Marine Mammal Commission

Annual Report to Congress

2007

Marine Mammal Commission
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INTRODUCTION

The passage of Marine Mammal Protection Act of 1972 was remarkable for its time. The Act reflects the values, desires, and commitment of the U.S. public to conserve marine mammals, and it remains a cornerstone of U.S. policy for protecting marine ecosystems. Title II of the Act created the Marine Mammal Commission as an independent agency with oversight and advisory responsibilities to promote the implementation of the Act's provisions and the achievement of its goal—to maintain the health and stability of marine ecosystems. The Commission considers it a privilege to work for the U.S. public to achieve that difficult but vital goal.

The Commission consists of three members, one of whom serves as Chairman. All three are nominated by the President and confirmed by the U.S. Senate. The Act requires that Commissioners be knowledgeable in marine ecology and resource management. The Commission is supported by a nine-member Committee of Scientific Advisors on Marine Mammals. Committee members are appointed by the Chairman with the concurrence of the other Commissioners and after consultation with the Chairman of the Council on Environmental Quality, the Secretary of the Smithsonian Institution, the Director of the National Science Foundation, and the Chairman of the National Academy of Sciences. The Marine Mammal Protection Act requires that committee members be scientists knowledgeable in marine ecology and marine mammal affairs. The work of the Commission is carried out primarily by its staff, located in Bethesda, Maryland.

The Marine Mammal Protection Act sets forth the Commission's duties as follows:

(1) undertake a review and study of the activities of the United States pursuant to existing laws and international conventions relating to marine mammals, including, but not limited to, the International Convention for the Regulation of Whaling, the Whaling Convention Act of 1949, the Interim Convention on the Conservation of North Pacific Fur Seals, and the Fur Seal Act of 1966;

(2) conduct a continuing review of the condition of the stocks of marine mammals, of methods for their protection and conservation, of humane means of taking marine mammals, of research programs conducted or proposed to be conducted under the authority of this Act, and of all applications for permits for scientific research, public display, or enhancing the survival or recovery of a species or stock;

(3) undertake or cause to be undertaken such other studies as it deems necessary or desirable in connection with its assigned duties as to the protection and conservation of marine mammals;

(4) recommend to the Secretary and to other federal officials such steps as it deems necessary or desirable for the protection and conservation of marine mammals;

(5) recommend to the Secretary of State appropriate policies regarding existing international arrangements for the protection and conservation of marine mammals and suggest appropriate international arrangements for the protection and conservation of marine mammals;

(6) recommend to the Secretary such revisions of the endangered species list and threatened

species list published pursuant to section 4(c)(1) of the Endangered Species Act of 1973 as may be appropriate with regard to marine mammals; and

(7) recommend to the Secretary, other appropriate federal officials, and Congress such additional measures as it deems necessary or desirable to further the policies of this Act, including provisions for the protection of the Indians, Eskimos, and Aleuts whose livelihood may be adversely affected by actions taken pursuant to this Act.

These duties are aimed at maintaining the status of marine mammals as functioning elements of healthy marine ecosystems. For any population, status is determined by survival and reproduction, which determine overall growth rate and which are, in turn, determined by such things as the health and condition of individual animals; their exposure to disease, contaminants, noise, and harmful algal blooms; the quantity and quality of their habitat for foraging, reproduction, and rest; the threats to them and their habitat; and the manner in which those threats are managed, minimized, or mitigated.

In that context, the year 2007 revealed historic and unsettling indicators of the status of marine mammals and marine ecosystems in a world of growing threats and competing priorities. Climate change, more than any other single risk factor, is revealing the global consequences of "economic growth and development untempered by adequate concern and conservation" (§ 2(a)(1) of the Endangered Species Act). The unanticipated, massive reduction in Arctic sea ice in 2007 reminded us of how little we understand the climate change phenomenon and how rapidly ecosystems can change into alternative forms with potentially irreversible consequences. The status of many Arctic marine mammals will change, although the nature and extent of that change is highly uncertain for most of them. Some may benefit from the expected changes, while others may decline severely, be extirpated throughout parts of their range, or become extinct. To compound matters, the beneficial effects of actions taken to address this phenomenon will not be fully realized for years or decades because of the inertia characteristic of the factors driving climate. Effective action will require a strongly proactive approach in the face of considerable uncertainty. In 2007 a Commission-sponsored project to predict the possible effects of climate change on marine mammals was nearing completion; the results will be published early in 2008 as a supplement to the journal *Ecological Applications*.

Climate change is not the only factor affecting marine mammal species at risk of extinction. In late 2006 an extensive survey failed to find a single Yangtze River dolphin, or baiji, the last species of the family Lipotidae. Factors contributing to the baiji's demise included direct and indirect fishery interactions, vessel strikes, pollution, and other forms of habitat degradation. The loss of this species should not have been a surprise. The signs of its pending extinction were evident for decades, and both the Chinese and the international conservation communities—indeed, all of us—simply failed to step forward and act. The baiji's preventable extinction occurred at our hands and on our watch.

In the past 60 years, the world has lost three marine mammal species (2.5 percent of modern marine mammal species). In 2007 a number of additional marine mammal species and stocks were at elevated risk from a variety of risk factors identified at an international consultation sponsored by the Commission (Reynolds et al. 2005). Those factors include direct and indirect fishery interactions, harmful algal blooms, contaminants, disease, anthropogenic noise, coastal development and habitat loss, and ship strikes. In 2007 the Commission was in the process of completing a report to Congress on "The Biological Viability of the Most Endangered Marine Mammals and the Cost-Effectiveness of Protection Programs" that will evaluate those threats and our effectiveness in addressing them. The report highlights nearly two dozen marine mammal taxa (i.e., species, subspecies, population stocks) in U.S. waters that are at risk of extinction, including one, the Caribbean monk seal, that formally will be declared extinct in 2008 and another, the AT1 pod of killer whales, that almost surely will be lost in the near future.

The Marine Mammal Protection Act provides a framework intended to prevent such events. Its implementation has been effective in some cases but not in others. To assess effectiveness, Taylor et al.

(2007) evaluated scientists' current ability to detect population declines of 50 percent over a 15-year period. They found that existing stock assessment efforts would not be sufficient for that purpose for 72 percent of large whales, 90 percent of beaked whales, 78 percent of dolphins and porpoises, 5 percent of pinnipeds that haul out on land, 100 percent of pinnipeds that haul out on ice, and 55 percent of polar bear and sea otter populations. Scientists will require substantially more resources and new research strategies to improve these percentages and document the changes that will undoubtedly occur in marine ecosystems and marine mammal status in the coming decades. And managers will be required to act decisively, even in the face of uncertainty.

Assessment and monitoring are only two aspects of conservation. Scientists monitored the demise of the baiji, but that information alone was not sufficient to bring about recovery. In the face of competing priorities, societies must be willing to invest in actions needed to ensure healthy marine ecosystems and marine mammal stocks, even in the absence of perfect information. Such a commitment is evident in the Marine Mammal Protection Act, the Endangered Species Act, the National Environmental Policy Act, and a suite of similar legislation passed in the 1960s and 1970s.

That commitment is now being tested. Whether our society will maintain its resolve in the face of various crises is not clear, as is evident from our ongoing equivocation regarding climate-related conservation actions. The equivocation results from conflicting values and priorities that may not only trump conservation but also contribute to its undoing. Crises emanating from our economy, use of energy, military defense activities, and various other domestic and international factors all demand attention and resources that might otherwise be used to mitigate climate change or enhance conservation efforts. Those crises may well persist and worsen in the foreseeable future as human populations continue to grow and the demand for resources increases both as a function of those numbers and as developing countries seek a higher standard of living. In 2007 the world's population increased by about 77 million people and by 2050 it is expected to reach about 9.4 billion, an increase of almost 3 billion beyond the curent level. The U.S. population is expected to increase from its current level of just over 300 million to about 420 million, with half of that growth (50 to 60 million) expected in coastal regions. Where will these people live, what resources will they require, what additional crises will they experience, what impacts will they have on marine ecosystems, and what will be lost through the course of this transition?

The information in this 2007 report to Congress describes some of the major issues in marine mammal conservation and the Marine Mammal Commission's activities in response to them. In 2007 the Commission held its annual meeting in Vancouver, Washington, to review marine mammal conservation and management issues along the West Coast (i.e., the coastal areas of Washington, Oregon, and California). There has been some good news in this region with regard to the status of some marine mammals. Most notably, pinniped and sea otter populations have recovered from extremely low numbers or are in the process of doing so. The eastern North Pacific gray whale population also has recovered. It is the only marine mammal species to have been officially removed from the list of threatened and endangered species thus far, but several other large whale species in this region also are exhibiting population growth.

Conservation and management of marine mammal populations in this region and the human activities affecting them will become more challenging in the foreseeable future. Human population projections indicate an increase of about 20 million (47 percent) for California, Oregon, and Washington combined between 2000 and 2025 and, again, much of that will be concentrated in coastal areas. During this period, a variety of factors will affect marine mammals including climate change, harmful algal blooms, human-generated sound, commercial shipping, fishery/marine mammal interactions, interactions between recovering and recovered pinniped populations and endangered and threatened salmonid stocks, and coastal development.

Chapter II of this report provides an overview of a subset of these issues, based in part on presentations and discussions at our annual meeting. The overview identifies both broad issues (e.g., climate change,

anthropogenic sound, harmful algal blooms) and species-specific concerns (e.g., California sea lion/salmonid interactions at Bonneville Dam, status of southern resident killer whales, proposed hunting of gray whales by the Makah Tribe). The overview is intended to give insight into the nature of these issues and concerns, the factors driving them, their implications for marine mammal and marine ecosystem conservation, and the federal, state, and private agencies and organizations attempting to address them. For example, climate change will affect California Current ecosystems causing increased climatic variability, altered patterns of coastal wind-driven upwelling, changes in precipitation patterns with increased rain and decreased snow, and ocean acidification. The use of the West Coast marine ecosystems for military purposes is generating considerable debate, especially when the activities introduce high volumes of sound into the ocean. Harmful algal blooms in this region have increased in frequency, distribution, and persistence and pose risks to a variety of organisms, including marine mammals and humans. And tensions are mounting over human/marine mammal/fisheries interactions, particularly at Bonneville Dam where California sea lions have learned to take advantage of obstacles (i.e., dams) that interrupt the migration of various salmonids, including some that are threatened or endangered.

Chapter III shifts to other species of concern in U.S. waters. Those species generally include taxa that are listed as endangered or threatened under the Endangered Species Act or designated as depleted under the Marine Mammal Protection Act. They are at high risk of extinction for any number of reasons, and efforts to conserve them often are controversial. Their fate will likely be determined by our willingness and ability to manage human activities that affect them directly or indirectly through changes to their habitat. Immediate issues for several stocks or species (e.g., Cook Inlet beluga whales, polar bear) pertain to whether they will be listed under the Endangered Species Act and thereby benefit from the additional protections provided by that Act. Hawaiian monk seals are declining at a rapid and steady rate following two decades of poor juvenile survival due to shark predation, entanglement in marine debris, and ecological factors that have yet to be clarified. The key question for them is whether we can develop the management tools necessary to address whatever threats persist or arise as the population continues to decline due to poor recruitment of young females into reproductive age classes. The fate of the North Atlantic right whale appears to hinge on whether the decision-makers at all levels impose the measures needed to reduce entanglement in fishing gear and ship strikes. The fate of the eastern North Pacific right whale population is highly uncertain and will depend on whether human-related threats are adequately addressed and whether the population is able to reproduce at a rate sufficient to bring about a long-term recovery. At present, the largest known human-related source of mortality for the Florida manatee is vessel strikes. However, the major future threat looming over this population is the loss of warm-water refuges, which are essential to the winter survival of much of the existing population. Finally, for Steller sea lions and sea otters, much remains to be done to determine the causes of their declines and implement more effective protection measures to address those causes that are human-related and therefore can be controlled.

Chapter IV discusses progress on special projects being undertaken by the Commission under congressional direction. In recent years, the Commission has reviewed the threats to marine mammals and the research needed to inform decision-making related to their management, the effects of anthropogenic sound on marine mammals, the biological viability of the most endangered marine mammals and the cost-effectiveness of recovery programs, and the ecological role of killer whales—a top-level predator in the marine environment. These special projects are generally aimed at key issues in marine mammal and marine ecosystem conservation and, in many respects, get at the heart of our national effort to ensure that our conservation efforts are successful. The main emphases of the Commission's report on the effects of anthropogenic sound included a call for a coordinated, interagency effort to conduct essential research, more consistent regulation of sound sources, and development of more effective monitoring and mitigation measures to determine and avoid adverse effects. The Commission's

report on marine mammal biological viability and the cost-effectiveness of recovery efforts will emphasize the need for a more coherent national strategy for directing and funding marine mammal research and recovery activities. The Commission's killer whale report is expected to highlight the fundamental lack of information on the species' ecological role and the types of research that are needed to address those shortcomings.

Chapter V describes the Commission's research and studies program. Annual funding for the Commission includes a small amount for research, which the Commission uses to investigate key aspects of marine mammal conservation. The Commission attempts to use this funding to support selected studies that may have a large impact on future research and management efforts. In many cases, the Commission's support serves as "seed" funding to encourage other agencies and organizations with greater resources to contribute to and pursue important research. The Commission also uses this funding to convene meetings and workshops to examine significant conservation matters. The Commission encourages publication and wide dissemination of the results of its research program to maximize the conservation utility of new knowledge and understanding. Examples of topics in need of further investigation include assessing and mitigating the cumulative effects of multiple risk factors on a species or habitat, developing assessment strategies for poorly known marine mammals (e.g., ice seals in the Arctic), and rescuing highly endangered species such as the vaquita from the brink of extinction.

Chapter VI reviews matters pertaining to marine mammal health and strandings. Animals stranded on beaches or in nearshore waters are often the focus of considerable public attention. Strandings generate concern about the well-being of individual animals, and they provide opportunities for responders and scientists to learn about the animals, the factors that caused them to strand, and the implications for their populations. Stranded animals also generate considerable debate about their handling and future disposition (i.e., can and should they be rehabilitated, will they be fit for release or require permanent holding in captivity, should they be on display or maintained with minimal human contact). Addressing all of these issues is a considerable challenge with multiple factors to be considered and multiple values among interested parties. During 2007 a total of 12 unusual mortality events occurred, including some that began in 2005 and 2006. Taken together, these events raise serious questions about the influence of a range of factors, such as harmful algal blooms, disease, chemical contamination, and the introduction of anthropogenic noise, on the health of the nation's coastal ecosystems.

Chapter VII describes efforts to address interactions between marine mammals and fisheries. This section provides a general overview of the framework established by the Marine Mammal Protection Act to address unacceptably high levels of direct interaction (i.e., where marine mammals are killed or seriously injured). Much of the description focuses on a series of take reduction teams convened to address specific interactions and their success in doing so. This section also provides a brief summary of the tuna/dolphin issue, which was among the three major concerns that led to the passage of the Marine Mammal Protection Act and remains an important concern because of the failure of affected populations to recover once reported mortality was reduced. This section also discusses the topic of indirect fisheries interactions (e.g., competition for prey, secondary ecological changes), which has been at the center of a number of controversies regarding the effects of fishing on marine ecosystems. The Act provides a well-structured framework for addressing direct fisheries interactions, but it does not provide a sufficient basis for addressing indirect effects of fishing (or other indirect effects), which may have a significant impact on the quality of marine mammal habitat. The most important question yet to be addressed is how much fish biomass can be removed without significantly altering the ecological characteristics of fished ecosystems and the biological communities they support.

Chapter VIII reviews both research and regulatory activities pertaining to the introduction of human-generated sound in the marine environment. The chapter begins by listing the recommendations of the Commission's 2007 report entitled "Marine Mammals and Noise: A Sound

Approach to Research and Management." It then describes major areas of research being conducted by agencies whose activities contribute to ocean noise, including the Navy, Minerals Management Service, National Science Foundation, and National Oceanic and Atmospheric Administration. The chapter then describes some of the regulatory activities pertaining to sound-generating activities, which were focused heavily on the development of various analyses of environmental effects, particularly by the Navy, and litigation over those analyses and proposed activities using low- and mid-frequency sonar. In 2007 the Minerals Management Service was faced with a marked increase in oil and gas activities due to the rising cost of energy. Much of the Service's focus in 2007 was in the Gulf of Mexico and along the Arctic coast, where exploration for oil and gas deposits has increased markedly. Offshore wind and wave projects also received more attention in 2007, as did systems for transporting oil and gas into and out of major ports. Finally, Chapter VIII briefly summarizes sound-related activities involving the National Science Foundation. The Foundation supports seismic research that introduces high levels of energy into the ocean to study the properties of the ocean bottom and the geophysical structure underneath.

Chapter IX gives a brief and selective overview of some of the key international aspects of marine mammal status, research, and management. This section describes the 2007 meeting of the International Whaling Commission and the passage of the U.S.-Russia polar bear agreement. It also highlights selected species and stocks of concern in foreign and international waters. The demise of the baiji is a clear indication that governments and conservation organizations must act swiftly and effectively if they are to save a number of other species and stocks on the verge of extinction. The vaquita, a small porpoise occurring only in the Gulf of California, may follow the baiji to extinction unless immediate and aggressive recovery actions are undertaken. An assessment of the status of marine mammals on a global basis would be useful for identifying those stocks and species most at risk and in need of protection and setting conservation priorities.

Chapter X describes matters pertaining to reauthorization of the Marine Mammal Protection Act. The Act was not reauthorized in 2007, but a number of bills were developed or introduced pertaining to the Act.

Chapter XI lists and briefly describes permits and authorizations issued for the take of marine mammals, either for research purposes or incidental to other activities. Appendix A lists recommendations made by the Marine Mammal Commission in 2007 and responses by the corresponding agencies. Appendix B lists reports emanating from the Commission or studies conducted with Commission funding.

The Commission submits its reports to Congress pursuant to section 204 of the Marine Mammal Protection Act of 1972. To ensure accuracy, federal and state agencies and knowledgeable individuals review report drafts, and the Commission gratefully acknowledges their efforts. The Commission also provides its reports to federal and state agencies, public interest groups, the academic community, private citizens, and the international community. This and similar reports for years beginning in 2000 are available on the Commission's Web site at www.mmc.gov/reports/annual.

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Chapter II

SPECIAL FOCUS: MARINE MAMMAL ISSUES ON THE U.S. WEST COAST

In 2007 the Marine Mammal Commission held its annual meeting in Vancouver, Washington, to consider marine mammal conservation issues on the U.S. West Coast. As is the case for other U.S. coastal regions, the West Coast faces a number of challenges in this regard. Some of these have been highly controversial because they involve human activities related to or deemed important for socioeconomic growth, energy, food, military defense, and recreation. Risk factors for marine mammals on the West Coast include many found in other regions of the country—direct and indirect fisheries interactions, disease, contaminants, harmful algal blooms, habitat loss, ship strikes, and long-term environmental change, including climate change (Reynolds et al. 2005). Although considerable progress has been made in addressing some of these factors, they can reasonably be expected to become more serious and contentious over time as the West Coast human population continues to grow. In 1972, when the Marine Mammal Protection Act was passed, the combined population of California, Oregon, and Washington was just over 23 million. The U.S. Census Bureau projects that the population will reach 60 million by 2030. About half of the population is expected to reside in coastal areas.

The task of managing human-related risk factors in the face of such growth will fall on a number of federal, state, local, and tribal authorities. Federal authorities with responsibilities related to marine mammals or otherwise involved in marine mammal management issues include the National Marine Fisheries Service, Fish and Wildlife Service, National Ocean Service, Navy, Minerals Management Service, Coast Guard, Park Service, Maritime Administration, and Army Corps of Engineers. Major federal laws directing such management include the Marine Mammal Protection Act, Endangered Species Act, National Environmental Policy Act, Coastal Zone Management Act, Magnuson-Stevens Fishery Conservation and Management Act, and Administrative Procedure Act. The states of California, Oregon, and Washington also have agencies working on marine mammal and marine ecosystem issues. The primary California agencies with responsibilities involving or affecting marine mammals include the California Coastal Commission, Coastal Conservancy, Department of Conservation, Fish and Game Commission, Department of Fish and Game, Ocean Protection Council, and Ocean Resources Management Program. The primary Oregon agencies include the Department of Fish and Wildlife and Pacific States Marine Fisheries Commission, and the primary Washington state agency is the Department of Fish and Wildlife.

The states also are making efforts to combine their resources, as reflected in a West Coast Governors' Agreement on Ocean Health, signed on 16 September 2006. The agreement highlights Washington's Puget Sound Partnership and Ocean Policy Working Group, Oregon's Ocean Policy Advisory Council, and California's Ocean Protection Council as forums where important ocean conservation issues are being discussed by government and tribal officials, managers, scientists, citizens, and other stakeholders. Based in large part on reports from the U.S. Commission on Ocean Policy and the Pew Oceans Commission, the agreement seeks to—

- ensure clean coastal waters and beaches,
- protect and restore healthy ocean and coastal habitats,

- promote the effective implementation of ecosystem-based management of our ocean and coastal resources,
- reduce adverse impacts of offshore development,
- increase ocean awareness and literacy among our citizens,
- expand ocean and coastal scientific information, research, and monitoring, and
- foster sustainable economic development throughout our diverse coastal communities.

The remainder of this chapter highlights several conservation challenges related to marine mammals and marine ecosystems along the U.S. West Coast. The descriptions are based largely on presentations and discussions at the Marine Mammal Commission's annual meeting in Vancouver, Washington, on 28–30 August 2007.

Harmful Algal Blooms (HABs)

The ocean's planktonic community includes many species of microscopic algae that produce toxins. Under certain conditions, these organisms multiply rapidly to high densities and form what are called "harmful algal blooms" (HABs). These events may be quite small, confined to a single small bay or river mouth, or may cover many thousands of square miles, affecting hundreds of miles of coastline. During such events, the toxins are accumulated in filter-feeding animals (such as zooplankton, mussels, clams, anchovies, and sardines), on sea grass stems, and in the intestinal tracts of fish, and are subsequently passed through the food web. Exposure to these toxins has resulted in human illness and die-offs of fish, marine mammals, and seabirds. HABs pose a health risk not only through ingestion of the toxins but also by contact through the respiratory tract, eyes, or open wounds. In addition to health risks, HABs may result in loss of opportunities for and revenues from commercial and recreational fishing and coastal recreation. These blooms also may damage vessel hull coatings, piers, and other structures. For all of these reasons, U.S. ocean policy and multiple federal agencies are focusing on means to predict and prevent HABs, as detailed in the recent interagency report entitled Oceans and Human Health (Sandifer et al. 2007).

Because of the growing national interest in these events, particularly on the U.S. West Coast, the Commission examined the issue in some depth at its 2007 annual meeting. The National Oceanic and Atmospheric Administration (NOAA) is the lead agency responsible for managing HABs, or the effects thereof, and a NOAA representative reviewed ongoing efforts by the agency and other federal and private partners to develop predictive models of the oceanic and climatic conditions that favor initiation and growth of HABs. Such models would provide a useful tool for forecasting, mitigating, or even preventing the harmful effects to marine life, human activities, and human health.

HABs appear to be increasing in frequency and severity on a global scale (Figure II-1). Although HABs occur for natural reasons, the recent increase may be related, at least in part, to increased nutrient runoff associated with agricultural practices and urbanization of coastal regions, growth in aquaculture, and climate change. Importantly, the human-related factors can be controlled with more rigorous, effective management in both coastal areas and upstream watersheds—that is, in inland areas where agriculture, urban and suburban development, and watershed management practices determine the characteristics of the effluent discharged into the oceans.

Harmful algal blooms are a well-documented cause of mortality and illness for marine mammals along all U.S. coasts (Gulland and Hall 2007). In recent years the neurotoxin domoic acid, which is produced by several species of diatoms of the genus *Pseudo-nitzschia*, probably killed the largest number of marine mammals. Periodic blooms of these diatoms along the coasts of California, Oregon, and Washington have killed or caused permanent non-recoverable neurological damage to thousands of seals, sea lions, and an undetermined, but probably smaller, number of common dolphins and humpback whales (see Chapter VI, Unusual Mortality Events). These animals become poisoned by consuming fish such as anchovy, sardines, and herring that feed either on toxic diatoms directly or on small filter-feeding zooplankton that are themselves able to tolerate the toxins. Clinical signs of

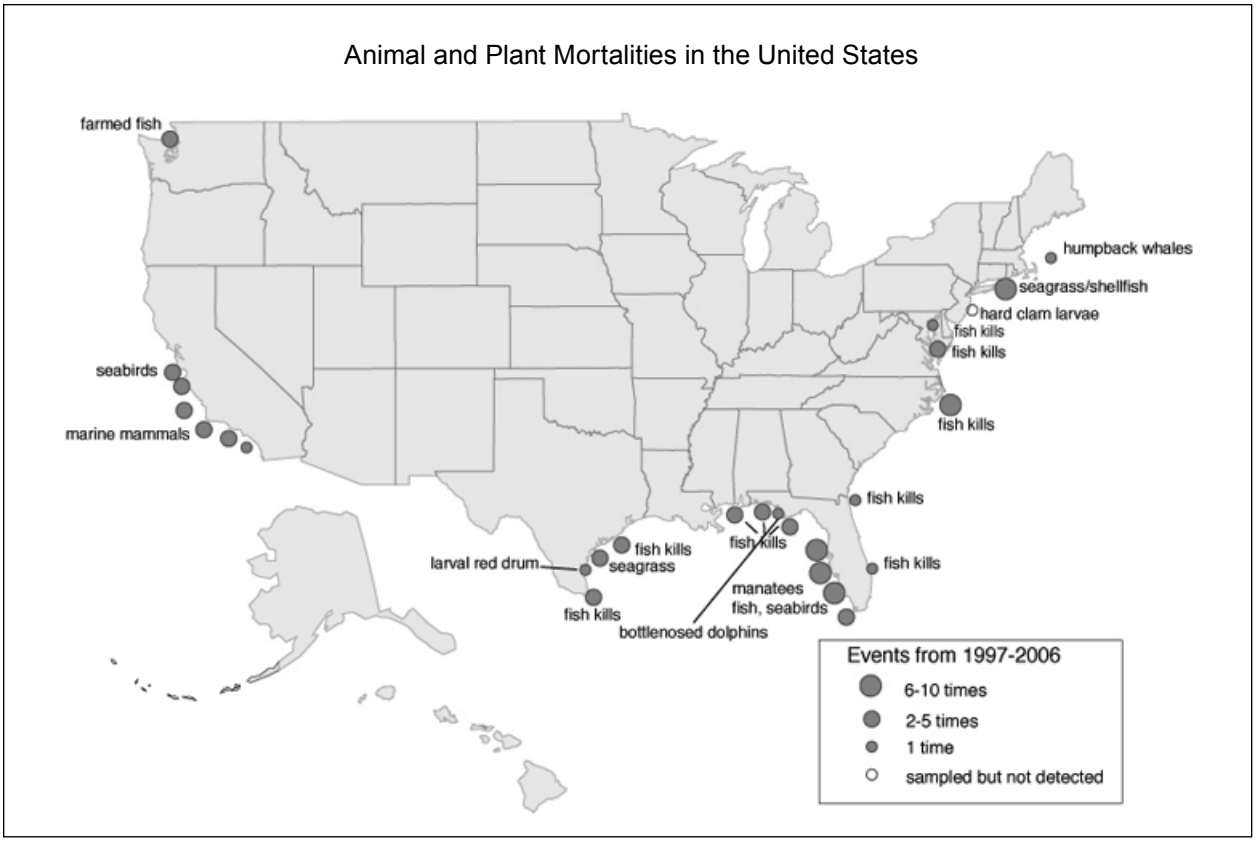

Figure II-1. Annual mortalities from harmful algal blooms within the United States, 1997–2006. Source: Woods Hole Oceanographic Institution; see www.whoi.edu/redtide.

toxicity include confusion, disorientation, memory loss, seizures, and permanent damage to specific regions of the brain, especially the hippocampus (Goldstein et al. 2008). The first documented case occurred in 1987 in Prince Edward Island, Canada, and involved humans who consumed contaminated shellfish. The condition was termed amnesic shellfish poisoning because the victims suffered memory loss, among other symptoms. Since that time, marine mammals poisoned by domoic acid have flooded the marine mammal rescue and rehabilitation facilities of the West Coast, straining the resources of these facilities as the animals undergo an often prolonged period of diagnosis and recovery. A significant fraction of the animals that survive fail to recover fully and must be euthanized or kept under permanent human care.

Another organism, the dinoflagellate *Karenia brevis*, is the primary source of the phenomenon commonly referred to as a "red tide." Although best known for its toxic effects on fish and, in aerosol form, as a respiratory threat to humans, *Karenia* also has been responsible for a number of large die-offs of marine mammals in the southeastern United States, including small cetaceans and especially manatees. Off the northeastern United States, blooms of *Alexandrium* spp. produce elevated levels of saxitoxin and have been suspected in a number of mortality events, including several involving large whales.

The National Marine Fisheries Service's Health and Stranding Response Program is responsible for overseeing responses to marine mammal illness and mortality stemming from HABs. The program's Web site (http://www.nmfs.noaa.gov/pr/health/) describes response strategies and results. Events leading to marine mammal illness and death are identified by the Working Group on Marine Mammal Unusual Mortality Events, which also provides guidance for the program as it investigates and responds to these events. Summaries of unusual mortality events in 2007, including those

related to HABs, are provided in Chapter VI of this report. The increasing frequency of these events indicates a deterioration of our coastal ecosystems that may lead to significant and perhaps irreversible changes.

Climate Change

In its 2006 annual report, the Marine Mammal Commission described a number of physical/chemical, biological/ecological, and secondary human-related effects of climate change on Arctic marine mammals and subsistence cultures. Physical/chemical changes include increased atmospheric temperatures, seasonal loss of ice, increased ocean pH, increased storm frequency and severity, increased freshwater runoff, sea level rise, coastal and insular inundation, alteration of water and nutrient cycles, and changes in atmospheric and oceanic circulation. Biological/ecological effects include changes in the rate, nature, and distribution of primary production; changes in the ecological food web secondary to changes in primary productivity; changes, and in many cases reductions, in availability of prey; loss of habitat for foraging, reproduction, and migration; increased exposure to new disease vectors; and decreased refuge from predators resulting from the loss of sea ice. Secondary human effects will result from increased human access to the Arctic and subsequent increases in commercial shipping, commercial fishing, extraction of oil and gas and various mineral resources, military activities, coastal development, and tourism.

Much of the concern regarding the potential effects of climate change has focused on the Arctic because of "arctic amplification"—the collective result of processes that accelerate climate-related changes in the Arctic relative to other regions of the earth (e.g., oceanic and atmospheric currents and redistribution of heat, reduced albedo effect). As noted in its 2006 annual report, the Commission has sponsored or is sponsoring a number of projects seeking to determine potential local effects of sea ice reduction, predict the potential consequences on Arctic marine mammals, and develop monitoring and conservation strategies for them (see Chapter IV). In 2007 attention was further drawn to the Arctic because of the vast reduction in the extent of ice coverage and multi-year ice. Compared to mean coverage from the late 1970s to 2006, ice extent in 2007 was reduced by about 40 percent. Multi-year ice also has declined significantly (University of Colorado at Boulder 2007), suggesting that the Arctic may reach an ice-free state even sooner than predicted, with potentially profound implications for a number of Arctic marine mammal species and stocks.

Although the effects may be exacerbated in polar regions, climate change will affect virtually all marine ecosystems. At its 2007 annual meeting, the Commission discussed the potential effects of climate change on the marine ecosystems off the U.S. West Coast. Climate models predict several significant changes in these ecosystems with important implications for marine mammals.

The first is ocean acidification, which results from increased absorption of atmospheric carbon dioxide. The carbon dioxide interacts with water to form carbonic acid (H_2CO_3), the acid separates into a free hydrogen ion (H^+) and a bicarbonate ion (HCO_3^-), and the free hydrogen ion combines with carbonate (CO_3^{2-}) to form more bicarbonate. The end result is a reduction in the amount of carbonate available to marine organisms that use it to form various hard structures (e.g., various plankton, coralline algae, and shellfish). These organisms are important prey for higher trophic level consumers including zooplankton and fish that are, in turn, prey for other consumers including marine mammals. Thus, acidification may have profound "bottom-up" effects beginning at the base of ocean food webs and cascading to higher trophic levels.

The full impact of ocean acidification on marine food webs along the U.S. West Coast will depend, in part, on the variability and dynamics of the California Current system and changes in surface ocean temperatures, stratification, mixing, and timing and extent of upwelling. Upwelling occurs along the U.S. West Coast as coastal winds drive surface waters offshore and are replaced by deeper, cooler, nutrient-rich waters. Under natural conditions, the influx of nutrients fuels primary production that, in turn, supports the food webs of these ecosystems. Because weather conditions become more variable with climate change (e.g., increasing storm frequency and severity), upwelling also may

become more variable, with potentially significant consequences for these ecosystems.

In addition, recent studies conducted by the Pacific Marine Environmental Laboratory (http://www.pmel.noaa.gov/co2/OA/) indicate that climate change and acidification may already be having significant ecological effects on these ecosystems. Laboratory scientists found that deep waters rising to the surface during upwelling events contained less calcium carbonate than expected, presumably from acidification over past decades. To the extent that carbonate becomes a limiting factor for production, then the influence of climate change on these ecosystems may be more severe than previously anticipated.

Climate change also is expected to alter precipitation patterns in the northwestern United States, with a shift toward more rain and less snow. Precipitation in the form of snow results in a delayed release of water into river systems and estuaries, corresponding with spring and summer salmon runs. Future winter and early spring rains will run off immediately, shifting the timing of freshwater flows with potential effects on salmon migration and spawning. The consequences may be particularly important for threatened and endangered salmon runs and marine mammal species that are highly dependent on the seasonal influx of salmon, such as the southern resident killer whale. (For additional information, see the report of an independent scientific advisory board convened by the Northwest Power and Conservation Council, Columbia River Basin Indian Tribes, and National Marine Fisheries Service, pp. 57–72 at http://www.nwcouncil.org/library/isab/isab2007-2.htm.)

Climate change also may affect the composition of biological communities in these ecosystems. Past El Niño–Southern Oscillation events have led to northward warm-water intrusions into the California Current, with marked declines in productivity and shifts in the distribution of the species composing those communities. If such events become more common with increased climate variability, the end result may be periods of decreased availability of certain prey types with significant consequences for marine mammals, as was observed in the early 1980s for pinnipeds off southern California (Trillmich and Ono 1991).

Finally, as has been the case with climate change in general, its effects in this region are likely to be replete with surprises. Virtually all ecological interactions (e.g., predator-prey interactions; the occurrence and significance of disease, parasites, and harmful algal blooms) may be altered by changes in the physical/chemical properties of these ecosystems. For marine mammals, the significance of such changes ultimately will be determined by their individual and collective influence on marine mammal survival and reproduction, the proximate determinants of population status.

Anthropogenic Sound

The potential effects of anthropogenic sound in the coastal waters of the U.S. West Coast have been a matter of considerable controversy in recent years. MacDonald et al. (2006) indicated that sound levels may be doubling each decade, at least in waters near the Channel Islands where historical records are sufficient to determine the trend over time. Their study focused on ambient noise levels that, absent a nearby high-frequency sound source, are largely a function of low-frequency sounds produced by natural (e.g., wind and wave turbulence) and anthropogenic (e.g., commercial shipping) sources. The measured increase in sound was attributed largely to the increase in commercial shipping, which introduces large amounts of low-frequency sound energy that travel long distances in the marine environment.

In the past decade, West Coast concerns regarding sound production have focused primarily on another sound source—the U.S. Navy's use of low-frequency active sonar for detecting and tracking submarines over relatively long distances (up to 200 miles) and mid-frequency active sonar used for the same purpose but over shorter distances and under varied environmental conditions. Although much of the controversy has been related to Navy activities off California, at least one recent event brought this issue to light in the coastal waters of Washington state. On 5 May 2003 the USS *Shoup* used its mid-frequency sonar in Puget Sound at a time approximately coincident with a number of harbor porpoise strandings and in relatively close proximity to a pod of killer whales. An analysis conducted by the Na-

tional Marine Fisheries Service did not find a connection between the harbor porpoise strandings (some of which occurred before the *Shoup*'s use of sonar) but did support the conclusion that sonar signals caused an abnormal behavioral response by the J pod of southern resident killer whales. The sonar exposure was not thought to have caused permanent or even temporary hearing loss but did cause the animals to behave erratically in an apparent attempt to move away from the sonar noise.

Since that incident, most of the controversy surrounding human-generated sound along the U.S. West Coast has pertained to Navy activities in its complex of testing and training ranges referred to collectively as the Southern California Operating Area. In October 2005 the Natural Resources Defense Council, the International Fund for Animal Welfare, the Cetacean Society International, the League for Coastal Protection, the Ocean Futures Society, and Jean-Michel Cousteau filed suit against the Navy for alleged violations of the National Environmental Policy Act, the Endangered Species Act, and the Marine Mammal Protection Act associated with naval exercises that use mid-frequency sonar in testing and training exercises. Plaintiffs contended that the Navy failed to (1) prepare adequate National Environmental Policy Act analyses for specific exercises, (2) informally or formally consult with the National Marine Fisheries Service with regard to impacts on endangered or threatened species, and (3) seek or obtain marine mammal incidental harassment authorizations or small-take permits as required by the Marine Mammal Protection Act. These matters had not been resolved at the end of 2007.

In February 2007 the Navy issued an environmental assessment for seven composite training unit exercises and seven joint task force exercises to be conducted in the Navy's Southern California Operating Area between February 2007 and January 2009. To comply with the Endangered Species Act, the Navy consulted with the National Marine Fisheries Service under section 7 of the Act regarding the potential effects of the exercises. To comply with the Coastal Zone Management Act, the Navy also submitted a consistency determination to the California Coastal Commission, indicating that the Navy believed that mid-frequency active sonar had no reasonably foreseeable effects on coastal uses or resources.

On 21 March 2007 the California Coastal Commission filed suit against the Navy because the Navy declined to implement certain precautions put forth by that Commission. Those precautions included seasonal restrictions to avoid gray whale migration, avoidance of areas of exceptional biological significance, larger safety zones around sound sources (out to 154 dB received sound level), use of trained observers, use of passive acoustic monitoring, lower sound levels in conditions of low visibility (e.g., nighttime, poor weather), 30-minute aerial surveys prior to operations, and reporting of unclassified results. On 22 March 2007 the Natural Resources Defense Council and co-plaintiffs filed a second lawsuit seeking a preliminary injunction on the exercises, alleging that the Navy had failed to meet requirements of the National Environmental Policy Act and the Coastal Zone Management Act. On 7 August the district court granted the injunction for the remaining 11 exercises that had not been conducted at that time. The Navy filed an emergency motion to stay the injunction pending an appeal, and on 31 August a three-judge panel granted the stay in part and remanded the matter back to the district court. The issues involved pertained largely to the question of whether the set of mitigation measures proposed by the Navy would provide sufficient protection for marine mammals and other marine life in the operation areas.

On 26 September 2007 the California Coastal Commission intervened in the case brought by the Natural Resources Defense Council and co-plaintiffs. The Coastal Commission argued that it had a direct interest in this matter, that the Navy's activities could directly affect coastal resources under its purview even if those activities occurred outside coastal areas, and that the Navy had not made a case for rejecting the mitigation measures put forward by the Coastal Commission.

On 8 November 2007 the Ninth Circuit Court of Appeals heard oral arguments on this case and, based on its assessment of the plaintiffs' likelihood of success on the merits of the case, they vacated the stay on the injunction, which then went into full effect. The case was ongoing at the end of 2007 and further litigation was expected.

Marine Mammal Health

The abundance, trend, and status of a closed marine mammal population (i.e., one without immigration or emigration) are determined by two demographic factors: survival and reproduction. The ability of animals within a population to survive and reproduce is determined, in turn, by a broad range of natural and human-related factors, including the availability of prey; the risk of predation and injury; access to essential habitat; prevalence of disease and parasites; and exposure to harmful algal blooms, pollution, and noise. The distinction between natural and human-related factors is becoming more obscure as the influence of human activities becomes more pervasive. Risk factors that do not kill an animal outright may affect its health and condition, as well as its ability to reproduce. Because such factors may affect the status of populations indirectly, they may serve as indicators of status or pending changes therein.

Physical perturbations to marine ecosystems along the West Coast of the United States may alter the incidence, composition, distribution, and intensity of a number of risk factors, including infectious diseases, contaminants, and biotoxins, with known or suspected negative impacts on marine mammal health. El Niño events are an example of such perturbations, and the evidence of their effects is found in records of marine mammal stranding events (Figure II-2). The warm temperatures associated with El Niño events can lead to changes in the distribution of prey species, impeding foraging and reproductive success of certain marine

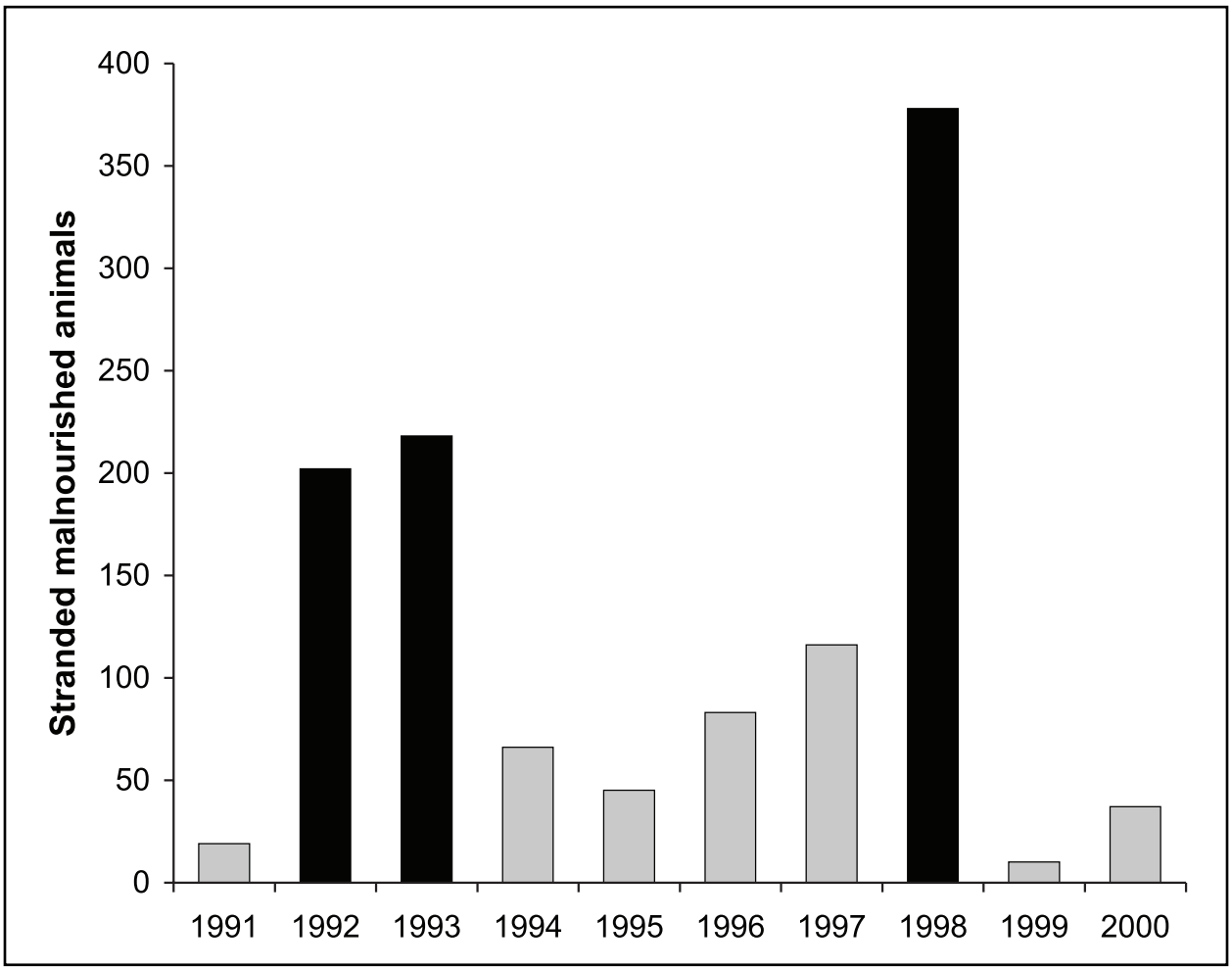

Figure II-2: Number of live strandings of malnourished California sea lions in central and northern California, 1991–2000 (Greig et al. 2005). Black columns indicate El Niño years.

mammals (Trillmich and Ono 1991). Warmer temperatures also may increase the exposure of marine mammals to new pathogens, leading to an increase in disease and parasitism. Increased water temperature also may foster the development of harmful algal blooms that in turn produce hazardous biotoxins, such as the neurotoxin domoic acid that has caused the deaths of California sea lions, common dolphins, and sea otters.

Growing urbanization along the West Coast has resulted in increased runoff of harmful substances, such as contaminants and terrestrial pathogens. High levels of contaminants may affect reproduction and immune response in marine mammals (e.g., Ross et al. 1995, 1996; O'Shea et al. 1999). Along the West Coast, high levels of PCBs (polychlorinated biphenyls) are associated with urogenital cancers in California sea lions: 18 percent of adult sea lions that strand dead exhibit these cancers (Ylitalo et al. 2005). Terrestrial runoff also has been implicated in the transmission of protozoan parasites (*Toxoplasma gondii*) that cause mortality of threatened southern sea otters (Conrad et al. 2005). Antibiotic-resistant pathogens that likely came from terrestrial sources have been found in northern elephant seals in California, although the impact of these pathogens on animal health is not clear (Stoddard et al. 2005). In addition to the introduction of hazardous substances, runoff of nutrients from agricultural fertilizers and other sources can lead to eutrophication and also may promote the development of harmful algal blooms (e.g., Gilbert et al. 2005).

The most obvious impact on marine mammal health is reflected by mortality events that often make headlines in regional and national news media. Outbreaks of the bacterial disease leptospirosis occur periodically in California sea lions, with peaks in mortality every three or four years (Gulland et al. 1996). Both domoic acid and leptospirosis mortality events of California sea lions along the West Coast occur with such frequency that they are no longer considered to be unusual by the Working Group on Marine Mammal Unusual Mortality Events (Gulland and Hall 2007). However, during 2007 four unusual mortality events were under way involving harbor porpoises in Washington, several species of cetaceans in California, Guadalupe fur seals in Oregon and Washington, and blue whales in southern California (see Chapter VI).

The ability to monitor the health status of marine mammals is limited along the West Coast and elsewhere by the quality and coverage of volunteer stranding networks. The effectiveness of such networks generally reflects the level of funding available as well as the expertise and initiative of the network members. Even in areas with good coverage by a stranding network, the data collected are by definition opportunistic in nature, which limits their usefulness in determining prevalence of disease or impacts on reproduction or survival of marine mammals. Standardization of sampling protocols and monitoring efforts is needed to improve the quality and usefulness of such data. In particular, the utility of the data could be improved by better cooperation between stranding networks and agencies and organizations that use the data to study or respond to factors affecting marine mammal health. To detect disease outbreaks or other events early enough to enable an effective veterinary (prevention or treatment) or research response, the data from stranding networks must be available in near-real time.

To promote better cooperation on the West Coast and other regions of the country, the Marine Mammal Commission wrote to the National Marine Fisheries Service on 30 November 2007 to recommend that the Service incorporate health-related information in marine mammal stock assessments and bolster regional efforts to address health issues by establishing a marine mammal health coordinator in each of the Service's regions. The Commission suggested that a regional marine mammal health coordinator could act as an on-site expert and liaison among regional health, stranding, and stock assessment groups. As a liaison, he or she could facilitate collection, archiving, and analysis of samples, assimilation and dissemination of laboratory results, and completion of health-related reports. Considerable progress along these lines will be necessary to assess the health of marine mammals and the human-related factors that may be affecting them and their habitat. Doing so is essential to conserve marine mammals and the ecosystems on which they depend. At the end of 2007 the Service had not yet responded to the Commission's recommendation.

Growing Pinniped Interactions Along the U.S. West Coast

Since the passage of the Marine Mammal Protection Act in 1972, certain seal and sea lion populations have experienced considerable recovery along the U.S. West Coast. Although that recovery represents a significant achievement in the restoration of West Coast ecosystems, it also means that seals and sea lions are more likely to interact with a steadily growing human population in the same region. The impact of such interactions on humans includes damage to recreational and commercial fishing gear, loss of catch, damage and losses to aquaculture facilities, risks of disease from animal waste, lost or reduced access to certain beach areas, risks of injury to people and pets, and even highway traffic accidents. The impact on seals and sea lions includes loss of historical food resources and habitat; risk of disease transmission from human, pet, and livestock vectors; and direct interactions that include legal and illegal harassment and shooting. These sorts of interactions are often attributed to "growing pinniped populations." However, that description may be misleading inasmuch as those interactions also may reflect a growing human population (together California, Oregon, and Washington grew by 18 million people between 1970 and 2000, an increase of about 75 percent; Hobbs and Stoops 2002) and decreased avoidance of humans by pinnipeds as a result of increased protection.

At its 2007 meeting in Vancouver, Washington, the Commission focused in part on several areas where marine mammal–human interactions have become significant local or regional issues. Here, we provide a brief overview of interactions involving California sea lions, northern elephant seals, harbor seals, Steller sea lions, northern fur seals, and Guadalupe fur seals. Pinniped interactions with fisheries are numerous and complex, have been described in detail in previous annual reports, and are described on a stock-by-stock basis in the annual stock assessment reports produced by the National Marine Fisheries Service (http://www.nmfs.noaa.gov/pr/sars/). Interactions between California sea lions and threatened and endangered salmon stocks passing Bonneville Dam have been one of the most contentious issues in the region and are discussed in greater detail in the following section on species-specific issues.

California Sea Lions

California sea lions were greatly reduced by commercial hunting and by unregulated shooting or bounty hunting in response to perceived conflicts with fisheries until they represented a small fraction of their original numbers. They were protected from commercial exploitation in Mexico before they were protected in the United States; by 1972 most of the California sea lion population of about 10,000 individuals bred in Mexican waters. Males typically migrate north along the coast as far as British Columbia during the non-summer months but were only seen in small numbers along the U.S. coast until the late 1970s. Following passage of the Marine Mammal Protection Act, breeding sites in the California Channel Islands grew rapidly and this region now accounts for most pup production today; little breeding occurs north of that region. The large numbers encountered between northern California and British Columbia during the non-summer months are almost all males of various ages, while the females tend to remain near the core of the breeding range from central California southward. The current total U.S. and Mexican population of the species is estimated to be about 237,000 to 244,000 (Caretta et al. 2007) with about 31,000 of that total residing in the Gulf of California (Szteren et al. 2006).

California sea lions compete with humans for several resources, including fish and coastal habitat. The human–sea lion situation at Pier 39 in San Francisco may be the best known example of this publicly visible increase in interactions. In the early 1990s, sea lions occupied a marina adjacent to a large shopping development in downtown San Francisco. The resulting conflict was resolved by turning the marina into a tourist attraction (http://www.pier39.com/Attractions/). In Monterey several small vessels and dock facilities have been sunk by the weight of basking sea lions, and access to vessels and boat ramps has been difficult at peak migration times with an estimated economic impact to the city in excess of a million dollars (see www

.monterey.org/harbor/sealions.html). Those losses are countered by revenues generated by tourism to view the seals in the area. Other harbors along the coast have had similar, if less extreme, cases of damage from the animals and their waste.

Northern Elephant Seals

Northern elephant seals constitute one of the more dramatic stories of marine mammal recovery. Before human development along the West Coast, elephant seals primarily inhabited islands off the California coast, their distribution limited by large predators such as grizzly bears and mountain lions. Hunting by humans in the nineteenth century reduced those predators but also reduced elephant seals to a remnant population, likely numbering fewer than 100 individuals. Commercial hunting ended in the early twentieth century, and the population began to recover. Since then the seals have made a remarkable comeback, and the population now numbers about 125,000 individuals (Caretta et al. 2007). Elephant seals have recolonized previous haul-out sites and colonized several coastal sites in California where large predators no longer pose a threat to them.

Unlike harbor seals and California sea lions, elephant seals migrate to deep waters far offshore and are rarely seen on the coast and in nearshore waters. They occur on shore during the winter breeding season and again during the molting period in late spring and early summer. The mainland sites colonized by elephant seals are on public lands with relatively little historical use. At certain sites, human access must be controlled for the safety of both seals and humans (http://www.nmfs.noaa.gov/pr/sars/). One recently established colony at Piedras Blancas, California, is adjacent to a heavily used state highway where a number of traffic accidents and delays have occurred in association with the seals, including one collision that killed a seal (Hatfield and Rathbun 1999, Saillant 2008). As pinniped populations around the world recover from past reductions and human populations continue to grow, interactions between pinnipeds and vehicles are likely to increase (Boren et al. 2008) although the increase is likely to be limited to small local areas where seals haul out to rest and reproduce.

Harbor Seals

Before 1972 harbor seals from California to Washington were considered a nuisance to fisheries and were the subject of bounty hunting that likely limited their numbers to fewer than 5,000 individuals. Their abundance has now increased about sevenfold to around 37,000 individuals (Caretta et al. 2007).

Harbor seals have been involved in fishery conflicts and interactions with aquaculture facilities on both coasts but not to the extent observed with the more gregarious and aggressive California sea lions on the West Coast. One of the more highly publicized interactions between harbor seals and humans on the West Coast has been the colonization by this otherwise easily disturbed species of a popular La Jolla, California, swimming beach known as Children's Pool. In the mid-1990s both humans and seals used the small sandy cove with only occasional harassment of seals by curious onlookers or dogs. However, the risk of disease and potential injury of people, pets, and seals led to a complete exclusion of people from the beach. The debate over access to the beach continues today (www.mmc.gov/reports/workshop/pdf/lecky.pdf) and may be indicative of conflicts to come as competition for coastal areas increases.

Steller Sea Lions

Not all pinnipeds along the West Coast regularly interact with human activities. Steller sea lions are most abundant in Alaska but breed as far south as central California. The eastern stock (central California through southeastern Alaska) has been recovering from decades of shooting and bounty hunting and now numbers about 45,000 to 50,000 (Caretta et al. 2007). The western stock has declined by about 80 percent in recent years and now numbers about 40,000 (Caretta et al. 2007). Male Steller sea lions from California, Oregon, and Washington tend to migrate north along the coast in the fall and winter, ranging up through British Columbia and southeastern Alaska. They are less tolerant of humans and are rarely involved in human interactions.

Northern Fur Seals

Northern fur seals also tend to avoid interacting with human activities, largely because they remain

well offshore to feed in deep waters. Like Steller sea lions, northern fur seals have experienced an overall decline since the 1970s. In U.S. waters, their largest colonies occur on the Pribilof Islands in the southeastern Bering Sea, but each winter these animals migrate southeastward to the North American coast as far south as the U.S.-Mexican border. On the Pribilofs, fur seals were taken in a commercial harvest until 1984. In addition to an annual harvest of juvenile males, about 316,000 females were harvested between the late 1950s and early 1970s under the pretext of improving reproduction and survival of young males for the harvest; they were also considered competitors for fisheries (York 1987). The population was expected to rebound when the female harvest was discontinued, but instead it began a period of decline from about 1.25 million animals in 1974 to about 722,000 at present (Caretta et al. 2007). In the 1950s and 1960s small numbers of fur seals colonized San Miguel Island off southern California, and since 1972 that population has grown exponentially to just under 10,000 individuals (Caretta et al. 2007). Like elephant seals, northern fur seals feed in the open ocean and are rarely seen in nearshore waters. Along the West Coast, they are rarely involved in human interactions although individual animals do strand each year as a result of entanglement in marine debris.

Guadalupe Fur Seals

Estimates of the number of Guadalupe fur seals prior to their exploitation range from 20,000 to 100,000 animals. The intensive fur trade in the nineteenth century reduced the population to extremely low numbers, with probably fewer than 100 individuals remaining in remote sea caves on the windward side of Guadalupe Island in Mexico. The species was thought to be extinct from the 1920s until the late 1940s, when a single male was sighted in the Channel Islands off southern California (Bartholomew 1950). Since then, numbers increased slowly during the 1950s and 1960s and more rapidly in the 1980s and 1990s to current levels of about 7,000 individuals (Caretta et al. 2007). They also are rarely involved in interactions with human activities along the West Coast. Again, as with northern fur seals, some entanglements occur each year and can result in strandings.

Marine Mammal Stock Assessments

The Marine Mammal Protection Act provides a framework for addressing the various risk factors and interactions described in previous sections of this chapter. The framework depends heavily on information regarding the various marine mammal stocks and human-related factors affecting them, especially fisheries. Stock assessment efforts have been highly successful for some stocks and unsuccessful or not undertaken for others. Some stocks are difficult to assess because of their distribution, natural history, behavior, and abundance. Others are not given high priority because they do not interact with human activities or the interactions are indirect, subtle, or difficult to observe. With the passage of the Marine Mammal Protection Act and a suite of related legislation, the major threats to marine mammals have shifted from intentional killing to unintentional killing or injury incidental to human activities (e.g., bycatch in fisheries, ship strikes, pollution, underwater sound, and marine debris) and indirect impacts such as destruction of habitat, competition with fisheries, and alteration of otherwise natural stressors (e.g., changes in the frequency and intensity of harmful algal blooms or disease outbreaks). At its 2007 annual meeting the Marine Mammal Commission considered stock assessment challenges along the West Coast and focused on inadequate assessments, management of transboundary stocks, and management of rare stocks.

The Adequacy of Stock Assessment Efforts

The underlying premise for stock assessment is that the information gained will be sufficient to detect changes that occur in a stock as a result of human activities and thereby provide a basis for management of those activities to prevent or mitigate significant adverse effects. Such an approach assumes, however, that changes in stock status can be correctly attributed to their causes. The 2007 assessment reports for stocks under the jurisdiction of the National Marine Fisheries Service describe the known status of 37 stocks in the eastern North Pacific or along the coasts of Washington, Oregon, and California. Abundance estimates are not available for 3 stocks, coefficients of variation (a measure of precision) are not available for 9 stocks, and

coefficients of variation are greater than 0.3 (one of the standards used to judge the adequacy of abundance estimates) for 18 (64 percent) of the remaining 28 stocks. As noted earlier in this report, a recent analysis by Taylor et al. (2007) revealed that current stock assessment methods and efforts are not sufficient to detect a decline of 50 percent in 15 years for most whales, dolphins, and porpoises or for any pinnipeds that haul out on sea ice. Given this finding, an important question is whether existing stock assessment methods, which clearly are not adequate, simply require more resources and support or alternative assessment methods. The status quo is not sufficient to accomplish the objective of the Marine Mammal Protection Act to maintain the health and stability of marine ecosystems, which it does, in part, by maintaining marine mammal stocks as functioning components of those ecosystems.

Transboundary Stocks

Transboundary stocks occur in waters of multiple nations and, in some cases, international waters. They are difficult to assess because their assessment requires coordination among the involved nations. In 2005 the National Marine Fisheries Service published revised guidelines for assessing marine mammal stocks, which suggested that assessment and management decisions for any transboundary migratory stock should be based on the portion of time the stock is in U.S. waters and for any transboundary non-migratory stock on the portion of the stock in U.S. waters. For the purpose of fisheries management, this approach is intended to distribute the burden of bycatch reduction proportionally among fisheries operating inside and outside U.S. waters. However, if bycatch outside U.S. waters is not regulated in a commensurate manner by a foreign government or international agreement, then the affected stock may not be adequately protected and the total bycatch may not be sustainable.

Several West Coast dolphin stocks shift their distribution across boundaries in response to oceanographic conditions (Figure II-3). To address this problem, the Service currently uses multiyear averages of bycatch and abundance estimates when making management decisions regarding the stock, although these averages can be quite variable depending on which years are averaged. The relationship between bycatch and abundance of these dolphin stocks cannot be determined on a yearly basis because surveys are not conducted every year and fishery observer programs are not implemented each year for all fisheries that are known to take the dol-

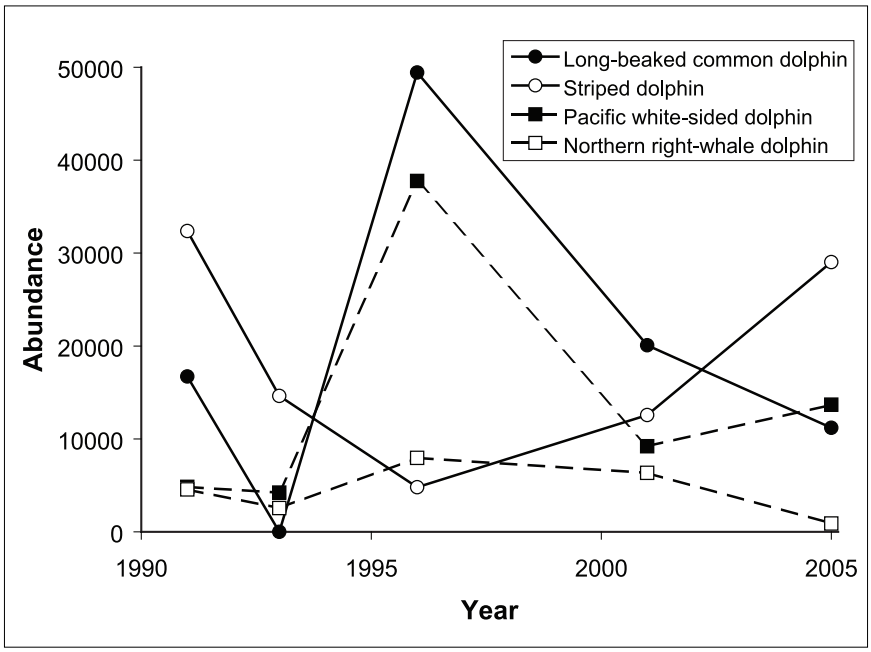

Figure II-3. Estimated abundances of several transboundary delphinid stocks in the U.S. waters off the coast of California (Barlow and Forney 2007). Much of the inter-annual variation can be attributed to the stocks moving in and out of the survey region, including movements southward into Mexican waters, westward into international waters, or northward into U.S. waters off Oregon and Washington. The most variable stock estimates, for the long-beaked common dolphin, probably result because this animal is rarely sighted on surveys (between 0 and 6 sightings per survey), and imprecision in estimates adds to the appearance of great inter-annual variation. The surveys used to collect the information on these species provide more useful information for other stocks. The results presented here illustrate the difficulty of assessing transboundary stocks.

phins. The existing approach might be enhanced by determining the ecological factors that control the distribution of these dolphin stocks and using that knowledge, combined with current oceanographic data and information on total dolphin abundance, to predict the number of dolphins in U.S. waters each year. Such information could be compared to observed bycatch rates and used to design better surveys for specific species rather than broadscale multispecies surveys. This kind of approach would clearly require extensive data on oceanic conditions and will be challenging from a modeling perspective. Nonetheless, Service staff indicated at the Commission's annual meeting that such ecological modeling was under way for some species.

Rare Stocks

Stocks that are rare or are rarely observed during surveys pose another assessment problem. For example, short-finned pilot whales have been observed only once (a group of seven whales) in the past two surveys of the West Coast Exclusive Economic Zone (2001 and 2005 [Figure II-4]). The lack of sightings presumably indicates that the stock's abundance is low or only a small portion of it inhabits U.S. waters. In contrast, most species of beaked whales are rarely observed on surveys, but this lack of sightings presumably reflects the difficulty of sighting them because of their cryptic behavior and limited time at the surface. In both of these examples, the rarity of sightings results in low and imprecise abundance estimates and correspondingly low estimates of the involved stock's potential biological removal level. Whether the estimates are accurate is difficult to determine. Management of such species is further complicated because observer coverage is often low for fisheries that might take them. In such cases, the possibility of both types of management error is large (i.e., assuming that take is either tolerably low or intolerably high when the opposite is true). A power analysis of observer programs and their ability to accurately characterize take levels would be useful. Such an analysis might well be as revealing as the

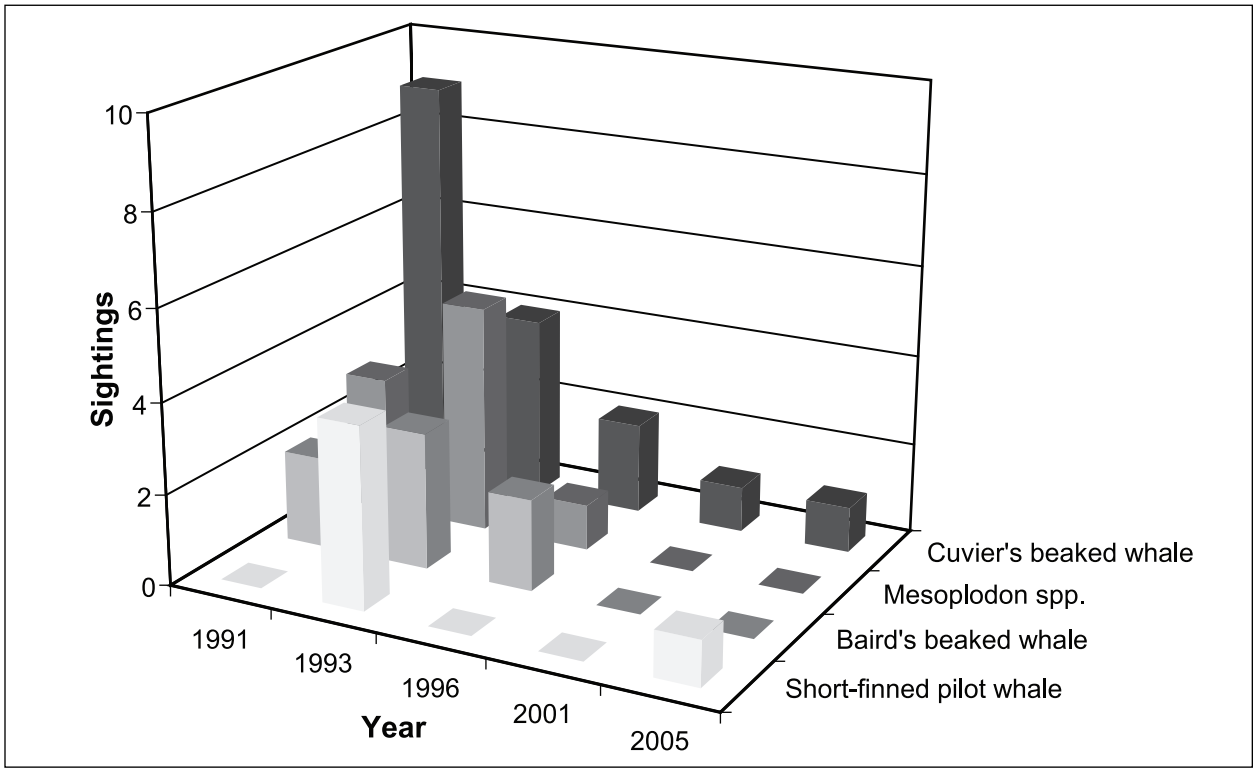

Figure II-4. Number of sightings of individuals or groups of rare or infrequently sighted stocks in U.S. waters off California (Barlow and Forney 2007). The rarity of sightings for these stocks results in substantial inter-annual variation in abundance estimates, particularly between years with and without sightings. The imprecision confounds efforts to determine trends.

power analysis conducted by Taylor et al. (2007) on the efficacy of stock assessment efforts for detecting marine mammal declines.

The shortcomings of current stock assessment efforts, which this discussion has only touched on, raise serious concerns as to whether the responsible agencies can manage a number of stocks effectively and mitigate threats to their persistence. At the end of 2007 the National Marine Fisheries Service was planning a joint meeting of its regional scientific review groups in January 2008, at which many of these issues would be discussed. The solution to these problems is likely to require some combination of increased stock assessment effort (i.e., more resources) and development of new indicators of stock status, perhaps involving new technology and methods. In the absence of adequate stock assessment information, management decisions regarding human activities that could place marine mammals at risk must explicitly consider such sources of uncertainty and infuse a corresponding level of caution into decision-making.

Pinniped–Salmonid Interactions at Bonneville Dam

Since passage of the Marine Mammal Protection Act, reports of seal and sea lion interactions with commercial fisheries and protected stocks of salmon have increased along with the increase in certain seal and sea lion stocks on the U.S. West Coast. To address concerns about predation on depleted salmonid stocks, Congress added section 120 to the Marine Mammal Protection Act in 1994. Section 120 allows states to apply to the Secretary of Commerce to obtain authority for lethal taking of individually identifiable pinnipeds that are having a significant negative impact on the decline or recovery of salmonid fishery stocks. These fish stocks must either be (1) listed under the Endangered Species Act (ESA), (2) approaching threatened or endangered status, or (3) migrating through the Ballard Locks at Seattle, Washington. Section 120 requires review of a state's application and, if the application contains sufficient information, establishment of a Pinniped–Fishery Interaction Task Force. The task force evaluates the situation, determines whether the pinnipeds are having a significant negative impact on the decline or recovery of the particular fish stocks, and makes recommendations on research and management needs.

Between 1994 and 2005 only one application for lethal taking was submitted to the National Marine Fisheries Service. In July 1994 the state of Washington sought authorization for intentional lethal taking of certain California sea lions preying on wild stocks of steelhead trout migrating through the Ballard Locks in Seattle. The Service granted Washington's Department of Fish and Wildlife authority to use lethal methods to remove nuisance pinnipeds early in 1995. The Service recommended, among other things, that (1) Washington attempt first to remove the pinnipeds using non-lethal methods, (2) lethal removal be used only if predation exceeded 10 percent of the available steelhead trout run in any consecutive seven-day period, and (3) captured sea lions be euthanized humanely. The state of Washington never invoked the authority granted for lethal taking but rather captured, marked, and transported the problem sea lions, either releasing them into the wild in a different location or placing them in permanent captivity. Sea lion predation is no longer a signficant issue at the Ballard Locks, but the Lake Washington steelhead is on the verge of extinction.

Application from Washington, Oregon, and Idaho

In December 2006 the National Marine Fisheries Service received its second application under section 120 of the Act when the Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, and Idaho Department of Fish and Game submitted an application for the intentional lethal removal of California sea lions from the Columbia River. The states contended that predation by California sea lions on eight different Pacific salmon and steelhead stocks listed as threatened or endangered under the Endangered Species Act was having a significant impact on the stocks' recovery.

In recent years, increased numbers of pinnipeds have been observed at Bonneville Dam, where some individual animals have learned to take advantage of the artificial situation and prey on spring runs of adult salmonids as they are slowed by the dam before passing through fish ladders. In 1997

the Oregon Department of Fish and Wildlife, with support from the National Marine Fisheries Service and the state of Washington, began capturing and marking California sea lions near the mouth of the Columbia River at Astoria. In spring months from 2002 to 2007, the Army Corps of Engineers' Fisheries Field Unit has assessed the presence and abundance of pinnipeds in the Bonneville Dam tailrace, including observations of pinnipeds consuming salmon.

In 2004 the Service, the Corps of Engineers, the Washington Department of Fish and Wildlife, the Oregon Department of Fish and Wildlife, and the Columbia River Inter-Tribal Fish Commission met to discuss non-lethal actions to stop pinniped predation on salmonids at Bonneville Dam. The four state and federal agencies decided to test the effectiveness of existing non-lethal methods for excluding sea lions from the fish passage facility and deterring them from entering the tailrace at Bonneville Dam. Preliminary efforts were made in 2005 and more extensive hazing programs were attempted in 2006. Based on that experience, the states concluded that non-lethal hazing carried out in the vicinity of Bonneville Dam had limited success at reducing California sea lion numbers or their predation rates and that foraging by sea lions was having "a significant negative impact on the decline or recovery" of Columbia River salmonid stocks.

On 5 December 2006 the states of Washington, Oregon, and Idaho submitted an application to the National Marine Fisheries Service seeking authorization for lethal taking of California sea lions at Bonneville Dam and urging the Service to form a task force to consider that request. The states sought authority to (1) lethally remove up to 1 percent of the potential biological removal level for California sea lions (about 85 animals per year) between 1 January and 30 June for an unspecified number of years; (2) remove any California sea lion seen above navigation marker 85, which is about five miles downstream from Bonneville Dam; and (3) remove individually marked sea lions known to have fed on salmon at Bonneville Dam whenever and wherever they occur.

The Service published a notice in the *Federal Register* on 30 January 2007 announcing receipt of the application and finding that the application had presented sufficient evidence to warrant establishing a pinniped–fishery interaction task force. The Service requested comments on the application, solicited additional information concerning the presence and behavior of California sea lions in the vicinity of Bonneville Dam and elsewhere in the Columbia River, and sought recommendations for possible members of the task force.

Commission Comments on the States' Application

On 2 April 2007 the Commission provided comments in response to the Service's *Federal Register* notice. The Commission underscored that the primary objective of the Marine Mammal Protection Act is to maintain the health and stability of the marine ecosystem and that actions to recover and conserve endangered and threatened salmonid stocks are essential to meeting that objective. The Commission noted that the Columbia River ecosystem is sufficiently disrupted that the removal of some sea lions may be necessary to achieve the conservation of the affected salmonid stocks. The Commission emphasized that, if the conflict comes down to a choice between the conservation of endangered and threatened salmonids or the removal of individual sea lions from healthy stocks that are contributing significantly to the problem, the Marine Mammal Protection Act directs that the conservation of the salmonid stocks takes precedence.

The Commission cautioned, however, that lethal taking authority should be issued only after a rigorous review to ascertain whether the Marine Mammal Protection Act's requirements have been fully met, including the establishment of safeguards to minimize the risk of killing animals unnecessarily. In particular, the Commission recommended that the pinniped–fishery interaction task force provide a detailed explanation to support any finding that sea lion predation is having a significant negative impact on salmonid stocks in the Columbia River. That explanation should, among other things, consider the impact of sea lion predation in the context of the overall threats faced by endangered and threatened salmonids and explain the basis for selecting a measure of significance that differs from that used at Ballard Locks, the only other situation in which section 120 has been invoked. The

Commission also advised the task force to review all available information on the presence of the various salmonid stocks in the Columbia River and their temporal overlap with the occurrence of sea lions to try to differentiate between predation on those salmonid stocks listed under the Endangered Species Act and those that are not, and predation on wild run versus hatchery-raised fish.

The Commission expressed concern about whether the states' proposal to target all California sea lions occurring above navigation marker 85 was consistent with the statutory requirement that only "individually identifiable pinnipeds" be subject to lethal removal and whether allowing the removal of animals in other locations and at other times of the year was consistent with section 120. The Commission therefore recommended that the task force be asked to describe more specifically the animals that could be taken and to draw a closer connection between those animals and the predation of listed salmonids in the vicinity of Bonneville Dam.

The Commission also recommended that the task force be asked to review the justification for the number of removals being sought by the states. The Commission noted that 1 percent of the potential biological removal level for California sea lions approximated the estimated number of individuals observed at the dam each year. It was not clear to the Commission, however, that all of these animals should be targeted for removal regardless of the amount of time they spend in the area or the contribution they make to the predation problem. The Commission suggested that, to the extent that such information is available, the task force should look at the predation history of specific individual animals as well as more general patterns of sea lion presence and behavior near the dam.

Consistent with the requirements of the Marine Mammal Protection Act, the Commission also recommended that the task force assess the feasibility of employing non-lethal alternatives to solve the predation problem. The Commission noted, for example, that, because of the relatively small number of sea lions eating steelhead at Ballard Locks, it was possible to capture and maintain all of the "problem animals" in captivity as an alternative to lethal removal. Whether it would be feasible to temporarily or permanently hold sea lions feeding on salmonids at Bonneville Dam would depend largely on the number of sea lions to be removed. A report referenced in the states' application (Stansell 2004) indicated that a few animals account for the majority of the salmonid predation at Bonneville Dam, which suggests that it might be possible to alleviate the problem by removing only those sea lions that eat the most fish.

Task Force Recommendations

The Pinniped–Fishery Interaction Task Force subsequently named by the Service met three times in Portland, Oregon, to review the application from Washington, Oregon, and Idaho; to develop additional information; and to formulate recommendations for consideration by the National Marine Fisheries Service. Meetings were held on 4–5 September, 9–10 October, and 30–31 October 2007. The meetings were attended by the chairman of the Commission's Committee of Scientific Advisors on Marine Mammals, who served as a member of the task force, and by a member of the Commission staff, who attended as an observer. Documents and presentations from the task force meetings, as well as agendas and meeting notes, are available at http://www.mediate.com/dsconsulting/pg17.cfm. The task force provided its recommendations in a report transmitted to the Service on 5 November 2007. The report and related documents are available on the Service's Web site at http://www.nwr.noaa.gov/Marine-Mammals/Seals-and-Sea-Lions/Sec-120-TF-Rpt.cfm.

The majority of the task force thought that California sea lions are having a significant negative impact on the recovery of threatened and endangered salmonids in the Columbia Basin, although the task force was unable to specify a quantifiable measure of significance. Consistent with this finding, the majority recommended that the Service authorize lethal removals of sea lions, outlining two alternative proposals. Under the first option, which was preferred by 10 of the 18 task force members, lethal removal would be authorized for three years and continue thereafter only if the rolling three-year average of predation of salmon by sea lions exceeds 1 percent of the run size between 1 January and 31 May. Identifiable sea lions (those that have been branded or tagged or that have other

identifiable marks) could be removed if they were seen catching a salmon in the area below Bonneville Dam or if they were seen in that area and are on a list of sea lions with a history of eating salmon in the vicinity of the dam. In addition, any sea lion that entered a fish ladder, was seen within 50 feet of a fish ladder, or was observed eating a salmon in the area below the dam would be subject to immediate removal. Also, any sea lion observed in the area above navigation marker 85 for a total of seven days or in three different years or was observed eating 30 or more salmon would be subject to removal anywhere it was found except on a sea lion rookery. In the event that the predicted run size of upriver spring chinook salmon drops to 82,000 or fewer fish, any sea lion observed above marker 85 would be subject to lethal removal.

Seven members of the task force preferred a second option with the goal of eliminating all California sea lions observed above navigation marker 85 and reducing predation on salmonids in the area below Bonneville Dam to 0.5 percent of the run size. To accomplish this, they recommended that all sea lions observed above marker 85 between 1 January and 31 May be subject to immediate lethal removal. Under this option, the number of lethal removals in a given year would be capped at 2 percent of the potential biological removal level, which would be twice the number the states had requested. Lethal taking authority under this option would initially be for six years.

One member of the task force filed a minority report recommending that lethal removal not be authorized. This member thought that the information available to the task force failed to demonstrate that predation on salmonid stocks by pinnipeds was having a significant effect, particularly when compared to "much higher rates of take that [the Service] itself allows for fisheries and other extractive users." The minority report also cast doubt on whether removing up to 85 sea lions per year would provide any appreciable benefit to the fish stocks or would merely create a vacated foraging niche for other sea lions to exploit.

The task force by consensus identified the need to continue and expand programs to monitor and evaluate pinniped predation, not only at Bonneville Dam but throughout the lower Columbia River. Its members believed that better data are needed to resolve uncertainties about the best choices for management actions to address the pinniped-fishery conflict. Members also generally agreed that managers should continue to pursue non-lethal deterrence of pinnipeds in the vicinity of Bonneville Dam, recognizing that this could be an effective means of preventing "naïve" sea lions from replacing animals that are removed.

Commission Comments on the Task Force Report

The National Marine Fisheries Service's Northwest Region transmitted the task force report to the Commission by letter of 6 November 2007, inviting it to comment on the report and to identify any issues or information that it would like the Service to consider in making a determination or preparing documentation under the National Environmental Policy Act.

The Commission provided detailed comments to the Service on 23 November 2007. The Commission reviewed the criteria for making a finding under section 120 of the Marine Mammal Protection Act and recommended that the Service adopt a two-part standard for applying those criteria. First, the Service should consider whether pinnipeds collectively are having a significant negative impact on the salmonid stocks of concern. If so, the Service should then determine whether the individual sea lions targeted for removal are significant contributors to the overall level of predation.

The Commission stressed the importance of supporting any affirmative finding made under section 120 with a clear explanation of why predation by pinnipeds is having a significant negative impact on salmonids. Although the task force had, by a substantial margin, found the impact to be significant, it had not provided a clear rationale. The Commission therefore recommended that the Service undertake additional analysis that relates the observed predation rates by pinnipeds to population-level impacts on the fish stocks, such as an increased risk of extinction or delay in recovery time.

The situation concerning the conservation of Columbia River salmonids is complex and involves multiple risk factors including migration barriers, habitat loss and degradation, take by fisheries, and

predation by birds and marine mammals. The Commission therefore recommended that the Service, as part of its decision-making process, conduct a comprehensive analysis that compares pinniped predation with authorized take levels from other sources and explains why some are considered significant while others are not.

The Commission also noted that the task force did not reach agreement on the goal of the recommended lethal removal of pinnipeds. Although making a finding that pinnipeds are having a significant negative impact on salmonid stocks is an explicit determination under section 120, the Commission believed that it was equally important for the Service to establish the point at which sea lion predation would no longer be considered significant. The Commission observed that reducing predation by sea lions to below that significance threshold should be the goal of the pinniped removal program and recommended that the Service seek to quantify that level.

In the Commission's view, the information available to the task force did not support a conclusion that all pinnipeds in the area below Bonneville Dam are significant contributors to the predation problem and should be subject to removal. Consistent with this view, the Commission noted that the option proposed by some task force members to authorize removal of all California sea lions above a certain point in the river, absent a showing that they are preying on salmonids to a degree that can be considered significant, would be inconsistent with the statutory criteria. The Commission therefore recommended that the second option proposed by the task force be rejected.

The selection criteria that would be established under the first alternative identified by the task force are more finely tuned and, with certain exceptions, were supported by the Commission. Although recognizing that the difficulties in detecting all incidents of predation and attributing the taking to a particular sea lion may be difficult, the Commission thought that some of the criteria proposed by the task force needed to be better justified and explained. For example, the Commission questioned whether a single observation of a particular sea lion eating a salmon was sufficient to establish that animal as a significant contributor to the predation problem. Similarly, the Commission expressed concern that some of the sea lions on the list of individuals that would be targeted for removal had little or no documented history of preying on salmonids in the area below Bonneville Dam. As such, the Commission recommended that the Service consider a phased approach with additional selection criteria that, at least initially, would target the sea lions that are the greatest contributors to the predation problem.

The Commission also commented on the task force proposal to establish alternative removal criteria if the predicted run size of upriver spring chinook salmon drops to 82,000 or fewer fish. The Commission noted that the task force had not explained its rationale for selecting this level and recommended that, if the Service adopts this proposal or establishes a similar threshold based on run size, it explain why any predation at that point would be considered significant.

In addition to making recommendations about whether to approve a state's application for lethal removal authority, any task force established under section 120 of the Marine Mammal Protection Act is to consider non-lethal alternatives if they are available and practicable. In this case, the task force noted that non-lethal alternatives had been tried extensively without much success, but it recommended that they be continued in an effort to prevent new animals from becoming established as predators. The Commission concurred that any lethal taking program approved by the Service should include an aggressive non-lethal deterrence component. The Commission also agreed with the task force that the Service and others should continue to pursue emerging technologies that may provide effective non-lethal alternatives. In particular, the Commission encouraged the Service to facilitate research on an electrical field barrier currently under development that could prove to be an effective deterrent if it prevents sea lions from transiting upstream.

The Commission observed that, by choosing to seek authority to address sea lion predation of salmonids in the Columbia River under section 120, the states had accepted certain limits on what taking could be authorized and under what conditions. Although the Commission appreciated the perspective of those task force members that seemed

driven more by the pragmatic goal of protecting fish stocks than the specific requirements of section 120, the Commission cautioned that any lethal taking authorization issued by the Service needed to comply fully with the applicable requirements. The Commission noted that seeking authority under other provisions of the Act, such as a waiver under sections 101(a)(3)(A) and 103, should be possible and would provide greater flexibility. For example, under those provisions, the Service could consider whether it is appropriate to take steps to exclude all sea lions from a certain area irrespective of a showing of a documented impact on salmonid stocks.

At the end of 2007 the Service was continuing to review the task force report and the comments provided by the Marine Mammal Commission. The Service expects to publish a draft environmental assessment early in 2008 setting forth and analyzing the alternatives it is considering. The Commission anticipates that the Service will address its comments and recommendations on the task force report in that document. The Service plans to provide a 30-day public comment period on the draft before finalizing the environmental assessment and taking final action on the states' application.

Congressional Action

Congressional interest in the pinniped predation problem in the Columbia River also remained high during 2007. As discussed in the previous annual report, on 28 September 2006 Representatives Hastings, Baird, and Dicks, all of Washington, and Representative Walden of Oregon introduced H.R. 6241. The bill would bypass the existing process under section 120 by amending the Marine Mammal Protection Act to authorize, on a temporary basis, the intentional lethal taking of up to 1 percent of the annual potential biological removal level of California sea lions on the Columbia River or its tributaries. The same four congressmen introduced a similar bill, H.R. 1769, on 29 March 2007 for consideration by the 110th Congress. The bill would grant the Secretary of Commerce authority to issue permits for lethal taking of California sea lions to eligible entities, including the states of Washington and Oregon and various Native American tribes, if the Secretary determines that alternative measures to reduce sea lion predation on threatened or endangered salmonid stocks in the Columbia River or its tributaries have not adequately protected the stocks. Each permit issued to an eligible entity would be valid for one year and authorize the intentional lethal taking of up to 10 California sea lions, with each entity being eligible to receive multiple permits. The cumulative number of California sea lions authorized to be taken each year would not exceed 1 percent of the annual potential biological removal level (85 animals according to the Service's 2007 California sea lion stock assessment report). The Secretary's authority to issue permits for intentional lethal taking of California sea lions under the proposed amendment would lapse five years after enactment.

The Subcommittee on Fisheries, Wildlife, and Oceans of the House Resources Committee convened a hearing on H.R. 1769 on 2 August 2007. The Commission's chairman presented testimony on behalf of the Marine Mammal Commission. The Commission strongly endorsed the goal of the bill—to restore healthy runs of salmon and steelhead in the Columbia River—and set forth general principles that should be followed in conserving those fish stocks: acting quickly to minimize the impact on the stocks, taking care to ensure that remedial measures do not result in additional problems, addressing the issue comprehensively so that all known or suspected causes of declines and impediments to recovery are considered and that any lethal removals of sea lions contribute meaningfully to resolving the problem, and limiting removals of sea lions to the minimum number necessary to protect fish stocks. Nevertheless, the Commission expressed misgivings about certain provisions of H.R. 1769.

The bill is premised on the belief that the available process to authorize the taking of pinnipeds under section 120 is too protracted and cannot be accomplished quickly enough to protect endangered and threatened salmonids. The Commission's testimony reviewed the explicit timing requirements of the existing authorization process and concluded that it was possible for the National Marine Fisheries Service to take final action within six months of receiving an application. In fact, this is what the Service was able to do in authorizing the removal of sea lions at Ballard Locks in 1995. Although

agency action to consider the states' application for lethal taking authority in the Columbia River was proceeding at a slower pace, the Commission believed that the process would be completed before the fish runs of concern began in 2008. The Commission therefore advised that the ongoing review of the states' application be allowed to play out before Congress stepped in to establish an alternative, site-specific authorization process. The Commission noted that doing so would give the task force time to complete its review and help Congress and other interested parties identify shortcomings in the process that might warrant legislative action.

The Commission also commented on the threshold determination that the Secretary would be required to make if H.R. 1769 became law—that alternative measures to reduce sea lion predation of salmonids are inadequate to protect listed fish stocks. The Commission noted that the existing section 120 process was one such alternative and that it would not be possible to know whether it provided adequate protection until the ongoing task force process had been completed. This is particularly true since that process is an iterative one that requires the task force periodically to review the effectiveness of any authorized taking and to suggest additional actions needed to address the predation problem. Because the task force process had not been completed, the Commission believed that any determination as to whether it was an adequate alternative would be highly speculative. If Congress did not intend for the existing section 120 process to be evaluated as an alternative, the Commission thought that this needed to be clarified in the legislation.

The Commission questioned the need for some of the intricacies of H.R. 1769, which would allow several different entities each to obtain multiple authorizations and then to delegate lethal removal authority to the Pacific States Marine Fisheries Commission and the Columbia River Inter-Tribal Fish Commission. Although the bill included provisions that would allow the Secretary to authorize hundreds of sea lions to be killed annually, and up to 60 in any 14-day period, other provisions would cap the total number of lethal removals at about 85 animals per year. The Commission also was concerned about the prospect that up to eight different entities could be exercising lethal taking authority in the Columbia River and its tributaries at any given time, creating concerns about coordination and the prospect that the annual limit on removals could be exceeded unless a real-time reporting system were in place.

The Commission noted that, unlike the existing provisions of section 120, H.R. 1769 did not require a finding that pinnipeds are having a significant impact on the decline or recovery of salmonid stocks. Rather, the drafters of the bill seemed to assume that this was the case in the Columbia River system. However, given the multiple factors affecting the salmonid runs in the Columbia River, the Commission thought that it would be valuable to require the Secretary to make such a finding that would consider the significance of sea lion predation in the context of those other factors.

Some members of the subcommittee seemingly agreed with the Commission that action on the states' application under section 120 should be completed before alternative legislation should be considered. Consistent with this view, no further action was taken on H.R. 1769 following the hearing, and it remained pending at the end of 2007.

Southern Sea Otters in California (*Enhydra lutris nereis*)

Sea otters are considered to be a "keystone" species because they play a central role in shaping many nearshore coastal ecosystems. Their diet consists largely of shellfish, including sea urchins that graze on and can destroy kelp forests. Where sea otters keep sea urchins in check, kelp forests may flourish, providing habitat for a rich diversity of fish and invertebrate populations. As a result, the presence or absence of sea otters has a major effect on the density of kelp beds and the biodiversity and biomass of coastal ecosystems.

Sea otters once inhabited nearshore waters around the rim of the North Pacific Ocean from Baja California, Mexico, north through Canada, west through Alaska and the Aleutian Islands, and south to northern Japan. Prized for their dense fur, sea otters were nearly eliminated by commercial hunters from the late 1700s to the early 1900s. By the time the Fur Seal Treaty of 1911 prohibited

commercial hunting for sea otters, their occurrence south of Alaska had been reduced to an isolated colony along the remote Big Sur coast of central California. Morphologic and genetic studies indicate that southern sea otters constitute a subspecies that is distinct from remnant groups of northern sea otters (*E. l. kenyoni*) that survived commercial hunting in Alaska. Since 1911 the abundance and range of southern sea otters have increased gradually. In 1977 they were listed as threatened under the Endangered Species Act.

Most southern sea otters now occur along the central California coast between San Mateo and Santa Barbara Counties. With the exception of a decline in numbers in the late 1990s and early 2000s, their abundance has increased steadily since 1982 when efforts were made to standardize sea otter census methods (Figure II-5). In 2007, under good sighting conditions, the count of southern sea otters reached a record high of 3,026, including 2,637 independent animals and 389 pups.

The U.S. Fish and Wildlife Service and the U.S. Geological Survey have lead federal responsibility for management of and research on the southern sea otter, and the California Department of Fish and Game is the lead state agency. In 2007 representatives of those agencies met with the Commission at its annual meeting to review the status and recovery of southern sea otters. Based on the results presented, the Commission wrote to the Fish and Wildlife Service on 23 November 2007 recommending actions to conserve southern sea otters. As discussed in the following sections, issues addressed in that letter included (1) the population's status relative to identified recovery criteria, (2) a decision on the effectiveness of efforts in 1987–1990 to establish a new sea otter colony on San Nicolas Island, (3) effects of contaminants and disease, and (4) interactions with commercial fisheries.

Population Monitoring

In 2003 the Fish and Wildlife Service adopted a revised Southern Sea Otter Recovery Plan (U.S. Fish and Wildlife Service 2003). The plan states that sea otters may be considered for reclassification from threatened to endangered under the Endangered Species Act if the three-year running average of total population counts declines below 1,850 otters, and that delisting may be considered if that average exceeds 3,090 for three years. As shown in Figure II-5, sea otter counts are approaching the identified criterion for delisting. In 2007 the three-year running average was a record high of 2,818 otters. With recent counts increasing at a rate of 2.4 percent per year, the criteria for delisting consideration could be met in as few as seven years.

Although this prospect and trend are encouraging, the rate of population increase for southern sea otters has been far slower than that observed among recovering sea otter populations in Alaska in the 1970s and 1980s. This low rate of recovery suggests that one or more risk factors may be suppressing growth of the sea otter population in California. In

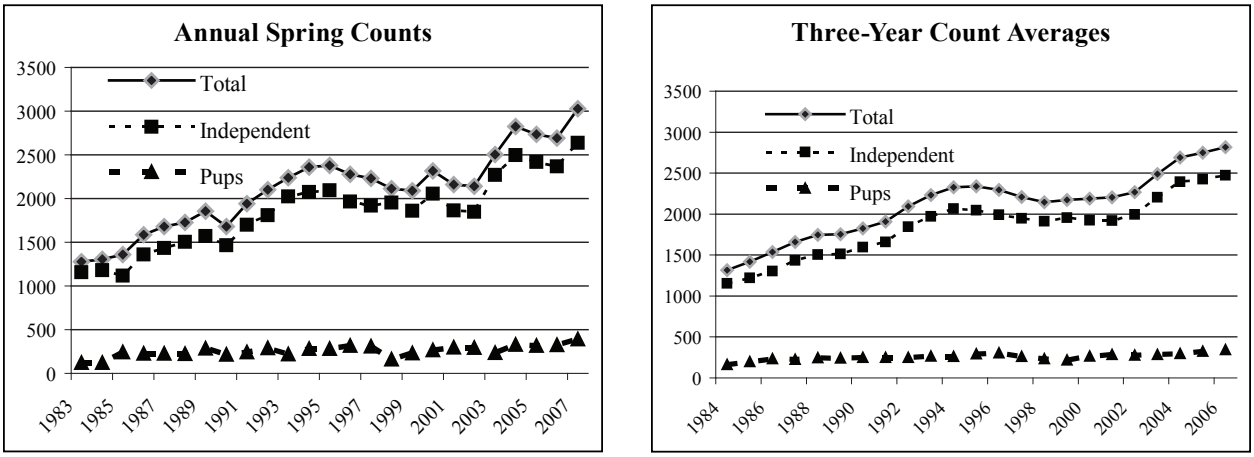

Figure II-5. Spring counts and three-year running count averages for southern sea otters: 1984–2007. Source: U.S. Geological Survey.

addition, the translocated population of sea otters at San Nicolas Island has increased more slowly than other recovering sea otter populations (see following discussion). In its 23 November 2007 letter to the Service, the Commission therefore recommended that funding and other support necessary for annual sea otter counts along the mainland and at San Nicolas Island and for the sea otter stranding response program (i.e., a program in which sea otter carcasses are recovered for examination) be continued at current levels.

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Future of the San Nicolas Island Translocation Project

Between 1987 and 1990 the Service moved 140 southern sea otters from the mainland population to San Nicolas Island, about 60 miles off the southern California coast. The goal was to establish a separate reserve colony of otters that would not be affected by a major coastal oil spill and that could be used to replenish a depleted mainland colony if such a spill occurred. As part of the translocation program, regulations were adopted to establish a no-otter management zone south of the mainland sea otter range to address several concerns, one being that an expanding mainland colony would deplete commercial and recreational shellfish resources off southern California. Sea otters south of Point Conception were to be captured and moved either to San Nicolas Island or back to their core mainland range.

After the move to San Nicolas Island, most translocated animals either returned to their mainland range or disappeared. As a result, the colony failed to increase as expected. Although a small number of animals stayed at San Nicolas Island and successfully produced pups, counts at the island in the early 1990s remained below 20 animals. Since the late 1990s this number has been increasing with counts in 2006 and 2007 now up to 37 independent otters (U.S. Geological Survey, unpubl. data). Nonetheless, this population could not be used as a source of animals to restock the mainland population, should that population experience a large-scale decline. In addition, efforts to remove otters from the no-otter zone proved more difficult than anticipated. Several animals died during capture and transport attempts, and such attempts have been discontinued.

In view of those developments, the Fish and Wildlife Service has taken steps to declare the translocation project a failure. In 2005 it prepared a supplemental draft environmental impact statement evaluating alternative actions, including a proposal to leave the San Nicolas Island otters at that site and to rescind regulations for the no-otter zone so that the mainland population could expand southward. By letter of 3 January 2006 the Commission expressed support for the Service's proposal. However, the Commission noted that certain abalone species in southern California had been listed as threatened or endangered and that expansion of the range of sea otters southward could adversely affect recovery prospects for those abalone populations. Therefore, the Commission recommended that the Service consult with the National Marine Fisheries Service under section 7 of the Endangered Species Act on the effect that sea otter range expansion might have on listed abalone. In its 23 November 2007 letter, the Commission recommended that, if issues related to abalone could be resolved, the Service should finalize its supplemental environmental impact statement and bring the issue regarding the fate of the translocation program to a close.

Contaminant, Biotoxin, and Disease Studies

Studies of more than 200 southern sea otter carcasses recovered along the California coast between 2000 and 2005 have implicated exposure to specific toxins and pathogens as a possible cause for high levels of observed mortality and a slow rate of population growth (Miller et al. 2007). The findings suggest that persistent pollutants found in tissues of dead otters may have compromised their immune systems, thereby increasing their vulnerability to various pathogens and parasites. Scientists with the California Department of Fish and Game, the U.S. Geological Survey, and other cooperating groups also have been studying foraging patterns to identify differences in prey preferences between and within particular areas inhabited by otters. Those studies suggest links in certain areas between specific prey, exposure to pathogens and toxins, and increased levels of mortality. Further research is planned to clarify the effects of specific pollutants on sea otter health and the pathways by which they are reaching otters. Results of such studies should promote man-

agement actions to control the sources of the toxins and pathogens affecting the population.

The discussions of the population status of sea otters at its annual meeting reaffirmed for the Commission that planned research is important for both ensuring sea otter recovery and establishing sea otters as a sentinel species for monitoring the health of coastal ecosystems. Therefore, in its 23 November letter, the Commission recommended that the Service ensure that research funding is adequate to investigate the role of contaminants, biotoxins, and pathogens in the mortality of stranded sea otters and to conduct complementary studies of sea otter foraging.

Fishery Interactions

Sea otters are subject to entanglement and drowning in the nets, lines, and traps of commercial fishing gear. To address such interactions, section 117 of the Marine Mammal Protection Act requires that the Fish and Wildlife Service prepare and annually update stock assessment reports for marine mammals under its jurisdiction that are listed as endangered or threatened. Despite this requirement, the stock assessment report for southern sea otters has not been updated since the initial stock assessment reports were prepared in 1995. During its annual meeting, the Commission was advised that a revised draft assessment report had been prepared in 2006 but that it had yet to be released for public review. In its 23 November 2007 letter, the Commission noted that stock assessment reports provide a basis for management decisions related to marine mammal–fishery interactions and that failure to update them is contrary to provisions of the Marine Mammal Protection Act. Thus, the Commission recommended that the Service take immediate steps to review and adopt a revised southern sea otter stock assessment report.

The Marine Mammal Protection Act also includes provisions for placing observers aboard fishing vessels likely to take marine mammals incidentally. This program is administered by the National Marine Fisheries Service. Although past actions to prevent deaths of sea otters in fishing gear have effectively addressed potential interactions within the population's core range, expansion of that range in recent years is placing sea otters at risk of being taken in fisheries, such as the Dungeness crab fishery, to the north of their core range and various finfish and lobster trap fisheries at the southern limit of their range. Noting that fishery observers provide data essential for assessing incidental take levels, the Commission in its 23 November 2007 letter also recommended that the Service consult with the National Marine Fisheries Service to ensure adequate observer coverage of fisheries in areas immediately north and south of the mainland range of southern sea otters.

Northern Sea Otters (*Enhydra lutris kenyoni*) in Washington State

Although sea otters once occurred all along the coast of North America north of Baja California, Mexico, and west through the Aleutian Islands to northeastern Asia, commercial hunters killed hundreds of thousands of them between the mid-1700s and early 1900s for their pelts. The Fur Seal Treaty of 1911 brought this hunting to an end; however, by then only a few remnant colonies remained in Alaska and central California. In 1969 and 1970 the Fish and Wildlife Service removed 59 northern sea otters from a recovering population on Amchitka Island, Alaska, and released them along the coast of Washington in an attempt to restore the species to that portion of its former range. Most of those animals died soon after being released, but a few survived and founded a new population that is now concentrated principally along a remote 80-km (50-mi) stretch of Washington's outer coast south of Cape Flattery at the mouth of the Strait of Juan de Fuca (Lance et al. 2004). However, otters are seen frequently in the Strait of Juan de Fuca as far east as Port Townsend, occasionally in the inland waters of Puget Sound, and occasionally as far south along the outer coast as Grays Harbor.

Population Abundance and Trend

The new population grew rapidly in the early 1980s, when counts increased at a rate of about 20 percent a year (Figure II-6). Since the late 1980s the overall growth rate has slowed to about 8 percent a year, with the southern half of the population

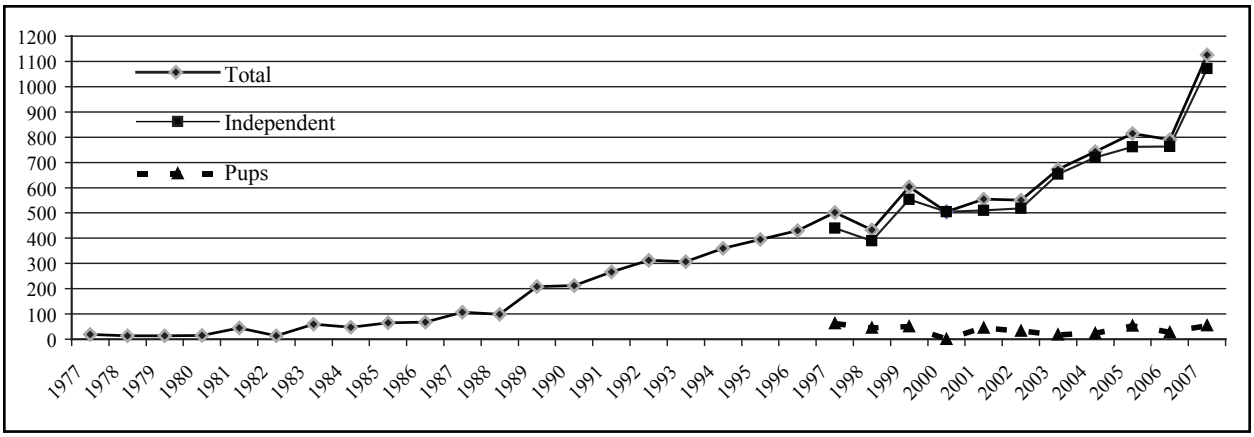

Figure II-6. Counts of northern sea otters in Washington, 1977–2007. Source: Washington Department of Fish and Wildlife.

continuing to grow at a rate of nearly 20 percent and the northern half slowing to less than 5 percent, perhaps indicating that the population is approaching the environmental carrying capacity in that region. In 2007 the overall number increased to 1,125 animals, well above the previous high count of 814 animals recorded in 2005 (Washington Department of Fish and Wildlife, unpubl. data).

Population Listing Status

As a reintroduced population of sea otters belonging to the northern subspecies (*Enhydra lutris kenyoni*), the Washington population is not listed as endangered or threatened under the Endangered Species Act. However, in 1981 the state of Washington listed this population as endangered under state law in recognition of its small size, limited distribution, and vulnerability to impacts such as oil spills.

Research and Management Activities

Research and management activities to conserve sea otters in Washington are carried out primarily by the Washington Department of Fish and Wildlife, the U.S. Fish and Wildlife Service, the U.S. Geological Survey, and local Indian tribes. Representatives of those agencies and the Makah Tribe participated in a review of the status of the sea otter population at the Commission's 2007 annual meeting. Major issues of concern discussed during the meeting included efforts to recover and analyze sea otter carcasses, the potential impacts of a large oil spill and fishery interactions, and funding to carry out needed research and management. Based on results of that review, the Commission wrote to the Fish and Wildlife Service on 23 November 2007 recommending steps to improve research and management actions.

The inability to retrieve and analyze carcasses in a timely manner to detect potential sources of mortality has been a significant constraint on managing sea otters in Washington. The population occurs primarily along a remote, rugged shoreline where access is limited, and funding to recover and necropsy carcasses has not been available. Although a few individuals along Washington's outer coast are willing to assist with strandings of marine mammals and marine species, including sea otters, all response efforts are subject to similar constraints. The Commission's 23 November 2007 letter to the Fish and Wildlife Service recommended that it consult with the National Marine Fisheries Service, the National Park Service, the Washington Department of Fish and Wildlife, and tribal authorities to organize and expand a cooperative volunteer stranding network along the outer coast to retrieve and analyze carcasses and tissue samples from stranded otters and other marine mammals.

Perhaps the greatest threat to the Washington sea otter population is from toxic spills resulting from the grounding or collisions of vessels carrying large volumes of oil or fuel through the Strait of Juan de Fuca to Seattle and other ports in Puget Sound. The risk of a major spill affecting otters is significant because vessel traffic through the area is heavy and the population's limited range is close

to major vessel traffic lanes. Based on discussions at the Commission's 2007 meeting, it appears that little has been done to prepare for an oil spill, either by purchasing necessary equipment, identifying facilities that could treat and rehabilitate oiled otters, or training personnel to rescue and treat the otters. Therefore, in its 23 November 2007 letter to the Service, the Commission also recommended that the agency consult with the Washington Department of Fish and Wildlife, the Coast Guard, regional shipping interests, and others to establish necessary equipment caches within the Washington sea otter population's range and to make arrangements with appropriate facilities and personnel to respond quickly to any oil spill that might affect the area's sea otters.

Entanglement in regional trap and gillnet fisheries also is a potential problem, but the information needed to assess those risks is limited. Based on discussions at the Commission's meeting, further steps are needed to evaluate tribal and non-tribal fisheries that could take otters incidentally and to place observers in those fisheries. In this regard, the Commission's letter recommended that the Service consult with the National Marine Fisheries Service, tribal authorities, and other relevant groups to assess gillnet and trap fishing efforts within the range of Washington sea otters and to place observers on fishing vessels that might incidentally take otters.

The Commission also noted that, as with southern sea otters, the Service had not updated a stock assessment report for the population as required by the Marine Mammal Protection Act, despite the fact that a draft assessment had been completed more than a year ago. Noting that such assessments provide a basis for allocating fishery observers, the Commission recommended that the Fish and Wildlife Service take immediate steps to complete its review of the draft stock assessment and adopt a final report as required.

Finally, the Commission noted that a relatively small amount of additional funding likely could accomplish a number of important actions. These actions might include expanding cooperative efforts with tribal and non-tribal coastal residents to improve local stranding response efforts, purchasing equipment for stranding and oil spill response and analyzing tissue samples, making arrangements to respond to oil spills, and working with tribal representatives and others to observe and gather data on interactions with local fisheries. Recognizing that the Service must prioritize funding first for species listed as endangered or threatened, the Commission noted that it would be willing to contribute funding to the Service to help defray costs for such work in 2008.

As of the end of 2007 the Commission was looking forward to the Service's response to its recommendations and its offer to help fund conservation work on sea otters in Washington.

Southern Resident Killer Whales (*Orcinus orca*)

Three ecotypes of killer whales inhabit the North Pacific. They are distinguishable on the basis of their genetics, acoustics, foraging patterns, and prey. They also differ in home range size and movement patterns and have been named accordingly as resident, transient, and offshore ecotypes. Killer whales of the resident ecotype have the smallest home ranges and generally spend part of each year in predictable locations. Existing information indicates that in the North Pacific resident killer whales prey on fish.

Social and Stock Structure

The National Marine Fisheries Service recognizes three biological stocks of resident killer whales in the North Pacific: the southern resident stock (observed primarily in Washington and southern British Columbia), the northern resident stock (observed primarily in central and northern British Columbia), and the Alaska resident stock (observed from southeastern Alaska to the Aleutian Islands and Bering Sea). These resident stocks are composed of pods of genetically related whales that, in turn, are composed of smaller, more closely related matrilineal groups (matrilines). Matrilines generally consist of a matriarch, her male and female offspring, and the offspring of those females; they have been known to include up to 17 animals and span up to four generations. Pods comprise groups of related matrilines, which tend to associate with each other and not with matrilines from other pods.

The southern resident stock of killer whales is composed of three separate pods (J, K, and L pods) and a total of 20 matrilines (4 J, 4 K, and 12 L) (National Marine Fisheries Service 2008).

Population Trends

Historically, southern resident killer whales are thought to have numbered more than 200 individuals. Since 1960, however, the southern resident stock has never exceeded 100 individuals (Figure II-7 [National Marine Fisheries Service 2008]). In the late 1960s and early 1970s an estimated 47 or 48 killer whales were taken from the southern resident stock for display in aquariums and for research. Most of those animals were immature, and their removal reduced the stock to an estimated 70 animals in 1976. Over the next two decades the population recovered partially from the loss of these animals to reach a total of 98 animals in 1995. Since then, the stock first declined to 81 animals in 2001, then increased to 90 animals in 2006, and declined again to 87 animals at the end of 2007. These trends in abundance primarily reflect changes in the abundance of animals in L pod, which is the largest of the three southern resident pods. The most recent increase, however, reflected an increase primarily in J pod. Pod-specific trends are important because males rarely mate with females from their own pod (and resident killer whales mate only within their ecotype in the North Pacific). As a result, the reproductive success of one resident pod is determined not only by the fecundity of females within that pod but also by the availability of fertile males from other resident pods. Thus, although L pod is the largest pod, its reproductive success may be limited by the availability of fertile males in J and K pods.

Threats

Three potentially contributing factors have been identified in the failure of southern resident killer whales to recover to their historic abundance: high contaminant loads, disturbance by whale-watching ventures and other vessel activity, and declines in available prey, particularly salmon (National Marine Fisheries Service 2008). Southern resident killer whales and transient killer whales in the North Pacific are among the most contaminated marine mammals in the world, particularly with regard to pollutants that bioaccumulate in the food chain, including polychlorinated biphenyls (PCBs) and polybrominated diphenyl esters (PBDEs, relatively new pollutants found in flame retardants) (Krahn et al. 2007, Rayne et al. 2004, Ross et al. 2000). Southern resident killer whales, which feed on fish, have contaminant levels much higher than those of other resident populations in the North Pacific. Their levels approach those of transient killer whales, which are expected to have higher contaminant levels because they feed on marine mammals and thus are at a higher trophic level. High contaminant levels may compromise

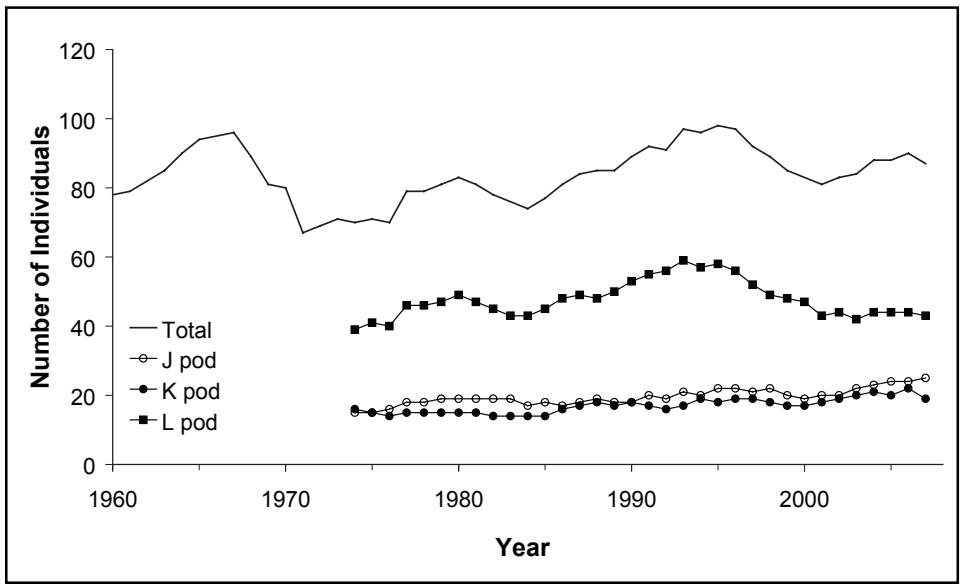

Figure II-7. Southern resident killer whale abundance from 1960 to 2007 based on the number of whales present in each pod at the end of a calendar year. Data courtesy of the National Marine Fisheries Service and the Center for Whale Research (National Marine Fisheries Service 2008).

reproduction and immune system function, and the levels of PCBs observed in southern resident killer whales exceed thresholds known to result in health impacts on harbor seals (Ross et al. 1995, 1996). The Service initiated a biopsy sampling program in 2004 to collect tissue samples from individual whales for testing. Preliminary results presented at the Commission's annual meeting indicate that southern resident killer whales still have high PCB levels although those levels are somewhat lower than concentrations detected in historic samples from 10 years ago (Krahn et al. 2007). On the other hand, PBDE concentrations appear to have increased compared to the historic samples.

Southern resident killer whales 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 not only may disturb the animals but also may increase the ambient noise level to the extent that it interferes with or masks killer whale sounds used for foraging, communication, or other purposes. Particularly loud sounds produced during some commercial (e.g., seismic surveys) and military (e.g., tactical sonar) operations also may disturb animals and, in some cases, could cause injuries. The Service has collaborated with local research organizations to study interactions of killer whales with whale-watching vessels, and preliminary findings presented at the Commission's annual meeting suggest that killer whales may alter their behavior or avoid vessels, particularly when many vessels are present or vessels are near (<100–400 m) the whales.

The failure of southern resident killer whales to recover also may be due, at least in part, to a decline in the availability of their prey. Existing evidence suggests that these whales depend heavily on salmon and perhaps on specific salmon runs (Ford et al. 1998, Krahn et al. 2002). The majority of salmon runs throughout the Pacific Northwest are much smaller than they were historically (e.g., Nehlsen et al. 1991, Slaney et al. 1996), and many are predicted to remain small into the future (Lackey 2003). In recent decades, overall salmon abundance in the Puget Sound region has been roughly stable if hatchery-produced salmon are included (National Marine Fisheries Service 2008). Recent population trends of southern resident killer whales (Figure II-7) are not clearly linked to changes in salmon abundance, although links between pods or matrilines and specific runs are possible. The Service has studied the prey preferences of southern resident killer whales while they are in Puget Sound based on observations of feeding as well as analysis of fecal samples, and preliminary results presented at the Commission's annual meeting suggest that chinook salmon are particularly important prey for the whales while they are in Puget Sound. Although the Service has initiated some studies of the winter habitat use by southern resident killer whales, it still is not clear where the whales go once they leave Puget Sound or what species of fish the whales prey on during the winter.

In addition to previously mentioned factors, the small population size of southern resident killer whales makes them especially vulnerable to catastrophes such as disease epidemics or oil spills. The AT1 transient killer whale stock in Alaska had only 22 members in the 1980s but seemed stable at that time. Forty percent of the population was lost in conjunction with the *Exxon Valdez* oil spill in 1989, and the stock likely will not recover from that catastrophe. The Service convened a workshop in 2007 to develop an oil spill response plan specific to southern resident killer whales, including the identification of potential resources and techniques to deter whales from entering an oiled area. The Service intends to use information from this workshop to inform development of the Northwest Area Contingency Plan for oil spill response.

Legal Status, Critical Habitat, and Recovery Planning

Following a petition by the Center for Biological Diversity and two status reviews, the National Marine Fisheries Service designated southern resident killer whales as depleted under the Marine Mammal Protection Act in 2003 and as endangered under the Endangered Species Act in 2005. On 29 November 2006 the Service designated critical hab-

itat for southern resident killer whales, comprising essentially all of Washington's inland waters with the exception of Hood Canal, 18 military sites, and waters less than 20 feet deep.

Also on 29 November 2006 the Service published a draft recovery plan. The draft plan considered a variety of threats facing the whales, including diminished prey availability, pollution/contaminants, vessel effects, oil spills, and acoustic effects (i.e., anthropogenic sounds). The recovery criteria were based on known threats and population dynamics. In particular, the biological recovery criteria were based on population viability analysis of southern resident killer whales, which indicated an apparent 14-year cycle in the variation of survival rates with approximately seven years of high survival followed by seven years of low survival (Krahn et al. 2004). The biological criteria required sustained population growth (average of 2.3 percent a year) over a full 14-year cycle for downlisting and over two full cycles (28 years) for delisting. The biological criteria also required that the demography of the population (e.g., sex/age distribution and age-specific reproductive and survival rates) be consistent with a growing or stable population. This demographic criterion focused primarily on the sex and age structure of the population and specifically required that (1) southern resident killer whales comprise at least three pods, (2) at least two (one for downlisting) reproductive-age males be present in each pod, and (3) the ratio of juveniles, adults, and post-reproductive males and females be similar to that of the northern resident population.

The Commission reviewed the draft recovery plan and commended the Service for its assessment of the stock's status, evaluation of factors likely to impede recovery, proposed recovery measures to address those factors, and proposed research activities to inform and support the recovery measures. On 1 March 2007 the Commission recommended that the Service strengthen the plan by (1) revising the delisting and downlisting criteria to be more explicit and measurable, (2) assigning high priority to population monitoring to detect changes in status and evaluate threats, (3) assigning high priority to evaluation of the effectiveness of recovery actions, (4) clarifying the relationships among specific delisting or downlisting criteria, recovery measures, and research and monitoring activities to ensure internal consistency in the recovery program, and (5) revising biological recovery criteria regarding demography to be more precautionary with respect to the numbers of reproductive males and females that would be required before consideration of downlisting or delisting. With regard to the final recommendation, the Commission argued that the presence of two reproductive males in each pod may not be sufficient to support the reproductive rate necessary for recovery and avoid the deleterious impacts of inbreeding. A final recovery plan had not been published at the end of 2007.

On 22 March 2007 the Service published an advance notice of proposed rulemaking regarding the take, including harassment, of southern resident killer whales incidental to marine vessel operations. Whale-watching vessels operate near the whales throughout the spring, summer, and fall months when the whales are in the inland waterways of Puget Sound. The Service requested information and comments on what type of regulations or other measures, if any, should be instituted to protect killer whales from the potential impact of vessel operations. The Commission has commented on similar topics in the past, generally recommending simple, enforceable regulations such as minimum approach distances (e.g., letter of 13 January 2006 regarding vessel and swimmer interactions with spinner dolphins in Hawaii). The Service had not published a proposed rule as of the end of 2007.

Service staff provided useful presentations at the Commission's annual meeting, summarizing the results of recent research and management activities, as well as describing plans for future activities. The Commission was impressed with the level of research and management coordination at all levels—within the Service, with Canada on transboundary issues, and with the state of Washington on local issues. Following the meeting, the Commission wrote to the Service on 30 November 2007, commending the Service for its efforts to promote the recovery of the southern resident killer whale stock and encouraging the Service to continue its research efforts, particularly those focused on understanding the ecology of southern resident killer whales when they are outside Puget Sound.

Subsistence Whaling by the Makah Tribe

The International Whaling Commission (IWC) authorizes the hunting of certain species of whales for aboriginal subsistence purposes. The authorizations are generally based on strike limits set for five-year periods. The Makah Tribe of Washington state sought and received a share of the 1998–2002 and 2003–2007 subsistence limits for eastern North Pacific gray whales. As discussed in Chapter IX, the IWC adopted a new five-year authorization at its 2007 meeting to extend the catch limit (620 whales, with no more than 140 whales to be taken in any one year) through 2012. The tribe has been covered by the IWC gray whale authorization since 1998. However, from 1999 (when it resumed whaling) to 2007, it took only one whale, that whale being struck and landed in 1999. As discussed later, tribe members took a second whale in 2007 but without first obtaining the necessary authorizations under the Marine Mammal Protection Act and the Whaling Convention Act.

A ruling of the Ninth Circuit Court of Appeals interrupted whaling by the Makah Tribe in 2000. The court found that the environmental assessment prepared by the National Oceanic and Atmospheric Administration/National Marine Fisheries Service on the Makah whaling program was inadequate in that it had not been completed until after agency officials and the tribe had entered into a cooperative agreement on whaling. The court directed the Department of Commerce to complete and circulate a new assessment, which it did in 2001.

Environmental groups filed suit (*Anderson* v. *Evans*) early in 2002 challenging the adequacy of the new assessment and asserting that whaling by the tribe must be authorized under the Marine Mammal Protection Act. The Ninth Circuit again sided with the environmental plaintiffs, directing the agency to prepare an environmental impact statement and ruling that whaling by the tribe must be authorized under the Marine Mammal Protection Act, not merely under the quota set by the IWC and/or the whaling rights reserved by the tribe in the 1855 Treaty of Neah Bay. The court also expressed concern regarding the possible impact of whaling on the aggregation of approximately 200 gray whales that inhabit Canada and the Pacific Northwest during the summer and fall. Those whales halt their northward migration south of Alaska and are known as the Pacific coast feeding aggregation.

The ruling in *Anderson* v. *Evans* prompted the Makah Tribe to seek authorization of its whaling activities under the Marine Mammal Protection Act. On 11 February 2005 the tribe requested that the National Marine Fisheries Service promulgate regulations waiving the Act's moratorium on taking marine mammals. The requested waiver, as implemented by the tribe, would—

- allow the tribe to kill up to 20 gray whales from the eastern North Pacific stock for ceremonial and subsistence purposes in any five-year period, with a maximum of five whales landed per calendar year;
- limit the number of whales that may be struck to no more than seven and the number struck and lost to no more than three, in any calendar year;
- allow whaling only during established gray whale migration periods when the majority of animals passing through the Makah hunting grounds presumably would not be part of the Pacific coast feeding aggregation;
- prohibit hunting in gray whale feeding grounds in the Strait of Juan de Fuca;
- require comparison of photographs of all landed whales with the National Marine Fisheries Service's photo-identification database for the feeding aggregation; and
- suspend the hunt for the remainder of any calendar year if necessary to prevent the harvest of whales found in the aggregation database from exceeding an allowable bycatch level, which would be calculated annually using a formula akin to that used to calculate the potential biological removal level of marine mammal stocks under section 117 of the Marine Mammal Protection Act. Using a minimum population size for the feeding aggregation of 106 whales, the tribe calculates the initial allowable bycatch level to be 2.49 whales.

Under the tribe's proposal, whaling activities would be governed by permanent regulations, which would authorize the Service to issue the tribe a renewable whaling permit, valid for up to five years, provided the tribe met certain standards necessary to conserve both the North Pacific gray whale stock and the Pacific coast feeding aggregation. Whaling by the tribe also would be subject to any subsistence whaling limits established by the IWC. Although the tribe submitted its application to comply with the Ninth Circuit's ruling, the tribe continues to maintain that its treaty whaling rights have not been abrogated by the Marine Mammal Protection Act or other U.S. law.

At its 2007 annual meeting, the Commission reviewed actions related to the Makah Tribe's petition for regulations authorizing subsistence whaling. Tribal representatives summarized the elements of the proposal and explained why the resumption of whaling is important to the tribe. The National Marine Fisheries Service provided an update on the status of its consideration of the tribe's proposal. The Service indicated that it expected to publish a draft environmental impact statement for public review sometime during the fall of 2007 and that that document would analyze various alternatives, including issuing the requested authorization. If, after completing the environmental impact statement, the Service decides to propose issuance of a waiver for whaling by the Makah under the Marine Mammal Protection Act, it must do so using formal rulemaking procedures. These procedures provide interested organizations and individuals the opportunity to request a formal hearing before an administrative law judge at which evidence concerning the proposal is presented and made available for cross-examination. Based on the hearing record, the administrative law judge provides a recommended decision to the agency for its consideration. The Service declined to speculate on when a rulemaking might be initiated or completed. Animal welfare groups also expressed their views to the Commission, indicating that they were monitoring the issue closely and were likely to participate as parties to any such rulemaking.

On 8 September 2007 five Makah Tribe members obtained three large-caliber rifles maintained by the tribe for hunting whales and headed offshore in two vessels to hunt a gray whale. Reportedly, the tribe members repeatedly shot and harpooned a gray whale and attached buoys to the animal to prevent its escape and to aid in recovering the whale after its death. Before the whale died, a Coast Guard vessel arrived on the scene and intervened. The whalers were questioned and taken into custody. The whale died several hours later and sank in deep water east of Cape Flattery.

On 10 September 2007 the Makah Tribe issued a press release denouncing the actions of the five whalers. The tribe stated that those actions were in "blatant violation" of tribal law and indicated that the whalers would be prosecuted by the tribe. The notice also called on the public to not let the actions of "five irresponsible persons" be used to harm the image of the entire Makah Tribe as a law-abiding people. Charges were subsequently filed by the tribe against the five individuals for whaling without proper authorization.

Shortly after the whaling incident, representatives of the tribe traveled to Washington, DC, to meet with members of Congress and officials from the National Oceanic and Atmospheric Administration and the Marine Mammal Commission. The Commission met with the Makah delegation on 13 September 2007. At that meeting, the tribal members confirmed that the hunt had occurred without tribal approval and provided assurances that steps had been taken to ensure that similar incidents do not occur in the future.

In addition to the tribe's enforcement action, the United States government filed charges against the five tribe members for alleged violations of federal law. In a 4 October 2007 indictment, each was charged with taking a marine mammal in violation of the Marine Mammal Protection Act, whaling in violation of the Whaling Convention Act, and engaging in a conspiracy to hunt and kill a gray whale illegally. The defendants in that case (*United States* v. *Gonzales et al.*) have filed several motions to dismiss the case and have sought to have some of the evidence excluded. Among other things, the defendants have argued that (1) their whaling activities did not constitute violations of federal law because they are authorized under the Treaty of Neah Bay, (2) the count against them under the Marine Mammal Protection Act is unconstitutional because it

violates due process principles by treating members of the Makah Tribe differently than Natives residing in Alaska who take marine mammals for subsistence purposes, and (3) the conspiracy charge should be dropped because a defendant cannot be convicted for agreeing to engage in conduct that is not per se prohibited by a federal criminal statute and that, in this case, the taking of a whale by a tribal member is not always unlawful under the applicable statutes. Unless the charges are dropped or dismissed, or plea agreements are reached, a trial on this matter is expected to begin on 8 April 2008.

Following the unauthorized taking of the gray whale, the National Marine Fisheries Service decided that the environmental impact statement it had been drafting requires substantial revision to reflect the changed circumstances. At the Commission's August meeting, the Service had anticipated that a draft environmental impact statement would be issued shortly. At the end of 2007 the Service did not expect to publish the document until mid-2008. Following public comment on the draft environmental impact statement, the Service will decide whether to publish a proposed rule to authorize the Makah Tribe to take whales under the Marine Mammal Protection Act.

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Chapter III

OTHER SPECIES OF SPECIAL CONCERN

Section 202 of the Marine Mammal Protection Act directs the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, to make recommendations to the Departments of Commerce and the Interior and other federal agencies regarding research and management actions needed to conserve species and stocks of marine mammals.

To meet this charge, the Commission devotes special attention to particular species and populations that are vulnerable to the impact of human-related activities. Such species may include marine mammals listed as endangered or threatened under the Endangered Species Act or as depleted under the Marine Mammal Protection Act (Table III-1). In addition, the Commission often directs attention to other species or populations of marine mammals not so listed whenever special conservation challenges arise that may affect them.

During 2007 special attention was directed to a number of endangered, threatened, or depleted species or populations including Cook Inlet beluga whales, polar bears, Hawaiian monk seals, North Atlantic and North Pacific right whales, Florida manatees, Steller sea lions, and northern sea otters in Alaska. In the preceding chapter, this report addresses issues involving marine mammal populations off the West Coast of the United States. These include interactions between pinnipeds and salmon at Bonneville Dam, southern sea otters off California and northern sea otters off Washington, southern resident killer whales, and the petition by the Makah Tribe for authorization to hunt gray whales.

Cook Inlet Beluga Whale (*Delphinapterus leucas*)

The Cook Inlet beluga stock is one of five in U.S. waters. Geographical isolation and mitochondrial DNA analyses confirm that it is a distinct stock. Unlike other beluga stocks in U.S. waters, the Cook Inlet stock has experienced a significant decline in recent years. Although the population is believed to have numbered more than 1,300 as recently as the late 1980s, it declined rapidly during the 1990s, primarily as a result of overharvesting by Alaska Native subsistence hunters. Current abundance is likely in the low 300s.

Because of their proximity to Anchorage, belugas in Cook Inlet are exposed to activities occurring around the largest urban area in Alaska. National Marine Fisheries Service analyses of beluga 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 now rarely seen in offshore waters or in the lower reaches of the inlet. In June, when the Service conducts aerial surveys of the population, belugas generally are concentrated in a few groups in the inlet's upper reaches around the Susitna River delta, Knik Arm, Turnagain Arm, and Chickaloon Bay.

Proposed Listing as Endangered

The National Marine Fisheries Service designated the Cook Inlet beluga whale stock as depleted under the Marine Mammal Protection Act on 31 May 2000. At that time, the Service declined to list the stock under the Endangered Species Act,

Table III-1 Marine mammals listed as endangered (E) or threatened (T) under the Endangered Species Act or depleted (D) under the Marine Mammal Protection Act, as of 31 December 2007

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; Greater Antilles; Bahamas
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 (including Red Sea and Arabian Gulf); Philippines; Australia; southern China
Otters			
Marine otter	*Lontra felina*	E/D	Western South America; Peru to southern Chile
Southern sea otter	*Enhydra lutris nereis*	T/D	Central California coast
Northern sea otter, Southwest Alaska population	*Enhydra lutris kenyoni*	T/D	Aleutian Islands to Cook Inlet, Alaska
Seals and Sea Lions			
Caribbean monk seal	*Monachus tropicalis*	E/D	Caribbean Sea and Bahamas (extinct)
Hawaiian monk seal	*Monachus schauinslandi*	E/D	Hawaiian Archipelago
Mediterranean monk seal	*Monachus monachus*	E/D	Mediterranean and Black Seas; northwestern African coast; Madeira
Guadalupe fur seal	*Arctocephalus townsendi*	T/D	Baja California, Mexico, to Southern California
Northern fur seal	*Callorhinus ursinus*	D	North Pacific from California to Japan; Bering Sea
Western Steller sea lion	*Eumetopias jubatus*	E/D	North Pacific from Japan to Prince William Sound, Alaska (west of 144° W longitude)
Eastern Steller sea lion	*Eumetopias jubatus*	T/D	North Pacific from Prince William Sound, Alaska (east of 144° W longitude) to central California
Saimaa seal	*Phoca hispida saimensis*	E/D	Lake Saimaa, Finland
Whales, Porpoises, and Dolphins			
Baiji	*Lipotes vexillifer*	E/D	Yangtze River, China
Indus river dolphin	*Platanista minor*	E/D	Indus River, Pakistan
Vaquita	*Phocoena sinus*	E/D	Northern Gulf of California
Northeastern offshore spotted dolphin	*Stenella attenuata attenuata*	D	Eastern tropical Pacific Ocean
Coastal spotted dolphin	*Stenella attenuata graffmani*	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 and North Pacific Oceans; Bering Sea
Southern right whale	*Eubalaena australis*	E/D	South Atlantic, South Pacific, Indian, and Southern Oceans
Killer whale, AT1 population	*Orcinus orca*	D	Prince William Sound; Kenai Fjords, Alaska
Killer whale, southern resident population	*Orcinus orca*	E/D	Coastal waters from central California to Vancouver Island and the Queen Charlotte Islands
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
Sei whale	*Balaenoptera borealis*	E/D	Oceanic; all oceans
Western gray whale	*Eschrichtius robustus*	E/D	Western North Pacific Ocean and adjacent seas
Sperm whale	*Physeter macrocephalus*	E/D	Oceanic; all oceans

Source: U.S. 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.

primarily because it believed that overharvest by subsistence hunters, which it had identified as the primary threat to the stock, was being adequately addressed. The Service concluded that, although the population had been reduced to a small size, it did not meet the Endangered Species Act's listing criteria because a stock with at least 300 individuals and a positive intrinsic growth rate was unlikely to go extinct due to stochastic events.

Contrary to the Service's expectations, the Cook Inlet beluga stock has not increased since harvest controls were established in 1999. In fact, it appears that the stock has continued to decline, despite the fact that subsistence hunters are reported to have taken only five whales in the past nine years. The point estimates of the population size for 2005 and 2006 are the lowest ever, with estimates of 278 and 302 whales, respectively, in those years. The point estimate of abundance derived from surveys conducted in 2007 jumped to 375, but given the uncertainty associated with these estimates, the difference from other recent estimates is not statistically significant. Abundance estimates dating back to 1994, when the Service instituted its monitoring program, and the confidence limits around those estimates, are provided in Figure III-1.

In light of these recent population trends and uncertainty regarding the cause or causes of the observed decline, the Marine Mammal Commission has recommended that the Service revisit its Endangered Species Act listing decision. On 24 March 2006 the Service published notice in the

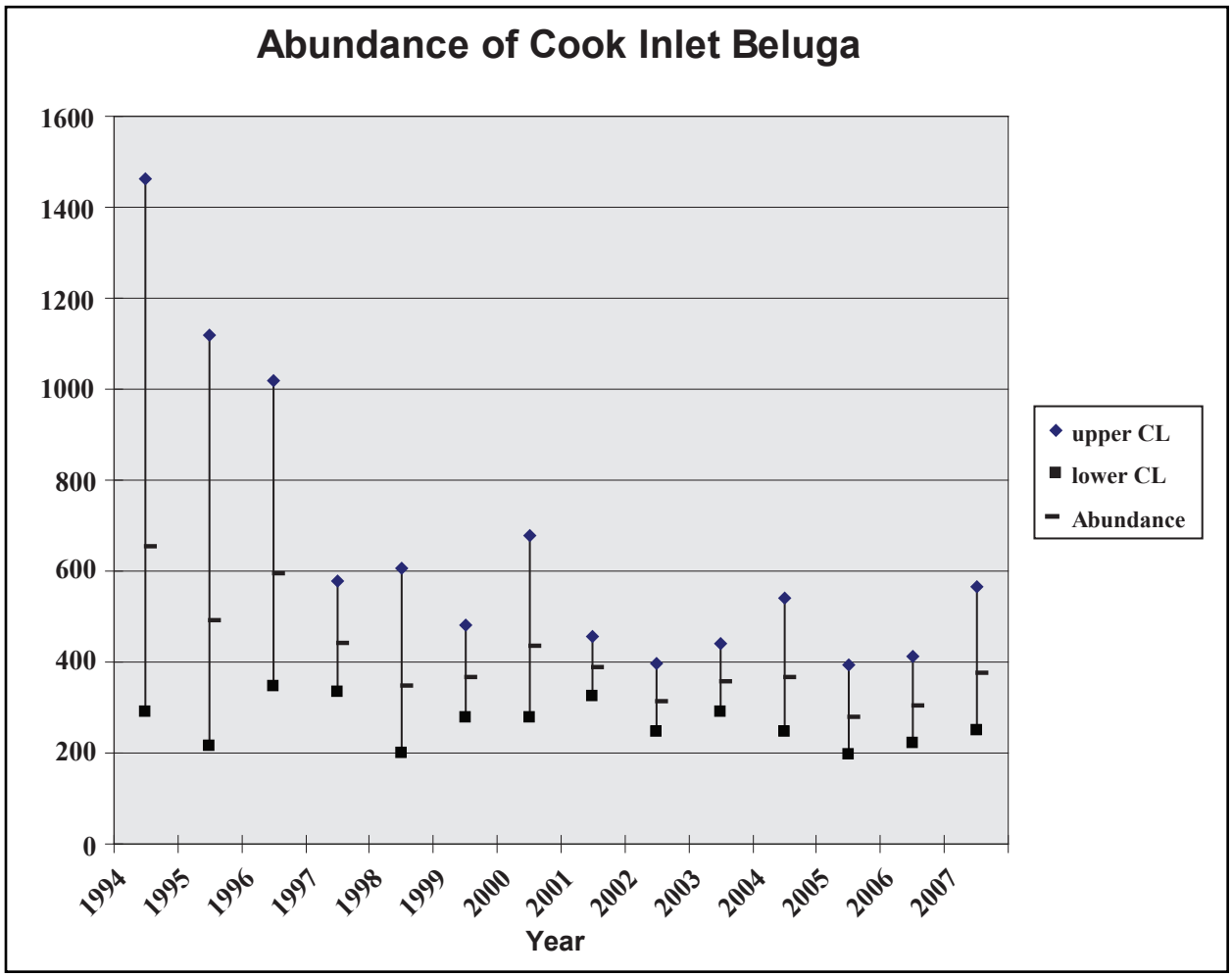

Figure III-1: Abundance estimates (and upper and lower 95 percent confidence limits) of Cook Inlet beluga whales, 1994–2007. Data courtesy of National Marine Fisheries Service.

Federal Register that it planned to reevaluate the status of Cook Inlet belugas and was initiating a status review of the population.

The Commission provided comments on the status of Cook Inlet belugas by letter of 24 April 2006, reiterating its opinion that listing the stock as endangered was warranted. The Commission noted that the Cook Inlet beluga population numbered about the same as the North Atlantic right whale population, which is generally considered by the Service and others to be among the most critically endangered cetacean species. The Commission also pointed to a recent review of the Cook Inlet beluga population's status by the Cetacean Specialist Group of the International Union for Conservation of Nature (IUCN) in which the group concluded that the stock qualified as "critically endangered" under the applicable IUCN criteria. The Commission recommended that the Service expedite publication of a proposed listing determination, rather than waiting to complete the envisioned status review, and that the agency should even consider using the emergency listing provisions of the Endangered Species Act as an interim measure.

The Commission also responded to the Service's call for information concerning the designation of critical habitat for the stock. The Commission expressed the view that the designation of critical habitat was one of the most important actions that the Service could take to prevent the extinction of the Cook Inlet beluga population, and it recommended that such a designation include all areas identified as "high value" habitat in the draft conservation plan that the Service had prepared for the stock under the Marine Mammal Protection Act.

In addition, the Commission expressed concern that the lack of any detectable growth in the population since subsistence hunting was curtailed strongly indicates that some other factor or factors are operating to reduce survival or reproduction. As such, the Commission believed that the most urgent need is additional funding for an expanded research program to investigate those factors and identify possible remedial actions. The Commission suggested that such activities might include foraging and habitat-use studies, analyses of contaminant levels in beluga tissues and their environment, systematic surveys to determine the probability of detecting strandings, an improved stranding response program to maximize the potential for rescue, and a necropsy program to maximize the information obtained from any deaths.

While the Service was soliciting comments on the status of the Cook Inlet beluga, it received a new petition to list the population under the Endangered Species Act. On 20 April 2006 Trustees for Alaska petitioned the Service to list the population as endangered. The Service published a finding on 7 August 2006 that the petition had presented substantial information that such a listing may be warranted, but because it had already initiated a new status review of the population, it did not separately solicit public comments on the merits of the petition.

On 20 April 2007, the deadline by which an initial decision was to be made, the Service published a proposed rule to list the Cook Inlet beluga whale as an endangered species. The proposed rule reaffirmed the Service's earlier determination that Cook Inlet belugas constituted a distinct population segment that could be considered for listing. It also summarized recent population trends and reviewed the factors that could be contributing to the observed decline. A population viability analysis prepared by the Service predicted a further decline of the population in 65 percent of the cases modeled and extinction within 300 years in 29 percent of the cases. Using the model with the best fit to observed population trends, the Service concluded that there was a 26 percent probability of the stock's extinction within 100 years. The Service noted that this risk of extinction would be considerably higher if any of the mortality rates used in the model were higher than assumed (e.g., if killer whale predation accounted for more than one death per year). In addition, the Service identified other factors—such as inbreeding and loss of genetic variability—that could further compromise a small population like this one. The proposed rule indicated that the Service would be considering the designation of critical habitat in a separate rulemaking.

The Commission commented on the proposed listing rule on 3 August 2007. The Commission noted that the justification and need for listing the Cook Inlet beluga whale under the Endangered Species Act had been apparent for several years.

Thus, it strongly supported the proposed listing and recommended that the Service move swiftly to complete the listing process. In support of this view, the Commission noted, among other things, that the addition of the 2006 population estimate to the trend analysis further strengthened the argument that the population is continuing to decline. When the 2006 estimate is added to the series, the probability that the population is declining increases from 71 percent to 81 percent. The Commission also reiterated its past recommendations that the Service expand its research efforts to investigate the factor or factors that may be having adverse effects on the population and to identify possible remedial actions.

Although the Service indicated that it intended to defer the designation of critical habitat until after a listing decision had been made, the Commission believed the scientific information currently available to be sufficient to identify areas that warrant designation. The Commission therefore recommended that the Service designate critical habitat for the Cook Inlet beluga as soon as possible. Noting that the Service had been conducting aerial surveys of the population since 1993, the Commission observed that there is a substantial amount of information on beluga distribution and habitat use in Cook Inlet, particularly for the mid-summer period, which could be used as the basis for a critical habitat designation. Other surveys, a tagging study, and modeling of habitat use provide additional information on which to base a designation. Drawing on those sources of information, the Commission suggested that a reasonable designation would include all waters of Cook Inlet from Kalgin Island northward to the headwaters of Knik and Turnagain Arms and all coastal waters less than 18 meters in depth in the rest of the inlet. The Commission noted that these areas correspond to the three key habitat types that the draft conservation plan for Cook Inlet belugas identified as being important to recovery of the stock. The Commission noted that, in addition to high-value summer habitat, it was important for the designation to include winter habitat, secondary summer habitat, and historically used habitat that likely would be reoccupied if and when the population recovers.

As a general rule, the Service has one year from the date of publication of a proposed listing action to complete the process. The listing deadline can be extended for up to six months if the Service determines that there is "substantial disagreement regarding the sufficiency or accuracy of the available data relevant to the determination…." Unless the Service issues an extension, publication of a final listing rule is expected by 20 April 2008. At the end of 2007 the Service was considering whether the 2007 population estimate, which was higher than those from the previous two years, created a disagreement over the sufficiency of the data on which the proposed listing was based. In the Commission's view, this single data point is not a sufficient basis for delaying a listing decision.

Conservation Plan

Section 115(b) of the Marine Mammal Protection Act directs the National Marine Fisheries Service to prepare a conservation plan as soon as possible for any stock that it designates as depleted unless it determines that such a plan will not promote the conservation of the species or stock. Conservation plans are to be modeled on recovery plans required under the Endangered Species Act. On 16 March 2005 the Service published a notice of availability of a draft conservation plan for the Cook Inlet beluga. The draft plan, comments on the plan, and other documents related to the management of Cook Inlet belugas are available on the Service's Web site, http://www.fakr.noaa.gov/protectedresources/whales/ beluga/management.htm.

The draft plan reviewed the biology and life history of Cook Inlet beluga whales and assessed the natural and human-induced factors that are or could be influencing the population. The Service identified four natural factors that could be impeding the recovery of the stock: stranding events, predation, disease, and environmental change. The Service considered nine types of human-induced factors that could be affecting the stock. These were subsistence hunting, commercial fishing and its potential effect on prey availability, pollution, vessel traffic, tourism and whale-watching activities, noise, oil and gas exploration and development, other types of development within Cook Inlet, and the possible effects of research activities. The draft

plan laid out proposed monitoring and research and a proposed conservation strategy based on the identified threats to the stock.

The Marine Mammal Commission provided extensive comments on the draft conservation plan by letter of 27 June 2005. A detailed summary of those comments was provided in the Commission's 2005 annual report. In short, the Commission recommended that the plan be reorganized into a more focused document that clearly describes the threats to the population, identifies specific actions to address those threats, discusses how those actions would contribute to the recovery of the stock, provides a budget for each action, and establishes clear priorities for undertaking those actions. The Commission also commented on the section of the draft plan concerning the possible listing of the Cook Inlet beluga under the Endangered Species Act, noting that coupling a listing review with development of the conservation plan would delay making a listing determination. The Service continued to rework the conservation plan during 2007, and a revised version of the plan is expected in 2008.

Regulation of Native Subsistence Hunting

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. Other limits may be placed on such taking only through formal rulemaking and only if a stock has been designated as depleted or is considered depleted by virtue of being listed as endangered or threatened under the Endangered Species Act. Estimates derived from a variety of sources indicate that high levels of subsistence hunting of Cook Inlet beluga whales occurred throughout much of the 1990s (Table III-2). Part of the impetus for this hunting was the availability of commercial outlets in Anchorage for be-

Table III-2. Reported Alaska Native subsistence take of Cook Inlet beluga whales, 1993–2007

Year	Reported total number taken	Estimated range of total take	Reported number harvested	Estimated number struck and lost
1993	30[1]	n/a	n/a	n/a
1994	21[1]	n/a	19[1]	2[1]
1995	70	n/a	42	26
1996	123	98–147	49	49–98
1997	70[2]	n/a	35[2]	35[2]
1998	42[2]	n/a	21	21
1999	0	0	0	0
2000	0	0	0	0
2001	1	–	1	0
2002	1	–	1	0
2003	1	–	1	0
2004	0	–	0	0
2005	2	–	2	0
2006	0	–	0	0
2007	0	–	0	0

[1] Estimated value (see 2002 stock assessment report)

[2] Represents a minimum value

Data courtesy of National Marine Fisheries Service.

luga muktuk (a popular Native food composed of the epidermis and underlying blubber of the whale). Such sales 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 a Native village.

Overhunting is the most likely primary cause of the severe decline in the population observed in the 1990s. The overharvest and precipitous decline of the Cook Inlet beluga whale stock led to a number of actions to prevent further decline and promote 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 stopgap legislative provision was enacted as part of the 1999 Emergency Supplemental Appropriations Act (Pub. L. 106-31) that prohibited, until 1 October 2000, the taking of belugas from the Cook Inlet stock for subsistence purposes unless authorized by a cooperative agreement between the National Marine Fisheries Service and an Alaska Native organization. Congress passed a revised provision in December 2000 (section 627 of Pub. L. 106-553) that extended indefinitely the prohibition on hunting Cook Inlet belugas unless authorized by the National Marine Fisheries Service through a cooperative agreement. Shortly before that, on 4 October 2000, the Service published proposed regulations on the hunting of Cook Inlet belugas under the Marine Mammal Protection Act. 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 was no longer depleted. This alternative was reflected in the proposed rule. Although it could have relied on its discretion under Public Law 106-553 to restrict subsistence taking by establishing harvest limits though cooperative agreements, the Service opted to proceed with the proposed rulemaking.

As discussed in previous annual reports, the Service convened rulemaking hearings in December 2000 and August 2004 to develop appropriate regulations. The Marine Mammal Commission participated as a party to that rulemaking. The major issues and the positions taken by the Commission at those hearings are discussed in past annual reports and are not repeated here.

At the conclusion of the 2000 hearing, the parties to the rulemaking agreed to interim subsistence hunting limits allowing the taking of 1.5 whales per year from 2001 through 2004, with the authorized number of strikes alternating between one and two each year. The rulemaking parties reached a new tentative agreement in 2004 to govern subsistence hunting for the five-year period from 2005 to 2009. Under that agreement, the allowable number of takes would alternate between two in the odd-numbered years and one in the even-numbered years. It was expected that final regulations establishing a long-term harvest regime would be in place for 2010 and beyond.

For a variety of reasons, not all of the authorized strikes have been used (Table III-2). In 2004 no harvest was allowed because the level of "unusual mortalities" (e.g., from strandings) in 2003 exceeded a threshold that the parties had agreed to for shutting down the hunt. Although one strike was authorized in 2006, no hunting occurred. As discussed below, Alaska Native hunters agreed to forego subsistence hunting in 2007 in response to recent low population estimates that strongly suggest that the population is continuing to decline.

Based on testimony presented at the 2000 and 2004 hearings and submissions by the parties, the presiding administrative law judge issued a recommended decision in the matter on 8 November 2005. The recommended decision was made available for public comment in February 2006.

The Commission provided comments on the recommended decision by letter of 8 March 2006. The Commission believed that the recommended harvest management regime (1) responded too slowly to instances when the beluga whale population is declining, remaining stable, or growing at an unusually slow rate, (2) did not fully satisfy the stipulations that the parties had agreed to that were to govern the development of the long-term regime,

and (3) did not require that the current population monitoring effort be maintained or, alternatively, include mechanisms that respond adequately to any dimunition in the quality of the data and the population estimates obtained. The Commission recommended that the Service retain flexibility to reconsider the interim harvest levels that would be established through 2009 under the recommended decision. In this regard, the Commission noted that, when the 2005 population estimate is considered, the five-year abundance average drops below the proposed 350-whale "floor" that would trigger a cessation of the harvest under the recommended long-term regime. The Commission did not advocate an immediate cessation of all hunting based on that single low estimate but thought that the final rule should afford the Service that option if low abundance estimates persist.

As reflected in Figure III-1, the 2006 abundance estimate was the second lowest on record. This prompted the Commission to write to the National Marine Fisheries Service on 6 March 2007 reiterating its recommendation that the harvest regulations provide flexibility to allow the agency to reduce or suspend hunting during the interim harvest period until the population shows clear signs that it is recovering fast enough to allow some harvesting. The Commission also expressed the view that, absent such regulations, Public Law 106-553 provided the Service with authority to limit or suspend hunting to prevent further decline of the population. The Commission believed that the situation had reached the critical point where no additional removals should be allowed. Although aware that the Service had asked the Cook Inlet Marine Mammal Council to forego hunting voluntarily, the Commission recommended that, if the hunters were unwilling to do so, the Service should act unilaterally to suspend the harvest. In making this recommendation, the Commission recognized the cultural and nutritional significance of beluga whales to Native hunters but believed that the situation concerning the Cook Inlet stock was sufficiently dire that conservation must take priority. As noted above, Cook Inlet hunters agreed voluntarily not to hunt beluga whales during 2007. As of the end of 2007 the Commission had yet to take a position on whether hunting should go forward in 2008 but noted that, even with the higher abundance estimate for 2007, the five-year average remains below 350 and that, under the proposed long-term harvest regime, no hunting would be allowed.

On 28 December 2007 the Service released a draft supplemental environmental impact statement on the long-term harvest regime. The Commission anticipates providing comments on that document within the specified comment period, which closes on 4 March 2008. The Service expects to finalize the supplemental environmental impact statement and publish a final rule during 2008.

Knik Arm Bridge

The State of Alaska established the Knik Arm Bridge and Toll Authority in 2003 for the purpose of overseeing the construction of a bridge across Knik Arm in upper Cook Inlet. The bridge would connect the municipality of Anchorage with the Mat-Su Borough. In September 2006 the bridge authority, in conjunction with the Federal Highway Administration, published a draft environmental impact statement (DEIS) under the National Environmental Policy Act to consider alternatives for the proposed bridge project and their impacts.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the DEIS and provided comments to the Federal Highway Administration on 17 November 2006, focusing on the potential effects on beluga whales. The Commission believed that the DEIS had identified most of the possible sources of impact, including disturbance from construction activities, increased vessel operations, and increased human use of the Knik Arm area; masking of sounds used by beluga whales for communication, navigation, and predator avoidance; alteration of habitat-use patterns, particularly in transit corridors into and out of Knik Arm; changes in the distribution and abundance of prey; and increased risk of strandings. However, the analyses in the DEIS largely discounted the significance of these potential effects. The Commission questioned several conclusions that it believed were overly optimistic and thought that some of these might stem from a misunderstanding on the part of the drafters as to how imperiled the Cook Inlet population of

belugas is. The Commission found the assessment of possible cumulative impacts in the DEIS to be especially wanting, particularly in light of the fact that the population seems to be experiencing an ongoing decline for undetermined causes even in the absence of the additional stressors likely to result from construction and operation of the bridge.

In its comments, the Commission also questioned whether the mitigation measures proposed in the DEIS would be sufficient to bring the bridge construction project into compliance with the Marine Mammal Protection Act's requirement that any resulting incidental taking have no more than a negligible impact on the affected marine mammal populations. This point had been raised by the Commission in a separate letter to the National Marine Fisheries Service, commenting on a request from the bridge authority for an incidental take authorization. Among other things, the Commission had noted the need for site-specific information but questioned whether data from a single season, which were all that had been collected, provided a sufficient basis to draw generally applicable conclusions about beluga whale habitat-use patterns in and around Knik Arm. A final environmental impact statement on the Knik Arm Bridge is expected early in 2008.

Polar Bear (*Ursus maritimus*)

The polar bear, perhaps the quintessential symbol of the Arctic, is the largest member of the genus *Ursus*. The species is distributed throughout the circumpolar Arctic in 19 populations totaling 20,000 to 25,000 bears (Aars et al. 2006). Polar bears evolved to exploit the Arctic sea ice niche. In recent years, global warming has led to a rapid decrease in the extent of sea ice habitat on which polar bears rely. This phenomenon, coupled with other threats, has raised serious concerns about the fate of polar bears, dependent as they are on sea ice habitat and healthy populations of ice seals for prey. The risk to polar bears has been recognized for more than a decade and prompted the Polar Bear Specialist Group of the International Union for Conservation of Nature (IUCN) to adopt a resolution in 2001 calling for increased research into the effects of global warming (Lunn et al. 2002). In 2005 the Polar Bear Specialist Group recommended that the species' status be changed from "low risk" to "vulnerable" based on the likelihood of an overall decline of more than 30 percent in the size of the total population within the next 35 to 50 years (Aars et al. 2006).

Two populations of polar bears are found within the jurisdiction of the United States. The Beaufort Sea stock numbers about 1,500 animals and is shared with Canada (Regehr et al. 2006). Although this population appears to have remained relatively stable over the past two decades, recent evidence, such as reduced cub survival, smaller body size, earlier emergence from dens, and episodes of cannibalism, suggests that the population is under stress due to the retreat of ice in summer (Regehr et al. 2006, Amstrup et al. 2006). The Chukchi/Bering Seas stock numbers about 2,000 animals and is shared with Russia (Lunn et al. 2002). Little information is available on the status of the Chukchi/Bering Seas stock, but anecdotal evidence suggests that unregulated subsistence hunting by Russian Natives on the Chukotka peninsula, coupled with legal hunting in Alaska, may have reached an unsustainable level.

In June 2007 the U.S. Fish and Wildlife Service convened a meeting of polar bear range states to discuss the status of polar bears and review national and international management and research programs for the species. A summary of that meeting is provided in Chapter IX. The taking of polar bears by sport hunters in Canada and importation of trophies into the United States are discussed in Chapter XI, as is the issuance of small take authorizations, some of which allow the taking of polar bears incidental to oil and gas operations in Alaska.

Proposal to List Polar Bears under the Endangered Species Act

On 16 February 2005 the Center for Biological Diversity petitioned the Secretary of the Interior to list the polar bear as a threatened species under the Endangered Species Act. The petition contended that the polar bear "faces likely global extinction in the wild by the end of this century as a result of global warming." Citing a recent report by the Arctic Climate Impact Assessment, the petition predicted

that summer sea ice coverage will decline by more than 50 percent and possibly disappear completely. The petition contended that even the partial loss of sea ice has the potential to drive the polar bear to extinction within the foreseeable future. In addition to the effects of global warming, the petition noted that polar bears face threats from increasing oil and gas exploration and development in the Arctic and the associated risk of oil spills, high levels of contaminants such as PCBs and heavy metals, unsustainable levels of hunting in some areas, and a general increase in human activities in the Arctic.

The petition also noted that some of these adverse effects are already manifesting themselves in at least one polar bear population, that in Canada's western Hudson Bay. The break-up of ice in western Hudson Bay is occurring about two and a half weeks earlier than it did 30 years ago. This translates into less time available for the bears to hunt seals, and the bears in that area are noticeably thinner and are experiencing lower reproductive rates and higher juvenile and subadult mortality.

The Fish and Wildlife Service's Initial Finding: Under the provisions of the Endangered Species Act, the Fish and Wildlife Service is required to make a determination within 90 days of receiving a listing petition as to whether the petition presents substantial information that the listing may be warranted. If an affirmative finding is made, the Service must promptly initiate a review of the species' status and, within 12 months of receipt of the petition, publish either (1) a finding that listing is not warranted, (2) a proposed rule to list the species, or (3) a finding that listing is warranted but precluded by other pending listing proposals.

The Fish and Wildlife Service published a finding on 9 February 2006 that the petition presented sufficient information to initiate a more thorough status assessment of polar bears worldwide. The Endangered Species Act defines an "endangered species" as any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined as any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act specifies that a status assessment and subsequent listing determination be based on the following five factors: (1) present or threatened destruction, modification, or curtailment of habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; and (5) other natural or manmade factors affecting the species' continued existence.

The Endangered Species Act does not define the term "foreseeable future," so one of the key determinations that the Service needed to make in deciding whether to list the polar bear as threatened was the time frame to use in its assessment. IUCN's Polar Bear Specialist Group, which had examined the status of polar bears in June 2005, had applied three generations as the appropriate time span for its projections. Generations, as defined by IUCN, are calculated as the age of sexual maturity (5 years for polar bears) plus 50 percent of the length of the lifetime reproductive period (20 years for polar bears). Based on these determinations, the Polar Bear Specialist Group calculated the period of one generation as 15 years and three generations as 45 years. Given the IUCN criteria, the life history and population dynamics of polar bears, documented recent changes in both multi-year and annual sea ice, and the direction of projected rates of change of sea ice in future decades, the Fish and Wildlife Service considered the three-generation, 45-year time span to be a reasonable projection of the foreseeable future in analyzing whether the species merited listing under the Endangered Species Act.

Consultation with the Marine Mammal Commission: During its preparation of a draft polar bear assessment, the Service consulted with the Marine Mammal Commission. The Commission believed that the draft assessment provided a comprehensive summary of information on the species but that a more directed, concise analysis that focused on the Endangered Species Act listing criteria was needed. In a 24 July 2006 letter to the Service, the Commission provided several drafting suggestions and recommended that the assessment be restructured to highlight four areas: the biology and ecology of polar bears, the status and trends of the various populations, the present and future threats to the species, and a mechanism for determining the significance of those threats. The Commission believed that some areas had been well

covered but that more attention needed to be paid to information on potential threats and, particularly, to an assessment of the risks that those threats posed to the affected populations. The Commission suggested, for example, that the Service engage in population modeling to estimate the amount of change in various population parameters needed to cause negative population-level effects that would lead to extinction over a defined period of time.

The Commission also indicated that the 45-year period being used by the Service in its analyses was too short. The Commission believed that a time frame of 100 to 120 years was more appropriate, in part because it would conform to the durations over which sea ice persistence is modeled and would be consistent with the time frames used in risk analyses for other marine mammal species such as large whales, beluga whales, and manatees.

The Service published its status review of polar bears on 21 December 2006. A copy of the review is available on the Service's Web site at http://alaska.fws.gov/fisheries/mmm/polarbear/pdf/ Polar_Bear_%20Status_Assessment.pdf. The Service adopted some, but not all, of the suggestions made by the Commission. Among other things, the Service retained the three-generation time span in its assessments.

Proposed Listing Rule: On 9 January 2007 the Fish and Wildlife Service published a proposed rule to list all populations of polar bears as threatened under the Endangered Species Act. The Service believed that the species as a whole met the definition of a threatened species and the various populations need not be listed separately. The proposed rule analyzed each of the five factors that are to be considered in making listing determinations and found that the first factor—present or threatened destruction, modification, or curtailment of the species' habitat or range—warranted listing. The Service reviewed various climate models that indicate a likelihood that sea ice, on which polar bears are dependent for hunting, seasonal movements, resting, and mating, will continue to decrease in extent and thickness. The Service noted that some models predict that, during summer months, sea ice will disappear almost completely by the end of this century. Researchers have already detected a link in certain areas (e.g., southern and western Hudson Bay) between a warming climate and declines in polar bear condition, distribution, and numbers. The Service found that other potential listing factors could take on added importance as polar bears are further stressed by habitat change, but that none of these other factors, by themselves, currently threatens the species throughout all or a significant portion of its range.

The Service is required to designate critical habitat concurrent with the listing of a species under the Endangered Species Act unless it determines that such a designation is not prudent or not determinable. If critical habitat is not determinable at the time of listing, the Service has up to an additional year in which to make such a determination. The proposed listing of polar bears discussed critical habitat in general terms—for example, areas with annual and perennial sea ice used by polar bears for hunting, traveling, denning, etc., and terrestrial areas used for denning—but did not include a proposed critical habitat designation. Rather, the Service indicated that such a designation would require additional time and evaluation, and it specifically solicited information regarding critical habitat.

Commission Comments: The Marine Mammal Commission provided comments by letter of 9 April 2007, supporting the proposed listing of the polar bear as a threatened species. Because polar bears currently have a relatively large total population size and a broad distribution, the Commission did not believe that the species currently is in danger of extinction. However, the Commission agreed with the Service that the loss of sea ice habitat as a consequence of continued climate change and the lack of adequate management mechanisms to address sea ice recession are likely to place the species in danger of extinction throughout all or a significant portion of its range within the foreseeable future (i.e., within the 45-year time frame considered by the Service).

The Commission noted that, because of the species' wide distribution and far-ranging movements, efforts to prevent further population decline of polar bears would require coordinated efforts among all of the range states with management responsibility for the species. The Commission therefore recommended that the

Service collaborate with management authorities in other range states to develop and enhance conservation programs for polar bears, including protection of their habitat. As discussed in Chapter IX, in June 2007 the Service convened a meeting of the polar bear range states to provide an international forum for exchanging information on polar bear research and management programs, reviewing the status of polar bear populations, and considering additional measures to strengthen polar bear conservation programs.

The Endangered Species Act requires that a recovery plan be developed and implemented for each listed species unless the Service determines that such a plan will not promote the conservation of the species. The Commission noted that, in general, recovery plans promote the conservation of species. Although it recognized that it may be premature to constitute a recovery team immediately, the Commission recommended that the Service make a concerted effort to identify and begin addressing management and research needs so that efforts to conserve polar bears are as well informed as possible. The Commission advised the Service to consider not only the direct effects of climate change but to anticipate secondary effects, such as increased shipping in the Arctic and expanded opportunities for commercial fishing, oil and gas production, tourism, and coastal development. The Commission stressed the importance of identifying essential polar bear habitats and collecting baseline information on use of those habitats before secondary threats associated with climate change occur and become irreversible.

The Commission recognized the complexity involved in identifying specific features and geographical areas that merit designation as critical habitat but disagreed with the Service's proposal to defer designation until after a listing decision is made. For example, polar bear denning areas along the North Slope of Alaska have been recognized for several decades, and biologists with the U.S. Geological Survey have mapped terrestrial areas used for denning and resting. The Commission recommended that these areas be designated as critical habitat. Sea ice habitat is dynamic, variable, and constantly changing, so identification of areas that may require special management or protection is more difficult. Nevertheless, the Commission thought that the Service needed to consider designating as critical habitat those areas of multiyear or annual pack ice north of Alaska that may provide suitable denning sites for polar bears. The Commission suggested that the Service work closely with sea ice scientists to predict areas where ice may persist in future decades for designation as critical habitat. In addition, the Commission observed that it might be necessary to develop a management system with dynamic boundaries that can be adjusted to reflect variations in the locations and extent of sea ice. The Commission also noted the importance of areas used by polar bears for feeding and movements between feeding and denning areas and recommended that the Service implement a study to identify such areas for inclusion in the critical habitat designation.

The Commission's letter also discussed the implications of listing the polar bear under the Endangered Species Act for the importation of trophies from sport hunts conducted in Canada, as authorized under section 104(c)(5) of the Marine Mammal Protection Act. If the species is listed, it will be considered depleted under the Marine Mammal Protection Act and imports will be allowed only under permits issued for purposes of scientific research or species enhancement. The Commission noted that the requirements for trophy imports established under the Marine Mammal Protection Act had prompted improvements in Canada's polar bear management programs and provided a strong incentive within remote villages in Canada to support science-based management of polar bears. The Commission cautioned that the costs and benefits of continued hunting needed to be weighed carefully as polar bears decline due to changing environmental conditions but said it believed that, at present, the conservation benefits outweighed the costs. The Commission therefore recommended that the Service consider ways in which the conservation benefits of allowing polar bear trophies to be imported from approved hunts in Canada could be retained and how those programs could be strengthened to enhance the long-term viability of polar bear populations. The Commission further suggested that the Service explore the establishment of criteria that could

be used to determine when the costs of allowing closely regulated hunting of polar bears would outweigh the benefits.

Additional Information: Shortly after publication of the proposed listing rule, the Secretary of the Interior asked the U.S. Geological Survey to develop new information, models, and interpretations on polar bears and their sea ice habitats that would be made available within the one-year decision-making time frame. Specifically, the agency was asked to (1) develop population projections for the southern Beaufort Sea population and analyze existing data on two polar bear populations in Canada, (2) evaluate Northern Hemisphere sea ice projections as they relate to polar bear habitat and the species' future distribution, and (3) model future range-wide polar bear populations by developing a synthesis of the range of likely spatial and numerical responses to sea ice projections. In response to this directive, the U.S. Geological Survey prepared nine new reports on polar bear status and demography, uncertainty concerning climate models, and the relationships between sea ice projections and polar bear distribution. The Fish and Wildlife Service announced the availability of these reports in the 20 September 2007 *Federal Register* and invited comments, initially during a 15-day public comment period that was later extended until 22 October. The nine reports are available on the U.S. Geological Survey's Web site at http://www.usgs.gov/newsroom/special/polar_bears/.

The reports divided the range of polar bears into four ecoregions based on significant differences in current and projected sea ice conditions. These ecoregions are (1) the seasonal ice ecoregion, which occurs mainly at the southern extreme of the polar bear range and includes Hudson Bay, (2) the archipelagic ecoregion consisting of the Canadian Arctic, (3) the polar basin divergent ice ecoregion, where ice is formed and then drawn away from nearshore areas, especially during the summer minimum ice season, and (4) the polar basin convergent ice ecoregion, where sea ice formed elsewhere collects against the shore. The reports also presented new information on the status of 3 of the 19 populations of polar bears, each from a different ecoregion. Based on current conditions, projected sea ice trends, and the associated effects on polar bears, the U.S. Geological Survey predicted population declines in western Hudson Bay (in the seasonal ice ecoregion) and southern Beaufort Sea (in the divergent ice ecoregion) due to reduced availability of sea ice. Furthermore, agency scientists predicted that polar bears could be extirpated from the polar basin divergent ice ecoregion and the seasonal ice ecoregion within the next 45 years. Extirpation of polar bears in the polar basin convergent ice ecoregion was likely to occur within the next 75 years. The models predicted that polar bears in the archipelagic ecoregion were likely to persist through the end of this century but in reduced numbers.

Commission Comments on Additional Information: On 22 October 2007 the Marine Mammal Commission transmitted comments on the new reports and their implications for the listing of polar bears to the Fish and Wildlife Service. The Commission believed that the papers made available by the Service made a compelling case that the polar bear as a circumpolar species faces threats that are likely to reduce its numbers in the foreseeable future to the point where the risk of extinction is significant. The Commission noted further that some populations already are in danger of extinction unless the declining trends in sea ice coverage are somehow reversed. Based on the new information indicating that polar bears inhabiting the divergent ice ecoregion and the seasonal ice ecoregion could be extirpated by the middle of the 21st century, the Commission recommended that populations in those regions (the southern Beaufort Sea, Chukchi Sea, Laptev Sea, Kara Sea, Barents Sea, western Hudson Bay, and southern Hudson Bay) be listed as endangered. The Commission also recommended that polar bear populations in the other two ecoregions be listed as threatened.

The Commission explained that the Endangered Species Act requires that listing decisions be based on the best available scientific and commercial information and expressed the view that the papers and analyses circulated by the Service for review constituted the best scientific information currently available on the likely changes to polar bear habitat and the implications of those changes for the species. The Commission observed that, in some areas, populations already are showing signs of stress (i.e., shifting toward land-based denning, abandonment

of areas with high rates of ice degradation, the presence of starving and underweight bears, and cannibalism).

The critical factor for polar bear persistence is the extent and characteristics of sea ice. As such, the case for listing bears made by the new reports hinges largely on whether the reductions in sea ice predicted by the U.S. Geological Survey are reasonably likely to occur. The Commission thought that the models used had been selected with objectivity and rigor and that the agency had appropriately relied on the models that were most consistent with observed ice trends. One possible shortcoming identified by the Commission was that the models used to predict future ice patterns failed to take into account observations from 2007. In 2007 minimum sea ice coverage declined to a historic low of just over 4 million km^2, which is about 1 million km^2 less than the previously observed minimum (in 2005) and reflects a nearly 40 percent reduction compared with the average from 1979 through 2000. Had data from 2007 been used, the projected sea ice coverage in future years would likely have been lower and the impact on polar bears greater than those reflected in the agency's analyses. In addition, those analyses failed to account for some factors that might exacerbate the problem, including projected increases in the release of greenhouse gases from the thawing of permafrost and the albedo effect that is expected to increase thermal absorption as ice coverage diminishes. Noting that recent trends in sea ice coverage suggest an accelerating loss of ice, the Commission observed that the projections from the models used by the U.S. Geological Survey in its assessment might prove to be optimistic.

At the end of 2007 the Service was reviewing comments on the new information and preparing a final listing determination, which is expected early in 2008.

Native Subsistence Hunting

The Marine Mammal Protection Act authorizes Alaska Natives to take marine mammals for subsistence uses and for purposes of making and selling authentic Native articles of handicrafts and clothing. Subsistence hunters in Alaska take polar bears from both stocks that occur in Alaska (see Table III-3). The Fish and Wildlife Service's

Table III-3. Numbers of polar bears reported taken by Alaska Natives, 1980–2007

Harvest Year	Total Take	Chukchi/ Bering Seas Stock	Beaufort Sea Stock
1980–1981	109	71	38
1981–1982	92	69	23
1982–1983	88	56	32
1983–1984	297	235	62
1984–1985	120	67	53
1985–1986	133	103	30
1986–1987	104	68	36
1987–1988	128	91	37
1988–1989	142	83	59
1989–1990	103	78	25
1990–1991	82	60	22
1991–1992	62	34	28
1992–1993	81	43	38
1993–1994	128	78	50
1994–1995	96	73	23
1995–1996	46	12	34
1996–1997	92	38	54
1997–1998	61	33	28
1998–1999	107	84	23
1999–2000	67	36	31
2000–2001	97	53	44
2001–2002	109	76	33
2002–2003	66	27	39
2003–2004	65	21	44
2004–2005	65	34	31
2005–2006	89	57	32
2006–2007	70	50	20

Harvest year is 1 July to 30 June.
Data courtesy of the Fish and Wildlife Service.

marking and tagging program has provided data on the numbers of polar bears taken since 1988, the year that program was instituted. Under the program, Alaska Native hunters are required to report within 30 days each polar bear taken and to present the animal's skin and skull for tagging. The Service has established a network of "taggers" located in each of the hunting villages who tag the bear parts and collect information on the size, sex, and approximate ages of the bears and the locations where they were taken.

The number of bears taken from the Chukchi/Bering Seas stock has declined since the 1980s. The average annual take of bears in the 1980s was 92. This fell to about 50 a year during the 1990s and has dropped to about 45 a year since 2000. The causes for this decline are not well understood but may be related to changing climate conditions and the altered duration, extent, movement, and thickness of the sea ice in the area, and may reflect a population decline. The suspected, but unquantified, increase in the number of bears being taken from this population in Russia also may be having an impact on the availability of polar bears to subsistence hunters in Alaska. The decline in the number of bears being harvested for subsistence also might be due in part to a decline in the number of active hunters in the Native hunting villages. In contrast to the Chukchi/Bering Seas population, the average number of polar bears taken from the Beaufort Sea stock has remained relatively constant since 1980 at about 36 bears a year.

Since 1994 the marking and tagging program has collected information on whether polar bears reported by Alaska Natives were taken as part of traditional subsistence hunts or in defense of life or property. Although the number of polar bears taken in defense of life or property varies considerably among years, the trend generally has been increasing in recent years, rising from about 3 per year in the mid-1990s to about 12 per year since 1998. During the 2006–2007 season, 11 polar bears were reported to have been taken in defense of life or property. This trend appears to be related to changing sea ice conditions: polar bears must spend more time on shore and their increasing presence results in more human/bear interactions.

Data on the number of bears being taken by Alaska Natives, however, give only a part of the picture because each of the stocks that occur in Alaska is shared with either Canada (Beaufort Sea stock) or Russia (Chukchi/Bering Seas stock) and is subject to hunting in those countries as well. To address the potential for overharvesting of the shared Beaufort Sea population, the North Slope Borough, representing polar bear hunters in Barrow, Nuiqsut, Wainwright, Atqasuk, and Kaktovik, entered into a management agreement with the Inuvialuit Game Council, representing hunters in Canada. The agreement was signed in 1988 and remains in effect. Although outside the scope of the Marine Mammal Protection Act, it is in some respects more restrictive than the provisions of the Act. For example, it prohibits the taking of bears in dens or bears constructing dens and protects family groups made up of females and cubs, as well as any cubs less than 1.5 m (5 ft) in length. In addition, in an effort to ensure a sustainable harvest, the parties to the agreement jointly establish annual hunting limits, which are divided between the parties before the hunting season. In part because of that agreement, the Beaufort Sea stock has been fairly well studied and maintained in good health. However, recent observations have detected a reduction in cub survival and decreased skull measurements in adult males, presumably related to stress in the population due to the retreat of sea ice and associated reduction in availability of prey.

The situation concerning the Chukchi/Bering Seas stock is markedly different. The most recent abundance estimate (about 2,000 animals) is more than 10 years old and is not considered reliable. Up-to-date and reliable data also are needed on recruitment, survival, and movement patterns within the population. As noted above, questions remain about the number of polar bears being removed by hunters in Russia, where hunting is currently prohibited but illegal harvest levels may be substantial. To address these concerns, the United States and Russia have concluded a bilateral agreement to conserve this stock, set hunting limits, and provide a vehicle for cooperative research. The status of that agreement and efforts to implement its provisions are discussed in Chapter IX.

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 breeds only in the Hawaiian Archipelago and occurs principally in the remote Northwestern Hawaiian Islands (NWHI) at six major breeding colonies (Kure Atoll, Midway Atoll, Pearl and Hermes Reef, Laysan Island, Lisianski Island, and French Frigate Shoals) (Figure III-2). Except for a brief period of stability early in the 1990s, counts of seals hauled out on beaches in the NWHI have been declining since at least the 1950s when the first counts were made. Since the late 1990s their numbers have been declining at about 4 percent a year and only about 1,200 animals remain (National Marine Fisheries Service 2007).

Causes of the species' decline have varied over time. Monk seals were extirpated from the main Hawaiian Islands after arrival of the first Polynesians 2,000 years ago, which restricted their range to the small, uninhabited islets of the NWHI. In the 1800s their numbers were further reduced when Europeans discovered those islets, and thousands of monk seals were killed by commercial sealers and by visitors and shipwrecked sailors. From the late 1800s to the late 1900s some NWHI atolls were occupied year-round or for shorter periods by people engaged in various commercial and military activities. The activities of those people and their pet dogs introduced a chronic source of disturbance that likely caused seals to abandon preferred pupping and resting areas. As a result, seals, particularly pups and juveniles, likely spent more time in the water and experienced higher rates of shark predation, which also contributed to their decline.

By the early to mid-1980s human disturbance in the NWHI was brought under control, but several other risk factors are known or suspected to have caused the species' decline to persist. These include entanglement in derelict fishing gear, depletion of prey resources resulting from changing oceanographic conditions and commercial fishing, aggressive behavior by adult male seals toward female and juvenile seals, shark predation, loss of

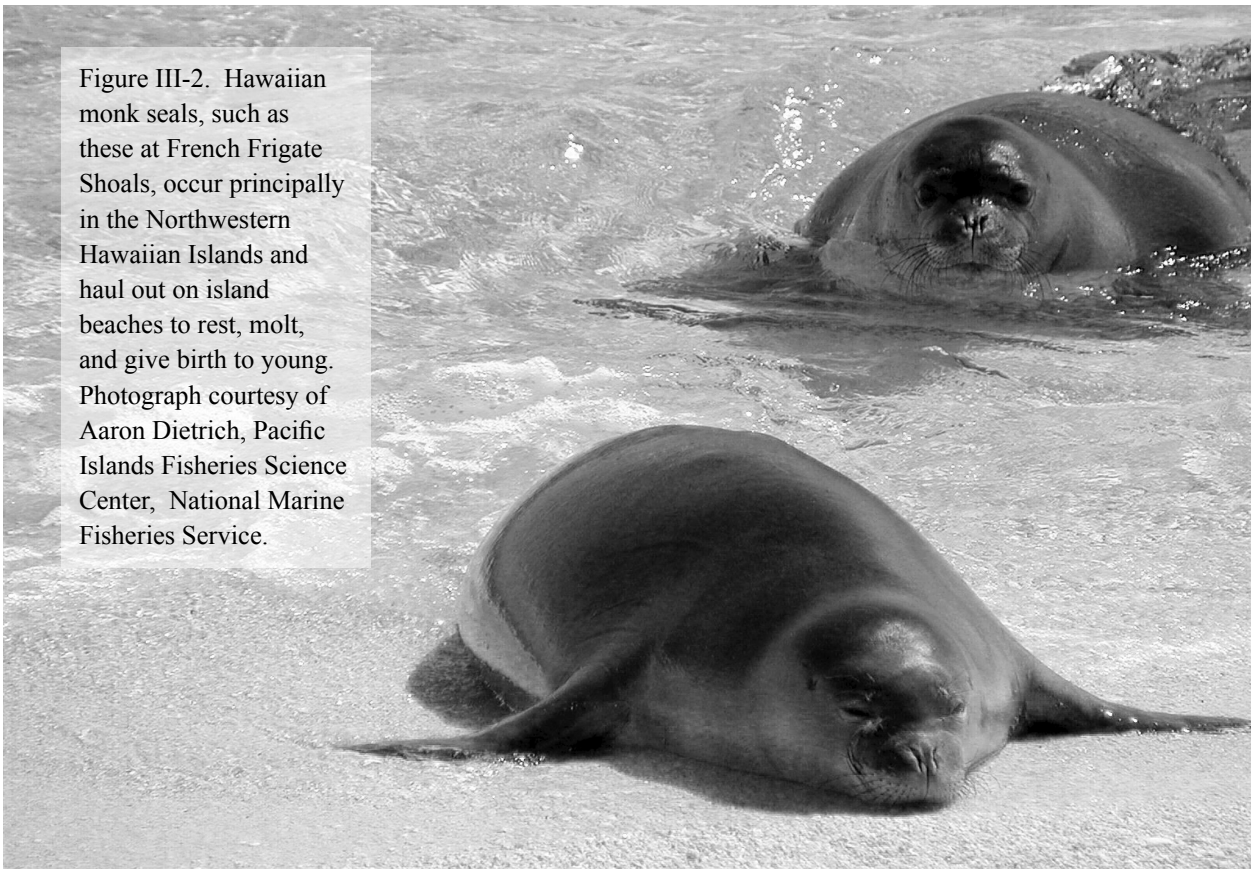

Figure III-2. Hawaiian monk seals, such as these at French Frigate Shoals, occur principally in the Northwestern Hawaiian Islands and haul out on island beaches to rest, molt, and give birth to young. Photograph courtesy of Aaron Dietrich, Pacific Islands Fisheries Science Center, National Marine Fisheries Service.

low-lying haul-out beaches from rising sea levels, and deaths due to natural biotoxins.

In contrast to the trend in the NWHI, monk seals have increased steadily on the main Hawaiian Islands over the past 15 years. A developing catalogue of known individuals indicates that at least 83 seals now live on the main Hawaiian Islands. Most sightings have been on the westernmost islands of Kauai and Niihau. The number of births on the main Hawaiian Islands also has increased. Whereas only a single monk seal birth is known to have occurred on the main Hawaiian Islands before the 1980s, at least 13 births, a record high, occurred in 2007. Both sightings and births now occur on all of the main islands. Although the species' reoccupation of former habitat is encouraging, it brings with it new challenges of managing interactions with beachgoers, fishermen, and swimmers and of minimizing new risks to seals from exposure to pathogens and diseases from domestic and feral animals not found in the NWHI.

The National Marine Fisheries Service is the lead agency responsible for protecting Hawaiian monk seals under the Endangered Species Act and the Marine Mammal Protection Act. Other federal and state agencies with related responsibilities are important partners in monk seal recovery work, including the Fish and Wildlife Service, the National Marine Sanctuary Program, the U.S. Coast Guard, the U.S. Navy, the Marine Mammal Commission, the Hawaii Department of Land and Natural Resources, and the Western Pacific Regional Fishery Management Council. With increasing numbers of seals in the main Hawaiian Islands, partnerships with local government agencies, coastal residents, businesses, Native organizations, and environmental groups also have become increasingly important. Representatives of many of these agencies and groups also participate as members of the Hawaiian Monk Seal Recovery Team, an advisory body convened by the Service to help identify and implement priority recovery work.

Adopting a Revised Hawaiian Monk Seal Recovery Plan

In 1983 the National Marine Fisheries Service adopted the first recovery plan for Hawaiian monk seals. That plan was outdated by the end of the 1990s and in 2001 the Service reconstituted the Hawaiian Monk Seal Recovery Team to draft a new plan. The team did so and on 26 November 2006 the Service requested public comments on the draft plan developed by the team.

The draft revised plan described the species as being in a state of crisis and called for aggressive expansion of recovery work. The most important actions identified were to (1) improve monk seal survivorship, particularly for females, by investigating the causes of poor survival, intervening where appropriate, reducing shark predation, preventing aggressive behavior by adult male seals, and removing hazardous marine debris; (2) maintain an extensive presence in the NWHI to carry out research and management activities; (3) ensure growth of the monk seal population in the main Hawaiian Islands through improved coordination among recovery program partners; and (4) reduce the chances of inadvertent introduction of infectious diseases to seals using the main Hawaiian Islands.

The stated goal of the draft revised plan was "…to assure the long-term viability of the Hawaiian monk seal in the wild, allowing initially for reclassification to threatened status and, ultimately, removal from the List of Endangered and Threatened Wildlife." Downlisting the species from endangered to threatened could be considered only if the following proposed criteria were met: (1) a total of 2,900 seals in the NWHI; (2) at least 100 seals in five of the six major NWHI subpopulations and 500 seals in the main Hawaiian Islands; and (3) female survival rates high enough to assure that the calculated growth rate for each subpopulation is not negative.

To accomplish its goal, the draft revised plan listed and ranked more than 100 tasks with projected annual funding needs of more than $20 million in the first year and between $7.2 and $8.3 million in each of the four subsequent years. The total costs included research and management activities by other agencies and activities intended to conserve wildlife species in addition to monk seals (e.g., preventing vessel groundings in the NWHI, completing repairs for a seawall on Tern Island at French Frigate Shoals, and assessing the status of lobster stocks in the NWHI).

On 29 January 2007 the Commission commented on the revised draft, recommending that highest priority be placed on activities likely to contribute directly to monk seal recovery by increasing survival rates of females and by increasing the number of seals in the main Hawaiian Islands. It also recommended that the Service—

- adopt the proposed biological criteria for downlisting the species,
- classify threats and assign task priorities accordingly,
- briefly describe the work required to complete each task,
- expand the list of recovery tasks to include (1) studies of monk seal foraging patterns in the main Hawaiian Islands, (2) preparation of a report analyzing past efforts to mitigate shark predation, (3) removal of sharks known to be preying on monk seals, (4) development of a plan to move seals at risk away from human interactions in the main Hawaiian Islands, and (5) assessment of procedures to protect seals that haul out on recreational beaches in the main Hawaiian Islands,
- consult with the Hawaiian Monk Seal Recovery Team to reassess priorities and projected costs assigned to identified tasks, and
- distinguish between costs that pertain primarily to the core monk seal recovery program and those that apply more broadly and should not be attributed solely to the monk seal program.

On 12 March 2007 the Commission wrote to the Service noting that the species was more imperiled than ever before and that greater recovery effort was needed in four key areas:

- enhancing the survival of young female seals through a captive care program,
- mitigating the loss of pups to shark predation, particularly at French Frigate Shoals,
- removing marine debris to prevent entanglement, and
- facilitating growth of the monk seal population in the main Hawaiian Islands.

Although all of the issues have been addressed in some fashion in the past, the Commission noted that more could and should be done to address all of them. Recognizing that the Service must address many marine mammal conservation issues with limited resources, the Commission noted that successful recovery efforts would require resources and cooperation by other agencies and organizations. The Commission urged the Service to convene a meeting of top-level decision-makers from key agencies and organizations to develop a more effective, coordinated strategy for tackling priority needs.

On 21 March 2007 the Service responded, reiterating its view that the species' status was at a crisis stage. It agreed that bringing together top-level decision-makers from various agencies and organizations could help develop a more effective course of action and therefore suggested that representatives of the Commission and the Service meet to discuss such an approach. During that meeting it was agreed that the Commission and the Service should explore the possibility of holding a meeting involving high-level administrators in the National Marine Fisheries Service, the Marine Mammal Commission, the Fish and Wildlife Service, the National Ocean Service, and the Hawaii Department of Land and Natural Resources following adoption of the monk seal recovery plan. The purpose of that meeting would be to agree on steps to increase cooperative actions and resource commitments to address the four issues identified in the Commission's 12 March letter. At the end of 2007 the Commission was working with the Service to explore the possibility of arranging such a meeting in 2008.

On 20 August 2007 the Service responded to the Commission's letter of 29 January 2007, noting that it had considered all of its comments and had modified the revised draft recovery plan. Among other things, the Service reevaluated and revised cost estimates for identified tasks, added a number of recommended tasks, highlighted the importance of developing a captive care program to improve juvenile female survival, reorganized parts of the plan, and revised the analysis of threats.

On 22 August 2007 the Service announced that it had adopted a revised Hawaiian monk seal recovery plan. The revision retained the above-mentioned goal and downlisting criteria and listed principal threats to the species as (1) low survival of juvenile and sub-adult seals due to starvation

and prey limitation; (2) entanglement in marine debris; (3) predation by Galápagos sharks; (4) human interactions and exposure to disease in the main Hawaiian Islands; (5) erosion of pupping beaches in the NWHI; and (6) disease outbreaks within individual breeding colonies. Estimated costs were modified for a number of tasks and costs for tasks with wider benefits were not attributed to the monk seal recovery program. Based on the revised estimates, annual costs for 14 different categories of tasks were projected to range over the next five years from $7.55 million in the first year to $6.99 million in the fifth year (Table III-4).

Captive Care Program

To examine whether human intervention might increase juvenile survival, the Service undertook three types of captive care programs between 1981 and 1995. The first was a headstart program undertaken from 1981 to 1991 during which 33 newly weaned pups born on Kure Atoll were captured and maintained in pens at the atoll for several months before being released at the same location. The second was a rehabilitation and release program undertaken from 1984 to 1995 when 100 weaned pups and juveniles born at French Frigate Shoals and determined to be underweight or in poor

Table III-4. Short- and long-term actions and projected cost estimates (in $ thousands) in the Revised Recovery Plan for the Hawaiian Monk Seal (* means that costs were included under category 12; TBD means "to be determined")

Recovery Action Category	Year 1	Year 2	Year 3	Year 4	Year 5
1. Investigate & mitigate factors affecting food limitation	1,920	1,900	1,900	1,900	1,900
2. Prevent entanglements	1,260	1,260	1,260	1,260	1,260
3. Reduce shark predation	300	300	300	300	300
4. Prevent spread of infectious diseases	605	585	585	585	585
5. Conserve monk seal habitat	250	50	50	0	0
6. Reduce interactions with fisheries	200	200	200	200	200
7. Reduce male aggression	*	*	*	*	*
8. Minimize sources of human disturbance	800	800	800	800	800
9. Investigate and respond to biotoxin impacts	250	125	125	75	75
10. Reduce impacts from vessel groundings	TBD	TBD	TBD	TBD	TBD
11. Reduce impacts of contaminants	50	0	0	0	0
12. Continue population monitoring	1,550	1,600	1,650	1,550	1,550
13. Create a main Hawaiian Islands monk seal management plan	200	200	150	150	150
14. Implement outreach and program oversight	170	170	170	170	170
Total estimated costs	**7,555**	**7,190**	**7,190**	**6,990**	**6,990**

condition were captured, taken to facilities on Oahu for fattening and medical treatment, and released six to ten months later at Kure or Midway Atolls. The third was a direct translocation carried out in 1990 and 1991 when five pups and juveniles captured at French Frigate Shoals and one pup born on Oahu were moved directly to Kure Atoll. Each of those efforts focused on young female seals to maximize the reproductive potential in the population. In addition, nine juveniles were translocated directly from French Frigate Shoals to Midway in the early 1990s.

Captive care efforts came to an abrupt halt in 1995 when pups captured for rehabilitation developed an eye ailment of unknown cause. Ten of those animals developed cataracts and became blind, and all 12 were judged unreleasable because of the risk of transmitting an unknown disease to wild seals. Although these captive care interventions helped reverse declining trends in abundance and juvenile survival at Kure Atoll where most seals were released, the survival rate of female seals released through the headstart program did not differ substantially from that of male pups left in the wild at Kure. Improvements in juvenile survival at Kure probably resulted from reduced disturbance by Coast Guard personnel stationed there.

Recent Captive Care Efforts: In March 2006 the Service built three shoreline pens (Figure III-3) to attempt captive care of juvenile seals at Midway Atoll, where juvenile survival had been low. In April that year, twin monk seals were born—the fourth known occurrence of such an event. Both pups (females) were undersized at weaning and in May they were captured (after weaning) and moved to a facility in the main Hawaiian Islands where more intensive care and monitoring was possible. Both responded well to treatment and gained weight. In

Figure III.3. Temporary beach pens, such as these installed on Sand Island at Midway Atoll in 2007, have been used to hold and fatten Hawaiian monk seals in attempts to increase juvenile survival. Photograph courtesy of Pacific Islands Fisheries Science Center, National Marine Fisheries Service.

October 2006 they were returned to Midway and held until release in mid-March 2007.

In addition to the twins, four young-of-the-year females were captured and placed in shoreline pens at Midway in 2006. Three were undersized and one was considered to be in average body condition. All four learned to feed on their own in captivity and were released in good health in March 2007 after having gained substantial weight. A fifth female, an undersized one-year-old, also was captured at Midway in 2006 for rehabilitation.

Post-release results of the 2006–2007 captive care efforts were poor. At the end of 2007 all but two of the seven seals had died or disappeared. The yearling never learned to feed on its own in captivity and, although force fed, it lost weight and exhibited signs of acute stress before dying in captivity late in 2006. The other six seals were released in good condition with telemetry tags and adopted diving and foraging patterns similar to wild seals within a few months of release. Three appeared to be in good condition but disappeared abruptly at sea, possibly due to shark predation. A fourth seal disappeared after being seen in emaciated condition. The two survivors at the end of 2007 were the twins; one moved to Kure Atoll where it was last seen in 2007 in good condition, while the other remained at Midway but was last seen in an emaciated state suggesting its survival prospects in 2008 were poor.

Captive Care Workshop: On 11–13 June 2007 the National Marine Fisheries Service convened a workshop to consider the use of short- and long-term captive care techniques to improve monk seal survival. Participants reviewed past captive care efforts and considered alternative strategies (e.g., capturing animals at different life stages, transporting seals between atolls, using hard as opposed to soft release methods, developing a centralized rehabilitation facility in the main Hawaiian Islands, and maintaining temporary pens and care capabilities in the NWHI).

The available data and monk seal population models indicate that stabilizing or reversing the current declining trend in monk seal abundance in the NWHI would require an increase in first-year survival to about 90 percent. While various management actions might help meet this goal, it was noted that reliance on captive maintenance methods to achieve such a level could require temporary maintenance of a large number of juvenile females born at NWHI breeding colonies. It was therefore suggested that, for long-term purposes, consideration should be given to constructing a centralized captive care facility in the main Hawaiian Islands that initially could hold about 50 animals, and eventually could be expanded to handle about 100 seals. In the short-term, participants agreed that efforts similar to those initiated at Midway in 2006 would be appropriate, but that an effort to maintain and protect older immature females might be more cost-effective and should be considered if funding and necessary permits could be obtained.

A final workshop report had not been released by the end of 2007. However, during the meeting participants were advised that, after some additional studies are completed, the Service expected to develop a 10-year captive care plan that would address various types of hands-on interventions to improve juvenile survival and consider possible steps for constructing and operating a large-scale centralized captive care facility in the main Hawaiian Islands. They also were advised that steps would be taken to obtain a new five-year research permit for a captive care program capable of addressing activities considered at the workshop.

Shark Predation

Shark predation is a significant source of mortality for juvenile monk seals in the NWHI. At French Frigate Shoals, where the problem appears to be greatest, the number of observed, probable, and possible deaths due to sharks increased sharply in the late 1990s (Figure III-4) to levels accounting for about a third of all pups born at that atoll, and more than half of the pups born at some of the atoll's islets. Based on observed shark attacks, most deaths appeared to be due to Galápagos sharks, some of which apparently have learned to patrol monk seal pupping beaches and prey on pups venturing from shore.

In 1998 monk seal researchers began tagging and identifying individual Galápagos sharks to test the hypothesis that the sudden increase in shark predation was a new behavior learned by a few individual sharks (e.g., fewer than 20). In 2002

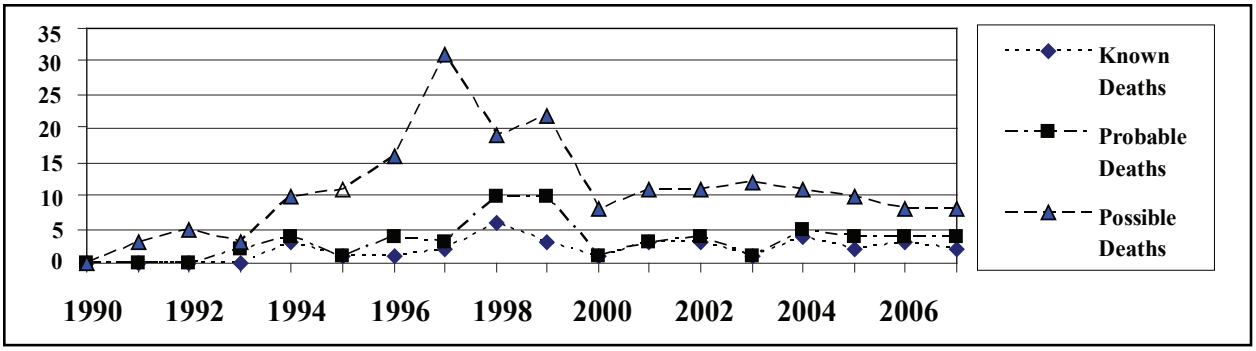

Figure III-4. Number of known and suspected pup deaths due to shark attacks at French Frigate Shoals; 1990–2007 (known deaths = witnessed shark attacks; probable deaths = known deaths + disappearances of pups seen with severe shark-related wounds; possible deaths = known and probable deaths + abrupt disappearances of pups last seen in apparently good condition).

they began removing sharks identified as having attacked a monk seal pup or observed patrolling a pupping beach. Between 2002 and 2006, 12 sharks were removed. After those efforts began, the number of known or suspected predation losses at French Frigate Shoals declined by about half but still represented about 15 percent of the atoll's pup production during the early 2000s. This proportion is greater than that observed at other breeding atolls. In addition, because the number of pups born at French Frigate Shoals is declining, the overall proportion of known and inferred shark attacks has again begun to increase. In 2007, 19 percent (8 of 43) of the pups born at French Frigate Shoals died of known or suspected shark attacks. Two died during observed attacks, two disappeared after being seen with severe shark-related wounds, and four others disappeared abruptly after being seen in good condition.

Shark control efforts over the past eight years have made the sharks wary of humans. In 2006 Service personnel were unable to catch any sharks and in 2007 a new shark removal approach was tried. Researchers set out baited hooks suspended from floats in channels believed to be used by the sharks preying on monk seals. No Galápagos sharks were caught using this approach and at the end of 2007 it was not clear what further efforts might be taken to control this source of mortality. The Service planned to convene a workshop early in 2008 to evaluate options for reducing shark predation. Also in 2007 field teams at French Frigate Shoals moved weaned pups from islets where past predation losses had been highest to other islets at the atoll where they had been infrequent. In all, 22 weaned pups were moved in 2007 and at the end of the year's field season none was known to have been attacked by sharks.

Entanglement in Marine Debris

Hawaiian monk seals, particularly juveniles, frequently become entangled in marine debris, particularly webbing, rope, and line from derelict fishing nets. Between 1982 and 2007, 284 monk seals have been observed entangled, including 16 in 2007 (Figure III-5). Entangled seals may die from wounds incurred or the constriction or drag of the entangling debris. Eight entanglement-related deaths have been recorded since 1982, but additional deaths have almost certainly occurred. Researchers are on the islands only a few months each year and animals that die at sea may not be observed and their deaths recorded. Most entanglement records have been from the NWHI where large amounts of debris arrive on currents from locations thousands of miles away around the rim of the North Pacific Ocean. With increasing numbers of seals in the main Hawaiian Islands, reports of entanglements there also have increased to between one and two per year. Most entanglements in the main islands are in fishing gear, particularly light monofilament line.

Researchers and wildlife managers disentangle any entangled seals encountered and judged unlikely to be able to free themselves. Since 1982 nearly 200 seals have been disentangled, including 10 in 2007**.** In addition, monk seal researchers and clean-up crews remove hazardous ropes and netting from haul-out beaches and nearshore waters in the

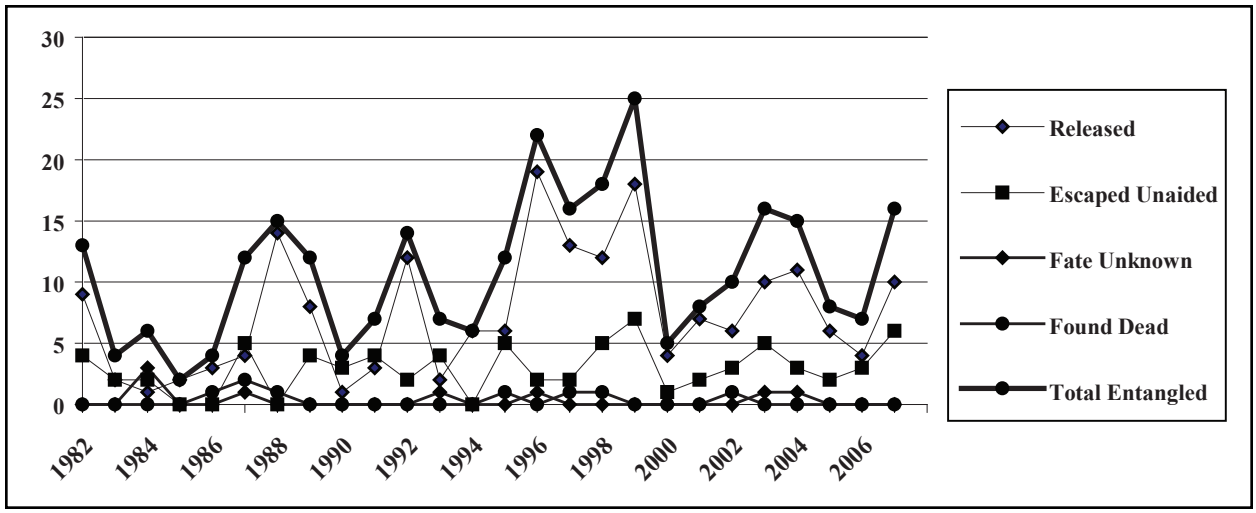

Figure III-5. Number of Hawaiian monk seals observed entangled, 1982–2007.

NWHI. In the late 1990s clean-up efforts were expanded to include offshore lagoon waters.

Net and other debris is a threat not only to monk seals, but also to seabirds, endangered sea turtles, coral formations, and other components of the NWHI coral reef ecosystem. Funding for reef clean-up has been provided principally through a coral reef conservation initiative administered by the National Oceanic and Atmospheric Administration. Between 2000 and 2005 funding for these cleanups was about $1 to $2 million per year and by the end of 2005, cooperative federal, state, and private clean-up teams had removed more than 400 metric tons of derelict netting from NWHI beaches and lagoons. In 2006 and 2007 funding was reduced, partly due to agency-wide funding cuts and partly due to the assumption that a lower level of effort could keep up with debris accumulation. About 24 metric tons of netting was removed both in 2006 and 2007, less than half that removed annually between 2001 and 2005. However, studies indicate that net debris is accumulating more quickly than anticipated and current clean-up efforts will not keep pace with accumulation.

Management in the Main Hawaiian Islands

Increasing numbers of monk seals in the main Hawaiian Islands have led to increasing interactions between people and seals. The National Marine Fisheries Service is seeking to manage this issue through cooperation with state officials (particularly the Hawaii Department of Land and Natural Resources), other federal agencies, local agencies, native Hawaiian organizations, environmental groups, coastal businesses, and shoreline residents.

As discussed in previous annual reports, the National Marine Fisheries Service, the Hawaii Division of Aquatic Resources, and the Marine Mammal Commission convened a workshop in 2002 to develop cooperative strategies for managing monk seals on beaches in the main Hawaiian Islands. Many of the resulting recommendations are being implemented. Island coordinators were hired for Kauai and Oahu to facilitate cooperative management on those islands and to coordinate local networks of volunteers to protect and monitor monk seals hauled out on recreational beaches. In 2006 the Service met with representatives of key federal, state, and local agencies, environmental groups, and concerned citizens to discuss management of emerging diseases, treatment of sick or injured seals, monk seal births on popular recreational beaches, seal aggression toward people, development of volunteer networks, and public outreach. The revised Hawaiian Monk Seal Recovery Plan calls for developing and implementing a main Hawaiian Islands monk seal management plan that sets forth measures and guidance with respect to such issues.

In 2007 two seals became entangled in debris, another died in a gillnet, six were hooked (three of which were caught and had the hooks removed and three of which were able to free themselves), and two hauled-out seals were attacked by dogs. No

seals are known to have died from disease in 2007. One seal had to be moved twice to less populated areas when it became a threat to swimmers. The Service and cooperating partners developed public outreach efforts explaining the need for precaution to avoid interaction with seals.

Management of the Papahānaumokuākea Marine National Monument

By Executive Orders in December 2000 and January 2001, President Clinton designated federal waters out to a distance of approximately 50 nmi around the NWHI as the Northwest Hawaiian Islands Coral Reef Ecosystem Reserve and directed that consideration be given to designation of the area as a national marine sanctuary. On 15 June 2006 President Bush bypassed that process by signing Presidential Proclamation 8031, which designated the NWHI and surrounding waters—an area covering nearly 140,000 nmi^2—as the Northwestern Hawaiian Islands Marine National Monument. The designation, which was the first marine national monument designated in the United States, created the world's largest marine protected area. In late 2006 the area was renamed the Papahānaumokuākea Marine National Monument.

The Monument overlays and includes a number of pre-existing protected areas including the NWHI Coral Reef Ecosystem Reserve, the Fish and Wildlife Service's Midway Atoll and NWHI National Wildlife Refuges, and the State of Hawaii's Kure Atoll Wildlife Refuge and NWHI Marine Refuge. Management of the area therefore is shared under a co-trustee partnership composed of representatives of the Fish and Wildlife Service, the National Ocean Service's Office of National Marine Sanctuaries, and the Hawaii Department of Land and Natural Resources' Division of Aquatic Resources. Since designation, the co-trustees have been taking steps to clarify research and management provisions for protecting the region's marine resources and ecosystem. As part of this effort, the Office of National Marine Sanctuaries, on behalf of the co-trustees, announced in the fall of 2006 that a natural resources science plan was being developed that would identify management needs for the Monument, highlight priority research themes to meet those needs, identify indicators and monitoring methods, and describe proposed research projects under those themes. The five identified themes included ecological processes and connectivity, biodiversity and habitats, human impacts, indicators and monitoring of ecosystem change, and modeling and forecasting of ecosystem changes. To develop this plan, comments were requested on the five research areas and projects that should be conducted under each.

On 19 December 2007 the Marine Mammal Commission responded to the request. Noting that the Hawaiian monk seal is a major component of the NWHI ecosystem and an endangered species whose conservation is a matter of international significance, the Commission recommended that the science plan place high priority on research that would complement the National Marine Fisheries Service's Hawaiian monk seal recovery program. The Commission recommended that the science plan include studies to—

- improve understanding of the ecology of monk seals within the NWHI ecosystem (e.g., factors limiting prey availability for juvenile monk seals),
- determine fine-scale movements and foraging patterns of sharks that prey on monk seals at French Frigate Shoals,
- continue assessments of marine debris accumulation rates in atoll lagoons near monk seal haul-out sites, and
- evaluate the use of remote technology to detect floating debris that might be removed before it reaches important wildlife habitat used by monk seals and other species within the Monument.

Noting that the Monument provides important habitat for other marine mammals, the Commission also recommended that the science plan include—

- studies of spinner dolphin populations using atolls in the NWHI, including their abundance, demography, movements, habitat-use patterns, and foraging behavior;
- year-round passive acoustic sampling and periodic visual surveys to determine the abundance and trend of humpback whales using the NWHI and to collect identification photos and biopsy samples to evaluate their relationships with other groups of humpback whales;

- long-term research on the oceanic and atmospheric conditions of the NWHI ecosystem; and
- provisions for holding periodic meetings for scientists, managers, and other people working on or interested in science projects conducted in the Monument to facilitate the exchange of information and ideas for resolving research and management issues.

At the end of 2007 the Commission understood that the co-trustees planned to circulate a draft natural resources science plan for the Monument for public review in 2008.

North Atlantic Right Whale (*Eubalaena glacialis*)

The North Atlantic right whale continues to be seriously threatened by deaths and injuries from entanglements in commercial fishing gear and collisions with vessels, principally large ships. The species currently numbers 300 to 400 individuals (Reeves et al. 2007) that migrate seasonally along the Atlantic coast of the United States and Canada. Most of that population spends the summer months in feeding grounds off New England and southeastern Canada. Each winter calving females and some juveniles migrate to calving grounds along the southeastern U.S. coast, principally off Georgia and northeastern Florida. At least a few right whales are present in the Gulf of Maine and Cape Cod Bay in winter, but the winter locations of the remainder of the population (i.e., adult males, non-calving females, and most juveniles) remain a mystery.

From 1990 through 2007 at least half of 53 observed dead right whales have died from either collisions with ships (22 deaths) or entanglement in commercial fishing gear (7 deaths) (Marine Mammal Commission, unpublished data; Figure III-6). Because cause of death cannot be determined for all observed carcasses, and not all carcasses are observed, the actual number of deaths from ship collisions and entanglement is undoubtedly higher.

The National Marine Fisheries Service has lead responsibility for promoting the recovery of North Atlantic right whales. In 1997 the Service adopted the Atlantic Large Whale Take Reduction Plan (62 Fed. Reg. 39157) to eliminate the serious injury or death of right whales incidental to commercial fishing. In 2005 the Service adopted an updated North Atlantic right whale recovery plan (National Marine Fisheries Service 2005) that identifies research and management priorities needed to bring about recovery. The North Atlantic right whale

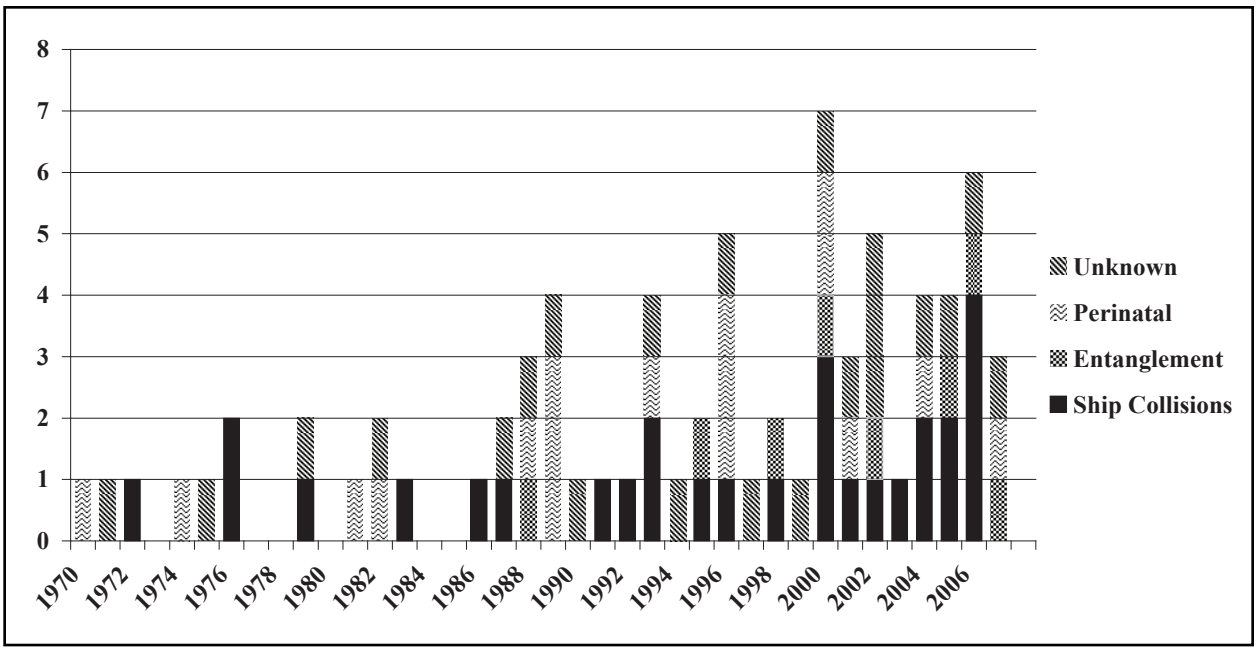

Figure III-6. Known mortality of North Atlantic right whales by cause of death, 1970–2007. Source: Marine Mammal Commission, unpublished data.

recovery program is assisted by numerous federal, state, private, and industry partners, including the Marine Mammal Commission. Management is focused on reducing entanglement and ship strikes.

To date, there is no evidence that management efforts have significantly reduced the rate of either vessel or fishery-related injuries and deaths. As a result, substantial changes in management approaches have been under consideration for several years. Developments related to these issues in 2007 are discussed below.

Right Whale Deaths and Injuries in 2007

Since 1990 an average of about three right whale deaths per year have been confirmed by direct observation. In 2007 three right whale carcasses were confirmed, the first of which was a neonate found by a fisherman off northeastern Florida on 25 January. The carcass was towed ashore where a necropsy revealed that the animal had never been nursed, suggesting that it was stillborn or had died almost immediately after birth. The second carcass was that of an adult male (whale ID #1424), found by a Canadian Department of Fisheries and Oceans surveillance plane, floating in the Gulf of Maine near the U.S.–Canada border on 25 March. Whale 1424 was seriously entangled in 2002 and rescue attempts in 2002 and 2003 failed to remove the attached line. The whale was last seen alive on 5 September 2005 in the Bay of Fundy; it was still entangled with line coming from its mouth but appeared to be in good condition. When its carcass was found, line was seen still caught in the mouth and around the rostrum. Because the carcass was found offshore during severe weather, it was not towed ashore for closer examination and the cause of death was listed as unknown. The year's third observed death involved a calf found by a recreational fisherman off North Carolina on 31 March. The carcass was towed ashore and a necropsy revealed line abrasions on the left flipper and trailing down the left side. Although no line remained on the animal when it was found, the scientists who conducted the necropsy concluded that the animal likely died as a result of entanglement.

Since 2000 an average of five or six new cases of seriously injured or entangled but live whales have been reported annually (Marine Mammal Commission, unpublished data). In 2007 four new injuries or entanglements were reported. One of those involved a two-year-old female (whale ID #3503) seen on 12 March by a right whale survey team off the tip of Cape Cod. It had a series of fresh, deep propeller cuts 2 to 3 ft wide extending 3 m (10 ft) along its right side. The animal was resighted in the Bay of Fundy in August and September with portions of its wound still open but showing signs of healing. Researchers in the Bay of Fundy also sighted a one-year-old whale missing the outer half of its right fluke on 5 August. Judging by the clean cut, this injury was suspected to have been caused by a propeller.

The other two injuries were both the result of entanglements in fishing gear. On 9 March an adult female (whale ID #2029) was seen in the Great South Channel 37 km (20 nmi) southeast of Cape Cod, Massachusetts, with line wrapped around its body and a deep cut from line abrasion on its tail stock. The entanglement was considered life- threatening, but distance from shore and other factors prevented a disentanglement attempt at that time. The whale was resighted two more times in 2007, once in Cape Cod Bay on 21 March and again in the Bay of Fundy on 18 September. On both occasions, disentanglement teams attempted to remove the entangling line. In March they had no success, but in September they managed to cut the line wrapped over the whale's back. The whale remained badly entangled. The second new entanglement involved a female of unknown age seen by an aerial survey team on 8 May in the Great South Channel. It had rope extending from its mouth with a red buoy attached to the trailing line. That whale was resighted in June, by which time the buoy had fallen off and the trailing line ended in a knotted mass of rope two-thirds down the whale's back. Both flippers were free of gear and the entanglement was judged to be minor and not life-threatening.

In 2007 three whales that had been entangled in previous years were resighted. Between early January and late February 2007 a juvenile male (whale ID #3346) entangled in 2004 was resighted numerous times in the southeastern U.S. calving grounds. Some gear had been removed from this whale during a widely publicized disentanglement effort in 2004. Since then, the animal has been

resighted each year. It had experienced a noticeable decline in health after the initial disentanglement attempts, but its condition has since improved. In 2007 the whale was last seen in August in the Bay of Fundy, still entangled with line wrapped around the right flipper. The second resighting of a previously entangled whale involved an adult male (whale ID #1403) first seen with line trailing from its mouth on 17 September 2006 in the Bay of Fundy. On 17 August 2007 it was seen gear-free in good condition at nearly the same location. The third sighting of a prior-year entanglement was a juvenile male (whale ID #BK01SEUS06) first seen entangled in the Bay of Fundy on 27 September 2006. In January 2007 it was seen off North Carolina and a disentanglement team was able to remove much of the line, leaving only some line still caught in the mouth.

Between 2000 and 2007, 30 individual live right whales were observed with attached fishing gear (Marine Mammal Commission, unpublished data). As shown in Table III-5, their fates have been variable. Disentanglement teams have been able to remove at least some gear from about half of all reported animals although even some of those animals subsequently died of their injuries.

Efforts to Reduce Fisheries-related Take

To reduce the risk of entanglement for North Atlantic right whales in U.S. waters, the National Marine Fisheries Service convened an Atlantic Large Whale Take Reduction Team in 1996. The team is composed of representatives from relevant fisheries, environmental groups, the scientific community, and government agencies, and its goal is to reduce fisheries-related right whale mortality to or below the species' potential biological removal (PBR)[1] level, which the Service has set at zero.

Although some right whales become entangled in gillnets, most entanglements involve vertical buoy lines used to mark the location of fishing gear, floating ground lines that link strings of pots together, or various other lines from set fishing gear. To reduce line entanglements, the Atlantic Large Whale Take Reduction Plan and the Service have relied principally on regulations requiring various combinations of gear modifications, such as weak links, knotless line, and sinking or neutrally buoyant line for trap ground lines (see, for example, 50 CFR 229.32) Requirements have varied by area and fishery to accommodate local fishing practices. Adopted measures have failed to reduce observed entanglement rates. As a result, many changes have been made over the past decade, and the regulations have become exceedingly complex. Because the entanglement rate remains high and includes some whales entangled in gear with approved modifications, the Service began a major revision of its large whale plan in April 2003.

Table III-5. Fate of entangled North Atlantic right whales observed between 2001 and 2007 based on unpublished data compiled by the Marine Mammal Commission

Status as of last sighting	No gear removed	Some gear removed	All or most gear removed	Total
Gear free in good condition	5	3	1	9
Gear free in fair/poor/improving condition	3	2	1	6
Entangled in good condition	1	3	–	4
Entangled in fair/poor/improving condition	6	2	–	8
Known or assumed dead	3	1	1	5
Not resighted/condition uncertain	3	–	1	4
Total	21	11	4	36

[1]PBR is defined by the Act as the maximum number of animals, not including natural mortalities that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. PBR is based on (A) the minimum population estimate of the stock; (B) one-half the maximum theoretical or estimated net productivity rate of the stock at a small population size; and (C) a recovery factor of between 0.1 and 1.0.

As discussed below, in 2007 the Service completed its rulemaking process. Throughout the process the Marine Mammal Commission recommended that, until more effective gear modifications are developed and proven, the Service should prohibit all hazardous fishing gear during periods of peak whale abundance in high-use right whale habitat. The Commission also recommended that gillnets and traps with vertical lines be prohibited seasonally in designated right whale critical habitat. In June 2005 the Service published proposed rules to require gear modifications, similar to those under previous rules, to more gillnet and trap fisheries in more areas. An accompanying draft environmental impact statement examined various combinations of gear modification requirements but included no alternatives for closing designated right whale critical habitats, as had been recommended by the Commission.

Gillnet Fishing in the Southeast Calving Grounds: On 26 January 2006 a right whale calf was killed in a gillnet in the southeastern U.S. right whale calving grounds. The gillnet was set in compliance with provisions of the take reduction plan. The Service responded promptly by publishing emergency rules on 12 February 2006 suspending all gillnet fishing in the southeast restricted area (a management zone established to protect right whales) for the remainder of that winter calving season. It also convened a meeting of the southeast subgroup of the Atlantic Large Whale Take Reduction Team on 11–12 August 2006 to seek advice on future measures to protect right whales in the southeastern U.S. calving grounds. Based on the subgroup's advice, permanent rules were to be developed before the next calving season. The team was unable to agree on measures for all gillnet fishing in the area but did agree that gillnet fishing for sharks and mackerel could be allowed in the southernmost part of the southeast restricted area before 31 December and after 1 March when right whale sightings in that part of the calving area are rare.

On 15 May 2006 the Commission wrote to the Service recommending a permanent prohibition on all gillnet fishing in the southeast restricted area except for shark and mackerel gillnet fishing as agreed to by the southeast subgroup. In addition, because of recent sightings of at least a few mother-calf pairs of right whales off South Carolina, north of the southeast restricted area, the Commission recommended that the boundary for the southeast restricted area be extended northward to the South Carolina–North Carolina border within 40 nmi of the coast and that the prohibition be extended to the period from 15 November through 15 April when whales could be using or traveling through the area.

The Service failed to propose permanent rules for the calving grounds before the fall of 2006. Therefore, on 15 November 2006 it published a new emergency rule for the upcoming right whale calving season. Consistent with the Commission's 15 May recommendations regarding permanent rules, the new emergency rule prohibited all gillnet fishing in the southeast restricted area north of a line (29ºN latitude) near Cape Canaveral. In addition, the rule covered an expanded area that included waters out to 35 nmi off the coast of South Carolina. The effective period for the northern extension was from 15 November 2006 through 15 April 2007. That same day the Service also published proposed permanent rules that included the same restrictions for gillnet fishing in the calving area after 15 November 2007. The proposed rule also included a prohibition on all gillnet fishing in the southeast restricted area south of 29ºN latitude except for that targeting sharks and mackerel. As described in its previous annual report, the Commission wrote on 19 December 2006 in support of the proposed permanent rule but also recommended that the seaward boundary of the restricted area be extended to the edge of the Exclusive Economic Zone as had been proposed by the Service in a June 2005 proposal to modify the Atlantic Large Whale Take Reduction Plan.

On 25 June 2007 the Service published final permanent rules for the southeast restricted area prohibiting all gillnet fishing in the area from 1 December through 31 March except south of 29ºN latitude for sharks and mackerel. For the two exempted fisheries, the regulations impose additional restrictions, including requirements that (1) nets be removed from the water immediately if a right whale, humpback whale, or fin whale is sighted within 3 nmi of a fishing site, (2) fishing at night or when visibility is less than 500 yards be

prohibited, and (3) no more than one mackerel net is deployed by a vessel at any one time. The rule also extended the restricted boundary north to the North Carolina–South Carolina border within 35 nmi of the coast and established an effective period for the northern extension of 15 November through 15 April to protect whales migrating to and from the core of the calving area.

Revision of the Atlantic Large Whale Take Reduction Plan: Proposed revisions to the Atlantic Large Whale Take Reduction Plan in June 2005 prompted sharp protests from Maine lobster fishermen. In particular, they were concerned about the requirement to replace floating lines used to link multiple traps with sinking line. These measures were designed to eliminate loops of line in the water column between traps where it can entangle whales. Citing various reasons, fishery representatives sought to alter or delay the rule, contending, in particular, that sinking line would cause ground lines to snag on rocky bottoms along the Maine coast, resulting in the loss of traps.

On 12 February 2007, a year and a half after the Service had published its proposed rule and nearly four years after it had begun the process of modifying the plan, the Humane Society of the United States and The Ocean Conservancy sued the Service, alleging that it was in violation of the Marine Mammal Protection Act because it had failed to complete its proposed plan modifications by the applicable deadlines. To meet provisions of a settlement agreement, the Service released a final environmental impact statement on alternative regulatory measures on 30 July 2007 and requested public comments. As in the earlier draft document, the only mitigation alternatives considered in the final statement involved various sets of gear modifications. Other than factoring in the new closure mentioned previously for gillnet fishing in the calving grounds, no alternatives for expanding the use of time-area fishing closures in high-use right whale habitats, as recommended by the Commission, were considered.

The Commission wrote to the Service on 17 September 2007 to comment on the final environmental impact statement. In its letter, the Commission noted that guidelines for preparing environmental impact statements require that action agencies evaluate and compare a range of reasonable alternatives for mitigation. Over the preceding decade, including various steps in the process of revising the Atlantic Large Whale Take Reduction Plan, the Commission had recommended that the Service consider closing known high-use right whale habitats to all hazardous fishing gear when right whales are present in peak numbers. That recommendation was based on the recognition that entanglement risks are not the same in all areas and that the likelihood of entanglements in particular areas must be related to the number of whales present in those areas, their period of occupancy, and the amount and characteristics of fishing gear deployed during the periods of peak whale abundance. Time-area closures have been used frequently to address other management problems, including bycatch and overfishing.

Again, the final environmental impact statement failed to analyze any such alternatives. It included no assessment of (a) the amounts or seasonality of fishing gear in designated right whale critical habitats, (b) the probability of whales encountering and becoming entangled in those areas, or (c) the likely effectiveness of seasonal closures in high-use right whale habitats for reducing entanglement risks and contributing to the conservation of target fish and shellfish stocks. Accordingly, the Marine Mammal Commission concluded that the final environmental impact statement was deficient and inconsistent with the Service's regulatory obligation to examine all reasonable alternative measures. The Marine Mammal Commission recommended that, to address this shortcoming, the Service immediately prepare a supplemental environmental impact statement evaluating the use of time-area fishing closures in known high-use right whale habitats, including all designated critical habitats and seasonal management areas, to reduce the number of right whale encounters with hazardous fishing gear and the frequency of entanglements.

On 21 September 2007 the Service signed a Record of Decision adopting its preferred alternative, and on 5 October it published a 90-page *Federal Register* notice announcing final rules. The complexity of the rules precludes a description in this report. With the previously noted exception in right whale calving habitat, the new rules continue to rely almost entirely on

broad-based gear modifications similar to those used in the previous plan (e.g., weak links and sinking ground lines). However, the scope of those modifications has been expanded so they apply to additional fisheries, times, and areas. In addition to the six different lobster trap and gillnet fisheries regulated under the previous plan, the new rules apply to more than a dozen other East Coast trap and gillnet fisheries. For most of these fisheries, the rules include variations and exceptions tailored to accommodate local fishing practices.

The plan's principal new feature is a phased-in expansion of the geographic area in which trap and gillnet fisheries must use sinking ground lines instead of floating ground lines between traps and between gillnet anchors and buoy lines. Because this modification eliminates loops of floating line, it is likely to reduce the risk of entanglement to whales. Prior to the new rules, the only areas where such lines had been required were certain state waters off Massachusetts, seasonal management areas in federal and state waters off Massachusetts, and "dynamic area management" zones (i.e., areas established temporarily around groups of feeding whales). Under the new plan, at least seasonal use of sinking ground lines would be phased in for trap and gillnet fisheries in most marine areas along the East Coast. Although the Marine Mammal Protection Act requires that takes be reduced to PBR levels within six months after implementation of take reduction plans, the new provisions on sinking ground lines were deferred until 5 October 2008 to give participants in trap and gillnet fisheries time to purchase new line and convert their gear. In response to objections to the ground line requirements from the Maine lobster fishery, the new rules also exempt most state waters along the Maine coast. The Service based this decision on a conclusion that right whales (as well as humpback whales, which also are covered under the plan) rarely occur in most state waters in Maine.

More than half of all right whale and humpback whale entanglements appear to occur in vertical buoy lines that mark the location of set gear and are used to retrieve gear. For such vertical lines, the new rules probably will not reduce entanglement risks. Recent entanglements indicate that the wider application of past modifications (principally weak links) to new areas and seasons will do little to reduce entanglement risks.

The record of decision on the environmental impact statement dismissed the need for evaluating time-area fishing closures in important right whale habitats, as was recommended by the Commission. It concluded that preparation of a supplemental environmental impact statement was not necessary because the suite of alternatives in the final environmental impact statement was comprehensive and reflected the best options available at the time.

Collisions with Ships

Ship collisions account for at least half of all observed right whale deaths. To reduce the incidence of ship strikes, the National Marine Fisheries Service has relied on voluntary efforts by vessel operators to avoid hitting whales. Among other things, the Service developed outreach materials to advise East Coast mariners of the problem, provided them with information on whale distribution and movements, and requested that vessel operators watch for and maneuver around whales. Believing stronger measures were required, the Commission has recommended on numerous occasions over the past decade that the Service also take steps to regulate the speed, as well as routes, of ships transiting high-use right whale habitat. To determine vessel speeds that are safe for whales, the Commission supported an analysis of ship/whale collision records (Laist et al. 2001). Results of that analysis suggested that in most instances whales are not seen or are seen too late to avoid hitting them. They also suggested that most collisions causing serious injury or death to whales involve large vessels (generally more than 80 m in length) traveling at speeds above 13 knots and that injurious or lethal collisions are rare when vessels are traveling at speeds below 10 knots.

Over the past seven years, the Service has been developing and evaluating a new ship-strike reduction strategy that would restrict vessel speeds and routes in times and areas where right whales are most numerous and collision risks are greatest. In cooperation with the Coast Guard, the Service modified the route of designated vessel traffic lanes into Boston Harbor to minimize the risk of ships encountering right whales and other large whales in that area. The Service and the Coast Guard also

designated recommended vessel routes in certain other high-use right whale habitat to minimize collision risks with whales. In addition, the Service analyzed available options, vessel traffic, and potential economic impacts and conducted scores of public meetings along the East Coast to develop ship-strike reduction rules, which it published on 12 June 2006. The rules would seasonally limit the speed of vessels over 65 feet long when such vessels are operating off major East Coast ports along the species' coastal migratory corridor between Florida and New England and in known high-use right whale habitat. Within regulated areas, there would be a 10-knot speed limit during periods when whales are likely to be present.

After taking public and agency comments into consideration, the Service developed a final rule and submitted it to the Office of Management and Budget on 20 February 2007 for review and approval. Although such reviews are to be completed within 90 days, as of the end of 2007 the office had not completed its review and it was unclear when it would do so. As a result, no new rules had been implemented to regulate vessel speed in high-use right whale habitat during 2007.

Construction and Operation of a Liquefied Natural Gas Facility off Massachusetts:

On 13 March 2007 the National Marine Fisheries Service requested comments on an application by Northeast Gateway Energy Bridge L.L.C. and Algonquin Gas Transmission L.L.C. for authorization under the Marine Mammal Protection Act to incidentally take small numbers of right whales and certain other marine mammals during construction and operation of a deepwater port and associated gas pipeline in Massachusetts Bay. Because the request involved the taking of only small numbers of marine mammals by harassment, it was reviewed using an expedited process. The requested authorization was for one year.

The proposed port includes two submerged mooring turrets where tankers would dock, re-vaporize their cargo of liquefied natural gas, and transfer it ashore through a buried pipeline to be built between the mooring turret and an existing offshore gas pipeline system several miles away. The mooring turrets would be located 24 km (13 nmi) offshore, 4.6 km (2.5 nmi) east of the Stellwagen Bank National Marine Sanctuary, about 1.9 km (1 nmi) north of the Boston traffic separation lanes and about 37 km (20 nmi) north of designated right whale critical habitat in Cape Cod Bay. Vessels using the port would cross through the marine sanctuary as well as designated right whale critical habitat south and east of Cape Cod in the Great South Channel.

In its preliminary analysis, the Service noted that, at worst, noise from the proposed port construction and operation, principally from positioning thrusters on construction barges and tankers using the mooring buoys, may cause small numbers of marine mammals to modify their behavior temporarily. It also concluded that no marine mammals would be injured or killed as a result of vessel traffic or other activities and that no authorization for such effects was being sought.

To avoid potential noise-related impacts on right whales, construction was to be limited to summer and fall months when few right whales would be expected in the area. In addition, two Service-approved observers were to be aboard all on-site construction vessels to watch for marine mammals. If any right whales were seen within 457 m (500 yd) of a work vessel, all activities emitting noise with a source level greater than 120 dB were to be suspended until the whales moved beyond that distance. The applicant also advised that a nearly real-time autonomous passive acoustic array would be installed around the construction site prior to beginning work to detect and locate vocalizing whales. The actions to be taken upon detection of a whale by this system were not clear. Weekly reports on marine mammal mitigation efforts are to be provided to the Service throughout the construction process.

To mitigate risks of vessel collisions, the Service noted that the applicants had made commitments to ensure that ships using the port would follow the Boston traffic separation lanes a few miles south of the port site, travel at 10 knots or slower when approaching or leaving port outside those lanes, travel at 10 to 12 knots when in the vicinity of the port, and reduce speed to 10 to 14 knots between 1 March and 30 April or, if requested by the Service, throughout the year when transiting a proposed ship-strike management area off the tip of Cape Cod.

On 11 April 2007 the Commission commented to the Service on the requested authorization, noting that, in general, the identified mitigation measures appeared helpful. It recommended that all of the identified marine mammal mitigation, monitoring, and reporting measures be included in the authorization. For clarification, the Commission recommended that the authorization explicitly identify which aspects of construction and operation (e.g., use of vessel thrusters) would be suspended when whales are detected within specified distances of the activities. It also recommended that the authorization include criteria and procedures for suspending and resuming construction activities when right whales and other protected species have been detected using passive acoustic monitoring.

To reduce the risk of ship/whale collisions, the Commission recommended that tankers using the port limit their speed to 10 knots at all times when transiting the Stellwagen Bank National Marine Sanctuary and between 1 March and 30 April when in those portions of the proposed ship-strike management area outside the sanctuary's boundaries. Finally, the Commission recommended that vessels smaller than 300 gross tons carrying supplies or crew between shore and the construction site contact the appropriate authority before leaving shore or the construction site for reports of recent right whale sightings and restrict speeds to 10 knots within five miles of any recent sighting locations.

On 14 May 2007 the Service published notice in the *Federal Register* announcing approval of the requested authorization. The Service agreed with most of the Commission's recommendations and included them as conditions for approval. The Service did not agree with the Commission's recommendation to specify which aspects of construction and operation would need to be suspended in the event that right whales or other marine mammals approach closer than specified safety distances. With regard to that recommendation, the Service concluded that the complexity of ocean conditions made it virtually impossible to specify shutdown criteria for each construction and operation activity. It also noted that the applicant was required to "cease any movement and/or stop noise emitting activities that exceeded a received level of 120 dB re 1 microPa at 100 yd (91m) (approximately 139 dB re 1 microPa at the source)" if a right whale was observed closer than 457 m (500 yd). Thus, notwithstanding the difficulties in determining sound levels produced by different activities at different distances, the Service apparently assumed that the vessel operators and construction crew would know which of their activities need to be stopped when marine mammals come closer than the specified safety range.

Status of the North Atlantic Right Whale under the Endangered Species Act

When the northern right whale (*Eubalaena glacialis)* was listed as endangered under the Endangered Species Conservation Act of 1969, it was considered a single species with both North Atlantic and North Pacific populations. That designation was carried forward under the current Endangered Species Act. Recent genetic studies, however, have confirmed that right whales in the two oceans are separate species: the North Atlantic right whale (*E. glacialis*) and the North Pacific right whale (*E. japonica*). To reflect this new understanding, the National Marine Fisheries Service published proposed rules on 27 December 2006 to modify the List of Endangered and Threatened Wildlife under the Endangered Species Act by replacing the listing of northern right whales with separate listings of the two species, each of which would be classified as endangered.

On 22 January 2007 the Commission wrote to the Service in support of the proposed change. The Commission also recommended that the final rules indicate that both species may be composed of at least two separate populations (i.e., eastern and western populations in each ocean basin) and that, pending better information on stock structure, management efforts should address those populations separately. In this regard, the Commission recommended that the Service analyze population structure to determine if and how distinct population segments of the two Northern Hemisphere right whale species should be defined under the Endangered Species Act.

At the end of 2007 the Service had not announced a final decision on the proposed change.

North Pacific Right Whale (*Eubalaena japonica*)

As noted in the previous section, right whales in the North Pacific are now recognized as a separate species, *Eubalaena japonica*. North Pacific right whales once occurred across the North Pacific Ocean and southern Bering Sea from North America to Asia. They were hunted nearly to extinction by commercial whalers in the mid-1800s. Despite a significantly diminished catch, North Pacific right whales continued to be hunted through the early 1900s. In 1935 the League of Nations adopted a ban on commercial hunting of all right whales and the International Whaling Commission extended the ban under the International Convention for the Regulation of Whaling of 1946. Although the ban provided the species a respite from most whaling and may have allowed right whale numbers in the North Pacific to increase, an illegal take of 372 whales by Soviet whalers between 1963 and 1967 (Brownell et al. 2001) pushed the species closer to extinction.

Available information suggests that the species consists of separate populations, one in the western North Pacific off China, Korea, Japan, and Russia, and the other in the eastern North Pacific off Mexico, the United States, and Canada (Brownell et al. 2001). An estimate from the late 1980s and early 1990s suggested that about 900 right whales could be found in the Sea of Okhotsk in summer months although the reliability of that estimate is questionable. The eastern population may now number far less than 100 (Brownell et al. 2001).

Between the late 1960s and mid-1990s, right whale sightings in the eastern North Pacific were rare and widely scattered between Baja California and Alaska, with a few observations in Hawaiian waters. In the summer of 1996, however, four whales were seen feeding together in the southeastern Bering Sea (Goddard and Rugh 1998). The National Marine Fisheries Service began annual summer surveys in that area and at least a few right whales were seen each year between 1996 and 2006. In the summer of 2001, Service biologists observed a concentration of 24 whales. Photo-identification records and genetic analyses of biopsy samples indicate at least 35 individual right whales have been identified in the eastern North Pacific and southeastern Bering Sea since 1996, and many of those have been sighted in more than one year (72 Fed. Reg. 61089–61105). In 2007, for the first time since 1996, no right whales were sighted in any of the areas surveyed by the Service.

Designation of North Pacific Right Whale Critical Habitat

Prior to the 2006 National Marine Fisheries Service's listing proposal and in response to a lawsuit filed by the Center for Biological Diversity the Service designated two areas off Alaska as critical habitat for northern right whales on 6 July 2006 (71 Fed. Reg. 38227; Figure III-7). One included a large portion of the southeastern Bering Sea between the Pribilof Islands and the Alaska Peninsula where most of the recent sightings occurred, and the other included a smaller area south of Kodiak Island in the Gulf of Alaska where a few right whales had been seen feeding. As discussed in previous annual reports, the Commission recommended that the Service designate a larger area as critical habitat, including passes along the Aleutian Islands through which migrating whales likely travel. The Service, however, chose to limit the designation to areas encompassing locations where multiple sightings had been made since the species' initial listing in the early 1970s. In doing so, it noted that the boundaries could be revised in the future as more information on habitat-use patterns became available. The two designated areas cover a combined area of about 95,325 km^2 (35,800 mi^2).

To ensure that the designated critical habitats remain in effect once the North Pacific right whale is listed separately under the Endangered Species Act, the Service proposed a new rule on 29 October 2007 to designate the same two areas as critical habitat for "North Pacific" right whales. At the end of 2007 final action had not yet been taken on either the proposed change in listing or the critical habitat rules for North Pacific right whales. The species nevertheless continues to be protected under the Endangered Species Act by virtue of the listing of the northern right whale.

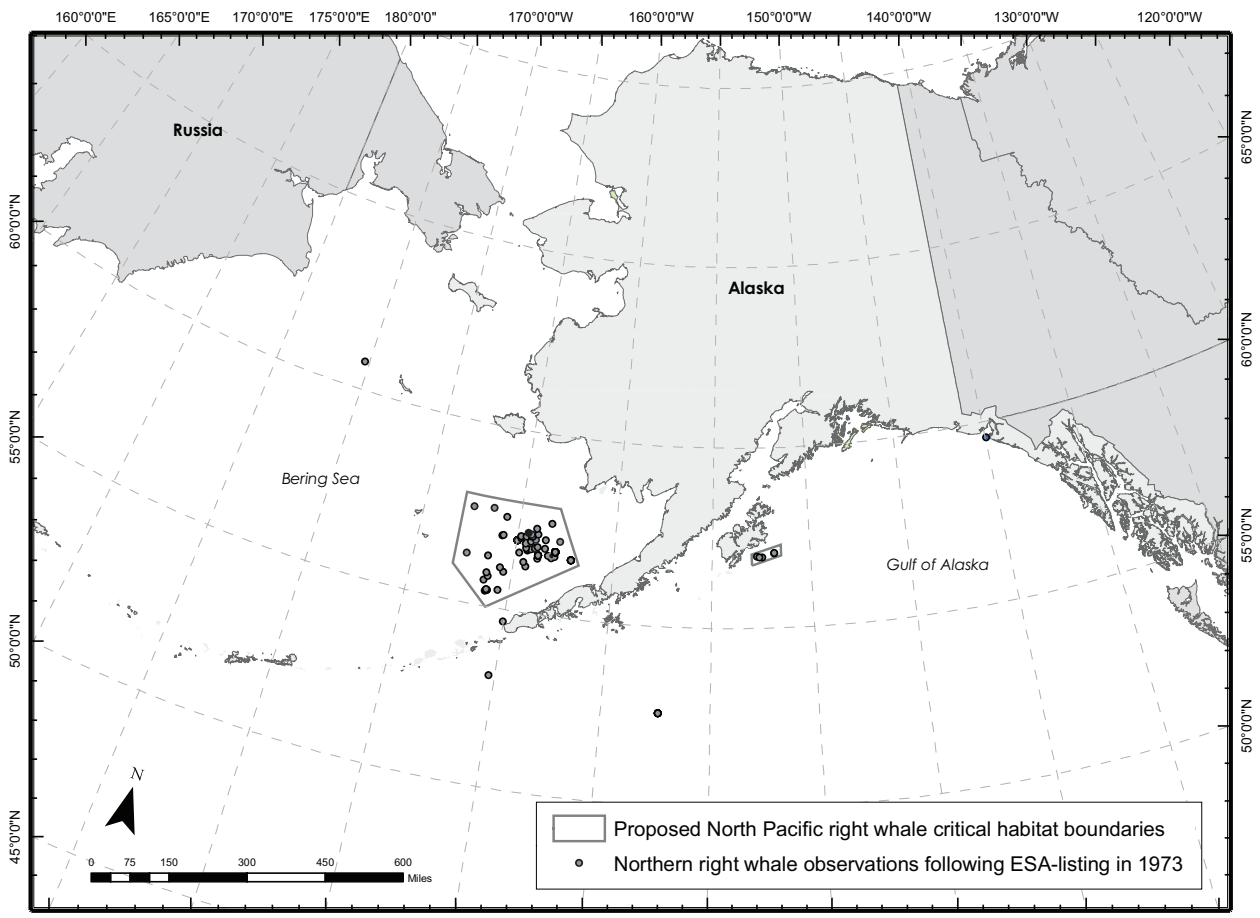

Figure III-7. National Marine Fisheries Service's proposed critical habitat for North Pacific right whales.

Florida Manatee (*Trichechus manatus latirostris*)

The Florida manatee is a subspecies of the West Indian manatee that occurs only in rivers and coastal bays of the southeastern United States. It was first listed as endangered in 1967 under the Endangered Species Preservation Act, a status which has been carried forward under the current Endangered Species Act.

Responsibility for Florida manatee research and management is shared by the U.S. Fish and Wildlife Service, which is the lead federal agency for manatee recovery under authority of the Marine Mammal Protection Act and Endangered Species Act, and the Florida Fish and Wildlife Conservation Commission, which implements a protection program under authority of the state's Florida Manatee Sanctuary Act. Many other agencies and groups, however, assist in funding or carrying out recovery activities. The Service and the Florida Fish and Wildlife Conservation Commission are currently implementing recovery activities through those agencies and in partnership with stakeholders.

Abundance

When West Indian manatees, including Florida manatees, were first listed as endangered, little was known about their distribution, abundance, or ecology. Today, the best estimate of abundance for Florida manatees is at least 3,300 animals based on a statewide count in January 2001. Scientists generally agree that manatee abundance increased in the last three decades of the 1900s, although recent trends are uncertain. The uncertainty is because annual statewide counts, which began in the early 1990s, are conducted during especially cold winter weather and have produced highly variable totals among years. In addition, the fraction of the population at warm-water refuges during those counts is

not known. In 2007 the maximum winter count was 2,817 manatees, with 1,412 seen on Florida's east coast and 1,405 on the west coast.

The manatee population in Florida waters is divided into four regional subpopulations (also called management units by the Fish and Wildlife Service): Upper St. Johns River, Atlantic coast, Southwest, and Northwest. These subpopulations are assessed using mark-recapture analyses of photographic records of distinctive individuals and aerial surveys (1977 to present) at Florida Power & Light Company power plants. The Atlantic coast subpopulation is the largest, including at least 1,650 manatees in 2003, and the evidence indicates that it has increased since the 1980s. The southwestern subpopulation is the second largest, including at least 1,392 manatees in 2001, but may be declining. The upper St. Johns River subpopulation included at least 193 manatees in 2007, and the northwestern subpopulation included 455 manatees in 2006. These two smaller subpopulations are both growing.

Threats

The most immediate threat to Florida manatees is the high number of deaths from human activities, particularly boating (Table III-6). About a quarter to a third of annual deaths are attributable directly to human causes. Watercraft-related deaths reached a record high of 98 animals in 2002 but have averaged 77 per year since then, including 75 in 2007. The next most common sources of human-caused manatee deaths are crushing or drowning in water control structures (i.e., flood gates and navigation locks) and entanglement in fishing gear and marine debris. Initiatives to mitigate those threats are described in previous annual reports and continue to be a major management focus. They include establishing and enforcing networks of boat speed regulatory zones, installing automatic reversing mechanisms on gates at water control structures, and rescuing, rehabilitating, and releasing injured and distressed manatees.

Red tides are a growing threat to manatees, particularly the southwest Florida subpopulation. Red tides off Florida's west coast are usually caused by blooms of the planktonic dinoflagellate *Karenia brevis*, which produces a neurotoxin (i.e., brevetoxin) that can be either ingested or inhaled by manatees. Ingestion of brevetoxins may occur when animals incidentally eat filter-feeding organisms (e.g., tunicates or other epiphytes attached to sea grass blades) that concentrate toxins, grass blades coated with toxins, or fish carrying toxins in their intestinal tracts. Inhalation can occur when manatees surface to breathe in areas where the toxins have been released into the atmosphere. The first two manatee die-offs attributed to red tides occurred in 1982 and 1996, when the deaths of 39 and 151 animals, respectively, were recorded. Since 2000 high numbers of deaths due to red-tide have been recorded in 2002 (37 deaths), 2003 (96 deaths), 2005 (92 deaths), and 2006 (62 deaths). In 2007, 30 red tide-related deaths were confirmed and another 8 were suspected in southwest Florida. The increased occurrence of red-tide related deaths could be due to (a) more and longer-lasting red tide events because of pollution (e.g., nutrients discharged into the eastern Gulf of Mexico via the Mississippi or other major rivers) or climate change, and (b) improved means of detecting manatees that have been exposed to brevetoxin. The only known treatment is to rescue animals with early signs of toxic effects for care at captive care facilities.

Loss of warm-water refuges

Over the next 10 to 20 years, the greatest threat to Florida manatees may be loss of warm-water refuges that now support most overwintering animals. As is evident from their distribution, manatees are limited in their ability to tolerate cold water. Calves, in particular, are unable to survive long periods of time in water temperatures below about 18 to 20°C (64 to 68°F [Bossart et al. 2002]). As a result, in winter virtually all manatees are confined to mild temperatures in the southern two-thirds of the Florida peninsula. Even there, however, most manatees retreat to local warm-water refuges during periods of prolonged or intense cold weather. Warm-water refuges are created either by (1) constant discharges of warm water (generally 22°C [71°F] or above) from power-plant cooling systems or natural springs or (2) passive thermal basins where the stratification of water columns in dredged channels or naturally deep holes retains pockets of water heated by the sun or other sources long enough for animals to survive cold periods. Except during the coldest winter periods, manatees may leave warm-water refuges

Table III-6. Known manatee mortality in the southeastern United States (excluding Puerto Rico) reported through the manatee salvage and necropsy program, 1978–2007; data provided are number of animals killed and percent of total recorded deaths for the year

Year	Watercraft No. (%)	Floodgate And Locks No. (%)	Other Human Related No. (%)	Perinatal No. (%)	Cold Stress No. (%)	Other [2] No. (%)	Total
1978	21 (25)	9 (11)	1 (2)	10 (12)	--	43 (51)	84
1979	24 (31)	8 (10)	9 (12)	9 (12)	--	28 (36)	78
1980	16 (24)	8 (12)	2 (3)	13 (19)	--	28 (42)	67
1981	25 (21)	2 (2)	4 (3)	13 (11)	--	75 (63)	119
1982	20 (17)	3 (3)	2 (2)	14 (12)	--	81 (67) [3]	121
1983	15 (19)	7 (9)	5 (6)	18 (22)	--	36 (44)	81
1984	34 (26)	3 (2)	1 (1)	26 (20)	--	67(51)	131
1985	35 (27)	3 (2)	5 (4)	25 (20)	--	60 (47)	128
1986	33 (26)	3 (2)	1 (1)	27 (22)	12 (10)	49 (39)	125
1987	39 (33)	5 (4)	4 (3)	30 (25)	6 (5)	34(29)	118
1988	43 (32)	7 (5)	4 (3)	30 (22)	9 (7)	41 (31)	134
1989	51 (29)	3 (2)	5 (3)	39 (22)	15 (8)	63 (36)	176
1990	51 (23)	3 (1)	5 (2)	45 (21)	50 (23)	64 (29)	218
1991	56 (31)	9 (5)	7 (4)	53 (29)	2 (1)	54 (30)	181
1992	38 (23)	5 (3)	7 (4)	48 (29)	1 (1)	69 (41)	168
1993	35 (24)	7 (5)	7 (5)	39 (26)	2 (1)	58 (39)	148
1994	51 (26)	16 (8)	5 (3)	46 (24)	4 (2)	72 (37)	194
1995	43 (21)	8 (4)	5 (2)	56 (28)	0 (0)	91 (45)	203
1996	60 (14)	10 (2)	1 (0)	61 (15)	17 (4)	267 (64) [3]	416
1997	55 (22)	8 (3)	9 (4)	61 (25)	4 (2)	109 (44)	246
1998	67 (27)	9 (4)	6 (2)	53 (22)	12 (5)	97 (40)	244
1999	83 (30)	15 (5)	8 (3)	54 (20)	6 (2)	107 (39)	275
2000	79 (28)	7 (3)	9 (3)	58 (21)	14 (5)	112 (45)	279
2001	82 (24)	1 (0)	7 (2)	63 (19)	32 (10)	151 (45)	336
2002	98 (31)	5 (2)	9 (3)	53 (17)	18 (6)	132 (42) [3]	315
2003	75 (20)	3 (1)	7 (2)	72 (19)	48 (13)	178 (46) [3]	383
2004	69 (24)	3 (1)	4 (1)	72 (26)	52 (18)	82 (29)	282
2005	80 (20)	5 (1)	9 (2)	89 (22)	29 (7)	186 (47) [3]	398
2006	87 (21)	5 (1)	4 (1)	70 (17)	21 (5)	233 (55) [3]	420
2007	75 (23)	2 (1)	5 (2)	59 (18)	19 (18)	162 (50)	322

Data provided by the Florida Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission; data for 2007 are preliminary.

[1] Includes deaths from entanglement or ingestion of marine debris, drowning in shrimp nets, poaching, vandalism, etc.

[2] Includes deaths due to other natural and undetermined causes.

[3] Includes a large number of known or suspected red tide related deaths in southwestern Florida: 39 in 1982, 151 in 1996, 37 in 2002, 96 in 2003, 92 in 2005, 62 in 2006 and 38 deaths in 2007.

for periods of a few hours to a few days to feed in grass beds, sometimes up to 30 km (19 mi) away.

In winter months, scientists have counted at least 50 manatees at 22 refuges, including 11 power-plant outfalls, 4 warm-water springs, and 7 thermal basins (Figure III-8). Maximum counts often exceed 200 manatees at several power plants and have exceeded 500 manatees at one plant. During the January 2001 statewide survey that resulted in the record high count of Florida manatees, nearly 80 percent of all animals counted in the Atlantic coast subpopulation were seen at power-plant outfalls, with most found at the five Atlantic coast plants shown in Figure III-8. In spring, as water temperatures rise, manatees disperse throughout Florida, with some animals moving as far north as North Carolina along the Atlantic coast and west to Louisiana or Texas on the Gulf of Mexico coast. On rare occasions, animals may travel as far north as southern New England.

All power plants used as warm-water refuges by manatees are more than 40 years old, although two facilities used extensively by manatees have recently been refitted to burn natural gas, thereby extending their operational lifespan. Given aging equipment, rising fuel costs, concerns about carbon emissions from burning fossil fuels, and new, more efficient electric generating technology, many of those plants could be retired or begin operating on intermittent schedules in the next 5 to 20 years. Because regulations adopted in the 1970s under the Clean Water Act prohibit facilities built since then from discharging thermal effluent, any new plants built to replace older facilities (other than those built on the same site as a previously approved plant) will not generate comparable thermal outfalls. For near-

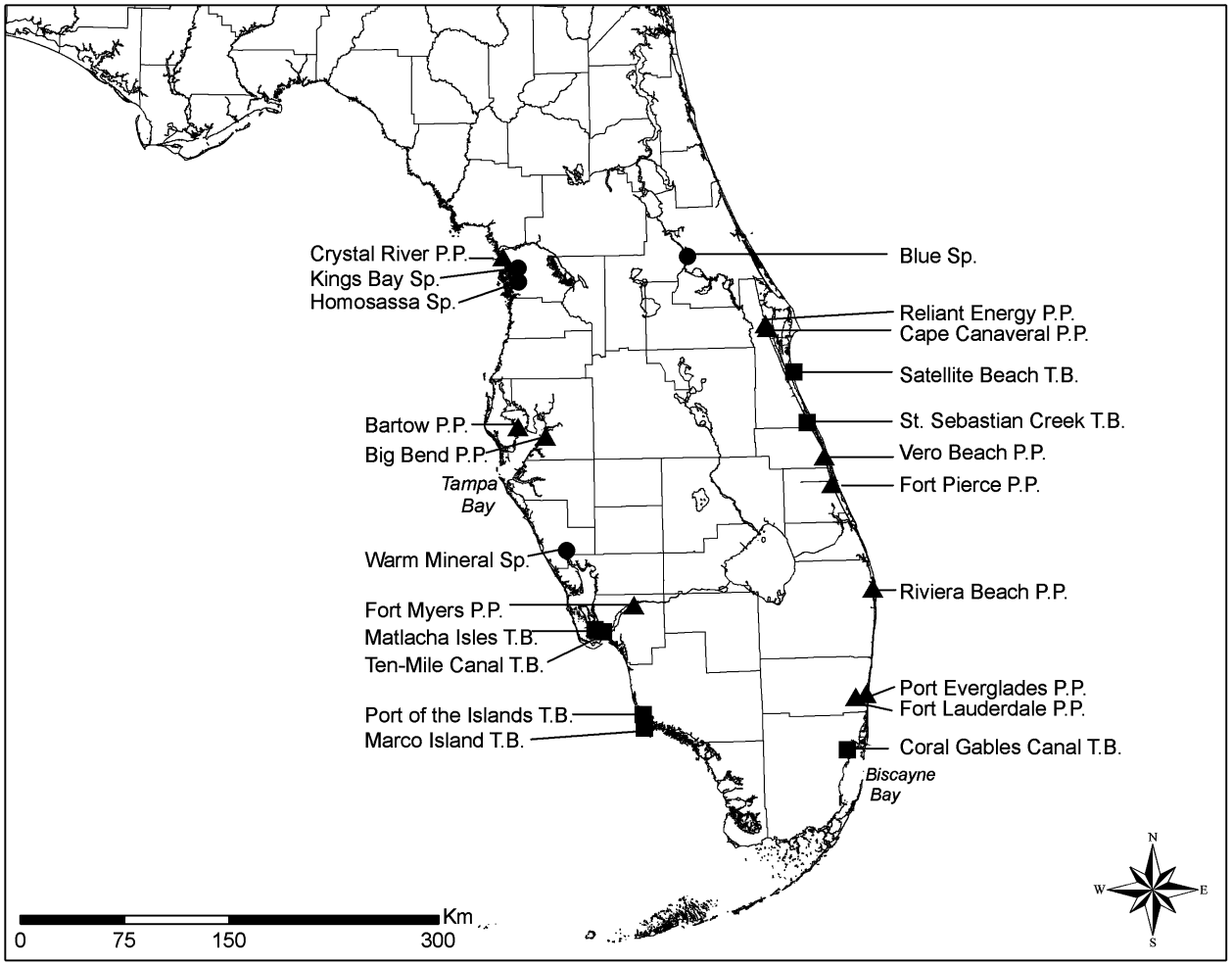

Figure III-8. Warm-water refuges with at least one winter count of 50 or more manatees (PP = power plant, Sp = natural warm-water spring, TB = passive thermal basin).

ly two decades managers have recognized that the loss of these warm-water refuges poses a threat to manatees, but effective mitigation options are not yet in place.

Interim Replacements for Power Plant Outfalls

In August 1999 the Fish and Wildlife Service convened a warm-water workshop to develop recommendations for ensuring the long-term availability of warm-water refuges for Florida manatees. The workshop provided an opportunity to exchange ideas regarding long-term policies, research needs, and management strategies. To follow up on its results, the Service established the Warm-Water Task Force. Among other things, the task force began drafting an action plan setting forth possible research and management actions to identify and maintain an optimal network of warm-water habitats for each of the four recognized Florida manatee subpopulations.

Recognizing that manatees had learned to use power plant outfalls over a 60-year period, task force members agreed that changing manatee habitat-use patterns might take a long time, whereas plants might start closing in the near future (i.e., 5 to 10 years). As an interim strategy, the draft plan recommended that artificial warm-water sources that can support overwintering manatees within their current winter ranges should either be retained or replaced by functionally equivalent sources of warm water according to their current distribution. Over the long term (e.g., more than 40 years), the draft plan suggested that regional networks of warm-water refuges should seek to minimize reliance on refuges that depend on technology and maximize manatee use of natural springs and thermal basins. The task force endorsed efforts to examine options for (1) improving manatee access to natural warm-water springs, (2) developing new thermal basins, and (3) testing the feasibility of building temporary replacement refuges that could be used on an interim basis (e.g., 25 years) to support manatees in areas where power plants might be shut down.

To assess existing access to and use of natural springs, Florida Power & Light supported a contract to identify possible long-term warm-water refugia (Reynolds 2000). The Marine Mammal Commission supported an additional survey in 2006 to evaluate the status of Florida's natural warm-water springs (Taylor 2006). That report has been provided to the Warm-Water Task Force for use in identifying natural springs where actions might be taken to facilitate manatee access and increase the number of overwintering animals they might support.

The Commission also funded a modeling study by the Florida Solar Energy Center to examine the feasibility of using solar panels and a closed-circuit heating system to warm enclosures that could serve as temporary warm-water refuges to replace outfalls at East Coast power plants that may be shutdown (Gu 2005). That report concluded that existing solar heating technology could maintain water temperatures in walled enclosures at 22ºC (i.e., a temperature comparable to natural springs used by manatees) throughout the winter even at the latitude of the northernmost power plant used by manatees (i.e., near Cape Canaveral). Depending on the size of the enclosure, the cost for solar panels might range from $130,000 to $760,000, being less expensive at sites farther south. The Warm-Water Task Force agreed that results of the report were promising, and it encouraged support for a follow-up study to develop conceptual engineering plans and cost estimates for a test facility.

Reliant Energy offered to construct a test facility at the company's Indian River Generating Station. On several occasions in recent winters Reliant Energy has operated its Indian River plant solely to produce thermal effluent for manatees. It did so to comply with a manatee protection plan developed under the company's National Pollution Discharge Elimination System permit, which is required by the Clean Water Act to authorize its thermal discharges. A test facility at this site would help protect the northern, and most vulnerable, part of the Atlantic subpopulation. The site is close to a warm-water refuge (i.e., the Florida Power & Light Company's Canaveral Power Plant), giving manatees an alternative in case the test site does not produce sufficiently warm water. It also is within a no-entry zone for boats, and no new regulatory measures to protect animals would be required. Finally, it would save the company fuel and operating costs when it is not economical to run the power plant.

The Marine Mammal Commission responded to Reliant Energy's offer by funding the Florida Solar Energy Center to work with Reliant Energy and the Warm-Water Task Force to prepare conceptual plans and a cost estimate for building the test facility. The Center calculated heating requirements to maintain an enclosure at a constant 22ºC and prepared a report on those requirements. Reliant Energy contracted with an engineering firm to develop a design plan and cost estimates for the facility. The Warm-Water Task Force provided advice on design features (e.g., enclosure depth, water temperature, and size of enclosure openings). The Center completed a draft report in 2007.

The envisioned facility consists of (1) a refuge enclosure with two openings to allow manatee access and a heat exchanger mounted to the inside of the enclosure's walls to heat water in the enclosure and (2) a land-based heating system composed of an array of solar panels and a back up gas-fired water heater (or two gas-fired water heaters without the array), and associated pumps and piping to circulate the heated water from the solar panels and boiler through the refuge heat exchanger. Given its size, it was thought that up to 50 manatees might use the enclosure at any one time. The land-based heating system would include water-heating solar panels and a supplemental gas-fired water heater.

Construction would proceed in two phases. The first phase would be limited to construction of the enclosure with the heat exchanger and installation of the gas-fired boiler. If manatees use the enclosure, then either the solar array or the second gas-fired boiler would be installed. Estimated costs are $1.5 million for phase one and $2.4 million for phase two, for a total of just under $4 million. At the end of 2007 the Commission expected to transmit the report to the Fish and Wildlife Service for consideration as to further steps to build and test such a facility.

Manatee Harassment at the Crystal River National Wildlife Refuge

In early 2007 the Commission learned of videos showing manatee harassment by divers in Kings Bay. The bay is the site of the Fish and Wildlife Service's Crystal River National Wildlife Refuge, which was established in 1983 to provide a winter refuge for manatees using the numerous warm-water springs that discharge into the bay. The videos showed divers grabbing, chasing, kicking, and riding manatees. Reports of such harassment have been a long-standing concern at Kings Bay, and on 1 December 2000 the Commission wrote to the Service recommending that enforcement efforts be increased and diver education materials, including a video entitled "Manatee Manners," be updated to inform divers about proper conduct when viewing manatees underwater. The Commission's letter recommended that educational materials advise divers to avoid touching animals, to back away from animals that approach them, and to maintain more than an arm's length from any animal.

The new videos showed that manatee harassment was continuing in Kings Bay. On 14 March 2007 the Commission wrote to the Service to reiterate its previous recommendations and to recommend that the Service develop regulations prohibiting the touching of animals, requiring that divers not approach animals closer than 10 ft, and back away from animals that approach them.

On 18 April 2007 the Service replied that it had recently updated its video and educational materials and that it believed its recommended guidelines afforded refuge visitors a positive encounter that helped make them stronger advocates for manatee conservation. Copies of its educational video and materials were enclosed with the letter. The reply also noted that the Service was a member of the national Watchable Wildlife program, that it was working with local dive tour operators to address the problem, that it did not encourage or tolerate activities of the type shown in the videos, and that it planned to address the harassment issue in a comprehensive planning process for the Crystal River Refuge that would begin in the fall of 2007.

The Commission reviewed the updated educational materials sent by the Service but remained concerned that the advice presented was not sufficient to ensure that manatees would not be harassed. Although the Commission was pleased to see that the new materials encouraged "passive interaction" with manatees, the message was undercut by a video showing divers scratching manatees and taking pictures of a manatee with a camera lens inches from the animal's face. The Commission therefore concluded that the new video could instill an expec-

tation in at least some divers that they should be allowed to touch live animals and approach them as close as they wished. Because not all animals want to be touched and many animals flee from divers who attempt to approach closely, the video could encourage inappropriate behavior likely to lead to harassment. The Commission also believed that opportunities for public enjoyment of manatees would not be diminished significantly if people were prohibited from touching wild animals or approaching them within inches, that a tolerance for touching manatees and approaching them close enough to be touched placed the Service's guidelines in conflict with National Marine Fisheries Service policies regarding human interactions with marine mammals, and that, as a general matter, such behavior by people viewing endangered species should not be encouraged or condoned.

The Commission therefore wrote again to the Service on 9 October 2007 noting that a prohibition on touching and approaching animals too closely would be less ambiguous to the public and far easier for officers to monitor and enforce. In its letter, the Commission again recommended that the Service implement regulations prohibiting divers from touching or approaching manatees closer than 10 ft, and requiring that they back away from animals that approach them closer than that distance. At the end of 2007 the Commission understood that its views would be considered by the Service as the agency proceeded with its comprehensive planning process for the Crystal River Refuge.

Status of Florida Manatees under State Law

Although the Florida manatee population has been listed as endangered under state law since the 1960s, in 2005 the Florida Fish and Wildlife Conservation Commission adopted new criteria and procedures for classifying imperiled species under state law. The criteria were based loosely on those used by the International Union for Conservation of Nature (IUCN). However, the state equated the categories "endangered" and "threatened" under state law to the categories "critically endangered" and "endangered," respectively, under the IUCN system. Upon adopting its new criteria, the Florida Commission directed its staff to reassess the status of Florida manatees.

The staff did so and recommended that Florida manatees be downlisted from endangered to threatened on the state list. The Florida Commission concurred, and at its June 2006 meeting, directed its staff to proceed with steps to reclassify Florida manatees. Under the state's new classification procedures, such action requires that a management plan first be adopted to identify and guide actions that would allow recovery to a point where the population could be removed from the state's imperiled species list. In November 2006 the Florida Commission's staff circulated a draft manatee management plan for public comment.

The draft plan identified three measurable biological goals for gauging progress toward recovery:

- regional adult survival rates are sufficient to avoid predicted declines greater than 30 percent over the next three manatee generations (60 years), given available warm-water resources;
- regional warm-water carrying capacity is sufficient to avoid predicted declines greater than 30 percent over the next three manatee generations given prevailing rates of adult survival; and
- the population includes at least 2,500 adults.

On 7 February 2007 the Marine Mammal Commission commented to the Florida Commission on the draft management plan. The Commission commended the staff of the Florida Commission for developing a useful recovery guide and the state for explicitly recognizing the importance of (1) restoring manatee access to the Oklawaha River (i.e., a tributary of the St. Johns River with warm-water springs that could no longer be used by manatees because of a dam built in the 1960s), (2) collecting data on boat traffic patterns and compliance with boat speed rules, as well as manatee behavior and ecology, and (3) preparing a thorough list of actions needed to recover Florida manatees.

The Commission was concerned, however, that the draft plan's goals were inappropriate and in need of substantial revision. For example, the measurable biological goals stating that the objective was "to avoid predicted declines of more than 30% over three generations" suggested that the state would find recovery goals to have been met as long as the population did not decline by more than 30 percent

over the next 60 years (i.e., three manatee generations). To address this and other problems, the Commission suggested that the Florida Commission:

- delete the first measureable biological goal on annual adult survival rates or revise it to identify an adult survival rate that would be sufficient to ensure that the population increased toward its carrying capacity level;
- replace the second measurable biological goal on warm-water habitat with a measure specifying a proportion of the Florida manatees that used natural warm-water springs or passive thermal basins to survive winter cold periods; and
- expand discussion of the third measurable biological goal on the minimum number of adult animals (i.e., 2,500 mature animals) to explain why that number was substantially below the state's adopted threshold (i.e., 10,000 animals) for adding or removing species from the state's imperiled species list.

The Florida Commission was scheduled to consider adoption of the state manatee management plan and reclassification at its September 2007 meeting. Shortly before its meeting, however, the governor of Florida wrote to the chairman of the Florida Fish and Wildlife Conservation Commission expressing concern about the need for a better method of estimating manatee abundance, the large number of manatees found dead in 2006 (i.e., 420 animals), and the need for recently appointed Commissioners to have more time to review the situation. In light of those concerns, he asked that consideration of the reclassification decision be postponed. At its December 2007 meeting, the Florida Commission voted to approve the Florida manatee management plan but deferred a decision on reclassifying Florida manatees. The Florida Commission also directed its staff to re-examine the imperiled species listing process and develop alternatives to be considered at a future meeting.

Status of Florida Manatees under Federal Law

The Endangered Species Act calls for review of the status of listed species every five years. Using five broad listing factors, those reviews are intended to determine if a listed species should remain as listed, be reclassified, or be removed from the list of endangered and threatened wildlife. On 9 April 2007 the Fish and Wildlife Service announced that it had completed a five-year review of the West Indian manatee (the first done for manatees under the ESA) and that its staff had concluded that the species no longer fit the Act's definition of endangered (i.e., "in danger of extinction throughout all or a significant portion of its range"). Accordingly, the Service's staff recommended that the species be reclassified as threatened under the U.S. Endangered Species Act.

To reclassify West Indian manatees as threatened, the Service must complete formal rulemaking to amend the Endangered Species Act list of endangered and threatened wildlife. As part of this process, the public must be afforded an opportunity to review and comment on the Service's reasoning and proposed change. In part, that rationale must demonstrate that identified threats to the species are under control and unlikely to cause a future decline that would necessitate upgrading their status or relisting. In announcing the results of the five-year review and staff recommendation, the Service did not provide information as to when rulemaking action might proceed. The announcement also identified a number of conservation issues that needed to be resolved, including uncertainties regarding the future availability of warm-water refuges, ongoing watercraft-related deaths, and a possible decline in the number of manatees in the southwestern Florida subpopulation.

No further information on future rulemaking was provided during 2007. At the end of the year, it was unclear whether further steps would be taken to downlist manatees. That action may depend on progress to resolve outstanding conservation needs identified in the review.

Steller Sea Lion *(Eumetopias jubatus)*

The western population of Steller sea lions (*Eumetopias jubatus*) occurs from the central Gulf of Alaska through the Aleutian Islands. The population has declined by about 80 percent since the

1970s and in 1990 the entire species was listed as threatened under the Endangered Species Act (55 Fed. Reg. 49204). In 1997 the National Marine Fisheries Service recognized separate western and eastern populations (i.e., distinct population segments), changed the listing status of the western population to endangered, and left the status of the eastern population as threatened (62 Fed. Reg. 24345). The eastern population occurs from California through southeast Alaska. This population has increased by 2 to 3 percent annually over the past three decades and is recovering from high levels of human-related mortality in the years prior to the passage of the Marine Mammal Protection Act.

Causes of the Western Population's Decline

The causes of the western population's decline have been a matter of considerable debate. A number of factors are known to have contributed to the decline, including bycatch in commercial fisheries, illegal shooting by fishermen and others, the intentional killing of 45,000 pups for their fur between the mid-1960s and the early 1970s, and subsistence harvests by Alaska Natives. However, these factors explain only a portion of the decline, and the debate over other possible causes has been intense. The leading hypotheses include competition with groundfish fisheries in the Gulf of Alaska and the Bering Sea, large-scale oceanographic changes or regime shifts, and predation by killer whales. Because of the potential involvement of commercial fisheries, research on the decline of the Steller sea lion has received more funding in recent years than that for all other endangered marine mammal species combined. Funding increased from about $3 million in 1998 to as much as $56 million in 2002 and 2003 (Weber and Laist 2007), with reduced levels in subsequent years. Not all of these funds were directed toward research, and a good portion of them were passed through the National Marine Fisheries Service to other organizations for a variety of purposes. The Service distributed those funds over which it had discretion, and a wide range of research was conducted both on Steller sea lions and their ecosystems. Despite that research, the controversy over potential causes of the decline persists.

Counts after 2000 suggest that the western population has stabilized and may have experienced a small amount of recovery. Counts in 2007 were incomplete, particularly in the western Aleutian Islands. The counts that were conducted suggested that the population was essentially unchanged over the past two years, with counts increasing in the central and western Gulf of Alaska and eastern Aleutian Islands region and declining in the eastern Gulf of Alaska and central Aleutian Islands. Past counts in the western Aleutian Islands suggest a strong decline in that region. More detailed information about the 2007 counts can be found at the National Marine Mammal Laboratory Web site http://www.afsc.noaa.gov/Quarterly/ond2007/divrptsNMML1.htm.

Research Permits and Possible Research Effects

The rapid increase in research funds in 2001 caused a substantial increase in the number and complexity of applications for Steller sea lion research permits. In 2002 the Service issued several permits based on an environmental assessment that concluded that the multiple research projects proposed through 2004 would not have a significant impact on Steller sea lions. In May 2005 the Service issued several new permits for additional research, including continuation of some of the previous studies.

In a series of letters to the Service dating back to 2001 (27 July 2001, 2 August 2002, 19 May 2005, and 10 June 2005), the Commission expressed concern that the growth in research activities being undertaken by a wide range of investigators for a number of different purposes increased the potential for adverse effects from research itself. Despite these concerns, the Service continued to issue the requested scientific research permits, authorizing virtually all proposed research activities without mechanisms to adequately evaluate potential research impacts.

In 2005 the Humane Society of the United States sued the Service over the issuance of those permits, citing concerns similar to those raised by the Commission and others who had commented on the applications. In response, the Service published a notice in the *Federal Register* on 28 December 2005 announcing its intent to prepare an environmental impact statement to evaluate the

impacts of issuing Steller sea lion research permits, including the cumulative impacts of authorizing multiple studies.

On 26 May 2006 the U.S. District Court for the District of Columbia found in favor of the Humane Society. The court ordered the Service to prepare the environmental impact statement and analyze the potential for a significant research impact, and the court vacated the permits that had been issued a year before. In June 2006 the Service and the Humane Society reached a settlement under which the Service and other permit-holders were allowed to conduct non-invasive research (e.g., observations of tagged and branded animals). The delay in reaching that settlement disrupted a number of research activities, including surveys to assess population trends. The intent of the lawsuit, as described by the plaintiffs, was not to disrupt research but rather to ensure that it was well directed, coordinated, and conducted to provide essential information without negatively affecting the sea lion populations through unintended adverse effects.

On 15 February 2007 the Service announced in the *Federal Register* (72 Fed. Reg. 7420) that it had received a suite of research permit applications for research in 2007 and beyond. On 16 February 2007 the Service published in the *Federal Register* a notice that it had completed a draft programmatic environmental impact statement on the effects of research on both Steller sea lions and northern fur seals. In the following month, it also held a series of meetings on potential research effects.

On 2 April 2007 the Commission provided recommendations and comments to the Service regarding its draft environmental impact statement. The Commission's recommendations emphasized the need for an adaptive management approach to assess fishery effects, the development of an implementation plan in accordance with the draft recovery plan, and greater emphasis on the need to evaluate potential unintended effects of research activities. To promote better understanding of research impacts, the Commission recommended the development of "best practices" in research methods; additional coordination, mitigation, and monitoring to characterize and minimize such impacts; and development of a database of activities that involve handling endangered, threatened, and depleted populations that would provide a basis for evaluating potential long-term impacts from research activities.

The Commission also emphasized the importance of prioritizing research to ensure that the studies that are conducted on sea lions are those that will inform managers about key issues and that will provide the largest net benefit. The draft impact statement tended to treat all described research activities as more or less equal in priority. The Commission disagreed with this treatment and cited an adaptive experimental approach to assessing fishery effects as an example of research that has not been given sufficient priority. In the draft impact statement the Service stated that "none of the alternative policies for continuing SSL [Steller sea lion] and NFS [northern fur seal] research would have a direct, indirect, or cumulative effect on commercial fisheries." The Commission considered this a telling statement that indicated that the Service had no intent to modify the fisheries in any way to investigate their impact, despite the fact that the most controversial question regarding the Steller sea lion decline, and current lack of recovery, has been the role of commercial fishing. The Commission therefore recommended that the draft statement be revised to include a thorough discussion of the costs and benefits of an adaptive experimental approach for assessing potential fishery effects, as described in the draft recovery plan.

On 2 May 2007 the Commission submitted recommendations and comments to the Service regarding the numerous applications for research permits. The recommendations were largely consistent with those submitted on the draft environmental impact statement, particularly with regard to the need for implementation teams to prioritize research and thereby maximize its net benefit to sea lion recovery. The Commission also recommended that all of the permits be reviewed by Institutional Animal Care and Use Committees as required by the Animal Welfare Act, and that anesthesia be used for branding activities and similarly painful procedures, with adequate justification and specific authorization required in advance for any proposed exceptions. The Commission also provided recommendations and comments on each of the individual permit

applications. (Commission recommendations are summarized in Appendix A of this report.)

Recent Recovery Planning

In the late 1980s the Service convened a recovery team and in 1992 completed the first recovery plan for the Steller sea lion. The plan became outdated over the course of the next decade, and the Service convened another team in 2001. This second team consisted of scientists from agencies and organizations conducting research on Steller sea lions and the Bering Sea and Gulf of Alaska ecosystems, as well as representatives of the fishing industry, conservation organizations, and the state of Alaska. After five years of debate, writing, and rewriting, the team completed the draft revised recovery plan in 2006.

On 24 May 2006 the Service announced the availability of the draft revised recovery plan in the *Federal Register* and solicited comments on it. The plan identified subsistence hunting, illegal shooting, entanglement in debris, disease, and disturbance from vessel traffic and scientific research as minor threats; contaminants and incidental take in fisheries as moderate threats; and competition with fisheries, oceanographic changes, and predation by killer whales as potentially high threats. The plan identified 78 recovery actions that emphasized assessment of status and vital rates, investigation of remaining threats, and corresponding implementation of conservation measures. The plan highlighted three conservation issues as being of particular importance: (1) maintaining current fishery management measures, (2) conducting an adaptive management approach to investigate fishery effects and the efficacy of fishery management measures, and (3) continued monitoring of sea lion status and investigation of threats. The plan also set forth the following measures of recovery and criteria to be met before delisting of the western population: (1) the population in the U.S. region has increased at an average rate of 3 percent for 30 years based on counts of adults and juveniles (i.e., not including pups), (2) population ecology and vital rates are consistent with a growing population as described in criterion 1, (3) trends in adult/juvenile numbers are positive or stable in at least five of the seven regions occupied by the western population in U.S. waters, two adjacent regions cannot be declining significantly, and any single region cannot have declined more than 50 percent, and (4) specific conditions satisfying the five listing factors in the Endangered Species Act are met. The plan recommended initiation of a status review for the eastern population as it may no longer warrant listing.

On 31 August 2006 the Marine Mammal Commission wrote to the Service commenting on the draft revised plan. The Commission commended the recovery team for its work and concurred with the major focus and recommendations of the plan. To further strengthen recovery efforts, the Commission also made three recommendations to the Service. The first was that the Service reconsider its recovery criteria. In the course of preparing the draft revised plan, the recovery team had worked with an independent scientist to develop a modeling approach for determining recovery criteria. The benefits of the modeling approach were that it took into account all relevant population data, including the extreme variation in trends of the western population and uncertainty as to the causes of that variation. Because much of the past decline in the western population has not been explained, the Commission believed it prudent to recognize and incorporate that type and degree of uncertainty into recovery criteria.

The Commission's second recommendation was, again, that the Service develop and implement a rigorous, adaptive management approach for investigating the role of fisheries in the decline of the western population and its potential significance in current and future recovery efforts. The debate over potential fishery effects has generated considerable controversy regarding matters that are difficult to address without an adaptive research program that can manipulate the fishery to determine its effects.

The third recommendation was that the Service convene a team to advise it on implementation and coordination of research efforts. Such guidance not only would facilitate the best possible research but also would lend credibility to the research program. In addition, the implementation team could assist the Service in the development of research methods to investigate the effect of research itself on the western population, an issue that has become controversial. To date, none of the above recommendations have been followed by the Service.

On 21 May 2007 the Service announced in the *Federal Register* the availability of and request for comments on a revised draft recovery plan for the Steller sea lion. The primary difference between this draft and the draft released one year earlier involved the perceived significance of killer whale predation as a cause of the sea lion decline. In the draft plan announced on 21 May 2007, killer whale predation was listed as a medium threat to Steller sea lions. The fishing community objected to the dimunition of the perceived killer whale threat to Steller sea lions and, at the end of 2007 this matter was being reconsidered by the Service as it prepared to finalize the plan in early 2008.

Potential Changes to Protection Measures

On 26 December 2007 the National Marine Fisheries Service published a *Federal Register* notice that it intended to prepare a supplemental environmental impact statement on revisions to Steller sea lion protection measures. The Service and the North Pacific Fishery Management Council determined that a supplemental impact statement was required based on new information pertaining to the effect of existing measures on the human environment. The notice solicited comments on the measures in place and possible alternatives. As described in the notice, existing measures include "(1) global harvest controls for Steller sea lion prey species (pollock, Pacific cod, and Atka mackerel); (2) spatial harvest controls specific to prey species, gear type, and proximity to rookery, haulout, or forage areas to limit prey species removal in an area; (3) temporal harvest controls for pollock, Pacific cod, and Atka mackerel, including seasonal apportionments to limit prey species removal during certain times of the year; and (4) a vessel monitoring system requirement for all vessels (except vessels using jig gear) fishing for pollock, Pacific cod, or Atka mackerel." Alternatives to be considered include (1) no action (i.e., continue existing measures); (2) changes in spatial measures; (3) changes in temporal measures; and (4) changes in other measures such as gear restrictions. Assessment of social and economic impacts would focus on (1) those who harvest the groundfish resources; (2) those who process and market the resources; (3) those who consume the products; (4) those who rely on Steller sea lions in the region for subsistence purposes; (5) those who benefit from non-consumptive uses of Steller sea lions and other living marine resources; and (6) fishing communities. Comments on these alternatives and evaluations were due on 21 April 2008.

Northern Sea Otter, Southwest Alaska Stock (*Enhydra lutris kenyoni*)

Sea otters (*Enhydra lutris*) once occupied coastal waters more or less continuously along the North Pacific rim from central Baja California to northern Japan. In Alaska, sea otters (*E. l. kenyoni*) were very abundant prior to the establishment of the fur trade in the mid-1700s. Overharvesting severely reduced their abundance, and only a few small remnant groups remained when protection was afforded them by the Fur Seal Act in 1911. With protection, otter numbers rebounded and by the 1980s they had reoccupied much of their previous range in Alaska, reaching what were thought to be equilibrium densities in some regions (VanBlaricom and Estes 1988).

The U.S. Fish and Wildlife Service is responsible for managing activities that may affect sea otters. The Service recognizes southeast, southcentral, and the southwest stocks in Alaska. The most recent (2002) assessment reports for these stocks indicate that the southeast stock is growing and expanding its range, the southcentral stock is stable or slightly increasing, but the southwest stock has recently undergone a major decline (Angliss and Outlaw 2007).

The southwest Alaska stock includes sea otters within the region from Kamishak Bay and Kodiak Island in the east to Attu Island in the west. Within that overall area, otters occupy waters along the mainland and offshore islands of the Alaska Peninsula, all of the Aleutian Islands, and the southern and western parts of Bristol Bay. Because they are benthic feeders with limited diving capabilities, they usually stay relatively close to shore, except in areas with extensive offshore shallow waters such as Bristol Bay.

The Decline and Its Causes

Although the entire range of the southwest stock was surveyed prior to the recent decline, those surveys used a number of different methods and were of variable quality. The best estimate is that there were 94,050 to 128,650 otters in the region in 1976 (Burn and Doroff 2005). The most recent analysis of survey data estimates the overall abundance at 47,676, which indicates an overall decline of 49 to 63 percent (Table III-7, Estes et al. 2005). The decline has not been evenly distributed throughout the stock's range. The estimated degree of decline exceeds 70 percent in the western Aleutians and south Alaska Peninsula areas, whereas abundance at Kodiak Island appears to be stable. On a smaller scale, otters may have completely disappeared from some small rocky islands in the Aleutians where they previously were common.

The animals in this stock do not exhibit evidence of food limitation or reduced reproduction, and the limited data available generally do not indicate abnormal levels of disease (but see later discussion) or effects of contaminants. Only small numbers are thought to be killed in fishing gear or taken by Alaska Native subsistence hunters. The leading hypothesis to explain the decline, at least in the central and western Aleutian Islands region, is predation by killer whales (*Orcinus orca*). Support for the predation hypothesis comes from observations of killer whales interacting with otters, changes in otter distribution and behavior, the persistence of otters in refuges not accessible to killer whales, and calculations indicating that the decline could have been caused by a small number of killer whales preying on otters. A related hypothesis is that removal of about 500,000 large whales in the Bering Sea and the North Pacific from the 1950s to 1970s reduced the prey available to killer whales, which then changed their foraging patterns and sequentially depleted harbor seals, Steller sea lions, northern fur seals, and sea otters. The hypothesis that killer whales have caused the decline in the central Aleutian Islands is reasonably well supported, but the link to whaling is both speculative and controversial. This issue currently is being examined by the Marine Mammal Commission (see Chapter IV for a discussion of the Commission's special project on the ecology of killer whales) and will be summarized in a report to Congress in 2008.

Listing under the Endangered Species Act

In 2001 the Center for Biological Diversity petitioned the Fish and Wildlife Service to list Alaska sea otters as depleted under the Marine Mammal Protection Act. That petition was denied on the grounds that substantial information was not provided to warrant the petitioned action and that

Table III-7. Recent sea otter abundance estimates for the southwest Alaska stock

Region	Year of most recent count	Estimated abundance	Population change from earliest estimate
Region	**Year of most recent count**	**Estimated abundance**	**Population change from earliest estimate**
Western Aleutian Islands	2000	6,250	-73 percent
Eastern Aleutian Islands	2000	2,492	-55 percent
Bristol Bay	2000	11,253	-39 percent
South Alaska Peninsula	2001	4,724	-74 percent
Kodiak Island, Kamishak Bay, and Alaska Peninsula	2001 and 2004	22,957	Relatively stable
Overall for southwest Alaska		47,676	-49 to -63 percent

Source: U.S. Fish and Wildlife Service

the best estimate of population size for the entire Alaska sea otter population considerably exceeded the number presented in the Center's petition. The Service recognized, however, that the best available evidence indicated that sea otters in Alaska comprise at least three separate stocks, and in 2002 the Service revised its sea otter stock assessment reports accordingly. Based on information obtained from additional surveys, on 11 February 2004 the Service proposed to list the southwest Alaska distinct population segment as threatened under the Endangered Species Act. That listing was finalized on 9 August 2005. The listing notice included an analysis of the Act's five listing factors, which concluded that the only identifiable threats to the population were predation by killer whales and contaminants, particularly a large oil spill, which could affect the remaining population. In the final rule, the Service did not designate critical habitat and stated that, although designation of critical habitat may be prudent, it was unable at that time to determine the physical and biological features essential to conservation of the distinct population segment.

Current Management and Research

Recovery Team and Recovery Plan: In February 2006 the Service established a recovery team for the southwest Alaska sea otter. The team met twice in 2006 and began drafting a recovery plan. Recovery team meetings were held in April and October 2007. At the April meeting the Service provided the team with updates on FY 2007 funding, management actions, and ongoing and planned research. The team continued to draft the recovery plan with focus on the biological background, threats, and recovery goals and criteria. At its October meeting the team was again updated on management and research activities and worked on the draft plan, particularly threats analysis and population modeling to support delisting criteria. Additional information on the recovery team and its activities can be found at http://alaska.fws.gov/fisheries/mmm/seaotters/recovery.htm.

Critical Habitat Designation: On 19 December 2006 the Center for Biological Diversity sued the Fish and Wildlife Service for failing to designate critical habitat for the distinct population segment within one year of listing. To settle the lawsuit, the Service agreed in 2007 to make a "not prudent" determination or to deliver a proposal to designate critical habitat to the Office of the *Federal Register* by 30 November 2008 and to deliver a final rule by 1 October 2009.

Endangered Species Act Section 7 Consultations: As required by section 7 of the Endangered Species Act, the Service has conducted a number of consultations on possible impacts of proposed activities on southwest Alaska sea otters. In all cases, the Service determined that the proposed action was not likely to jeopardize the population. In one case, however, further action will be required before the activity can occur. In that case, the proposed action was operation of a hovercraft in Surf Bay on Akun Island, including areas used by sea otters. The initial determination by the Service was that, although that action would not cause jeopardy as defined in the Endangered Species Act's section 7, it would likely result in the taking of otters by harassment. Such incidental take must be authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act. The applicant for this activity agreed to apply for incidental harassment authority under the Marine Mammal Protection Act but did not submit an application before the end of 2007.

Funding for Research and Recovery Efforts: The Service's Marine Mammals Management Office and the U.S. Geological Survey's Biological Resource Division are responsible for most of the management of and research on sea otters in Alaska. Base funds in those two agencies have allowed a certain amount of basic population assessment and ecological research, but they have been far from adequate to characterize factors limiting the southwest Alaska stock and bring about its recovery.

The Marine Mammals Management Office has been receiving add-on funds for assessing marine mammal populations under its jurisdiction. In past years those funds were directed primarily toward a walrus survey, which has now been completed, and some of the base funding may be shifted to sea otters. However, funds going to the Service's sea otter program also may be reduced due to competing needs, such as addressing issues relating to proposed Endangered Species Act listings of

polar bears and walruses. Funding for sea otter research at the Biological Resource Division's Alaska Science Center did not change between FY 2006 and FY 2007. In FY 2003 to FY 2006, the Alaska SeaLife Center received congressionally earmarked funds through the Service to work on sea otter research and recovery. In addition, the Alaska Sea Otter and Steller Sea Lion Commission received support through section 119 of the Marine Mammal Protection Act to conduct a number of activities relating to co-management of sea otters. However, the SeaLife Center did not receive an earmark for sea otter research for FY 2007, and its sea otter program will be downsized or terminated. The Alaska Sea Otter and Steller Sea Lion Commission also did not receive section 119 funding in FY 2007.

Unusual Mortality Event: Beginning in 2004 and continuing through 2006, Service biologists, working with the Alaska Marine Mammal Stranding Network, detected an elevated number of sea otter carcasses in the area between Umnak Island and Kachemak Bay. Information on those deaths is discussed in Chapter VI. Although much of this region overlaps the southwest Alaska distinct population segment, most of the carcasses were found in Kachemak Bay, located just east of the boundary between the southwest and southcentral stocks. In the majority of cases, the cause of death was diagnosed as valvular endocarditis/septicemia associated with *Streptococcus infantarius* sp. *coli*, and most of those cases were prime-age males. The Service consulted with the Working Group on Marine Mammal Unusual Mortality Events, and on 24 August 2006 the Working Group officially declared the mortalities to constitute an unusual mortality event.

In 2007 Service biologists and collaborators live-captured 44 otters in Kachemak Bay. The biologists implanted radio transmitters in the otters, collected a variety of samples and measurements, and then released them. The otters' movements have been monitored on a weekly basis. Samples from live-captured and dead animals have been examined for exposure to a variety of potential diseases as well as for contaminants that could suppress immune function. In 2007 the rate of carcass recovery and the causes of deaths were similar to that observed in 2006, and, at the end of 2007 the unusual mortality event was considered ongoing. In 2007 a number of additional disease-related studies on Alaska sea otters were initiated, including—

- pathogenesis of *Streptococcus infantarius* sp. *coli* valvular endocarditis in sea otters;
- prevalence of *S. infantarius* sp. *coli* in heart valves from subsistence-hunted sea otters;
- use of lymphocyte proliferation assays to investigate immune dysfunction as a possible predisposing factor for septicemia;
- the relationship between levels of contaminants (chlorinated fatty acids, PBDE, and PHOS) and immune system function;
- *Bartonella* sp. as a possible contributing factor to the unusual mortality event; and
- molecular identification of a phocine distemper-like virus as a pre-disposing factor found in Alaska sea otters.

Population Monitoring: In 2007 the Service conducted a two-week cruise in the Aleutian Islands, counting sea otters from skiffs in the Near Islands and Rat Islands. Counts at Attu, Amchitka, Kiska, and Little Kiska islands were somewhat higher than those recorded in 2005, in some cases possibly due to animal movements. Overall counts showed no further signs of decline in that region. In 2007 the Aleut Marine Mammal Commission and the Service conducted aerial surveys in the Shumagin and Pavlof Islands, and the counts were about 20 percent lower than in 2004. Counts of otters conducted by the U.S. Geological Survey's Alaska Science Center in Kachemak Bay and along the outer coast of the Kenai Peninsula (just east of the boundary with the southeast Alaska stock) indicate that numbers have been increasing rapidly since 2002, while at Bering Island (just west of the southwest Alaska stock's western boundary) otter numbers have increased slowly during the years 1995 to 2007.

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Chapter IV

SPECIAL PROJECTS OF THE COMMISSION

From time to time, the Marine Mammal Commission takes on special projects that either Congress or the Commission deems to be particularly critical to the conservation purposes of the Marine Mammal Protection Act. Such projects may involve review and analysis of scientific information, evaluation and development of suitable management measures, the integration of science and management, and the planning of future directions for both. These projects vary in scope but often are directed at key issues with broad application. The Commission focused on four special projects during 2007.

Marine Mammals and Noise

In March 2007 the Marine Mammal Commission released its report on the effects of anthropogenic sound on the marine environment. The report responds to a congressional directive to "share findings, survey acoustic 'threats' to marine mammals, and develop means of reducing those threats while maintaining the oceans as a global highway of international commerce" (Public Law 108-7). The report includes statements from seven groups of stakeholders, a report from an international workshop on the topic, co-sponsored by the Marine Mammal Commission and the U.K. Joint Nature Conservation Committee (JNCC), and a report from a workshop focused on the beaked whales, a marine mammal group of special concern (Cox et al. 2006).

Human activities are increasing in the oceans, causing widespread concern about potential effects on marine mammals and marine ecosystems. Major human sources of sound include seismic surveys for oil and gas exploration and scientific research, commercial shipping for transportation of goods, and sonar systems for military purposes, fishing, and research. Sound also is important to marine mammals for communication, individual recognition, predator avoidance, prey capture, orientation, navigation, mate selection, and mother-offspring bonding. Potential effects of anthropogenic sounds on marine mammals include physical injury, physiological dysfunction (for example, temporary or permanent loss of hearing sensitivity), behavioral modification (for example, changes in foraging or habitat-use patterns, separation of mother-calf pairs), and masking (an inability to detect important sounds due to increased background noise). For individual animals, such effects and their secondary consequences may vary in significance from negligible to fatal—the worst outcome being documented in a small number of cases. The implications for conservation of marine mammal populations are undetermined.

In the late 1960s and early 1970s Congress provided a framework for protecting marine mammals and marine ecosystems when it passed a suite of environmental laws, including the Marine Mammal Protection Act (MMPA), Endangered Species Act (ESA), and National Environmental Policy Act (NEPA). With respect to sound effects, the management framework has been of limited effectiveness largely because of the considerable uncertainty regarding those effects, inadequate attention to management of sound producers, lack of monitoring and mitigation methods to characterize and avoid or minimize effects, and implementation strategies that have not achieved legislative goals.

Important progress has been made toward understanding sound and its potential effect on marine mammals. The research effort has been

led by the U.S. Navy with significant contributions by the Minerals Management Service, National Oceanic and Atmospheric Administration, National Science Foundation, several industry groups, and scientists from the academic community and private sector. In addition, the National Research Council has conducted four reviews of the sound issue, providing important recommendations for future research to address remaining uncertainties.

Despite these commendable efforts, the effects of anthropogenic sound on marine mammals remain uncertain and, as yet, the significance of sound as a risk factor cannot be assessed reliably. The 2005 National Research Council report indicated that "sound may represent only a second-order effect on the conservation of marine mammal populations; on the other hand, what we have observed so far may be only the first early warnings or 'tip of the iceberg'…." The need to address this issue will increase over time as the nation's human population continues to grow and concentrate in coastal areas and as commercial vessel traffic, oil and gas exploration and production, military exercises, and other ocean-related human activities—both anticipated and unforeseen—expand with that growth.

The challenge facing the concerned community of decision-makers, managers, scientists, sound producers, and conservationists is to gain an understanding of the effects of sound in the oceans and to manage those effects in a judicious manner. Doing so will require recognition of remaining uncertainties and provision of a suitable buffer to ensure marine mammal conservation while also endeavoring to avoid or minimize unnecessary constraints on human activities that introduce sound into the oceans. The major unresolved elements of this issue are as follows:

Uncertainty Regarding the Risks to Marine Mammals and Marine Ecosystems

Risk assessment requires research to identify and characterize sounds that may be hazardous to marine mammals, determine the level of exposure, assess the animals' responses to such exposure, characterize the significance of those responses for both individual animals and their populations, and manage the resulting risks of adverse effects. Such assessment must address individual sound effects, cumulative effects of multiple sound exposures over space and time, and the combined influence of sound and other risk factors for marine mammals and marine ecosystems.

Inadequate Monitoring and Mitigation Measures

Existing monitoring and mitigation methods are not adequate for detecting the presence of marine mammals and discerning the impacts of sound exposure. More effective monitoring and mitigation measures are needed to determine (1) whether harmful effects occur, (2) whether such effects are biologically significant, and (3) whether measures taken to mitigate impacts are necessary and effective.

Regulatory Inconsistencies

The requirements and procedures for obtaining authorizations to take marine mammals differ among and within various groups of sound producers—for example, commercial shippers, fishermen and aquaculture operators, the military, the oil and gas industry, and the academic community. Even when the same provisions apply, implementation and enforcement are inconsistent. The current management framework is not well suited for managing some activities, such as commercial shipping, which is a major source of ocean noise and which may result in the taking of marine mammals. Some modification of existing regulations and statutes is necessary to ensure that, where feasible, all sound producers are subject to consistent standards.

The two cornerstones of a national approach to the sound issue should be an expanded research program to improve our understanding and a more effective, comprehensive management approach to ensure marine mammal conservation while minimizing unnecessary constraints on sound-producing activities. With that in mind, the Marine Mammal Commission made the following recommendations:

(1) Establish a coordinated national research program on the effects of anthropogenic sound on marine mammals and the marine environment.

Table IV-1. Marine mammal taxa currently listed as endangered or threatened under the ESA or depleted under the MMPA, with the current IUCN classification also shown

Taxon Name	ESA Listing	MMPA Listing	IUCN Classification
West Indian manatee, Florida population	Endangered	Depleted	Vulnerable
West Indian manatee, Antillean population	Endangered	Depleted	Vulnerable
Southern sea otter	Threatened	Depleted	Endangered[1]
Northern sea otter, southwest Alaska population	Threatened	Depleted	Endangered[1]
Caribbean monk seal	Endangered	Depleted	Extinct
Hawaiian monk seal	Endangered	Depleted	Endangered
Guadalupe fur seal	Threatened	Depleted	Vulnerable
Northern fur seal, eastern Pacific population	Not listed	Depleted	Vulnerable[1]
Steller sea lion, eastern population	Threatened	Depleted	Endangered[1]
Steller sea lion, western population	Endangered	Depleted	Endangered[1]
Blue whale	Endangered	Depleted	Endangered[2]
Bowhead whale, western Arctic population	Endangered	Depleted	Lower risk, cd[3]
Fin whale	Endangered	Depleted	Endangered[1]
Humpback whale	Endangered	Depleted	Vulnerable[1]
North Atlantic right whale	Endangered	Depleted	Endangered
North Pacific right whale	Endangered	Depleted	Endangered
Sei whale	Endangered	Depleted	Endangered[1]
Sperm whale	Endangered	Depleted	Vulnerable
Beluga whale, Cook Inlet population	Not listed	Depleted	Critically endangered
Bottlenose dolphin, mid-Atlantic coastal population	Not listed	Depleted	Data deficient[1]
Killer whale, southern resident population	Endangered	Depleted	Lower risk, cd[1,3]
Killer whale, AT1 group	Not listed	Depleted	Lower risk, cd[1,3]

[1] Listing applies to the entire species worldwide; individual populations have not been evaluated.

[2] Listing applies to the entire species worldwide; North Pacific population listed as lower risk; North Atlantic population listed as vulnerable.

[3] The category of "lower-risk, conservation-dependent" is no longer in use, but the categorization for this taxon has not been changed because a formal reassessment of status has not been done.

(2) Establish consistent standards for the regulation of sound in the marine environment.

(3) Ensure that all sound producers comply with statutory and regulatory requirements.

(4) Retain mitigation and monitoring as requirements of the authorization and compliance process and designate as high priorities the evaluation of existing measures and development of more effective measures.

(5) Require the National Marine Fisheries Service and the Fish and Wildlife Service to develop a management system that accounts for the cumulative effects of sublethal exposure to anthropogenic sound and other human impacts on marine mammals.

(6) Direct the National Marine Fisheries Service and the Fish and Wildlife Service to streamline the implementation of permitting and authorization processes for research on sound effects and for activities that may take marine mammals incidentally.

(7) Promote U.S. leadership in international matters related to anthropogenic sound in the marine environment.

The Commission's report, "Marine Mammals and Noise: A Sound Approach to Research and Management," and the appendices are available as a downloadable pdf file (6 Mb in size) from the Commission's Web site (www.mmc.gov/reports/workshop/pdf/). A printed copy of the report is available on request from the Commission.

The Biological Viability of the Most Endangered Marine Mammals in U.S. Waters and the Cost-Effectiveness of Protection Programs

As part of the 2004 Omnibus Appropriations Bill, Congress directed the Marine Mammal Commission to "review the biological viability of the most endangered marine mammal populations and make recommendations regarding the cost-effectiveness of current protection programs." The Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972 are the principal legislative instruments in the United States for protecting marine mammals. Together, those statutes affirm a deep national interest in conserving endangered marine mammals and establish a corresponding commitment to promote their survival and recovery.

The Commission focused its analyses on the 22 marine mammal species and populations (referred to here as taxa) occurring entirely or regularly in areas under U.S. jurisdiction and currently listed as endangered or threatened under the Endangered Species Act or designated as depleted under the Marine Mammal Protection Act (Table IV-1). The Commission understood that the purpose of the directive was to obtain an assessment of the effectiveness with which funding was being used to implement recovery programs for the most endangered marine mammals. An evaluation and comparison of the full range of possible societal costs associated with those programs was considered beyond the scope of this project.

The Commission formed a steering committee to guide its response to the directive, reviewed systems for identifying imperiled species, reviewed the activities and status of protection programs, convened a workshop of experts to review population viability analysis (PVA) and, with the National Marine Fisheries Service, convened a case-study review of the cost-effectiveness of the North Atlantic right whale recovery program. In 2007 reports were completed on each of these topics. A synopsis of those reports follows.

Endangered, Threatened, and Depleted Marine Mammals in U.S. Waters: A Review of Species Classification Systems and Listed Species

Lowry et al. (2007) reviewed the three main systems used to evaluate species at elevated risk of extinction. The Endangered Species Act applies to species or subspecies of fish, wildlife, or plants, and any distinct population segment of any species of vertebrate, fish, or wildlife that interbreeds when mature. The Act uses five factors for listing and delisting decisions for any given species:

- the present or threatened destruction, modification, or curtailment of its habitat or range

- overutilization for commercial, recreational, scientific, or educational purposes
- disease or predation
- the inadequacy of existing regulatory mechanisms
- other natural or man-made factors affecting its continued existence

The Marine Mammal Protection Act uses the population stock as its basic unit of conservation, which it defines as "a group of marine mammals of the same species or smaller taxa in a common spatial arrangement, that interbreed when mature." This Act identifies stocks in need of additional protection based on their ability to function within their ecosystems. Those that fall or are reduced below their maximum net productivity level (which is generally interpreted to be 60 percent of their natural environmental carrying capacity) are designated as depleted and given additional protections under the Act.

The International Union for Conservation of Nature (IUCN) evaluates species, subspecies, and geographical populations worldwide according to a set of quantitative criteria and classifies them into a range of categories including data deficient, least concern, near threatened, vulnerable, endangered, critically endangered, extinct in the wild, and extinct. The criteria for such determinations are based mainly on current population size and trend, population structure, size of occupied range, and probability of extinction.

In U.S. waters 22 marine mammals are listed as endangered (14) or threatened (4) or designated only as depleted (4). However, as indicated in the report, listing determinations have not kept pace with available scientific information, and the authors suggest that for large whales, in particular, the National Marine Fisheries Service should examine existing data on stock structure, reevaluate extinction risk for the stocks, and revise listings under the Endangered Species Act accordingly. The authors also suggest that based on such review, certain stocks are likely to be reclassified. Finally, the authors suggest that a more robust decision-making system is needed to cope with the paucity of information on many stocks and species.

The Status of Protection Programs for Endangered, Threatened, and Depleted Marine Mammals in U.S. Waters

Weber and Laist (2007) reviewed the 22 marine mammal taxa that occur in U.S. waters and are listed as endangered or threatened under the Endangered Species Act or designated as depleted under the Marine Mammal Protection Act. The review considered the status of each taxon; major threats to its persistence; the management framework in place to bring about recovery; what major management actions have been undertaken; whether critical habitat has been designated; whether a recovery or conservation plan has been initiated, drafted, approved, or revised; and staffing and funding committed to recovery efforts.

Report of the Workshop on Assessing the Population Viability of Endangered Marine Mammals in U.S. Waters

Of the 22 marine mammal taxa listed as endangered, threatened, or depleted, participants in this workshop considered that 2 are not viable. The Caribbean monk seal has not been observed and documented since 1952 and is considered extinct. The AT1 pod of killer whales, found primarily in the waters of Prince William Sound, Alaska, now numbers only seven animals, four of which are aging females that have not produced a surviving calf for more than two decades. This population is certain to disappear with the death of these last seven individuals. A third taxon is of great concern, but there is reason to hope that it will prove viable. The eastern population of North Pacific right whales may number fewer than 50 animals. A total of 23 individuals have been identified, and observations of mother-calf pairs confirm that they are able to reproduce successfully. Little else is known about the population's distribution, major threats, and chances for survival. Complete protection is essential if this population is to recover. Workshop participants considered all of the other listed and designated marine mammal taxa to be viable if threats are managed effectively.

This workshop also reviewed the state of population viability analysis (PVA) for marine mammals. PVA generally consists of quantitative

modeling that integrates all available and pertinent information to estimate the probability of a population's persistence over a given period of time and under a given set of conditions. PVAs have been run for only a portion of listed marine mammal taxa, including California sea otters, Cook Inlet beluga whales, Florida manatees, North Atlantic right whales, southern resident killer whales, and the eastern and western stocks of Steller sea lions. Key types of information needed to run PVAs include population structure, population dynamics, ecology, health, factors that act with special force on small populations, and major threats. In the absence of such information, workshop participants discussed alternative methods for assessing the status of marine mammals. A theoretical decision-making framework was proposed to facilitate listing and other management decisions. The intent of the framework was to simplify and standardize listing decisions using quantitative criteria that could be applied to both data-poor taxa (i.e., using default values) and data-rich taxa (i.e., taking advantage of existing information). The proposed approach would classify populations into four categories based on their dynamics and then model their viability to determine whether they should be listed.

Report of the North Atlantic Right Whale Program Review

The fourth review and report used to inform the Commission's final report to Congress was an evaluation of the recovery program for the North Atlantic right whale. The review was undertaken in coordination with the National Marine Fisheries Service and conducted by a review panel of five scientists, four of whom were members of the Commission's Committee of Scientific Advisors on Marine Mammals at that time; the fifth panel member was a former member of the Committee. All were familiar with the North Atlantic right whale program. The major findings of this panel are summarized as follows.

To enhance both the effectiveness and cost-effectiveness of research to support the recovery efforts, the panel recommended that the recovery program should—

- be given a one-time funding supplement to enhance the utility of the central identification catalogue and sightings database by upgrading data storage and integrating a backlog of photographic and genetic records;
- review distribution data to assess whether and how critical habitat designations should be changed to ensure that all appropriate areas have been identified and adequately protected;
- assess population size and trend on an ongoing basis;
- review funding support for stranding responses, including necropsy teams;
- continue investigations of health and reproduction;
- continue to fund genetics studies based on the merits of proposed work; and
- consider alternative research methods as a way of increasing cost-effectiveness.

To prevent collisions between ships and whales, the panel concluded that—

- vessel speed restrictions and routing and reporting measures are urgently needed;
- further research on ship-mounted sonar or alarm devices and whale-mounted tags is not likely to be cost-effective;
- continued research is needed on passive acoustic detection systems and whale behavior in relation to approaching ships; and
- the cost-effectiveness of recent rulemaking to prevent ship strikes will be determined by the specific measures adopted and their effectiveness.

To prevent the risk of whale entanglement in fishing gear, the panel concluded that—

- the Service has relied too much on gear modifications to prevent entanglement in fishing gear;
- all fisheries should be required to demonstrate that fishing gear likely to entangle whales is whale-safe before its use is approved in areas where right whales congregate (e.g., designated critical habitats, seasonal area management zones, and dynamic area management zones);
- neither dynamic nor seasonal time/area regulations have provided adequate protection for right whales because implementation has

been slow and incomplete;
- disentanglement efforts are not cost-effective compared to prevention of entanglement. However, in view of the great value of saving each individual whale, these efforts should continue because they have demonstrated some level of success in reducing entanglement impacts. Disentanglement efforts also should be subject to further assessment to minimize the human risks involved, and they should be funded by the programs authorizing the involved fisheries rather than by the right whale recovery program; and
- the Atlantic Large Whale Take Reduction Team should be replaced by a less costly scientific advisory body, such as a small recovery team consisting of individuals with direct knowledge of right whale biology and whale entanglement issues.

Report to Congress

With those reports in hand, the Commission completed the analysis needed for its final report to Congress. At the end of 2007, that report was undergoing final editing in preparation for printing, and was expected to be published and distributed to Congress in early 2008. At the end of 2007, the main findings of the report were expected to be that—

- 20 of the 22 marine mammal taxa listed as endangered, threatened, or depleted should be viable if the human-related threats to those species are managed effectively;
- recovery programs for endangered, threatened, and depleted taxa depend heavily on information on population structure and dynamics, population ecology and health, factors that act with special force on small populations, and general threats (much remains to be learned about these factors);
- intentional killing was undoubtedly the greatest threat to marine mammals in the 1800s and early to mid-1900s, but with the implementation of various conservation laws the primary threats to marine mammals are now more indirect;
- each year Congress allocates a substantial budget for marine mammal recovery programs with the expectation that those funds will be used effectively and cost-effectively;
- results have been mixed with regard to their effectiveness and cost-effectiveness, but no marine mammal taxon in U.S. waters has gone extinct under current legislation and many taxa have demonstrably benefited;
- the agencies responsible for recovery programs undoubtedly have used congressional funding to balance competing interests and respond to a range of priorities, all under the constraint of a limited total budget, but agency discretion has been limited;
- in the end, certain at-risk taxa have received relatively high levels of attention in the form of specifically directed funding, while certain others have not received enough attention to prevent or even understand their ongoing decline;
- absent a more integrated, coherent national system for determining funding needs, setting priorities, and deciding how the limited funds should be allocated, we have reason to worry that recovery efforts for certain taxa will deteriorate into a patchwork of reactive crises, increasing the risk of extinction for those taxa and inflating the long-term costs required to bring about their recovery.

Based on these findings, the Commission expected to make a single recommendation to Congress for a more coherent national funding strategy for efforts to recover marine mammal taxa at high risk of extinction. Such a strategy should increase interagency cooperation, establish clear funding needs, provide a basis for prioritizing recovery actions, monitor and report results, and provide a basis for adjusting research and recovery efforts as threats to marine mammals change and become better understood.

The Ecological Role of Killer Whales in the North Pacific

In its fiscal year 2004 appropriations bill, Congress directed the Marine Mammal Commission to "review available evidence regarding the theory that rogue packs of killer whales are wiping out discrete populations of the most endangered marine mammals." Killer whale predation has been suggested as a possible cause of the declines

in pinniped and sea otter populations in the North Pacific Ocean and Bering Sea over the past three or four decades (e.g., Estes et al. 1998, Springer et al. 2003). Several other factors have been identified as potentially important causes of the declines (National Research Council 2003), including diminished or altered food resources caused by commercial fishing or environmental changes (e.g., Hennen 2006, Trites et al. 2007). As a result of the observed declines, the western population of Steller sea lions (*Eumetopias jubatus*) has been listed as endangered, the southwest Alaska population of northern sea otters (*Enhydra lutris kenyoni*) has been listed as threatened, and the Pribilof Islands population of northern fur seals (*Callorhinus ursinus*) has been designated as depleted. These changes in legal status have potentially significant management implications and have received considerable attention due to constraints, or the possibility of constraints, imposed on fishing and other human activities.

A comprehensive response to the directive requires that the Commission consider a range of factors that have affected the marine ecosystems of the Gulf of Alaska and the Bering Sea over the past few decades and that may have contributed to the declines or to changes in killer whale ecology and behavior. Over the past century, humans have manipulated North Pacific Ocean ecosystems through broad-scale removals of large whales, pinnipeds, and fishes. Human activities also have resulted in pollution on global and local scales, including but not limited to the 1989 *Exxon Valdez* oil spill in Prince William Sound. In addition, the North Pacific Ocean has undergone several oceanographic regime shifts, resulting in ecosystem-wide changes in the distribution and abundance of important species such as forage fishes (e.g., Anderson and Piatt 1999, Benson and Trites 2002).

Comprehensive research strategies are required to understand the complexity of North Pacific ecosystem processes, including the interactions between killer whales and their marine mammal prey. Those strategies must be capable of describing the status and dynamics of individual populations, their ecological interactions, and their interactions with features of their marine environment. The Marine Mammal Protection Act establishes maintenance of the health and stability of marine ecosystems as its primary objective, but existing research and monitoring efforts frequently fall short of providing all of the information necessary to characterize these ecosystems at the level needed to understand them. A greater investment in research may appear expensive, but over time the knowledge gained may help prevent more costly management errors affecting species conservation as well as human activities such as commercial fisheries.

To respond to the congressional directive, the Commission initiated a review of the ecological role of so-called "transient" killer whales that prey upon other marine mammals in the North Pacific Ocean. In 2005 the Commission convened a workshop of experts to assess existing knowledge regarding the ecological role of transient killer whales and to identify important information gaps. The Commission convened a second workshop later in 2005 to develop strategies for implementing the type of long-term, ecosystem-scale research program required to address the information gaps identified in the first workshop. Based on the workshops and further review of the scientific literature, the Commission developed a comprehensive research plan to provide long-term direction for needed research on killer whales and their role in ecosystems. The Commission also funded several research projects addressing information needs identified in the research plan. A report summarizing the Commission's analysis and findings regarding the ecological role of transient killer whales in the North Pacific Ocean will be submitted to Congress in 2008.

Development of Monitoring Strategies for Arctic Marine Mammals

The Commission convened an international workshop during 4–6 March 2007 at L'Oceanogràfic in Valencia, Spain, to review current regional research and monitoring efforts and to develop integrated, circumpolar monitoring plans for two Arctic marine mammal species—the ringed seal (*Phoca hispida*) and the beluga whale (*Delphinapterus leucas*). These two species were selected because of their circumpolar distribution,

the availability of historic and recent data on their status, and their importance to indigenous communities. The goal of the workshop was to anticipate research needed to conserve ringed seals and beluga whales in the face of a changing Arctic climate. Workshop participants discussed monitoring strategies needed to detect changes in ringed seal and beluga whale status and to identify the natural and anthropogenic causes of those changes. The participants included representatives from most Arctic countries and several indigenous communities. They were experts on the biology and ecology of these species, Arctic ecosystem dynamics, Arctic oceanography and climate, sea ice, marine mammal health, subsistence harvest and biosampling networks, and monitoring techniques.

Workshop participants reviewed previous and ongoing research and monitoring efforts, identified key work that should be continued or initiated, and provided recommendations regarding the geographic scale, frequency, and location of future efforts. In particular, participants discussed research and monitoring needs for each species with respect to population dynamics, behavior, habitat, health status, trophic dynamics, and human activities/ threats. Information and recommendations provided at the workshop will be compiled into reports describing requirements for circumpolar monitoring plans for each species. These reports are expected to be complete in 2008 and will be used to guide monitoring efforts, perhaps under the direction of an international working group for each species.

As described in the Commission's annual report for 2006, this workshop is one in a series of related efforts to address concerns regarding climate change and its effects on Arctic marine mammals. The current project and workshop reflects collaboration and support provided by the U.S. Fish and Wildlife Service, L'Oceanogràfic, and in-kind support by participants' home institutions throughout the Arctic. The Arctic Council also has provided support through its Circumpolar Biodiversity Monitoring Program, which currently serves as the online host for some of the background information regarding the workshop.[1] The Commission plans to continue this work in cooperation with other U.S. and foreign governmental agencies as well as international organizations, with the ultimate goal of conserving the health of Arctic marine ecosystems. Through such cooperative efforts, the Commission expects to facilitate the development of additional plans for other Arctic marine mammals, including ribbon and bearded seals, narwhals, bowhead whales, walruses, and polar bears.

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Chapter V

RESEARCH AND STUDIES PROGRAM

The Marine Mammal Protection Act requires that the Marine Mammal Commission continually review research programs conducted or proposed under the Act and authorizes the Commission to undertake or cause to be undertaken studies that it deems necessary or desirable in connection with marine mammal conservation and protection. To accomplish these tasks, the Commission convenes meetings and workshops to review, plan, and coordinate marine mammal research. It also awards grants for studies to identify and develop solutions to domestic and international problems affecting marine mammals and their habitats. In its research-related activities, the Commission seeks to facilitate and complement activities of the National Marine Fisheries Service, the Fish and Wildlife Service, and other federal agencies, while preventing unnecessary duplication of research.

Workshops and Planning Meetings

During 2007 the Commissioners, members of the Committee of Scientific Advisors on Marine Mammals, and Commission staff helped to organize and participated in meetings and workshops on a variety of topics, including—

- development of monitoring strategies for Arctic marine mammals faced with climate change
- international policy issues concerning the Arctic, the United States' involvement in them, and the potential role of the Marine Mammal Commission in supporting U.S. involvement
- predation by pinnipeds on endangered and threatened Columbia River salmonids and deliberations by the Bonneville Dam Pinniped–Fishery Interaction Task Force
- co-management of subsistence harvests of Alaska marine mammals and planning for the 2008 Commission review of co-management efforts by Alaska Native organizations
- an international review of science and policies addressing man-made underwater sound by the 2nd Intergovernmental Conference on the Effects of Sound in the Ocean on Marine Mammals
- the 59th Annual Meeting of the International Whaling Commission
- development of the North American Conservation Action Plan for the vaquita (*Phocoena sinus),* a trilateral meeting sponsored by the Commission for Environmental Cooperation
- marine mammal issues and interactions with U.S. Navy operations
- the 3rd International Bioacoustical Signal Processing Conference on development of software tools for detecting and classifying marine mammal sounds
- Effects of Sound on Aquatic Life, an international meeting of scientists studying sound production, hearing, and responses to man-made sound by marine organisms, including marine mammals, fish, and invertebrates
- protection of the western North Pacific gray whale (*Eschrichtius robustus*) population from the effects of oil and gas development off Sakhalin Island, Russia
- management of fisheries that target forage fish
- evaluation of current guidelines for determining serious injuries of marine mammals incidental to human activities
- estimation of survival rates for Florida manatees (*Trichechus manatus)*

- the role of ownership, rights, and privileges in marine conservation
- the Society for Marine Mammalogy's 17th Biennial Conference on the Biology of Marine Mammals

In addition, Commission staff participated on several interagency committees, teams, and working groups focused on issues of concern for marine mammals, including the following:

- recovery teams and other endangered species management teams, including those for Hawaiian monk seals (Captive Care Workshop) and Florida manatees (Warm-Water Task Force; ad hoc group meeting on manatee research in southwestern Florida
- take reduction teams, including the Atlantic pelagic longline, Atlantic trawl gear, Atlantic large whale, Gulf of Maine/mid-Atlantic harbor porpoise, and bottlenose dolphin teams;
- scientific review groups convened under the Marine Mammal Protection Act
- Joint Subcommittee on Ocean Science and Technology and its subcommittees on ocean partnerships, ocean observations, and harmful algal blooms, hypoxia, and human health
- Arctic Policy Group
- Interagency Coordinating Group on Acoustics
- Interagency Marine Debris Coordinating Committee
- North Pacific Research Board Science Panel
- Working Group on Marine Mammal Unusual Mortality Events

Commission-Sponsored Research and Study Projects

As funding permits, the Marine Mammal Commission supports research to further the purposes of the Marine Mammal Protection Act. In particular, the Commission convenes workshops and awards grants for research and studies to identify, characterize, and minimize threats to marine mammals and their habitats. Research ideas originate from within the Commission, from unsolicited proposals submitted by scientists outside the Commission, and from responses to Commission requests for proposals. Since it was established in 1972, the Commission has funded more than 1,000 projects ranging in amounts from several hundred dollars to $150,000. Final reports of most Commission-sponsored studies are available from the National Technical Information Service or directly from the Commission.

During 2007 the Commission awarded 10 grants totaling approximately $130,000. Two of those grants provided funds to help offset publication and distribution costs for *SireNews* and the *Latin American Journal of Aquatic Mammals*. One award to the Society for Marine Mammalogy supported graduate student travel to the 17th Biennial Conference on the Biology of Marine Mammals convened in Cape Town, South Africa. Brief descriptions of the projects supported by the seven other grants are provided here.

Bringing the knowledge of fishermen to bear on developing conservation strategies to reduce bycatch of Atlantic white-sided dolphins (*Lagenorhynchus acutus*) in the northwest Atlantic bottom trawl fishery
(University of New Hampshire, Durham, NH)

In New England, the Atlantic Trawl Gear Take Reduction Team seeks to reduce bycatch of small cetaceans, including Atlantic white-sided dolphins, in Atlantic trawl fisheries. The goal of this research is to obtain information from fishermen regarding Atlantic white-sided dolphin habitat use and bycatch events and use that information to develop recommendations for the team. Specific objectives include (1) combining observer bycatch data for Atlantic white-sided dolphins with corresponding environmental characteristics to develop maps of bycatch probability; (2) interviewing fishermen to collect data on dolphin bycatch and habitat, fishing operations, and the economic effects of mitigation; and (3) integrating these data to develop spatial/temporal strategies for avoiding bycatch while minimizing the economic impact on fishermen.

Report on the effects of tagging large whales
(International Union for Conservation of Nature, Gland, Switzerland)

The western North Pacific population of gray whales was hunted to such low numbers that it was thought to be extirpated. Sightings in the 1970s re-

vealed that a few whales had persisted. Although some growth likely has occurred since the 1970s, the population remains critically endangered. It is subject to a number of threats, including incidental catch in coastal net fisheries and large-scale offshore oil and gas development off northeastern Sakhalin Island, near the whales' principal summer feeding ground. Since 1994 the population has been studied annually on its summer feeding ground, but its migratory routes and breeding areas are unknown. The use of satellite tags to determine the migratory paths and wintering areas of endangered whales is controversial, and it was suggested that tags be tested on eastern North Pacific gray whales before being used on western gray whales. Tagging work was conducted in Mexico and, after reviewing the results in 2006, the IWC's Scientific Committee recommended that telemetry work be undertaken on western gray whales but only under certain provisions. Those provisions included review of the report of the 2005 workshop on the effects of tagging large whales, which was organized by the Marine Mammal Commission and the National Marine Fisheries Service and held in conjunction with the 16th biennial conference of the Society for Marine Mammalogy. In a final report, the principal investigator will integrate the workshop findings with available literature on tagging large whales.

Abundance and distribution of the franciscana (*Pontoporia blainvillei*) in southeastern Brazil
(Instituto Aqualie, Rio de Janeiro, Brazil)

The franciscana is endemic to the eastern coasts of Brazil, Uruguay, and Argentina. The chief threat to the species is incidental mortality in coastal fisheries. The franciscana population inhabiting the southeastern coast of Brazil is the least studied and may require the most immediate conservation attention. The investigators will conduct aerial surveys in this area to estimate franciscana population abundance and distribution, identify areas of important habitat, and characterize environmental parameters that may influence the population's distribution and ecology. The research addresses recommendations from the Brazilian Environmental Agency, the International Whaling Commission, and the International Union for Conservation of Nature.

Support of outreach and engagement efforts for the Antarctic Treaty Summit
(University of California, Santa Barbara)

The Antarctic Treaty Summit: Science-Policy Interactions in International Governance will be convened in Washington, DC, in 2009 to commemorate the 50th anniversary of the signing of the Antarctic Treaty. Conference participants, including scientists, historians, economists, government officials, and other stakeholders, will review and analyze lessons emanating from the Antarctic Treaty System. More specifically, they will examine how the Antarctic Treaty System has managed nearly 10 percent of the earth "for peaceful purposes only" during the past half century, identify factors that have contributed to the treaty's resilience and successes, and extract insights that have global relevance about managing regions and resources beyond national jurisdictions. The objective of this grant is to foster outreach and engagement efforts in preparation for the 2009 summit, primarily through development of an informative Web site. Developing the site will require consulting with the Antarctic Treaty Summit advisory board regarding layout, functions, and content and compiling background materials to post on the site.

Why did the Yangtze River dolphin become extinct? Identifying extinction drivers and causes of conservation failure
(Institute of Zoology, Zoological Society of London, England)

The Yangtze River dolphin, or baiji (*Lipotes vexillifer)*, has been critically endangered for decades, and a comprehensive 2007 survey of the species' known habitat along the Yangtze River failed to document any baiji. As a result, many scientists believe that the baiji is extinct or consider that, if any have survived, the population is too small to be viable. The Commission provided partial funding for a study to clarify the factors that caused the probable extinction of the baiji. The research is being conducted under the supervision of the Chinese Ministry of Agriculture, the key governmental policy-maker for baiji conservation, and in partnership with the Institute of Hydrobiology, China's leading Yangtze River freshwater cetacean research institute and advisory body to the Ministry. The investigators

will interview approximately 500 local fishermen across the middle and lower Yangtze River region over an 80-day period in 2008. The purpose of the interviews is to improve understanding of factors responsible for the decline of baiji and Yangtze finless porpoises (*Neophocaena phocaenoides).* The interviewers will solicit new data on past baiji mortality events associated with different types of fishing gear and other anthropogenic factors and on the magnitude and scope of Yangtze fishing operations and their impact on other target species. The interview process also may reveal that a few baiji still exist in the Yangtze basin, as suggested by an unconfirmed sighting from the Tongling region in August 2007. Fishermen who spend their lives on the Yangtze River or its tributaries are most likely to know about any remaining baiji. Interviews also will be conducted with scientists involved in international baiji conservation efforts and representatives from governmental and non-governmental organizations in China to obtain more information about management decisions that impeded direct action and funding for baiji conservation efforts during the past few decades. Those interviews may reveal insights into the failure of the Chinese and international parties to conserve the species and therefore inform strategies for more effective conservation of other species at risk of extinction.

Health monitoring of Lake Ladoga ringed seals (*Phoca hispida ladogensis*): Pilot study
(North Pacific Wildlife Consulting, Anchorage, AK)

The Lake Ladoga ringed seal may be a good indicator species with respect to possible impact of climate change and human activities in the Arctic. Ringed seals in general appear to be sensitive to changes in climate because they depend on stable sea ice with sufficient snow cover to create birth lairs. Lake Ladoga, located in the Karelia region of Russia, is Europe's largest lake. Because of the lake's proximity to St. Petersburg, ringed seals at this site may be susceptible to the effects of both climate change and human activities. The purpose of this study was to determine the feasibility of using these seals as indicators of impending change in the Arctic. To that end, the objectives of the study were to (1) survey areas in the northern part of Lake Ladoga where ringed seals haul out as a way to identify optimal sites for conducting research, (2) develop techniques for collecting measurements and biological samples from seals, (3) select the optimal site for a field laboratory to analyze biological samples, and (4) initiate preliminary discussions with local authorities and conservation organizations about the potential for assisting with future monitoring of the health of Lake Ladoga ringed seals. The principal investigators identified optimal research areas in the Valaam Archipelago, surveyed the seals in the area, and attempted live captures. They also collected morphometric measurements and tissue samples from six dead seals and selected sites for future field laboratories.

A public service announcement regarding illegal feeding of wild dolphins
(Mote Marine Laboratory, Sarasota, FL)

Cruises offering tourists a chance to "feed-the-wild-dolphins" are an expanding conservation and management problem throughout the southeastern United States, despite the fact that such activities violate provisions of the Marine Mammal Protection Act. Feeding wild dolphins may cause them to alter their natural behavior (particularly foraging) and become less wary of humans, thereby elevating the likelihood of harmful interactions. Limited staff and funding have made it difficult to enforce wildlife protection laws, and management efforts regarding responsible wildlife viewing are being focused on public education. However, inappropriate encouragement of potentially harmful interactions by ecotourism ventures and the media have undermined even these efforts. The Commission provided partial support for production and distribution of a public service announcement to broadcast the message that feeding dolphins in the wild can be harmful to the animals, dangerous to people, and illegal under federal law. This public service announcement will be distributed to television stations and other media outlets in southern Florida. Outreach materials such as a "don't feed wild dolphins" Web site and/or signs to post near "hot-spot" areas for dolphin foraging also may be developed to educate the public about the perils of feeding and harassing wild animals.

Survey of Federally Funded Research

From 1974 to 2000 the Marine Mammal Commission conducted an annual survey of federally funded marine mammal research. The survey provided information on species, geographic regions, and research topics and issues investigated, as well as the supporting and performing agencies, offices, and organizations. The Commission plans to reinitiate this survey in the near future to identify trends in funding and evaluate the effectiveness and cost-effectiveness of research and conservation efforts for marine mammals.

In 2006 and 2007 the Commission created a relational database for funding data and analyzed funding trends between 1980 and 2000. The database allows analyses of funding for specific research topics, geographic regions, and species or species groupings.

Preliminary results of data analyses were presented at the Commission's annual meeting in August 2007. At present, the Commission is developing a standardized data form and in 2008 will be soliciting assistance from the agencies that will be involved in the survey.

Chapter VI

MARINE MAMMAL HEALTH AND STRANDING RESPONSE

The National Marine Fisheries Service established the Marine Mammal Health and Stranding Response Program (MMHSRP) in the early 1990s after a large number of bottlenose dolphins stranded along the U.S. Atlantic coast in 1987 and 1988. The program was created by the 1992 amendments to the Marine Mammal Protection Act, and its goals are to facilitate collection and dissemination of data; assess health trends in marine mammals; correlate marine mammal health with available data on physical, chemical, environmental, and biological parameters; and coordinate effective responses to unusual mortality events (commonly known as UMEs).

The Marine Mammal Health and Stranding Response Act directed the Secretary of Commerce to—

- establish an expert working group to provide advice on measures necessary to better detect and respond appropriately to future marine mammal UMEs,
- develop a contingency plan for guiding responses to such events,
- establish a fund to compensate people for certain costs incurred in responding to UMEs,
- develop objective criteria for determining when sick and injured marine mammals have recovered and can be returned to the wild,
- continue development of the National Marine Mammal Tissue Bank, and
- establish and maintain a central database for tracking and accessing data concerning marine mammal strandings.

Draft Programmatic EIS on the Marine Mammal Health and Stranding Response Program

In December 2006 the National Marine Fisheries Service announced its intent to prepare a programmatic environmental impact statement (EIS) on the MMHSRP. On 16 March 2007 the Service published a notice of availability of a draft EIS, and in April 2007 it held public hearings on the document in San Francisco; Seattle; Boston; Silver Spring, Maryland; and St. Petersburg, Florida. The draft document describes four proposed actions of the MMHSRP, including—

- issuance of final guidance for the previously proposed Policies and Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release;
- issuance of a new Endangered Species Act / Marine Mammal Protection Act permit to authorize the program to take marine mammals while responding to stranding events involving endangered marine mammal species, disentangling marine mammals from fishing gear and marine debris, carrying out biomonitoring projects, and importing and exporting marine mammal tissue samples;
- continuation of current program operations, including response, rehabilitation, release, and research activities involving marine mammals, as well as renewal and authorization of stranding agreements and other Service activities referenced in the draft statement; and
- continuation of the John H. Prescott Marine Mammal Rescue Assistance Grant Program.

The draft programmatic environmental impact statement considered three alternatives—no action, status quo, and preferred—based on six key considerations. Under the preferred alternative, the Service would (1) establish stranding agreement criteria and develop a new stranding agreement template; (2) recommend that carcasses of chemically euthanized animals be transported offsite for disposal; (3) issue new stranding authorizations, continue to authorize rehabilitation activities, and implement new standards for rehabilitation facilities; (4) issue new stranding agreements, continue release activities, and implement final release criteria; (5) continue the current activities of the disentanglement network on the U.S. East Coast but modify those authorized on the West Coast, and implement disentanglement guidelines and training prerequisites; and (6) issue a new Endangered Species Act/Marine Mammal Protection Act permit to include current and future biomonitoring and research activities.

On 30 May 2007 the Marine Mammal Commission forwarded its comments on the draft, commending the Service for developing the document and for its work in coordinating responses to stranding events nationwide, providing care for stranded marine mammals, and examining carcasses and collecting tissue samples to assess possible causes of morbidity and mortality. The Commission noted, however, that certain issues in the draft document warranted more discussion and other important issues not addressed in the document warranted inclusion. The Commission recommended that the Service revise the draft programmatic environmental impact statement to address the following points.

Collection and Synthesis of Data from Unusual Mortality Events

Of the 26 unusual mortality events declared by the Working Group on Marine Mammal Unusual Mortality Events between 1991 and the end of 2005, final reports have been completed for only six events, draft reports have been completed for three events, and papers have been published for seven events. Reports have yet to be prepared for the remaining 10 events. Such reports are of value to stranding network participants and to researchers seeking to understand unusual mortality events, the factors causing them, and their significance for the affected populations. Therefore, the Commission stressed the need for completing these reports in a timely fashion. The Commission recommended that the Service revise the draft statement by adding an update on the status of final reports, explore ways to promote completion and circulation of final reports more promptly, and identify actions that the Service can take to improve the synthesis and use of data from such events.

Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release

The Service published a manual entitled Interim Policies and Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release for the purpose of standardizing the practices of National Stranding Network participants. The manual includes five draft documents: (1) Evaluation Criteria for a Marine Mammal Stranding Authorization, (2) National Template for Marine Mammal Stranding Authorizations, (3) Standards for Marine Mammal Rehabilitation Facilities, (4) Standards for Release of Rehabilitated Marine Mammals, and (5) Marine Mammal Disentanglement Guidelines. The Commission commented specifically on two of these.

Interim Standards for Marine Mammal Rehabilitation Facilities

The interim standards for rehabilitation facilities set facility, husbandry, and veterinary standards for rehabilitating marine mammals to optimize the success of releasing animals back to the wild. The standards are based in large part on the U.S. Department of Agriculture's Animal Welfare Act regulations, which define minimum standards for captive marine mammals, and on input from a workshop of experts hosted by the National Marine Fisheries Service in 1998. The Service will continue to require that all rehabilitation facilities meet certain standards, which will be finalized after the Service completes its analysis under the National Environmental Policy Act. The draft programmatic environmental impact statement did not, but should, describe how the Service will ensure that rehabilitation facilities are, in fact, meeting those standards.

Interim Standards for Release of Rehabilitated Marine Mammals

The interim standards for release require, among other things, that stranding network participants prepare "release determination recommendations" and release plans and obtain the Service's concurrence before releasing rehabilitated marine mammals into the wild. In preparing the interim standards, the Service recognized that the facilities may at times have incentives to promote releases that are inadvisable or, alternatively, to hold animals that are fit for release (e.g., for public display). The Commission therefore recommended that the draft be revised to discuss and clarify the procedures and substantive criteria—other than those already required under the interim standards for release—that the Service will use in reviewing and approving or disapproving recommended releases of marine mammals by rehabilitation facilities.

The interim standards for release also state that standardization of data collection protocols for monitoring released animals may be helpful in comparing individual cases and that the Service "will provide the stranding network with the desired format for receipt of tracking data in reports." The Commission agrees that standardized data collection protocols would be useful, and it recommended that the draft statement be revised to identify the types of information that would be collected to monitor released animals.

Public Viewing of Marine Mammals Undergoing Rehabilitation

Guidelines are needed to govern when and under what conditions marine mammals in rehabilitation facilities may be placed on public display. The Service is considering such guidelines but did not describe them in the draft statement. In its comments, the Commission recommended that the Service revise the draft by describing its plans for developing such guidelines and authorization procedures, including opportunities for review by the Commission, the affected facilities, and the public prior to their adoption. The Commission also recommended that the Service work closely with the Animal and Plant Health Inspection Service to ensure that the guidelines meet the requirements of the Marine Mammal Protection Act and the Animal Welfare Act and that the potential for successful rehabilitation and release is not compromised.

Additional Stranding Network Issues

Three additional, separate stranding-related issues have generated concern in the past: insufficient space at rehabilitation facilities, difficulties with placing non-releasable marine mammals in public display facilities (particularly pinnipeds, neonates, and animals with chronic health problems), and onsite criteria for evaluating the likelihood that a stranded marine mammal can be successfully rehabilitated and released. The Commission recommended that the Service revise the draft document to include an in-depth examination of these issues and possible strategies for addressing them.

Releasing Animals Rehabilitated Outside Their Home Range

Rehabilitation and release of marine mammals pose a risk of transmitting diseases or parasites to wild populations. The risk is heightened if rehabilitation occurs in an area not usually inhabited by the species. For example, if ice seals from an Arctic climate are moved to a subarctic area for rehabilitation, they may be exposed to diseases that they do not usually encounter in their natural habitat. Concern for such exposure and possible transmission to wild populations is reflected in resolutions passed in 2006 and 2007 by two Alaska Native organizations, the Ice Seal Committee and the Bristol Bay Marine Mammal Council. These organizations have taken the position that, absent a compelling conservation rationale, releases of ice seals rehabilitated elsewhere should not be authorized.

The Commission agrees that extreme caution should be exercised when moving animals between different geographic areas and different ecosystems that may have dissimilar disease profiles. These concerns are reflected in the Service's interim release guidelines, which state, among other things, that

> [t]he goal of required [pre-release] testing requested by NMFS [National Marine Fisheries Service] or FWS [Fish and Wildlife Service] is to safeguard the health of wild marine mammal populations and this

> is achieved by testing for diseases (reportable diseases) that pose a significant morbidity or mortality risk to wild populations. Other reportable diseases include those that are of zoonotic or public health and safety concern and the agencies will require immediate notification to assure proper protocols are put into place. The agencies may request testing for other emerging diseases as part of a surveillance program to identify potential epidemics of concern or to determine health trends.

The Commission cited this provision in its 8 November 2007 comments on a permit amendment request submitted by the Alaska SeaLife Center to release rehabilitated ice seals. The Commission recommended that the Service act conservatively by not authorizing any release of ice seals rehabilitated outside their usual range for the following reasons: (1) the probability of transmitting new diseases and/or parasites into areas inhabited by ice seals is uncertain, (2) currently available screening practices are unlikely to provide sufficient certainty that released animals are, in fact, disease-free, (3) the releases serve no pressing conservation need, and (4) the consequences of disease or parasite introduction could be severe for animals that may already be stressed by the effects of climate change.

Unusual Mortality Events

The National Marine Fisheries Service, in consultation with the Marine Mammal Commission and the Fish and Wildlife Service, established the Working Group on Marine Mammal Unusual Mortality Events in 1993 and it has continued to operate since then. The group is composed of experts from around the country, including marine mammal biologists, veterinarians, pathologists, and other scientists with pertinent expertise. The Service consults the working group whenever increases in stranding rates or other factors suggest that a UME may be occurring.

In 2006 the working group revised the criteria for determining when a UME was occurring and published a review of UMEs since 1978 (Gulland 2006). The review describes patterns in UMEs and their causes and evaluates progress in responses to them. Both the revised criteria and review were discussed in the Commission's 2006 annual report. To improve responses, the review recommended that the National Marine Fisheries Service (1) expand the national stranding database, (2) improve the stranding network's surveillance capabilities, (3) improve administrative support for UME investigations, (4) establish emergency response teams of trained personnel, (5) require timely submission of final reports and encourage peer-reviewed publication of those reports, (6) develop a centralized national sample archiving system, (7) improve the availability and quality of diagnostic tests performed on samples from marine mammals, (8) integrate the MMHSRP with stock assessment and population monitoring programs from cooperating agencies, and (9) develop and fund a research plan addressing factors predisposing populations to UMEs. Although Congress established a contingency fund in 2005 to improve UME responses and investigations, no additional funds have been appropriated to supplement the contingency fund, which is rapidly diminishing as these events occur. In addition, the Service has not requested additional funds for this purpose, despite the fact that such funds are necessary to fulfill the mandates of the Marine Mammal Protection Act.

Unusual Mortality Events in 2007

At least 12 separate UMEs occurred during 2007, including four events that began in 2005, four that began in 2006, and five new events. All 13 events are described briefly below.

Blue Whales along the Southern Coast of California

In September 2007 three dead blue whales were found floating near the Channel Islands off southern California. All three deaths were attributed to vessel strikes. Three such deaths in one month are highly unusual, and the Service declared a UME on 11 October 2007. Subsequently, one more blue whale was found dead on San Miguel Island (one of the Channel Islands). One of the whale's flippers had been sliced severely, and its death also was attributed to a vessel strike. Shipping lanes pass

to and from Los Angeles across this area, and the whales likely were struck by vessels traveling in those lanes.

The circumstances surrounding the vessel strikes remain unknown. The distribution and operation of vessels probably have not changed in recent years, and the events may reflect a change in the distribution or behavior of the blue whales. A number of other factors may have been involved. However, investigation of those factors was not possible because of difficulties in either accessing the carcasses while at sea or the state of decomposition when the carcasses were accessible. Only two necropsies were performed, both on carcasses that were fairly decomposed and revealed no evidence of illness or other sources of trauma.

On 25 September 2007 the Center for Biological Diversity petitioned the National Marine Fisheries Service for an emergency rule to reduce marine vessel speed limits in the Santa Barbara Channel and reduce the risk of vessel strikes. At the end of 2007 a response to the petition was still pending. In the meantime, the Service and the U.S. Coast Guard worked together to notify mariners of the presence of whales in the shipping lanes and to suggest that mariners slow to 10 knots when transiting the area. The Channel Islands National Marine Sanctuary, in conjunction with the Coast Guard and California Department of Fish and Game, also flew several aerial surveys of the shipping lanes to find and report any whales in or near the lanes. The Service intends to analyze historic information on blue whale distribution in southern California waters to determine how frequently whales have been found in the Santa Barbara Channel in the past and possibly identify factors that could lead to changes in the density of whales in and near the shipping lanes. The UME was ongoing at the end of 2007.

Guadalupe Fur Seals in Oregon and Washington

Between June and July 2007, 15 Guadalupe fur seals stranded along the coast of Oregon and Washington. Previously only a single yearling male Guadalupe fur seal was known to have stranded in this area. The Service declared a UME on 18 October 2007. Necropsies were performed on 6 of the 15 stranded animals, 5 carcasses were frozen for later examination, 3 were not collected, and 1 animal is alive in rehabilitation. Malnutrition appears to have caused the strandings and deaths. Water temperatures warmer than usual may have caused these animals to venture outside their normal foraging range. Neither biotoxins produced by harmful algal blooms nor any other cause of death was evident from the necropsy results although the timing and location of harmful algal blooms in the area is being investigated. In addition, protozoal infections, such as *Toxoplasma gondii* or *Sacrocystis neurona*, might have been involved. The UME was ongoing at the end of 2007.

Cetaceans in California

Between 2 April and 7 June 2007, 37 cetaceans were found stranded dead along the California coast. They included 23 common dolphins, 5 harbor porpoises, 2 minke whales, 4 gray whales, 2 sperm whales, and 1 unidentified small cetacean. The Service declared a UME on 2 May 2007, and additional animals continued to strand throughout the year. Although a comprehensive summary was not available at the end of 2007, at least 13 additional cetaceans stranded between 7 June and 13 October 2007. Similar events in the past have been linked to harmful algal blooms and domoic acid, and large numbers of pinnipeds were observed stranding along the California coast in 2007 as a result of exposure to domoic acid. These pinniped mortality events are now considered to be "repeat events" rather than unusual mortality events, although the distinction is drawn for administrative rather than biological reasons. Domoic acid was detected in samples from at least five common dolphins. Five other common dolphins had been shot and presumably died from the resulting wounds. At the end of 2007 the Service was still compiling information and had not declared the UME officially closed.

Manatees in Southwest Florida

Beginning 7 March 2007, 53 manatees stranded along the coast of Lee County, Florida, and the Service declared a UME on 23 May 2007. Forty-five of the animals were found dead, and necropsy results, condition of carcass, and toxin analysis indicated that 38 of those deaths resulted from the effects of brevetoxins. Brevetoxins are produced by the di-

noflagellate *Karenia brevis*, which is responsible for "red tides" along the western coast of Florida. Watercraft collisions caused three other deaths, and two deaths were from unknown causes. Six of the eight animals that stranded live exhibited signs of brevetoxicosis. One of those animals subsequently died, but the others swam away, and their fate is not known.

In southwestern Florida, between Sarasota and Lee Counties, a red tide event began in late June 2006 and continued through early winter, with patches persisting until early spring 2007. By early April, the red tide was no longer detectable in Lee County, and manatee strandings and deaths returned to normal levels. This was the fourth red tide–induced UME for Florida manatees in the past five years and raised the question of whether die-offs caused by red tide should be considered unusual or "repeat" events, again for administrative purposes. The working group, in collaboration with the manatee research community, is developing a case definition for manatee brevetoxicosis to allow for easier diagnosis of this sort of event. Although manatee strandings had returned to normal levels at the end of 2007, the Service had not yet declared the UME officially closed.

Bottlenose Dolphins in Texas and Louisiana

Between 25 February and 27 March 2007, a total of 64 bottlenose dolphins stranded individually along Galveston and Jefferson Counties, Texas, and Cameron Parish, Louisiana. The strandings coincided with die-offs of redfish and gar. All age classes were represented in the dolphin strandings, but almost 60 percent were less than 115 cm (45 in) in length, suggesting that they were young of the year. Due to the unusual increase in mortality and the unusual shift of mortality from adults to calves, the Service declared a UME on 20 March 2007. Phytoplankton samples collected during the peak of strandings indicated a bloom of *Pseudo-nitzschia pseudodelicatissima* in the area. This diatom produces domoic acid, but domoic acid was detected in samples from only two of the necropsied animals. At the end of March, stranding numbers returned to normal, and the Service declared the UME closed on 26 November 2007. A report of this UME is expected in 2008.

Florida Manatees in Everglades National Park

During 9 November to 31 December 2006, 24 dead manatees were found in the Everglades National Park between the Broad River and the Monroe-Collier county line. The Service declared a UME on 27 December 2006. Necropsy results and brevetoxin analyses indicate that 9 out of 10 animals tested died from brevetoxicosis caused by *Karenia brevis* (red tide). Brevetoxicosis also was the suspected cause of death for the remaining manatees as well as four additional manatees found outside the affected area. At the end of 2007 the Working Group on Marine Mammal Unusual Mortality Events was reviewing information and considering whether to close this event.

Humpback Whales along the Atlantic Coast

During July to September 2006, 13 humpback whale carcasses were observed floating at sea off the U.S. Atlantic coast, and two additional carcasses washed ashore. In response to this marked increase in reported carcasses, the Service declared a UME on 4 October 2006. Additional humpback whale carcasses have been observed with high frequency; a total of 48 were reported between January 2006 and December 2007 (including one each in Canada and Bermuda). The majority of these carcasses (29) were floating at sea, making necropsies and sample collection difficult. A total of 16 necropsies was conducted. Seven whale carcasses showed evidence of fishery interactions (entanglement), four showed evidence of ship strikes, and one carcass showed evidence of both fishery interactions and ship strike. One calf that had been separated from its mother died from starvation. The cause of death for the remaining whales could not be determined because of the state of decomposition or the inaccessibility of the carcass (i.e., the carcass was too far offshore). Biotoxin analyses were conducted on samples from four humpback whales. One sample tested positive for domoic acid; saxitoxin was detected in another. The biotoxin levels indicated that the whales were exposed to the toxins but were not high enough to confirm that the biotoxins contributed to their deaths. Saxitoxin produced by dinoflagellates of the genus *Alexandrium* was thought to have caused

two previous UMEs in this region. The Service had not closed the UME by the end of 2007.

Harbor Porpoises in the Pacific Northwest

Beginning on 11 January 2006, 64 individual harbor porpoises stranded on the coastlines of Washington and Oregon. Sixty-one of the porpoises were found dead, two live-stranded animals were returned to the water, and another was euthanized. The Service declared a UME on 3 November 2006. An additional 50 individual harbor porpoises (including a Dall's porpoise/harbor porpoise hybrid) stranded in 2007. Stranded animals represented all sex and age classes although the number of young animals (yearlings and calves) increased significantly in 2006 and 2007 compared to previous years.

Detailed external and internal examinations were conducted on a total of 75 porpoises (42 in 2006 and 33 in 2007). Histological samples from 55 cases revealed no common lesions, parasites, or diseases that could account for the overall increase in mortality. Trauma and infectious disease were the most commonly diagnosed conditions. Entanglement in fishing nets caused most of the traumatic injuries observed on adult animals. Infectious diseases included four cases of protozoal encephalitis caused by *Toxoplasma gondii*, *Sarcocystis neurona*, or both. The *T. gondii* found in these porpoises is identical to that reported in sea otters in California. Analyses also revealed the fungus *Cryptococcus gattii* in six carcasses, and a variety of other pathogens in individual cases. Biotoxin analyses of selected samples were negative for domoic acid, and stomach content analysis did not show unusual prey items or reflect any change in food habits. At the end of 2007 the UME was still under investigation, and the Service had not declared it officially closed.

Pinnipeds in the Northeastern United States

Beginning in April 2006 the number of pinniped strandings along the U.S. northeast coast increased dramatically. During the previous decade, an average of 233 pinnipeds stranded annually in the region from Virginia to southern Canada, with the majority of stranded animals being pups. More than 1,100 pinnipeds stranded in 2006 and more than 600 stranded in 2007. In both years an unusually high proportion of the strandings involved subadult or adult animals rather than pups. Most of the strandings in 2007 involved live animals (approximately 350), and many of those were taken into rehabilitation facilities. The Service declared a UME on 20 October 2006 because of the unusual increase in mortality and the unusual shift of mortality from pups to adults. Analyses detected morbillivirus in a few of the stranded animals, raising concern about the possibility of an epizootic similar to those experienced in northern Europe and Russia in recent years, which involved the deaths of tens of thousands of seals. In 2006 the Service initiated a sampling protocol for stranded pinnipeds including tests for morbillivirus, herpes, *Brucella*, leptospirosis, avian flu, biotoxins, and contaminants. In 2007 the Service modified the protocol to focus on testing for morbillivirus. An isolate of morbillivirus from an animal sampled in Maine is being compared to morbillivirus from the seal epizootic events in Europe to determine any similarities among the viruses. The Service had not declared the UME closed at the end of 2007.

Multiple Species along the West Coast of Florida

Between March 2005 and December 2006, 130 manatees died from brevetoxicosis along the west coast of Florida. In addition, a total of 173 dolphins stranded dead between July 2005 and November 2006, and many of those strandings appeared to be related to brevetoxicosis. The Service declared a UME for manatees on 22 March 2005, and that event was expanded to include dolphins on 10 November 2005. Seabirds, sea turtles, and fish also died during this multispecies mortality event, and the Service and the working group helped to coordinate the various investigations of these presumably related events. The Service declared this event closed on 18 July 2007. A report is expected in 2008.

Alaska Sea Otters

In 2000 sea otters began stranding with unusual frequency in southcentral Alaska, and the rate of stranding increased over time. By 2005 stranded sea otters were reported every month, and in summer 2006 stranding networks found at least one dead

otter almost daily along the beaches of Kachemak Bay in Cook Inlet. The Service declared a UME on 24 August 2006. From 2002 through 2007, 346 carcasses were reported, with 103 carcasses reported in 2007 alone. The vast majority of carcasses (337) have been recovered and evaluated, with the level of evaluation or necropsy depending on the state of the carcass. Necropsies from all years (including 2007) indicate that the majority of the mortality is due to vegetative valvular endocarditis/septicemia (VE/S). The bacteria *Streptococcus bovis* complex or *Streptococcus infantarius* subsp. *coli* were commonly found in those cases, and an unusually large proportion of the cases involved prime-aged males. Most stranded otters were from the southcentral Alaska stock, but some belonged to the southwest stock, which is listed as threatened under the Endangered Species Act. The Service had not declared the UME closed at the end of 2007.

Large Whales in New England

Between July and November 2005, 32 large whale carcasses were found floating at sea or stranded along the New England coast. These carcasses included ten minke whales, seven humpback whales, four fin whales, one sperm whale, one right whale, one unidentified fin/sei whale, six unidentified baleen whales, and two large whales that could not be identified as being either baleen or sperm whales. A UME was declared on 16 August 2005. A large harmful algal bloom of *Alexandrium* spp. was observed in New England during the summer of 2005. Samples were taken from nine whales, and two whales tested positive for low quantities of saxitoxin. The level of toxicity of saxitoxin in whales remains unknown, so it is not clear whether saxitoxin played a role in any of the deaths. This event was closed on 6 February 2006 and a report is expected in 2008.

Prescott Grant Program

The Marine Mammal Rescue Assistance Act of 2000 amended Title IV of the Marine Mammal Protection Act and instructed 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 program provides financial assistance for participants of marine mammal stranding networks to carry out critical activities including recovery or treatment of stranded marine mammals, collection of data from living and dead stranded marine mammals, and payment of operational costs directly related to those activities. Each award has a maximum of $100,000 and may be granted for a period of up to three years. An applicant may receive no more than two awards per competition.

The National Marine Fisheries Service administers the grant program for species under its management jursidiction. The Fish and Wildlife Service has neither requested nor received Prescott funds since the program's inception in 2001. The National Marine Fisheries Service, on the other hand, consistently has requested Prescott funds and awarded Prescott grants. For fiscal year 2007, the National Marine Fisheries Service awarded grants totaling approximately $3.7 million to 42 projects out of 80 submitted proposals. Technical and merit review panels evaluated the proposals and selected award winners. In June 2007 the National Marine Fisheries Service solicited proposals for grants to be awarded in fiscal year 2008 and received 75 proposals.

Literature Cited

Gulland, F.M.D. 2006. Review of the Marine Mammal Unusual Mortality Event Response Program of the National Marine Fisheries Service. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-OPR-35.

Chapter VII

MARINE MAMMAL/FISHERIES INTERACTIONS

Fishing operations may disturb, harass, injure, or kill marine mammals, either accidentally or deliberately. Conversely, marine mammals may take or damage bait or fish caught on hooks, in traps, or in nets. They may damage or destroy fishing gear or may injure fishermen trying to remove them from fishing gear. In addition, marine mammals and fisheries may compete for the same fish and shellfish resources. Interactions between fisheries and marine mammals are regulated primarily under provisions of the Magnuson-Stevens Fishery Conservation and Management Act and the Marine Mammal Protection Act but also may be regulated under the Endangered Species Act.

This chapter discusses activities undertaken in 2007 to manage the incidental take of marine mammals in commercial fisheries, including the assessment of the status of all marine mammal stocks in U.S. waters, efforts to diminish the impact of incidental take on marine mammal stocks through development and implementation of take reduction plans, and the status of dolphin populations in the eastern tropical Pacific Ocean after their reduction by tuna fishing in previous decades. Events related to interactions between California sea lions and salmon at the Bonneville Dam and the impact of growing pinniped populations on other fisheries are discussed in Chapter II.

Stock Assessments and List of Fisheries

The Marine Mammal Protection Act establishes the framework for managing the incidental take of marine mammals in commercial fisheries. The Act requires (a) monitoring and reporting of the status of marine mammal stocks in U.S. waters, (b) monitoring of incidental take of marine mammal stocks by commercial fishing operations, (c) classification of fisheries based on their relative level of incidental take, and (d) implementation of fishery management measures or take reduction plans to address situations where incidental take is not sustainable. The National Marine Fisheries Service and the Fish and Wildlife Service are responsible for preparing and periodically updating stock assessment reports for each marine mammal stock under their respective jurisdictions.[1] In such reports, the Services are required to describe the geographic range of the stock and provide estimates of its minimum population size, population trend, current and maximum net productivity rates, and potential biological removal level (PBR). PBR is defined by the Act to mean the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. PBR is calculated based on the stock's minimum population estimate, maximum net productivity rate, and a recovery factor that is designed to adjust PBR to provide additional protection based on the relative status of the stock. The Services also are required to describe in each report the commercial fisheries that interact with the stock and the estimated human-caused mortality and serious injury of the stock. Finally, the Services must categorize each

[1]The National Marine Fisheries Service is responsible for all species of cetaceans and most pinnipeds. The Fish and Wildlife Service is responsible for manatees, sea otters, polar bears, and walruses.

stock as strategic or not. Stocks listed as threatened or endangered under the Endangered Species Act or designated as depleted under the Marine Mammal Protection Act are strategic by default. Stocks that are declining and are likely to be listed under the Endangered Species Act in the foreseeable future are also considered as strategic. Other stocks are categorized as strategic based on a comparison of the estimate of PBR to the estimate of human-caused mortality and serious injury for the stock. Generally, stocks are not categorized as strategic unless human-caused mortality and serious injury exceed the PBR calculated for the stock.

Determining strategic stocks is more difficult when either PBR or human-caused mortality cannot be estimated reliably. In those instances, the Service relies upon the advice of its regional scientific review groups to determine whether a stock should be classified as strategic. However, the advice provided by the scientific review groups or the Service's response to that advice has been inconsistent among stocks and regions. Some stocks with unreliable estimates of either PBR or human-caused mortality are classified as strategic, whereas others are not. The classification of such stocks is often justified on the basis of concerns regarding cryptic or poorly monitored threats. For example, five stocks of Atlantic and Gulf of Mexico beaked whales are classified as strategic because "of uncertainty regarding stock size and evidence of human-induced mortality and serious injury associated with acoustic activities." However, abundance and mortality/injury rates are similarly uncertain for beaked whale stocks in the Pacific and Alaska regions, and although those whales also may be exposed to anthropogenic noise, none is classified as strategic. In 2007, as in previous years, the Commission recommended that the Service adjust stock assessment guidelines to ensure consistent methods for identifying strategic stocks. In view of the uncertainty involved, the Commission also recommended that the methods chosen be precautionary to ensure adequate protection of the stocks. The Service is planning to address this issue at a joint scientific review group meeting in 2008.

The Marine Mammal Protection Act also requires the National Marine Fisheries Service to compile and maintain a List of Fisheries and classify each fishery based on the frequency with which it incidentally takes marine mammals. A fishery is classified as Category III if its incidental take (human-caused mortality and serious injury) of all marine mammal stocks is less than 1 percent of the PBRs for those stocks. If a fishery's incidental take exceeds 1 percent of PBR for one or more stocks, it is classified as Category III only if the total incidental take by all fisheries is less than 10 percent of PBR for those stocks. Otherwise, a fishery is classified as Category II if its incidental take of any marine mammal stock is greater than 1 percent (but less than 50 percent) of the PBR for that stock. Finally, a fishery is classified as Category I if the incidental take of any marine mammal stock by that fishery exceeds 50 percent of the stock's PBR.

The Act also requires that the Service establish a program for monitoring take of marine mammals incidental to commercial fishing operations. Participants in Category I or II fisheries must take on board an observer if requested to do so by the Service. The Act indicates that the priority for observer allocation shall be based on the status of the affected marine mammal stocks (endangered, threatened, depleted, declining, and unknown—in that order) and the absolute and relative rates of incidental take. The Act specifically requires that the Service place observers on vessels in each Category I fishery sufficient to observe 20 to 35 percent of the operations of each fishery. If such observer coverage cannot be obtained, then observers are to be allocated with regard to the priorities identified earlier. Although the level of observer coverage for each fishery that interacts with a given marine mammal stock is described in the relevant stock assessment report, that information is not summarized in the List of Fisheries. Without such information, it is difficult to evaluate the Service's ability to meet the Act's mandates regarding observer programs and coverage. Furthermore, many fisheries are either not observed or have very low observer coverage. Thus, estimated incidental take rates tend to be imprecise at best and inaccurate at worst, and the resulting fishery classifications may be incorrect. In 2007, as in previous years, the Commission recommended that the Service describe observer coverage for each fishery in the List of Fisheries. Otherwise, it is not possible to

determine whether a given fishery was adequately observed and no marine mammals were taken, or if the fishery was not adequately observed and mortality and serious injury may have occurred but were not documented.

Take Reduction Teams

The Marine Mammal Protection Act stipulates that take reduction plans be developed for each strategic stock that interacts with a Category I or II fishery. Such plans also may be developed for non-strategic stocks that interact with a Category I fishery if the fishery has a high level of incidental take of several such stocks. Take reduction plans are developed based on recommendations from multi-disciplinary take reduction teams. These teams are convened by the responsible agency (either the National Marine Fisheries Service or the Fish and Wildlife Service) and are intended to include an equitable balance of representatives from relevant fisheries, environmental groups, the academic community, fishery management organizations, and fishery management offices of the involved federal and state agencies. All team members are required to have expertise regarding either the implicated fishing practices or the conservation and biology of the affected marine mammal stock(s). The goals of a take reduction plan are to reduce incidental take to levels less than PBR for the relevant stocks within six months of the plan's implementation and to reduce the number of takes to less than 10 percent of PBR within five years. For situations where incidental take by a Category I or II fishery exceeds PBR for a strategic stock, the take reduction team must submit a draft take reduction plan to the responsible agency within six months of the team's establishment. That deadline is extended to 11 months for situations where incidental take by a Category I or II fishery is less than PBR for a strategic stock or for non-strategic stocks that interact with a Category I fishery.

Since adoption of the 1994 amendments to the Marine Mammal Protection Act, the Service has convened eight take reduction teams (Table VII-1), one of which, the Atlantic Offshore Cetacean Team, has since been disbanded. In 2007 the Service reconvened four teams: bottlenose dolphin, harbor porpoise, Atlantic trawl gear, and Pacific offshore cetacean. The Atlantic Large Whale Take Reduction Team, which addresses incidental takes of North Atlantic right whales and several other endangered whales, met in December 2006. In 2007 the Service modified its Atlantic Large Whale Take Reduction Plan based in part on that team's advice (see the North Atlantic right whale section in Chapter IV). Despite recommendations by the Commission in years past and again in 2007, the Service did not convene a team for the Hawaii stock of false killer whales that has been taken by the Hawaii longline fishery at levels exceeding PBR for several years.

Bottlenose Dolphin Take Reduction Team

The National Marine Fisheries Service initially convened the Bottlenose Dolphin Take Reduction Team in 2001 to reduce the incidental takes of western North Atlantic coastal bottlenose dolphins (*Tursiops truncatus*) in gillnet and trap fisheries off mid-Atlantic coastal states. In 2001 this complex of dolphins consisted of an assemblage of multiple groups extending from New York to Florida and varying in their distribution and migratory patterns. North of Cape Hatteras, North Carolina, members of this population tend to stay within 12 km (6.5 nmi) of the coast, while south of Cape Hatteras they may occur out to 27 km (14.6 nmi) from shore. Within this range some animals appear to prefer inland bays and estuaries. Their migratory patterns vary by region—dolphins summering between Virginia and New Jersey move south of the Chesapeake Bay and intermingle with dolphins off North Carolina in winter, whereas south of North Carolina they exhibit limited seasonal movements.

The development of take reduction measures for bottlenose dolphins has been confounded by limited information on take levels in the various local fisheries and uncertainty in the stock structure. Based on seasonal movements and genetic relationships, the stock currently is believed to consist of seven groups, each of which is treated as a separate management unit for purposes of estimating abundance, PBR levels, and bycatch rates, and for developing take reduction measures. Scientists are conducting genetic, tagging, and movement studies to improve understanding of stock structure. The results of these studies could lead to significant re-

Table VII-1. Take reduction teams established under the Marine Mammal Protection Act to reduce the incidental take of marine mammals in commercial fisheries

Take Reduction Team	Date Established	Team Focus
Gulf of Maine Harbor Porpoise	1996[1]	Take of harbor porpoises in various New England set gillnet fisheries for groundfish (e.g., cod, haddock, and flounders), spiny dogfish, monkfish, skates, and sharks
Atlantic Large Whale	1996	Take of right, humpback, fin, sei, and sperm whales in various gillnet and trap fisheries for lobster, crabs, conchs/whelks, groundfish (e.g., cod, haddock, and flounders), sharks, monkfish, hagfish, and other finfish
Pacific Offshore Cetaceans	1996	Take of pilot, sperm, pygmy sperm, and humpback whales in drift gillnets for sharks and swordfish
Atlantic Offshore Cetacean	1996[2]	Take of right, humpback, sperm, beaked, and pilot whales and common and bottlenose dolphins in pelagic drift gillnets, longlines, and pair-trawls for tuna, swordfish, and sharks
Mid-Atlantic Harbor Porpoise	1997[1]	Take of harbor porpoises in various mid-Atlantic region set gillnet fisheries for monkfish, groundfish (e.g., cod, haddock, and flounders), coastal finfish, and coastal sharks
Bottlenose Dolphin	2001	Take of bottlenose dolphins in various mid-Atlantic set gillnets, traps, seines, and pound nets for coastal finfish, dogfish, and crabs
Atlantic Pelagic Longline	2005	Take of pilot whales and Risso's dolphins in pelagic longlines for swordfish, sharks, and tuna
Atlantic Trawl Gear	2006	Take of pilot whales, common dolphins, and white-sided dolphins in trawl nets for various finfish, squid, and shellfish

[1] In 2007 the National Marine Fisheries Service combined the Gulf of Maine and the Mid-Atlantic Harbor Porpoise Take Reduction Teams into a single Atlantic Harbor Porpoise Take Reduction Team.

[2] The Atlantic Offshore Cetacean Team was disbanded in 2001 by the National Marine Fisheries Service because a closure adopted by the Service for the pelagic drift gillnet and pelagic trawl fisheries eliminated the cetacean bycatch of concern and the nature of the fishery had changed dramatically.

adjustments of management units and management measures in the future. Although dolphin abundance was surveyed in 2004 and 2005, the results have not yet been fully analyzed. The most recent abundance estimates, therefore, are based on surveys conducted before 2003.

When the take reduction team was first formed, dolphin bycatch in the northern half of their range was estimated to exceed 200 animals, a level more than twice the calculated PBR level in parts of that area. Most takes were in coastal gillnets catching sharks (principally dogfish) and finfish (e.g., striped bass, bluefish, weakfish, spot, mullet, mackerel, and flounder), although some dolphins also were being taken in coastal pound nets and inshore blue-claw crab traps.

In a series of meetings between 2001 and 2003, the bottlenose dolphin team recommended by consensus the take reduction measures that the National Marine Fisheries Service used to develop a final take reduction plan. As shown in Table VII-2, the plan's regulatory measures were published on 26 April 2006 and focused on actions to reduce bycatch in gillnets; these varied by area, season, and

Table VII-2. Regulatory measures for gillnet fishing to reduce the bycatch of western North Atlantic coastal bottlenose dolphins

Region	Area	Season	Mesh Size	Restriction
New Jersey through Virginia	Within 3 nmi of shore	1 June – 1 Oct.	5 to 7 in	Night fishing prohibited with anchored nets unless fisherman remains within 0.5 nmi of net, gear must be stowed aboard vessels before returning to port
			> 7 in	Gear must be stowed aboard vessels before returning to port
Southern Virginia	Within 3 nmi of shore	1 Nov. – 31 Dec.	> 7 in	Night fishing prohibited with gear stowed aboard vessel at night
Northern North Carolina	Within 3 nmi of shore	1 May – 31 Oct.	< 5 in	Fishing prohibited unless nets less than 1,000 ft (304.8 m) long
		1 Nov. – 30 Apr.	5 to 7 in	Night fishing prohibited, provision expires after April 2009
		15 Apr. – 15 Dec.	> 7 in	Fishing prohibited
		16 Dec. – 15 Apr.	> 7 in	Night fishing prohibited without tie-downs
Southern North Carolina	Within 3 nmi of shore	1 Nov. – 30 Apr.	5 to 7 in	Night fishing prohibited; provision expires after April 2009
		15 Apr. – 15 Dec.	> 7 in	Fishing prohibited
		16 Dec. – 14 Apr.	> 7 in	Night fishing prohibited; gear must be stowed aboard vessel at night
South Carolina, Georgia, & Florida east coast	Within 14.6 nmi of shore	Year-round	All Gillnets	Fisherman must remain within 0.25 nmi of gillnets and remove all gear from water when returning to port

net mesh size. The plan also included non-regulatory measures. For example, it recommended, but did not require, that blue-claw crab traps use buoy lines made of negatively buoyant line of the shortest length possible to avoid slack floating line that could entangle dolphins. It also recommended that those traps use inverted or modified bait wells to discourage dolphins from attempting to feed on bait, and that traps be deployed in a straight line to reduce the risk of line coming off the bottom and entangling animals. Other non-regulatory measures called for research on gear modifications to reduce incidental takes, improved observer effort, and public education and outreach.

Recent data from fishery observers indicates that the bycatch of bottlenose dolphins in gillnets

has declined significantly compared to earlier estimates. In particular, bycatch from the winter mix of management units off North Carolina declined from an average of 180 dolphins per year between 1996 and 2000 (i.e., a level more than twice the corresponding PBR estimate of 67.8) to an annual average of 21.3 dolphins between 2002 and 2006. Most of the decline apparently resulted from reduced fishing effort required to rebuild the overfished spiny dogfish stock. However, bycatch from the northern North Carolina management unit in summer has remained slightly above PBR (Table VII-3). Bycatch levels also have remained above ZMRG for several management units.

To further reduce bycatch, the National Marine Fisheries Service reconvened the bottlenose dolphin

Table VII-3. Estimates of abundance, potential biological removal level (PBR), and bycatch from currently recognized management units of the western North Atlantic coastal stock of bottlenose dolphins

Management Unit	Abundance	PBR	Average Annual Bycatch 2002–2006[1]
SUMMER (May–October)			
Northern Migratory	17,466	73.1	12.6
Northern North Carolina			
Oceanic	6,160	15.6	Unknown
Estuary	919	4.2	Unknown
Both	7,079	19.6	23.7
Southern North Carolina			
Oceanic	3,645	7.5	Unknown
Estuary	141	0.6	Unknown
Both	3,786	7.9	Unknown
WINTER (November–April)			
North Carolina Mixed Units (In winter the Northern Migratory, Northern NC, and Southern NC units appear to intermix)	16,931	67.8	21.3
YEAR-ROUND			
South Carolina	2,235	19.6	0.8
Georgia	2,195	17.2	0.5
Northern Florida	448	Unknown	0.2
Central Florida	10,652	Unknown	5.4

[1] Bycatch estimates include takes in gillnets, poundnets, and crab pots, as well as a low level of take associated with research activities.

team on 19–20 June 2007. During that meeting, the team noted that further work is needed to resolve uncertainties about stock structure, which could affect PBR calculations and necessitate adjustments to management and regulatory measures. With regard to the northern North Carolina management unit, the team concluded that measures adopted in 2006 could further reduce the five-year average annual bycatch (currently 21.5 dolphins per year) below the PBR level without additional restrictions. However, as an additional conservation action, the team recommended that a prohibition on night fishing with medium-mesh gillnets (i.e., a mesh size of between 5 and 7 inches), set to expire in 2009, be extended for an additional three years. The team also made several recommendations on non-regulatory aspects of the plan (e.g., gear research, observer coverage, research on stock structure).

At the end of 2007 the Service was reviewing the team's consensus recommendations.

Gulf of Maine/Mid-Atlantic Harbor Porpoise Take Reduction Team

Harbor porpoises (*Phocoena phocoena*) occur in relatively discrete migratory populations in the temperate coastal waters of the Northern Hemisphere. One of those populations, the western North Atlantic population, occurs over the continental shelf between the Bay of Fundy, Canada, at the northern end of the Gulf of Maine, and South Carolina. In summer, most are found in the northern Gulf of Maine and the Bay of Fundy. In winter, they migrate south and scatter broadly over the outer continental shelf from New England to South Carolina.

In the 1990s thousands of harbor porpoises were killed incidentally in gillnet fisheries targeting groundfish (e.g., cod, haddock, and flounders) off New England and Canada. The National Marine Fisheries Service established the Gulf of Maine Harbor Porpoise Team in 1996 to develop bycatch reduction measures for U.S. fisheries. It then became apparent that significant numbers of porpoises also were being taken in gillnet fisheries for monkfish and dogfish off the U.S. mid-Atlantic states. In 1997 the Service established a separate mid-Atlantic harbor porpoise team to develop take reduction measures for that area.

The Gulf of Maine team recommended a combination of time-area fishing closures and management areas in which fishermen had to equip their gillnets with pingers. Pingers are battery-operated devices about the size of a soda can that are attached at intervals along a string of nets. They emit pulses of sound at set intervals within a prescribed frequency range to alert approaching porpoises to the presence of nets and thereby prevent porpoises from becoming entangled. The mid-Atlantic team recommended a combination of time-area closures and seasonal gear restrictions (e.g., minimum net twine diameters, net lengths, and soak times and use of tie-downs that reduce the height of nets between their bottom lead line and top float line).

Based on the teams' recommendations, the Service developed a take reduction plan with regulatory and non-regulatory measures for fisheries in both areas. Those measures—principally the non-regulatory measures—were periodically modified during the late 1990s and early 2000s based on evaluations of their effectiveness and advice provided during team meetings. During the mid- to late 1990s, Canada's Department of Fisheries and Oceans also developed measures to monitor and reduce harbor porpoise bycatch in gillnet fisheries under its jurisdiction in the Bay of Fundy.

These steps appeared to reduce bycatch estimates significantly. In 2001 the estimated bycatch in U.S. and Canadian waters (including strandings in areas lacking observer coverage) fell to 155 porpoises (Table VII-4). In 2000 the PBR estimate also increased significantly because a 1999 population survey estimated the stock's abundance to be 89,700 porpoises, well above the previous estimates. Hence, the National Marine Fisheries Service stopped convening the take reduction teams after 2001 but continued to monitor the harbor porpoise population and the effectiveness of the take reduction plan. Canada also reduced its efforts to protect harbor porpoises, most notably by suspending its bycatch monitoring program.

After 2001 bycatch estimates in U.S. waters increased, and in 2004 they again exceeded PBR. Although Canadian bycatch estimates are no longer available from portions of the Bay of Fundy, both fishing effort and bycatch in that area are believed to have increased by an unknown amount since

Table VII-4. Estimates of Gulf of Maine harbor porpoise bycatch in sink gillnet fisheries in the Bay of Fundy (Canada), and in waters off New England and U.S. mid-Atlantic states, 1990–2006 (Dashes indicate that data are inadequate or unavailable)

Year	New England	Bay of Fundy	Mid-Atlantic	Other[1]	Total	PBR
1990[2]	2,900	–	–	–	–	–
1991[2]	2,000	–	–	–	–	–
1992[2]	1,200	–	–	–	–	–
1993[2]	1,400	424	–	–	–	–
1994[2]	2,100	101	–	–	–	–
1995[2]	1,400	87	103	–	1,590	403
1996[2]	1,200	20	311	–	1,531	403
1997[2]	782	43	572	–	1,397	403
1998[2]	332	38	446	–	816	483
1999[2]	270	32	53	19	374	483
2000[2]	507	28	21	1	557	483
2001[2]	53	73	26	3	155	747
2002[2]	444	–	–	2	–	747
2003[2]	592	–	76	9	–	747
2004[2]	654	–	137	6	–	747
2005[2]	630	–	470	–	–	747
2006[3]	514	–	512	–	–	610

[1] This column includes strandings showing evidence of fishery interactions (e.g., net marks) with unknown gillnet fisheries in areas where there was no observer coverage.

[2] U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments, 1995–2006 series published by the National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole MA; available at www.nefsc.noaa.gov/pr/sars/region.htm.

[3] Belden, D., and C.D. Orphanides. 2007. Estimates of cetacean and pinniped bycatch in the 2006 northeast sink gillnet and mid-Atlantic coastal gillnet fisheries, National Marine Fisheries Service, Northeast Fisheries Science Center, Reference Document 07-20; available at www.nefsc.noaa.gov/publications/crd/crd0720/.

2000. Thus, the combined bycatch is thought to be exceeding PBR by a considerable amount. To address bycatch in U.S. waters, the Service convened a new Harbor Porpoise Take Reduction Team on 16–19 December 2007 with representatives from both New England and mid-Atlantic states. A representative of the Marine Mammal Commission participated on the team.

During this meeting, participants reviewed information on recent bycatch levels and related research and management activities. Based on that information, the team reached consensus on the need for a number of new regulatory measures for areas off the mid-Atlantic states, southern New England, and the Gulf of Maine. Off the mid-Atlantic states, most of the recent bycatch has occurred off New Jersey and New York in the late winter and early spring. The team recommended that a new management zone should be established for that area south and east of the existing Mudhole Closure south and east of New York City where fishery observers had recorded most of the region's bycatch. The new area would encompass waters along parts of the Hudson Canyon and would be closed to gillnet fishing from 1 February through 15 March.

Off southern New England (i.e., east of Cape Cod and off the south shore of Massachusetts, Rhode Island, and Connecticut), most recent

bycatch has occurred in late winter and spring just outside an existing management area called the Cape Cod South Closure Area. In that area gillnet fishing is now prohibited in March. At all other times between 1 December to 31 May, nets must be equipped with pingers. Poor compliance with pinger requirements, however, apparently has contributed to a higher than expected bycatch rate. The team recommended expanding the closure area south to a line near the edge of the continental shelf and east to include coastal waters off the eastern Cape Cod coast, equipping all gillnets within the expanded area with pingers from December through May, establishing a mandatory pinger certification program, and increasing outreach and enforcement efforts to assure use of pingers.

In the western Gulf of Maine (off eastern Massachusetts north of Cape Cod, New Hampshire, and Maine), the periods of greatest bycatch also have been in winter and spring (and also in fall off Maine). Poor compliance with pinger requirements also appears to have contributed to high bycatch in this area. The team recommended measures to eliminate geographical gaps between existing management areas, to modify or expand closure periods and periods when pinger requirements would be in effect, to implement a new certification program for using pingers, and to increase related outreach and enforcement. For both the southern New England and Gulf of Maine regions, the team also recommended the establishment of "consequence" closure areas if compliance with pinger requirements remains a problem. Those measures would expand fishery closures if, after two years, bycatch rates are not reduced to levels predicted from observed hauls of nets that comply with pinger and other requirements.

At the end of 2007 the team expected to finalize its recommendations during a teleconference call early in 2008. Based on those results, the National Marine Fisheries Service expects to adopt the new regulatory measures by the beginning of 2009.

Atlantic Pelagic Longline Take Reduction Team

The Atlantic pelagic longline team was first convened in 2005 to address incidental takes of marine mammals in the Atlantic pelagic longline fishery for highly migratory species (e.g., swordfish, tunas, and sharks). The team was established as part of a settlement agreement for a lawsuit brought by the Center for Biological Diversity and Turtle Island Restoration Network against the National Marine Fisheries Service in 2002. That agreement called for the formation of two take reduction teams to address takes of common dolphins (*Delphinus delphis*) and both long-finned and short-finned pilot whales (*Globicephala melas* and *G. macrorhynchus*, respectively) in the Atlantic longline fishery (this team) and in Atlantic trawl fisheries (the Atlantic Trawl Gear Take Reduction Team, see next section).

Although the longline team originally was charged with addressing takes of pilot whales and common dolphins, no common dolphin takes have been observed in the longline fishery over the past five years (i.e., the period used for calculating take rates). As a result, the team is no longer focusing on common dolphins. However, Risso's dolphins (*Grampus griseus*) have been taken in recent years, and current take estimates for that species and pilot whales, although less than the PBR, are greater than the zero mortality rate goal. For that reason the team has agreed to include Risso's dolphins in the take reduction plan, although it will maintain its initial focus on pilot whales. Because long- and short-finned pilot whales are virtually indistinguishable in the field, those two species are currently managed as a single unit, with abundance estimates and incidental take rates for both species combined.

The longline team met four times between June 2005 and May 2006, and on 8 June 2006 it submitted a recommended take reduction plan to the Service, recommending both regulatory and non-regulatory measures. With regard to regulatory measures, the team recommended that the Service—

- designate Cape Hatteras as a special research area in which fishermen would have to be willing and able to participate in research and carry an observer on board their vessels if asked to do so;
- limit the length of longlines to 20 nmi (while not limiting the number of longlines set);
- require posting of voluntary marine mammal handling guidelines on deck and in the wheelhouse of all longline vessels; and

- institute a mandatory certification program for operators of all longline vessels to ensure that they are aware of take reduction measures and procedures.

The non-regulatory measures included actions to increase observer coverage for the fishery, encourage vessel operators to maintain communications with other vessels on take levels, update marine mammal handling guidelines, distribute quarterly bycatch reports to team members, and collect certain data necessary to evaluate progress on plan implementation.

Since June 2006 the Service has been preparing a draft take reduction plan for public and agency review. Although section 118 of the Marine Mammal Protection Act directs that proposed take reduction plans are to be circulated within 60 days of receiving a team's recommended plan, a proposed Atlantic Pelagic Longline Take Reduction Plan had not been circulated for public or agency review at the end of 2007.

Atlantic Trawl Gear Take Reduction Team

The Atlantic trawl gear team was initially convened in 2006 to address incidental takes of marine mammals in Atlantic midwater and bottom trawl fisheries for various species, including squid, mackerel, butterfish, and herring. The team was established as part of the settlement agreement discussed earlier that also led to the formation of the Atlantic pelagic longline team and is charged with addressing takes of common dolphins and both long-finned and short-finned pilot whales. White-sided dolphins (*Lagenorhynchus acutus*) also are taken in Atlantic trawl fisheries (Table VII-5), and the Service therefore recommended including that species within the team's scope as well.

The Atlantic trawl gear team first met in September 2006 and was reconvened on 25–26 April 2007. At the time of the team's first meeting in 2006, the mid-Atlantic midwater trawl fishery was classified as a Category I fishery. In March 2007 it was reclassified as a Category II fishery. Because Atlantic trawl fisheries are not Category I fisheries and the stocks that interact with the fisheries are not designated as strategic, some team members argued at their first meeting that the team was not required to develop a take reduction plan or to comply with the timelines for those plans set forth in the Marine Mammal Protection Act.

At the team's 2007 meeting, the National Oceanic and Atmospheric Administration's Office of General Counsel provided legal guidance on this point raised by the team. Because the marine mammal stocks taken by trawl fisheries have not been designated as strategic stocks and none of the fisheries managed under the team is currently classified as a Category I fishery, the Office of General Counsel concluded that the timelines for developing take reduction plans in the Marine Mammal Protection Act do not apply. Given that guidance, as well as updated information on the status of the marine mammal stocks involved and their bycatch levels, the team recommended that research and fisheries outreach plans be developed as part of an overall strategy to reduce interactions between marine mammals and Atlantic trawl fisheries. The team agreed to continue deliberations on developing consensus research and outreach plans that could become part of a take reduction

Table VII-5. Abundance and incidental take information for marine mammals affected by Atlantic pelagic longline and trawl fisheries (Data from National Marine Fisheries Service stock assessment reports for 2007)

Species	Abundance	Estimated Number of Takes			Total	PBR
		Longline	Trawl	Gillnet		
Common dolphin	120,473	0	146	5	151	1,000
Pilot whales	31,139	87	76	0	163	249
Risso's dolphin	20,479	37	0	3	40	129
White-sided dolphin	68,368	0	326	31	357	509

plan should one be required, and at the end of 2007 two working groups had been convened for that purpose.

Pacific Offshore Cetacean Take Reduction Team

In 1996 the National Marine Fisheries Service established the Pacific offshore cetacean team to reduce incidental takes of pilot whales (*Globicephala macrorhynchus*), northern right whale dolphins (*Lissodelphis borealis*), and long-beaked common dolphins (*Delphinis capensis*) in drift gillnet fisheries for sharks and swordfish off California and Oregon. Based on recommendations from team meetings in 1996 and 1997, the Service adopted a take reduction plan that, among other things, imposed requirements for setting nets deeper in the water column by using 11 m (36 ft) net buoy extenders, and for attaching pingers to both the lead line and float line of each net. The team assumed that nets positioned deeper in the water column would be less likely to entangle whales and dolphins swimming at the surface.

During its meeting in 2007, the team was advised of significant progress toward meeting required bycatch reduction goals. The bycatch of all whale and dolphin species taken in this gillnet fishery was below PBR, but the bycatch of short-finned pilot whales, northern right whale dolphins, and long-beaked common dolphins remained above levels consistent with the zero mortality rate goal. The team recommended continuation of requirements for net buoy extenders and pingers, encouragement of fishermen to ensure that pinger batteries are working for every set, and continued research by the Service to determine if other pinger frequency ranges might be more effective in reducing marine mammal incidental takes. The team recommended regulations requiring a dockside enforcement strategy with regard to pinger use and by increasing at-sea enforcement. The team also noted that long-beaked common dolphins and perhaps other marine mammals also may be taken in certain drift gillnet fisheries not covered currently under the plan. Therefore, the team recommended that additional observer effort be provided to collect information on those fisheries, and that the scope of the Pacific offshore cetacean team be expanded to include other Category I and Category II gillnet fisheries off California.

The Tuna-Dolphin Issue

For reasons not fully understood, schools of large yellowfin tuna (those greater than 25 kg, or 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 became trapped in the nets and were killed or injured. Estimated dolphin mortality in the early years of the fishery was in the hundreds of thousands per year (Wade 1995), resulting in the sharp reduction of several stocks.

Efforts to reduce the incidental mortality of dolphins in this fishery have been a primary focus of the Marine Mammal Protection Act since its enactment in 1972. As a result of these efforts, direct incidental mortality now averages fewer than 2,000 dolphins per year.[1] Nevertheless, at least two dolphin stocks that had been heavily affected by the fishery—the northeastern offshore spotted dolphin (*Stenella attenuata*) and the eastern spinner dolphin (*Stenella longirostris*)—have not exhibited the population growth rates one would expect, given the reduction in observed mortality, and the stocks remain depleted (Reilly et al. 2005). More recently, efforts have focused on identifying the possible insidious effects of chasing and encircling large numbers of dolphins in the tuna fishery each year—effects that may not be reflected in the reported mortality figures but that may be impeding the recovery of depleted dolphin stocks (Reilly et al. 2005).

[1] Parties to the Agreement on the International Dolphin Conservation Program, Executive Report on the functioning of the AIDCP in 2006, available on the Inter-American Tropical Tuna Commission Web site, http://iattc.org/IDCBPDocumentsENG.htm.

The fishery, which was once dominated by U.S. vessels, has evolved into one largely carried out by foreign fleets. As such, efforts to conserve the marine mammal stocks affected by the fishery have taken on an increasingly international focus. Those efforts include the development and implementation of international agreements and the enactment of domestic legislation that ties access to the still-substantial U.S. tuna market to compliance with those agreements. In addition, U.S. legislation establishes standards as to what tuna may be labeled as being "dolphin-safe," a label that makes the product much more attractive to U.S. consumers.

The Eastern Tropical Pacific Tuna Fishery

At the height of U.S. participation in the eastern tropical Pacific tuna fishery during the mid-1970s, more than 110 large purse-seine vessels flagged in the United States engaged in the practice of setting on dolphins to catch tuna (Sakagawa 1991). By the mid-1980s that number had dropped to fewer than 50. Currently, no large U.S. purse-seine vessel appears on the vessel registry maintained by the Inter-American Tropical Tuna Commission (IATTC) as being authorized to fish for tuna in the eastern tropical Pacific Ocean, and no U.S. vessel has intentionally set on dolphins since 1994. Although some accidental marine mammal mortalities may occur when purse seine nets are deployed on schools of tuna that are not associated with large schools of dolphins, none was reported in 2007 in conjunction with U.S. fishing operations. The most recent mortalities attributed to the U.S. fleet involved five rough-toothed dolphins (*Steno bredanensis*) in 2002 (National Marine Fisheries Service staff, pers. comm.).

Concurrent with the decline in the U.S. fleet in the eastern tropical Pacific, foreign capacity in the fishery grew. In 1980, just before the precipitous decline of the U.S. fleet began, there were about 80 large purse seine vessels (those greater than 425 m^3 in well volume—roughly 400 short tons/363 metric tons or more in capacity) in the foreign fleet (Sakagawa 1991). Information provided by the IATTC (www.iattc.org/VesselRegister/VesselList.aspx?List=RegVessels &Lang=ENG) indicates that currently about 160 large purse seine vessels participate in the fishery. The largest fleets belong to Ecuador (44 vessels), Mexico (42), Panama (25), Venezuela (20), and Colombia (10). The growth in overall fleet capacity during the 1990s prompted the IATTC—the international fishery organization with responsibility for oversight of the fishery—to adopt a resolution in 2002 capping the size of the international fleet and establishing a vessel registration requirement. Under that resolution, only vessels that participated in the fishery prior to 28 June 2002 may be registered, except for new registrants to replace vessels removed from the register. However, replacement vessels cannot exceed the capacity of the vessels being replaced. Under the IATTC program, the capacity of the international fleet eligible to purse seine for tuna in the eastern tropical Pacific is limited to the capacity of vessels under the jurisdiction of tuna commission parties with a history of participating in the fishery prior to 28 June 2002. The United States further placed a voluntary limit on the aggregate active capacity of U.S. purse-seine vessels in the area to 8,969 metric tons per year, the equivalent of about 25 vessels with a capacity of 363 metric tons each. In addition, the Inter-American Tropical Tuna Commission resolution allows up to 32 U.S. vessels licensed to fish for tuna in the western Pacific Ocean to each make a single fishing trip of not more than 90 days in the eastern tropical Pacific without being counted against the fleet capacity limit.

Not only has overall fleet capacity increased in recent years, but so too has the number of sets being made on schools of dolphins (Figure VII-1). The largest number of sets on dolphins made in any year, 13,839, occurred in 2003 (IATTC staff, pers. comm.). The number of sets on dolphins made in 2002, 2004, and 2006 also were among the highest on record, surpassed only in 2003 and 1989. Fishing effort on schools of dolphins declined in 2006 to 8,923 sets and again in 2007 to 8,879 sets (IATTC staff, pers. comm.). This decline seems to be related to a reduction in the number of yellowfin tuna being recruited in the fishery and an associated drop-off in the catch of tuna associated with dolphins, particularly in offshore areas. This decline prompted the IATTC to institute a six-week closure of the fishery for each party (either 1 August–11 September or 20 November–31 December) during 2007.

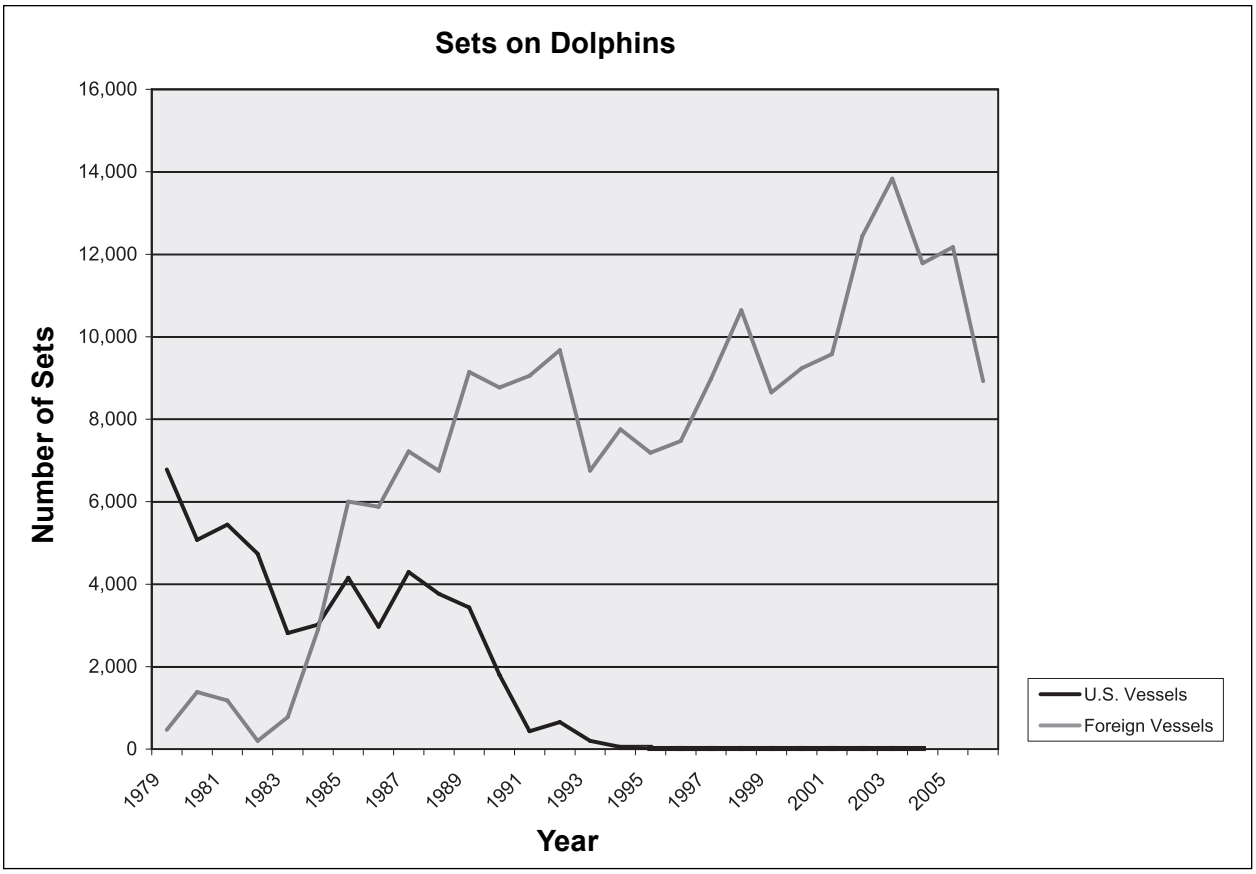

Figure VII-1. Sets on dolphins by U.S. and foreign fleets, 1979–2007.

The reduced number of sets in 2007, coupled with the low reported incidental mortality rate (about 0.1 dolphin per set), resulted in a record low number of 838 reported dolphin deaths incidental to the fishery in 2007 (IATTC staff, pers. comm.). This is the second year in a row that reported dolphin mortality has been below 900, well below the aggregate dolphin mortality limit of 5,000 per year allowed under the Agreement on the International Dolphin Conservation Program (Table VII-6). Although this level of mortality is not believed to be biologically significant to the affected dolphin stocks, stress and its related impact from the chase and capture of dolphins in the course of catching tuna may be adversely affecting the ability of depleted dolphin stocks to recover. As such, the pattern of an increasing number of sets being made on dolphins since the 1990s remains a cause for concern.

Another issue that has garnered increasing attention in recent years is the size of vessels capable of making sets on schools of dolphins and that should be covered by dolphin protection programs. Historically, the regulatory agencies and Congress believed that only vessels of greater than 400-short-tons carrying capacity could successfully make sets on dolphins. This is reflected both in domestic legislation and in international agreements. For example, the National Marine Fisheries Service, in regulations implementing the dolphin-safe labeling requirements of the Marine Mammal Protection Act, has used the 400-short-ton threshold to define what constitutes a large purse-seine vessel, which in turn determines whether documentation as to how tuna were caught is required before it can be labeled as dolphin-safe. Also, the general requirement to carry observers applies only to vessels of greater than 400-short-tons carrying capacity. However, a growing body of evidence indicates that some smaller vessels have been setting on dolphins. According to the IATTC, approximately 300 sets on dolphins have been made by vessels smaller

Table VII-6. Estimated incidental kill[1] of dolphins in the tuna purse-seine fishery in the eastern tropical Pacific Ocean, 1972–2007

Year	U.S. Vessels	Non-U.S. Vessels	Year	U.S. Vessels	Non-U.S. Vessels
1972	368,600	55,078	1990	5,083	47,448
1973	206,697	58,276	1991	1,002	26,290
1974	147,437	27,245	1992	439	15,111
1975	166,645	27,812	1993	115	3,601
1976	108,740	19,482	1994	105	4,095
1977	25,452	25,901	1995	0	3,274
1978	19,366	11,147	1996	0	2,547
1979	17,938	3,488	1997	0	3,005
1980	15,305	16,665	1998	24	1,853
1981	18,780	17,199	1999	0	1,348
1982	23,267	5,837	2000	0	1,636
1983	8,513	4,980	2001	0	2,129
1984	17,732	22,980	2002	0	1,513
1985	19,205	39,642	2003	0	1,502
1986	20,692	112,482	2004	0	1,469
1987	13,992	85,185	2005	0	1,151
1988	19,712	61,881	2006	0	886
1989	12,643	84,403	2007	0	838[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

than 400 short tons since 1987. In response to this concern, parties to the Agreement on the International Dolphin Conservation Program adopted a resolution in October 2002 specifying that any vessel of 400 short tons or less carrying capacity identified as having intentionally set its nets on dolphins will be required to carry an observer on subsequent fishing trips.

The 2004 Consolidated Appropriations Act (Public Law 108-447) funded the National Marine Fisheries Service's activities related to its tuna-dolphin program for fiscal year 2005. That legislation directed the Service to dedicate some of that funding toward "revising downward its definition of a vessel that is not capable of setting on or encircling dolphins to reflect the fact that vessels smaller than 400-short-tons are known to engage in this practice." The capability of a vessel to fish for tuna by setting on dolphins depends on more than just its carrying capacity. This is reflected in a preliminary analysis prepared by the IATTC in 2005 that examined the potential for developing a statistically based system for identifying which smaller vessels may have set on dolphins. Such a system would look not only at vessel size but also would consider information on fishing practices, gear characteristics, catch composition, location of fishing operations, and environmental variables. Although considerable work has been done to pursue this matter, the study has yet to be completed and the regulatory definition has not been changed.

The International Dolphin Conservation Program Act

In 1995 representatives of the United States and 11 other nations signed an agreement, the Declaration of Panama, setting forth their intention to formalize and make binding some of the steps

that had been taken voluntarily to reduce incidental dolphin mortality in the tuna fishery. Implementation of the declaration was contingent on the enactment of changes in U.S. law. It called on the United States to open its market to all tuna caught in compliance with the agreement, whether caught by setting on dolphins or not, and to redefine "dolphin-safe" tuna to include tuna caught in the eastern tropical Pacific by a purse-seine vessel in a set in which no dolphin mortality was observed. The formal international agreement envisioned under the Declaration of Panama, the Agreement on the International Dolphin Conservation Program, was concluded in May 1998 and entered into force in February of the following year. Before concluding the Agreement on the International Dolphin Conservation Program, the United States enacted some, but not all, of the changes identified in the Declaration of Panama. Most notably, the International Dolphin Conservation Program Act (Public Law 105-42) made changes to the definition of dolphin-safe tuna contingent on the results of research into the effects of the chase and encirclement that occurs in the course of purse-seine fishing on the affected dolphins and dolphin stocks. Only if the National Marine Fisheries Service determined that chase and encirclement were having no significant adverse effects would the definition of dolphin-safe tuna be changed to include all tuna harvested in sets in which no dolphin mortality or serious injury was observed. The Service, on 31 December 2002, issued a finding that, based on the results of its research and other relevant information, concluded that deploying purse-seine nets and encircling dolphins in the fishery are not having a significant adverse effect on any depleted dolphin stock. Further information concerning the research program and the finding can be found on the Service's Web site (http://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=228&id=1408).

Litigation

Almost immediately after release of the Service's final finding on the effects of chase and encirclement, environmental organizations filed suit in the U.S. District Court for the Northern District of California challenging the finding (*Earth Island Institute* v. *Evans*), claiming that it was not supported by the research results and other information and, therefore, that it was arbitrary and not in accordance with the applicable law. In a 9 August 2004 ruling, the court ruled in favor of the plaintiffs, finding that the Service had failed to pursue some of the mandated studies diligently and that decision-makers had been influenced by political and policy concerns rather than relying on the best available scientific evidence as required by the International Dolphin Conservation Program Act. The court directed that the term dolphin-safe continue to mean that "no tuna were caught on a trip in which such tuna were harvested using a purse seine net intentionally deployed on or to encircle dolphins, and that no dolphins were killed or seriously injured during the sets in which the tuna were caught."

The United States filed a notice of appeal of the district court's ruling on 6 October 2004, contending that the district court erred in not deferring to the agency's expertise in the methodology of how the studies had been conducted. The Ninth Circuit Court of Appeals issued its ruling in the case (now *Earth Island Institute* v. *Hogarth*) on 27 April 2007, affirming what it called the district court's "well-reasoned decision." The appellate court concluded that no deference to agency discretion in carrying out its mandate is appropriate when, as in this instance, the agency ignored its own statistical methodology and failed to connect its final finding to the best available scientific evidence. In addition, the Court of Appeals agreed with the district court that the Service's final finding had been, at least to some degree, influenced by political, rather than scientific, concerns. The court found it untenable that Congress would mandate that the agency carry out studies on which to base an important environmental determination and not expect that the studies would produce reliable results. The court ascertained that, because the Service had failed to complete the mandated chase and encirclement study and had used a necropsy sample size too small to draw population-level inferences, it still did not have an answer to the fundamental question posed by Congress 10 years ago as to whether the eastern tropical Pacific tuna fishery causes stress effects on dolphins that is preventing population recovery.

Although the court could have remanded the matter back to the agency for action to address the identified deficiencies in the final finding, it found this to be one of the unusual instances when a remand was not appropriate. The appellate court noted that the Service had shown intransigence in carrying out Congress' mandate and had failed to complete two of the three required studies in a way that could have yielded meaningful results. Because the statutory deadline for completing the studies had passed, and the existing data were insufficient to support an affirmative finding, the court saw no way that the Service could make a more definitive determination that would support a change in the tuna labeling requirements.

The appellate court ruling deviated from the district court ruling in one respect. The district court had ordered the Secretary of Commerce and the National Oceanic and Atmospheric Administration not to allow tuna products sold in the United States to be labeled as dolphin-safe if the tuna were caught on a trip during which purse-seine nets were set on dolphins. The court of appeals thought that directing the agency to take enforcement measures went beyond the scope of its review of the final finding.

Commission Review

As discussed earlier, the International Dolphin Conservation Program Act directed the National Marine Fisheries Service to establish a dedicated research program to examine whether the chase and encirclement of dolphins in the eastern tropical Pacific tuna fishery were adversely affecting the recovery of depleted dolphin stocks. Although the Service conducted surveys of dolphin abundance in the eastern tropical Pacific in 2003 and 2006 (Gerrodette et al. 2005, in press), most of the other research related to this issue was halted in 2002 when the final finding was made. Yet, many questions related to the impacts of the fishery on dolphins remain unanswered and many of the hypotheses developed in the course of conducting the mandated research have not been pursued. This prompted the Marine Mammal Commission to review the Service's tuna-dolphin research program at its 2007 annual meeting.

The staff of the Service's Southwest Fisheries Science Center presented an overview of the three prevailing hypotheses as to why eastern tropical Pacific dolphins have failed to recover since the enactment of the Marine Mammal Protection Act and in response to significant reductions in observed dolphin mortality beginning in the early 1990s. These are that (1) indirect effects from the fishery are ongoing, particularly from stress associated with chase and encirclement, separation of mothers and calves, orphaning of calves, fetal mortality, and disruption of the tuna-dolphin association and whatever benefits that association confers to both species; (2) current models of dolphin population recovery are not realistically capturing actual population dynamics, which may include delayed population responses to reduced mortality or incorrect modeling of dynamic interactions between the population and its environment; and (3) ecosystem regime shifts and long-term climatic changes are altering the carrying capacity of the habitat.

The Service's representatives noted that the agency had a continuing obligation to pursue the recovery of the depleted dolphin stocks and that additional research was needed to achieve this objective. They described the benefits that would be derived from further investigation into why standard species recovery practices had not produced the anticipated outcome in this case and, more specifically, which of the competing hypotheses best explains the lack of population recovery. The Service outlined a proposed research program designed to estimate population trends, gather physical and biological oceanographic measurements, and develop a "fishery exposure index" in an effort to correlate population composition, survivorship, and individual health of dolphins in areas of high fishery effort versus those areas with low fishery effort. Research to investigate the ecosystem links between dolphins and tuna in the eastern tropical Pacific also would be continued.

The Commission voiced general support for the proposed research effort and recommended that a workshop be convened to reexamine the Service's research needs and approach and data-gathering options. The Commission agreed to participate in such a workshop and suggested that, in addition to agency scientists, leaders in relevant scientific and technical disciplines also be invited.

Affirmative Findings and Embargoes

The regulations implementing the International Dolphin Conservation Program Act set forth procedures and criteria for identifying tuna-harvesting nations that are permitted to import yellowfin tuna and yellowfin products harvested in the eastern tropical Pacific into the United States. An affirmative finding for such countries is made for a five-year period but is subject to annual review to determine whether the exporting country is continuing to meet its obligations under the International Dolphin Conservation Program Act and responsibilities of membership in the IATTC. In 2005 the National Marine Fisheries Service issued new findings for Ecuador, Mexico, and Spain, giving them access to the U.S. market through 31 March 2010, contingent on annual renewals. The Service published renewal notices in the *Federal Register* for Spain on 16 April 2007, Ecuador on 30 May 2007, and Mexico on 23 July 2007. The only other country with an affirmative finding is El Salvador. The Service published a notice that El Salvador's affirmative finding had been renewed on 20 April 2007. El Salvador will need a new five-year finding in 2008. Embargoes remain in place for the other countries that fish for tuna in the eastern tropical Pacific Ocean—Belize, Bolivia, Colombia, Guatemala, Honduras, Nicaragua, Panama, Peru, Vanuatu, and Venezuela. Tuna embargoes also are 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 an intermediate nation. Currently, no such embargoes are in place.

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Chapter VIII

MARINE MAMMALS AND ACOUSTICS

In March 2007 the Marine Mammal Commission submitted to Congress a report titled "Marine Mammals and Noise: A Sound Approach to Research and Management."[1] The report describes many aspects of sound in the marine environment, including human sources of sound in the oceans; the uses of and responses to sound by marine mammals; research progress and challenges; regulation of taking of marine mammals by sound; avoidance, minimization, and mitigation of sound effects; monitoring and reporting of taking incidental to sound-generating activities; management challenges; and recommendations for future research and management. The report identifies three major unresolved elements of the sound issue: uncertainty regarding the risks to marine mammals and marine ecosystems, inadequate monitoring and mitigation measures, and inconsistent regulation.

The report to Congress includes the following recommendations:

- Establish a coordinated national research program on the effects of anthropogenic sound on marine mammals and the marine environment. The program would be guided by an interagency coordinating committee that would prepare a comprehensive 5- to 10-year plan and identify the funding needed to carry out that plan.
- Establish consistent standards for the regulation of sound in the marine environment.
- Ensure that all sound producers comply with statutory and regulatory requirements.
- Retain mitigation and monitoring as requirements of the authorization and compliance process and designate the evaluation of existing measures and development of new measures as high priorities for the national research program.
- Require the National Marine Fisheries Service and the Fish and Wildlife Service to develop a management system that accounts for the cumulative effects of sublethal exposure to anthropogenic sound and other human impacts on marine mammals.
- Direct the National Marine Fisheries Service and the Fish and Wildlife Service to streamline their implementation of permitting and authorization processes for research on sound effects and for activities that may take marine mammals incidentally.
- Promote U.S. leadership in international matters related to anthropogenic sound in the marine environment.

In 2007 the Consortium for Ocean Leadership (formerly the Center for Ocean Research and Education) drafted proposed legislation that, if passed by Congress, would implement the Commission's recommendations. The need for such action was again evident in 2007 as controversy continued over sound-related activities, particularly with regard to the Navy's use of mid-frequency active sonar and industry's seismic surveys associated with exploration and drilling for oil and gas. The federal government and others increased their investment in sound-related research and their assessments of environmental risk from various human activities with potential acoustic effects on marine mammals.

[1] The report is available at http://www.mmc.gov/reports/workshop/fullsound report.pdf or by contacting the Commission.

The following sections highlight sound-related research and regulatory activities in 2007.

Research

Research investment by the Navy, the National Science Foundation, the Minerals Management Service, and the National Oceanic and Atmospheric Administration all increased slightly in 2007, reflecting pressing internal agency needs to assess, understand the effects of, and manage the production of underwater sound as part of their own activities or activities that they regulate and oversee.

Between 2003 and 2007 the Navy's research program funded in excess of $100 million for research on potential acoustic effects and the means to monitor and mitigate such effects. Basic and early stage applied research is led by the Office of Naval Research and in 2007 included approximately $14 million for studies of marine mammal hearing; physiological and behavioral responses to sound; computer models of acoustic effects on marine life; and novel technologies for monitoring marine mammal behavior, movements, and habitat use. Additional funds were provided by the Navy's Environmental Readiness Division for surveys related to naval training and exercise areas, development and maintenance of related databases and models of marine mammal distribution, behavioral and physiological responses to sonar and explosives, and related topics. The Navy's research investment is expected to increase in 2008.

The Minerals Management Service's funding for research related to marine mammals and sound remains near prior levels at about $2 million annually. Following completion of a sperm whale seismic study in the Gulf of Mexico, which was aimed at evaluating the responses of these deep divers to seismic noise, research effort funded by the Minerals Management Service has shifted toward the Arctic. There the Service's research has focused on the potential effects of exploration (seismic studies) and drilling, which are increasing rapidly because of increased oil and gas prices. Such activities may have a number of effects on marine mammals, including disturbance by noise or exploration and drilling activities, exposure to contaminants, and degradation of habitat. The potential effects of an oil spill are of particular concern because of the risks to wildlife habitat and the difficulty of responding to oil spills in harsh environmental conditions, including in the presence of sea ice. The effects of these types of activities also are a concern with regard to the availability of marine mammals to coastal communities that depend on them for subsistence and cultural purposes. All of these effects may be compounded by the consequences of climate change and the expansion of human activities that is expected as the Arctic warms (e.g., increased shipping, fishing, coastal development, tourism). In 2007 the Service also was in the process of developing a research program for the North Aleutian Islands region of the southeastern Bering Sea, where oil and gas exploration and drilling are expected to start in the near future.

In 2007 the National Science Foundation expended about $2 million to study the potential effects of sound from geophysical research. Such research is used for a variety of purposes, such as studying the earth's crust and the movement of tectonic plates, the factors that lead to earthquakes. The agency recently acquired the research vessel R/V *Langseth*, operated by Lamont-Doherty Earth Observatory. The *Langseth* is the Foundation's first seismic survey vessel and is being used to study sound fields produced by the vessel and various seismic equipment during geophysical research. The Foundation also is conducting research to develop and test methods for the detection and monitoring of marine mammals as part of an effective mitigation program.

The National Oceanic and Atmospheric Administration expanded its modest program of research from $200,000 in 2006 to $450,000 in 2007, including funding for investigations of vessel noise and its effects, application of passive acoustic monitoring technologies for improving the efficacy of marine mammal surveys, deployments of archival acoustic tags to monitor marine mammal behavior, and an expert panel review of scientific data that might be used to establish acoustic risk thresholds for underwater sound. The results of the agency-convened panel were published in the journal *Aquatic Mammals* in 2007 (Southall et al. 2007).

The current state of federal research on human-generated sound is being documented in an

interagency task force report commissioned by the Interagency Committee on Ocean Science and Resource Management Integration. The report also describes research necessary to address the information needs of the various federal agencies and promotes coordination by the affected agencies. At the end of 2007 the report was under review and will be forwarded to the interagency committee for further review, approval, and publication in 2008.

In addition, federal agencies that fund research on this topic communicate regularly via an informal interagency coordinating group on acoustics that meets quarterly to discuss national science needs, ways to avoid duplication of effort, and monitoring private and non-U.S. government efforts by the oil industry, foreign navies, and others.

The oil and gas industry has established a joint industry program to investigate the potential effects of airguns used in geophysical exploration, as well as other industry activities that produce sound, and to develop technologies to reduce noise and to monitor and mitigate potential effects. The program has an annual budget of about $10 million. A review of its initial research investments is planned for October 2008. (More information can be obtained from the program's Web site, www.soundandmarinelife.org.) In addition, individual oil and gas corporations have a variety of investments in research and effects monitoring, including the monitoring of gray whales in the Sakhalin oil development area and monitoring the Northstar offshore drilling island in the Beaufort Sea. Several foreign governments (e.g., Australia, the United Kingdom, Norway, and the Netherlands) have research programs aimed primarily at assessing and mitigating effects from naval sonar and explosives use and/or assessing the effects of offshore oil and gas activities. An international review of current research on the effects of underwater sound was held in Nyborg, Denmark, in the summer of 2007. Proceedings from that meeting will be published in a special issue of the journal *Bioacoustics*, which is scheduled for publication early in 2008.

Regulatory Activities

Much of the 2007 regulatory activity involving the use of sound evolved around the Navy's use of sonar and the petroleum industry's oil and gas exploration and development activities in the Arctic.

The U.S. Navy

The U.S. Navy's activities introduce sound energy into the marine environment and have drawn considerable attention regarding the potential effects of that sound. Naval sources of underwater sound include low- and mid-frequency active sonars used for submarine detection and explosives that are used for various purposes, including shipshock testing of new vessels.

Low-Frequency Active Sonar: The Navy uses Surveillance Towed Array Sensor System Low-Frequency Active (SURTASS LFA) sonar to track submarines at relatively long distances (up to hundreds of miles). This sonar has the potential to affect marine mammals in various ways. Animals close to the sound source may be exposed to intense noise levels or otherwise disturbed. Animals at greater distances can be affected by the masking of important biological sounds. In August 2002 the Natural Resources Defense Council, the Humane Society of the United States, the League for Coastal Protection, the Ocean Futures Society, and the Cetacean Society International filed suit in the U.S. District Court for the Northern District of California against the Navy and the National Marine Fisheries Service on matters pertaining to the use and permitting of SURTASS LFA sonar. After hearing arguments, the court on 26 August 2003 enjoined the use of SURTASS LFA based on failure of the Navy and the Service to comply with the Marine Mammal Protection Act, the Endangered Species Act, and the National Environmental Policy Act. The court ordered the parties to mediate a solution that would allow continued operations with additional mitigation. The mediated resolution allowed the Navy to operate its SURTASS LFA in limited areas of the northwestern Pacific/Philippine Sea, Sea of Japan, East China Sea, and South China Sea with some year-round and seasonal restrictions. In October 2003 the court formalized the resolution as an order. In July 2005 the court amended the injunction to expand the areas of operation to allow the Navy to respond to actual security threats.

In May 2006 the Navy requested authorization for the incidental take of marine mammals under

§ 101(a)(5)(A) of the Marine Mammal Protection Act. Its existing authorization was set to expire on 16 August 2007. Fourteen months later, on 9 July 2007, the National Marine Fisheries Service published in the *Federal Register* a notice of proposed rulemaking to grant the authorization. Given the pending expiration of the Navy's existing authorization, the Service allowed only two weeks for public comment. On 11 July 2007 the Marine Mammal Commission wrote to the Service recommending that it extend the deadline for comments to give interested parties sufficient time to evaluate the rule and make informed comments. The Service did not respond to that request.

Lacking sufficient time to consult with its Commissioners and Committee of Scientific Advisors, the Commission wrote to the Service on 24 July to provide staff comments and recommendations on the proposed rule. In its letter, the Commission staff focused primarily on the efficacy of monitoring measures, given the results from previous monitoring efforts. During 471 hours of monitoring, Navy observers detected only three marine mammals, passive acoustic systems failed to detect any animals, and active acoustics detected only 71 marine mammals. These results raise questions as to the effectiveness of the Navy's monitoring methods, particularly visual observations and passive acoustics. In its letter, Commission staff argued that it is possible to evaluate those methods using similar marine mammal survey and mitigation protocols. For that reason, the staff recommended that the Service require the applicant to conduct performance studies to assess the effectiveness of monitoring measures. The Commission's comments were received too late for Service consideration, and the letter of authorization was signed 21 July 2007, effective 16 August 2007 through 15 August 2012. On 3 August 2007 the Navy issued a "finding of no significant harm for an overseas environmental assessment on Valiant Shield 07," a Navy exercise involving the use of SURTASS LFA sonar.

On 12 October 2007 the Natural Resources Defense Council and its co-plaintiffs filed a new motion in district court requesting a preliminary injunction to halt the deployment of SURTASS LFA while the court considered their claims against the Department of Commerce and the Navy regarding reauthorization of the sonar system. Again, the plaintiffs alleged that the National Marine Fisheries Service and the Navy had violated the Marine Mammal Protection Act, the National Environmental Policy Act, and the Endangered Species Act. In their motion and a follow-up brief dated 3 December 2007, the plaintiffs argued that the Service had failed to prescribe monitoring and mitigation measures to effect the least practicable impact, ensure that its monitoring requirements were adequate, ensure that impacts would be negligible, authorize lethal take, provide critical information for public review, specify the extent or amount of take in its incidental take statement, and comply with the Administrative Procedure Act in the completion of its biological opinion. The plaintiffs also argued that the Navy had failed to consider all reasonable alternatives in its supplemental environmental impact statement, had inappropriately rejected mitigation measures, and had failed to consider all reasonably foreseeable individual and cumulative impacts. The case was still pending at the end of 2007.

Mid-Frequency Active Sonar: The Navy has used mid-frequency active sonar since the 1960s. Potential effects of this type of sonar were not recognized until the 1990s and early 2000s when naval activities at a number of sites around the world resulted in the stranding and deaths of various types of marine mammals, particularly beaked whales (see the Marine Mammal Commission's 2003 Annual Report to Congress, available at http://www.mmc.gov/reports/annual/). For reasons not yet fully understood, beaked whales appear to be particularly vulnerable to mid-frequency active sonar.

Since those strandings, the Navy's compliance with environmental regulations regarding its use of sonar has been questioned and contested by the marine conservation community. To comply with the various environmental regulations, the Navy implemented its Tactical Training Theater Assessment and Planning Program beginning in 2000. In 2007 the program was focused on the preparation of environmental impact statements for 12 major naval range complexes and operating areas within the waters of the United States and its territories.

The complexes and operating areas are used for a wide range of activities that generate noise and may have impacts on marine mammals and marine

life. The activities include testing and training with mid-frequency active sonar, primarily for tracking submarines at close distances and in varied environmental conditions (e.g., depth, topography, oceanographic conditions).

Much of the controversy regarding the use of mid-frequency active sonar has played out in courtrooms on the U.S. West Coast and Hawaii. In 2005 the Natural Resources Defense Council, the International Fund for Animal Welfare, the Cetacean Society International, the League of Coastal Protection, the Ocean Futures Society, and Jean-Michel Cousteau sued the Navy over its use of mid-frequency active sonar. The plaintiffs alleged that the Navy failed to (1) prepare adequate National Environmental Policy Act analyses for specific exercises, (2) informally or formally consult with the National Marine Fisheries Service under the Endangered Species Act with regard to impacts on endangered or threatened species, and (3) seek or obtain marine mammal incidental harassment authorizations or small-take permits as required by the Marine Mammal Protection Act. On the West Coast, the controversy has since expanded to involve the California Coastal Commission, which believes that the Navy's use of mid-frequency sonar affects the coastal resources off California and because the Navy has declined to implement a suite of mitigation measures set forth by the California Coastal Commission to provide protection for those resources. The Commission's claims are described in more detail in Chapter II of this report.

The controversy also has extended to the mid-Pacific Ocean. On 3 July 2004 an estimated 150 to 200 melon-headed whales swam into Hanalei Bay, Kauai, where they milled about for a little over a day. One of the animals (a calf) died and the rest were herded back to sea. The occurrence of this pelagic species in the bay was atypical, and an investigation concluded that it was plausible, if not likely, that the event was caused by sonar use by several naval vessels during exercises commonly referred to as RIMPAC (for rim of the Pacific). These exercises have been held every other year for almost four decades and involve joint training operations by navies from countries around the Pacific and beyond.

The final report of the 2004 event was released in April 2006, just prior to the next set of RIMPAC exercises. In 2006 the Natural Resources Defense Council, the International Fund for Animal Welfare, the Cetacean Society International, the Ocean Futures Society, and Jean-Michel Cousteau sued the Navy, alleging that it had failed to follow the requirements of the Marine Mammal Protection Act and the National Environmental Policy Act. On 30 June 2006 the Deputy Secretary of the Navy exempted the Navy's 2006 RIMPAC exercises from the requirements of the Marine Mammal Protection Act. Nonetheless, the following week the U.S. District Court for the Central District of California found in favor of the plaintiffs and enjoined the Navy's RIMPAC sonar activities for failure to comply with the National Environmental Policy Act. Those activities were subsequently allowed to proceed after the Navy agreed to additional mitigation measures.

On 2 February 2007 the Navy announced its completion of an environmental assessment and finding of no significant impact for its undersea warfare exercises in the Hawaii Range Complex. These exercises are for Navy carrier strike groups and expeditionary strike groups transiting from the U.S. West Coast to the western Pacific Ocean. The exercises may involve surface ships, submarines, aircraft, non-explosive exercise weapons, and other training systems and devices, including the use of mid-frequency active sonar. The environmental assessment was to allow such exercises from January 2007 to January 2009.

On 16 May 2007 the Ocean Mammal Institute, the Animal Welfare Institute, Kahea (the Hawaiian Environmental Alliance), the Center for Biological Diversity, and the Surfrider Foundation sued the Navy and the Department of Commerce, alleging that the Navy's environmental assessment was inadequate, that the Navy failed to determine if its proposed actions were consistent with Hawaii's coastal zone management program under the Coastal Zone Management Act, and that it failed to evaluate the effect of its actions on the Hawaiian Islands Humpback Whale National Marine Sanctuary under the National Marine Sanctuaries Act. The suit also alleged that the National Marine Fisheries Service failed to use the best available information in its section 7 analysis under the Endangered Species Act. At the end of 2007 the case was still ongoing.

In July 2007 the Navy's Tactical Training Theater Assessment and Planning Program released for public comment a draft environmental impact statement on activities to be conducted in Hawaiian waters (see http://www.govsupport.us/hrc/ for additional description). The draft statement contained analyses for up to six exercises per year within the Hawaiian operating area between January 2007 and January 2009.

During the course of the aforementioned lawsuit, the Navy solicited additional public comment on its draft environmental impact statement on its Hawaii Range Complex activities. The Marine Mammal Commission commented by letter of 2 October 2007 and recommended that the Navy—

- create an alternative of reduced or no-range use and adequately document the likely consequences for national defense readiness, to be weighed against whatever reductions in environmental risk would be obtained by the no-action or reduced-action alternative;
- provide a comprehensive description of the proposed dose-response relationships and the manner in which they will be used; and
- provide a comprehensive description of the various monitoring and mitigation measures that might be used, evaluate the performance of those measures taking into account existing marine mammal monitoring and mitigation data, and instigate planning to evaluate and address the strengths and shortcomings of the proposed measures.

The first recommendation was to ensure that the full effects of the proposed actions were considered in the environmental analysis. The Navy had chosen to define the no-action alternative as the status quo. To ensure that the effects of the current activity level were adequately incorporated into the Navy's assessment, the Commission recommended that the Navy establish a true no-action alternative (i.e., one allowing no activities) to provide a proper baseline against which to measure various other alternatives. The second recommendation was aimed at the Navy's attempt to model the potential effects of its activities on marine mammals by estimating sound levels as a function of factors, such as depth and distance from the sound source and as a function of the abundance, distribution, depth, and movements of various marine mammal species. The description in the Navy's environmental analysis was incomplete, and it was not possible to determine how the dose-response approach was being used to estimate the overall potential effect. The third recommendation was directed at the long-standing problem of inadequate monitoring and mitigation measures. Such measures are implemented for the purpose of reducing potential impacts to an acceptable level. However, most measures used for this purpose are generally considered ineffective or only marginally effective, and do not provide a rigorous basis for concluding that risks have been reliably reduced. The Commission's comments were intended to encourage the Navy to use its considerable resources to carry out relatively straightforward performance testing on the standard monitoring and mitigation measures to determine how well or how poorly they achieve their stated purpose.

At the end of 2007 the final environmental impact statement for the Hawaii Range Complex and the associated record of decision were expected in mid-2008. In early 2008 the Navy is expected to release draft impact statements for the Atlantic Fleet Active Sonar Training program, the Southern California Range Complex, the Naval Surface Weapons Center Panama City Range, the Northwest Training Range, the Gulf of Alaska Training Range, and the Mariana Islands Range Complex. The National Marine Fisheries Service is a cooperating agency on all of these statements. The Commission anticipates commenting on all of these assessments.

Explosives Use and Ship-Shock Testing: Ship-shock testing and other uses of explosives also require analyses of environmental risks and, as necessary, mitigation. For example, the Navy has recently commissioned the LPD-17 San Antonio class of amphibious docking vessel. As required by law, a representative vessel of this class must be subjected to nearby detonations of explosives to assess performance under conditions similar to those that would be experienced in combat. In October 2007 the Navy released a draft environmental impact statement for the shock testing of the USS *Mesa Verde*.

The test plan and mitigation measures closely follow those that were used for the destroyer USS *Winston Churchill* in 2001 (Figure VIII-1). Three types of mitigation measures are used, including site selection, predetonation monitoring, and post-detonation monitoring. Site selection is based on operational requirements as well as results from various types of marine mammal surveys (aerial, satellite) with preference given to areas of low marine mammal density. Predetonation monitoring consists of aerial and shipboard monitoring, passive acoustic monitoring, and establishment of a 2-nmi safety range and a buffer zone from 2 to 3 nmi from the detonation point. After detonation, the area would be observed from vessel and aircraft to detect any injured or killed marine mammals, which—if any were present—would lead to a review and possible modification of procedures. In addition to these measures, the Navy maintains contact with stranding network personnel during the period following the test.

Figure VIII-1. The Navy destroyer, the USS *Winston Churchill*, was the target of underwater explosive testing during the June 2001 ship shock trials. Photography courtesy of U.S. Navy.

Minerals Management Service

Oil and Gas Activities: The Minerals Management Service, part of the Department of the Interior, is responsible for managing marine energy and other mineral resources in the U.S. Exclusive Economic Zone. The primary source of offshore energy is oil and gas. The Secretary of the Interior is required to prepare and maintain an oil and gas leasing program. The program operates on a five-year schedule of proposed lease sales and associated management actions. The Service held Beaufort Sea sale #202 in 2007 and expects to hold Chukchi Sea sale #193 in 2008. Each year, the Gulf of Mexico region holds a western and central sale (sales #204 and #205 in 2007 and sales #206 and #207 in 2008). The Service also was planning an eastern Gulf of Mexico sale #224 in early 2008. A list of planned lease sale events and related information is available on the Minerals Management Service Web site at http://www.mms.gov/ld/leasing.htm. To minimize potential effects, the Service issued a notice to lessees and operators for the Gulf of Mexico region specifying seismic survey mitigation measures and requirements for protected species observer programs (NTL 2207-G02; www.gomr.mms.gov/homepg/regulate/regs/ntls/2007NTLs/07-g02.pdf), and a similar protocol is used for the Alaska region (www.mms.gov/alaska/re/).

Despite such guidelines, the degree of monitoring for marine-based oil and gas sites varies markedly. Monitoring of Gulf of Mexico sites appears to be far less rigorous than monitoring of sites in the Arctic. For example, British Petroleum's Northstar project in the Beaufort Sea has been producing oil since 2001 and is the subject of an intensive monitoring program (http://www.mms.gov/alaska/ess/ongoing_studies/Multi_031401.pdf) because of its offshore location and potential impacts on bowhead whale and ringed seal populations important to local subsistence hunters. No significant displacement or disturbance of animals has been observed to date at this site although bowhead whales have exhibited some avoidance behaviors (Miller et al. 2005, Moulton et al. 2005).

The Marine Mammal Commission comments regularly on oil and gas operations and has consistently raised concerns regarding the potential cumulative effects of oil and gas projects and other risk factors (e.g., climate change). Oil and gas operations pose risks related to noise (e.g., seismic surveys, drilling operations), contaminants (oil leaks

and spills), habitat alteration, and disturbance or ship strikes from associated vessel traffic. Marine mammals that use and depend on habitat in the vicinity of oil and gas operations (including transport by vessel or pipeline) may therefore be exposed to multiple risk factors. Determining when such effects occur and may be biologically significant is a considerable challenge, in part because even subtle effects may be significant and identifying those effects generally requires extensive monitoring and data collection. The challenge is further complicated by the task of attributing observed effects to a particular cause or set of causes, which again may require extensive data. Establishing effective monitoring programs for this purpose will require more resources and effort but is necessary if scientists are to assess both the status of the marine mammal populations and the factors that place them at risk.

Other Marine Sources of Energy: In 2005 the Energy Policy Act expanded the Minerals Management Service's authority to manage energy production from sources other than oil and gas (e.g., wind, wave, current, and tidal energy). A number of coastal wind farm projects have been proposed or are being planned, with the first expected in the Cape Cod–Nantucket Sound area (Figure VIII-2). The technology for such wind farms is well developed and widely used in coastal areas of the United Kingdom, the Netherlands, Denmark, Norway, and Sweden. Both construction and operational phases of such projects have the potential to create noise and other hazards for marine mammals. Some species, such as harbor porpoises, have shown long-term avoidance of wind farm sites in the North Sea and the Baltic Sea where wind farm development has been extensive (Madsen et al. 2006).

The marine environment also is used to transport large volumes of oil and gas in different forms. On all coasts, a number of offshore terminals are in various stages of development and licensing because of increasing demand for natural gas in the United States and concerns about bringing oil and gas into ports on board large vessels. These terminals will enable the unloading of vessels carrying liquified natural gas (LNG, or in one case liquified petroleum gas, LPG) via regasification on site and conveyance to shore by pipeline rather than bringing LNG vessels close to heavily populated areas with extensive vessel traffic. Compliance with the National Environmental Policy Act for these facilities is handled by the Maritime Administration (MARAD) of the Department of Transportation (see http://www.marad.dot.gov/DWP/LNG/) and the Coast Guard, with coordination and review by the Minerals Management Service and the National Marine Fisheries Service's Office of Protected Resources. The main acoustic issues are noise from pile driving during the construction of terminal facilities and ongoing noise associated with terminal and vessel operations. The Marine Mammal Commission commented formally on the incidental harassment authorization issued to the Northeast Gateway Deepwater Port (Massachusetts) in April 2007 and is reviewing additional environmental analyses as they are made available for public review. In July 2007 the Commission also provided informal comments on the draft environmental impact statement for the Bienville (Louisiana) deepwater port. The Commission suggested possible options for reducing pile-driving noise and requested additional measurements of operating noise to confirm estimated levels reported in the

Figure VIII-2. Wind farms, increasingly common on land, are poised to move offshore.

draft statement. Of 17 applications received to date, MARAD has licensed 6, 1 authorization is pending, 6 authorization applications are in review, and 4 applications have been withdrawn or closed.

National Science Foundation

The National Science Foundation conducts a wide range of marine studies, including geophysical research of the ocean bottom. It uses seismic airguns for much of this geophysical research, which may expose marine mammals and marine life to various risks. The Foundation did not conduct environmental analyses until recently, when it was forced to cancel two geophysical projects because the required analyses had not been completed. The Foundation is now preparing a programmatic evaluation under the National Environmental Policy Act for all of its marine geophysical research efforts involving underwater sound. The evaluation is expected to be available for public review early in 2008.

As noted earlier, the National Science Foundation began operating a new geophysical research vessel, the R/V *Langseth*, in 2007. Preparations for vessel operation included an environmental assessment of risk from the vessel's operation, along with an extensive plan of monitoring during its operations. The plan also includes several research projects to better characterize the acoustic emissions of the ship and to advance methods for monitoring and avoiding marine mammals. Vessel operations were scheduled to begin in January 2008 in the Gulf of Mexico.

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Chapter IX

INTERNATIONAL ASPECTS OF MARINE MAMMAL CONSERVATION AND MANAGEMENT

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 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.

During 2007 the Commission was involved in a number of international efforts to protect and conserve marine mammals. Several of these efforts, including research in support of conservation of the franciscana dolphin and Lake Ladoga ringed seals, are discussed in Chapter V of this report. During 2007 the Commission continued to advise the U.S. delegation to the International Whaling Commission and supported efforts to implement the U.S.-Russia Polar Bear Agreement. This chapter also discusses several marine mammal species in other areas of the world that face major conservation challenges.

International Whaling Commission

The International Whaling Commission (IWC) was established under the International Convention for the Regulation of Whaling of 1946 (ICRW). The purpose of the IWC is to oversee the conservation of the world's whale stocks by conducting a continuing review of the status of those stocks and modifying conservation measures as appropriate. Croatia, Cyprus, Ecuador, Greece, Guinea-Bissau, Laos, and Uruguay joined the IWC in 2007, bringing the total number of member nations to 78. The 2007 meeting of the IWC was held in Anchorage, Alaska, from 28 to 31 May.

Revised Management Scheme

In 1982 the IWC established a moratorium on commercial whaling that was to take effect during the 1985–1986 whaling season. The purpose of the moratorium was to promote the recovery of a number of whale stocks that had been depleted by whaling. The amendment that established the moratorium indicated that the provision would be kept under review and specified that, by 1990 at the latest, the IWC would undertake a comprehensive assessment of the effects of the moratorium on whale stocks and consider the establishment of new catch limits. Since the mid-1990s the IWC has been attempting to develop a Revised Management Scheme (RMS) to guide the overall conservation of whales and the management of commercial whale harvests. The RMS would set forth the mechanisms by which harvest limits would be established and identify other practices needed to ensure that those limits are not exceeded.

The IWC's Working Group on the Revised Management Scheme met in conjunction with the 2006 IWC meeting to try to resolve several outstanding issues. The working group concluded, however, that discussions on the RMS were at an impasse, and it did not recommend further work on the matter during 2007.

Major actions within the IWC (e.g., lifting the moratorium on commercial whaling, setting harvest limits, and establishing whale sanctuaries) generally require the approval of a three-quarters majority for adoption. Faced with a nearly equal split between "pro-whaling" and "anti-whaling" factions, the IWC has become highly polarized and unable to resolve many of the issues raised by the party nations. To begin to address this problem, the IWC at its 2007 meeting had a general discussion about the future of the organization. Among other things, the IWC reviewed the results of three international meetings that had recently been convened on the topic.

In December 2006 representatives of nine Latin American countries met in Buenos Aires to consider alternative approaches that could be pursued to "modernize" the IWC. Participants at that meeting identified several key elements for any future debate, including the promotion of non-lethal use of whale resources, the establishment of new whale sanctuaries, and the suspension of scientific whaling pending a negotiated solution as to whether, and under what conditions, whales should be hunted. In February 2007 Japan hosted a conference in Tokyo for the "normalization" of the IWC. The aim of that conference was to identify actions needed to restore the IWC as an "effective resource management organization" overseeing the sustainable use of whales. In April 2007 the Pew Foundation sponsored a meeting in New York City to review the status of whale stocks, developments in ocean law since the ICRW was concluded in 1946, the history of whaling diplomacy, and possible ways forward.

After considerable discussion of the issue at the 2007 meeting, IWC members agreed in general that the whaling commission needed to move forward to resolve the impasse and that, in doing so, the parties should take into account the results of the three international meetings. The parties agreed to hold a meeting, open to all parties and observers, prior to the 2008 IWC meeting to pursue this matter. A steering group met in Washington, DC, in October 2007 to develop a draft agenda for that meeting, and it recommended that that meeting focus on the process of conducting negotiations within the IWC rather than actual negotiation of the underlying substantive issues. The meeting on the future of the IWC is scheduled for March 2008 in London. It is anticipated that the discussion will continue at the IWC's 2008 meeting in Santiago, Chile.

Aboriginal Subsistence Whaling

The moratorium on commercial whaling does not apply to aboriginal subsistence whaling, which is managed under separate provisions of the ICRW. The IWC authorized subsistence whaling from the following stocks in 2002: (1) the Bering–Chukchi–Beaufort Seas stock of bowhead whales, (2) the eastern North Pacific stock of gray whales, (3) minke and fin whale stocks off West Greenland, and (4) North Atlantic humpback whales off St. Vincent and the Grenadines. The five-year hunting limits for these stocks were up for reconsideration at the 2007 IWC meeting.

Setting new hunting limits for aboriginal subsistence whaling, particularly for bowhead whales, was an issue of key importance to the United States at the 2007 meeting. Members of the Alaska Eskimo Whaling Commission are the primary hunters of bowhead whales, with a limited number of the available strikes reserved for Native hunters in Russia. Bowhead whales are an important food source for inhabitants of remote areas of Alaska, and hunting whales is central to the cultural traditions of Native villages. At the 2002 IWC meeting, Japan and other pro-whaling nations initially had blocked adoption of the bowhead hunting authorization, and it was only at a subsequent special meeting that a hunting allocation for this species was approved. Although Japan had indicated that it would not oppose a new authorization at the 2007 IWC meeting, the United States was concerned that other pro-whaling nations might seek to block adoption of a bowhead whale quota as a bargaining chip to gain concessions on other issues.

Consideration of the gray whale subsistence harvest presented a similar issue. Although most subsistence hunting of gray whales occurs in Russia, a small number of the allowable strikes has been apportioned to hunters from the Makah Tribe, which resides on the Olympic Peninsula in Washington. The need for a new strike limit to cover whaling by the Makah, however, was not as pressing because, under a 2004 ruling by

the Ninth Circuit Court of Appeals, the tribe is precluded from whaling unless and until it obtains authorization to hunt whales through a waiver of the taking moratorium under the Marine Mammal Protection Act. Further information concerning the tribe's efforts to obtain such a waiver is provided in Chapter II.

The catch limits for bowhead whales, eastern North Pacific gray whales, and humpback whales taken by St. Vincent and the Grenadines were all renewed for an additional five years by consensus. For the period 2008–2012 subsistence hunters may land up to 280 bowhead whales, with no more than 67 whales to be struck in any year, except that up to 15 unused strikes from a previous year may be carried over into the subsequent year. The IWC authorized a total catch of 620 gray whales for the same five-year period, with a maximum of 140 to be taken in any year. The five-year catch limit for humpback whales taken by St. Vincent and the Grenadines remained at 20.

Review of the aboriginal subsistence request put forth by Denmark on behalf of Greenland proved to be more controversial. Unlike the other subsistence proposals, Greenland was seeking both to increase the number of whales that could be taken and to expand the species covered by the authorization. It sought an increase in the allowable catch of West Greenland minke whales from 175 to 200 per year and sought a new authorization to take 10 humpback whales and 2 bowhead whales per year. The request also included the renewal of previous authorizations for the annual take of 19 fin whales and 12 minke whales in East Greenland. Several countries, including the United States, thought that the science underlying the proposal, particularly with respect to the requests concerning humpback and bowhead whales, needed to be strengthened before they could support its adoption. The United States recommended that consideration of requested takes of these two species be deferred until the IWC's Scientific Committee could provide further advice.

Based on the initial reaction from several nations, Greenland revised its proposal. It dropped the request for a humpback whale quota, added a requirement that the catch limit for minke whales off West Greenland be subject to annual review by the Scientific Committee, and proposed that the taking of bowhead whales would be allowed in a given year only if the IWC received advice from its Scientific Committee that the take would be unlikely to endanger the stock. The United States and several other countries that initially had expressed reluctance indicated that they could support the revised proposal. When put to a vote, the proposal passed by the required three-quarters majority, with 41 voting in favor, 11 opposed, and 16 abstaining.

Continuing Commercial Whaling

Despite the moratorium on commercial whaling, two countries still engage in the practice: Norway, which lodged an objection to the moratorium when it was adopted, and Iceland, which left the IWC in 1992 but was allowed to rejoin in 2002 with a reservation to the moratorium. Under its reservation, Norway has indicated that it intends to take up to 1,052 minke whales in 2008. Iceland has established a whaling quota of 40 minke whales for 2008.

Scientific Whaling

In addition, the ICRW allows scientific whaling to be conducted outside the management sphere of the IWC. Scientific whaling is whaling that is undertaken for the purpose of collecting scientific information. Japan is the only country currently engaged in such whaling, with ongoing research programs in Antarctic waters and in the North Pacific. Iceland began a scientific whaling program in 2003, but that program was scheduled to be completed in 2007. The special permit issued by Japan for scientific whaling in Antarctic waters during the 2007–2008 season authorizes the lethal take of 935 Antarctic minke whales, 50 fin whales, and 50 humpback whales. Japan's special permit for scientific whaling in the North Pacific during 2008 authorizes the lethal take of 100 sei whales, 100 common minke whales, 50 Bryde's whales, and 5 sperm whales.

The issue of scientific whaling remains controversial within the IWC. Several nations, including the United States, believe that much of the research now being done could be accomplished using non-lethal alternatives. Over the years this

has prompted the IWC to adopt several resolutions calling on members to refrain from scientific whaling in the Southern Ocean Sanctuary and to permit scientific research involving the killing of whales only when it addresses critically important research needs. Noting that Japan had more than doubled its authorized take of minke whales and added fin whales and humpback whales to its list of targeted species, the IWC, at its 2007 meeting, passed a resolution calling on Japan to suspend indefinitely the lethal aspects of its research program in the Southern Ocean Sanctuary. Reflecting the schism within the IWC, 40 countries voted in favor of the resolution, 2 countries opposed it, and 1 country abstained. However, 27 countries declined to participate in the vote because they believed that such a proposal was not conducive to building better working relationships within the IWC.

Japan's decision to take humpback whales, some of which may belong to depleted breeding populations, was particularly troubling to the United States and certain other countries. Following the 2007 IWC meeting, the chairman of the IWC pursued negotiations with Japan, asking it to reconsider this aspect of its scientific whaling program. In response, Japan announced in December 2007 that it would postpone the hunting of humpback whales, at least until after the 2008 meeting of the IWC.

Safety at Sea

Scientific whaling remains controversial not only within the IWC but on the hunting grounds as well. Confrontations between whalers and protesters have intensified in recent years. This prompted the IWC at its 2006 meeting to pass a resolution stating that it did not condone any such actions that posed a risk to human life and property and urged those involved to refrain from such acts. Further incidents occurred during the 2006–2007 whaling season, in which two Japanese crew members were injured and vessels were damaged. Those incidents prompted the IWC to revisit the issue of safety at sea at its 2007 meeting. The IWC adopted by consensus a resolution condemning such actions and urging member nations to take appropriate measures under international and national laws to prevent and suppress them.

Coastal Whaling

In addition to its scientific whaling, Japan has continued to press the IWC to authorize small-type coastal whaling. Although Japan views such whaling to be similar to aboriginal subsistence whaling, several other countries, including the United States, consider small-type whaling in Japan to be essentially commercial whaling. As it has for the past two decades, Japan sought approval for small-type coastal whaling at the 2007 IWC meeting. The proposed schedule amendment sought authorization for an unspecified catch of common minke whales from the Okhotsk Sea–West Pacific stock. Japan noted that it had not included a specific number in its proposal because it was willing to negotiate a number that would be acceptable to the IWC. Further, Japan indicated that it was willing to reduce its scientific whaling program quota by the number of minke whales being taken from this stock, such that the total take would remain unchanged. Following discussion of the proposal, it was clear that sufficient support for adoption was lacking, and no vote was taken.

Whale Sanctuaries

The IWC currently has in place two whale sanctuaries, areas in which commercial whaling is prohibited. The Indian Ocean Sanctuary, established in 1979, covers the entirety of the Indian Ocean, extending southward to 55° S latitude. The Southern Ocean Sanctuary, established in 1994, covers waters surrounding Antarctica north to 40° S latitude, except where it abuts the Indian Ocean Sanctuary, and in the area around and west of the tip of South America, where it extends only to 60° S latitude. In 1998 Brazil and Argentina began to push for the creation of a South Atlantic Sanctuary, a matter that has been considered at the past six IWC meetings. At the 2007 IWC meeting Brazil and Argentina, joined by South Africa, again proposed a schedule amendment to create a sanctuary in the South Atlantic. The sanctuary would include the portion of the Atlantic Ocean stretching from the equator to the boundary of the Southern Ocean Sanctuary. When put to a vote, the sanctuary proposal failed to achieve the required three-quarters majority, with 39 members in favor, 29 opposed, and 3 abstentions.

CITES and Trade in Whale Products

Trade in whale products is controlled not only by the ICRW but also under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Except for the West Greenland population of minke whales, which is listed on CITES Appendix II, all of the large whales are listed on Appendix I. Exports and imports of Appendix I species and products derived from those species cannot be authorized if the action is primarily for a commercial purpose. As such, countries opposed to the commercial whaling moratorium continue to seek to downlist whale species on the CITES appendices to open up trade opportunities. Recognizing the interplay between the two international organizations, the IWC passed a resolution at the 2007 meeting indicating that any weakening of the restrictions on trade in whale products applicable under CITES could have significant adverse effects on the moratorium on commercial whaling and could increase the risks to whale stocks. The IWC therefore requested that CITES not seek to transfer cetacean species from Appendix I at its 2007 meeting.

The 2007 CITES Conference of Parties was held in The Hague, Netherlands, almost immediately after the close of the IWC meeting. A Japanese proposal calling for a review of the listing status of all great whale species failed to garner the necessary support. Instead, the CITES parties adopted a counterproposal from Australia that no such review should take place as long as the IWC's commercial whaling moratorium remained in place.

Status of Whale Stocks

The IWC and its Scientific Committee routinely review the status of whale stocks. At the 2007 meeting new information was received on Antarctic minke whales, North Pacific minke whales, Southern Hemisphere humpback whales, Southern Hemisphere blue whales, and a number of small stocks of bowhead, right, and gray whales. The Scientific Committee concluded that, although there is some evidence of increased abundance for several stocks of humpback, blue, and right whales in the Southern Hemisphere, these stocks remain at reduced numbers compared to their pre-whaling status. Special attention was paid to the status of the western North Pacific stock of gray whales, which numbers about 120 animals. The Scientific Committee noted that the survival of this population remains in doubt due to threats from oil and gas operations off Sakhalin Island in Russia and entanglement in fishing gear in Japanese waters. (See later in this chapter for additional discussion of this stock.) The IWC also noted that the North Atlantic stock of right whales, which numbers betwen 300 and 400 animals, continues to face threats from ship strikes and entanglement in fishing gear. It stressed that anthropogenic mortality needed to be reduced to zero as soon as possible. (See Chapter III for further discussion of issues concerning this stock.)

Small Cetaceans

Although parties to the IWC have differing views as to the organization's legal competence to manage small cetaceans, many countries continue to cooperate to address issues involving these species, particularly within the IWC's Scientific Committee. The Committee was saddened that the baiji (see later in this chapter) is probably extinct, the result of habitat degradation and incidental take, and is concerned that the vaquita (also discussed in this chapter) might meet a similar fate. In response, the IWC adopted a resolution by consensus commending Mexico on recent actions directed at reducing bycatch of vaquitas and urging other countries to provide financial and technical resources to support Mexico's efforts.

The 60th meeting of the IWC and its committees will be held in Santiago, Chile, from 23 to 27 June 2008. Madeira, Portugal, has been selected to host the IWC's 2009 meeting.

International Conservation of Polar Bears

Alaska is home to two stocks of polar bears: the western or Chukchi/Bering Seas stock, shared with Russia, and the southern Beaufort Sea stock, shared with Canada (Figure IX-1). Several other stocks occur throughout the Arctic in Canada, Greenland, Norway, and Russia. Polar bears can traverse great distances, often crossing national

boundaries and moving into international waters. Hence, efforts to conserve polar bears often require international cooperation. For that reason, and because an increasing number of polar bears were being taken by hunters 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 and entered into force in 1976. Among other things, the agreement limits the purposes for which polar bears may be taken, prohibits certain methods of taking, and requires the parties to protect habitats that are important to polar bears, such as denning and feeding sites and migratory corridors. It also requires signatory countries to maintain national research programs. Implementation of the agreement by the United States relies on domestic legislation, primarily the Marine Mammal Protection Act.

As discussed here, in the early 1990s the United States negotiated a bilateral agreement with Russia specific to conserving the population of polar bears shared by the two countries. This agreement was intended to address a concern voiced by the Marine Mammal Commission and others that the provisions of the Marine Mammal Protection Act might not fully implement the provisions of the Agreement on the Conservation of Polar Bears. It also reflected concern that the breakup of the Soviet Union might lead to renewed hunting of polar bears in Russia, which, when combined with subsistence hunting in Alaska, could exceed sustainable levels.

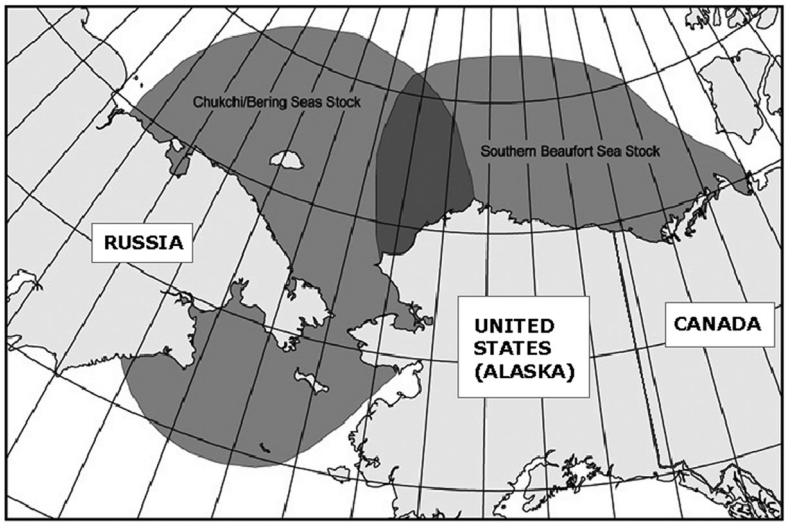

Figure IX-1. The United States shares two distinct polar bear populations, one with Canada and the other with Russia.

Meeting of Polar Bear Range States

The Agreement on the Conservation of Polar Bears calls on the member nations to consult with one another to further the conservation of polar bears and to exchange information concerning their research and management programs, particularly with respect to shared populations. However, those nations have never established a formal mechanism for conducting consultations and meetings rarely occur. Rather, they have largely relied on the Polar Bear Specialist Group, which was established under the auspices of the International Union for the Conservation of Nature and is composed of polar bear experts from the five polar bear range states, as the primary conduit for the exchange of information. The Specialist Group meets periodically, usually at three- or four-year intervals, to review matters pertaining to research and management of polar bears and to provide scientific advice and technical support that can be used by the contracting governments to implement the agreement.

In light of new threats faced by polar bears, in particular threats associated with climate change, and a proposal by the Fish and Wildlife Service to list polar bears as threatened under the Endangered Species Act (see Chapter III), the United States called for a meeting of the parties to the agreement to provide an international forum for exchanging information on polar bear research and management programs, reviewing the status of polar bear populations, and considering additional measures that the parties could take to strengthen polar bear conservation programs. The United States hosted such a meeting of the polar bear range states on 26–28 June 2007 at Shepherdstown, West Virginia. This is the first time that the parties to the 1973 polar bear

agreement had met since 1981. A member of the Marine Mammal Commission's staff participated as a member of the U.S. delegation to the meeting.

Each range state presented a country report on its polar bear research and management programs. These reports, among other things, described the laws under which the party implements the polar bear agreement, provided an overview of the status of polar bear populations within the country's jurisdiction, and identified research priorities. Copies of the range state presentations and summaries of the meeting's six plenary sessions can be found on the Fish and Wildlife Service's Web site at http://www.fws.gov/international/animals/polarbears/.

The range states agreed that climate change and the associated loss of sea ice presented a significant threat to polar bears. They also identified impacts from oil and gas activities and shipping and large-vessel traffic as emerging issues that needed to be tracked closely. Noting that the Arctic Council planned to conduct assessments of these activities on polar ecosystems, the participants thought it best to defer further consideration of these issues until those assessments have been completed. Representatives of the range states noted an increase in the incidence of polar bear–human interactions, both in the vicinity of oil and gas operations and near Native communities, and agreed to exchange information on best practices to minimize such conflicts. Meeting participants also expressed concern about the potential effects of increasing tourism on polar bears and believed that member countries should identify best practices and perhaps establish a code of conduct.

The range states identified the need to obtain sufficient data on the status and trends of polar bear populations as the most urgent research and monitoring priority. The meeting participants thought that this could best be accomplished by working with the Polar Bear Specialist Group to define minimum information needs and develop standards for the ongoing monitoring and reporting of the status of polar bear populations and their habitat. The range states recognized the value of both conventional scientific methods and systematically collected traditional ecological knowledge in meeting these needs.

Meeting participants also reviewed the mechanisms under which imports and exports of polar bears and their parts are authorized. They believed that the system in place under the Convention on International Trade in Endangered Species (CITES) was working well and encouraged those responsible for implementing national programs to continue to work cooperatively.

Canada currently is the only party to the 1973 polar bear agreement that allows sport hunting as part of its subsistence harvest. Greenland indicated that it was considering allowing sport hunting as part of its polar bear management program. The United States, Russia, and Norway advised the other parties that they did not anticipate allowing sport hunting in the foreseeable future. Despite these differences in their programs, the range states agreed that, where available, properly managed sport hunting programs do not pose a threat to polar bear populations and may provide an incentive for polar bear conservation by providing economic benefits to local communities.

Article II of the polar bear agreement directs each member nation to take appropriate action to protect the ecosystems of which polar bears are a part. At the meeting the member nations reinforced the importance of this directive, acknowledging efforts that had already been taken in this regard, and calling for continued bilateral cooperation concerning shared populations and promotion of land-use planning to conserve important polar bear habitat.

The member nations also thought that a process should be developed to assess the effectiveness of the polar bear agreement in achieving its core objectives. They agreed that the Shepherdstown meeting had been a first step in doing so, but that more frequent meetings were needed to assess and oversee implementation of the agreement. They resolved to meet on a biennial basis, with the next meeting tentatively scheduled for 2009.

United States–Russia Polar Bear Agreement

In the early 1990s the Fish and Wildlife Service began discussions with its Russian counterparts to develop a unified management approach for the polar bear population shared by the two countries. These discussions culminated in the two countries

signing a protocol in 1992 expressing their intent to pursue a joint management agreement for the Chukchi/Bering Seas stock of polar bears. An amendment to the Marine Mammal Protection Act in 1994 provided further impetus for a bilateral polar bear treaty. Section 113(d) of the Act, added in 1994, 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 Russian officials on the development and implementation of enhanced cooperative research and management programs for the shared polar bear stock.

In October 2000 efforts to pursue greater cooperation between the United States and Russia with respect to the Chukchi/Bering Seas polar bear stock culminated with the signing of 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. The agreement specifies that subsistence taking by Native residents of Alaska and Chukotka is to be the only allowable consumptive use of the affected stock of polar bears. Under the agreement, a joint commission composed of four members—a governmental official and a representative of the Native people from each jurisdiction—is to establish annual taking limits that may not exceed the sustainable harvest level determined for the stock. The allowable take 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. Once in place, 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. Additional information concerning the Chukchi/Bering Seas polar bear population and the treaty can be found at the Web site maintained by the Fish and Wildlife Service's Alaska Region (http://alaska.fws.gov/fisheries/mmm/polarbear/pbmain.htm).

Both parties must ratify the agreement before it can take effect. Russia did so in 2005. In the United States, ratification requires that the Senate provide its advice and consent. On 31 July 2003, the Senate unanimously passed a resolution providing its advice and consent, subject to one condition. That condition required the Secretary of State to provide prompt notification to the Senate Committee on Environment and Public Works and the Committee on Foreign Relations if, pursuant to Article 3 of the agreement, the parties modified the boundaries of the area covered by the agreement.

In addition, the United States recognized the need for legislation to implement certain provisions of the agreement domestically. To that end, Senator Ted Stevens, on behalf of himself and Senator Daniel Inouye, introduced S. 2013, the United States–Russia Polar Bear Conservation and Management Act of 2005. As discussed in the Commission's previous annual report, a slightly modified version of that bill was passed by both the Senate and the House of Representatives in the waning days of the 2006 session of Congress as part of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006. The President signed that bill into law on 12 January 2007 as Public Law 109-479. Section 902 of that law added a new Title V to the Marine Mammal Protection Act to implement the provisions of the bilateral agreement and to authorize appropriations to carry out functions related to the agreement through fiscal year 2010. Among other things the new title—

- sets forth the procedures by which U.S. commissioners are selected,
- establishes prohibitions on taking polar bears in violation of the U.S.–Russia agreement or any annual limit or other restriction on the taking of polar bears adopted by the parties to that agreement,

- relies on the existing authorities under Title I of the Act for enforcement,
- directs the Secretary of the Interior to promulgate regulations to implement the provisions of the Act and the agreement,
- authorizes the Secretary to share authority for managing the taking of polar bears with the Alaska Nanuuq Commission, and
- allows the United States to vote on issues before the United States–Russia Polar Bear Commission (to be established under the agreement) only if the two U.S. Commissioners agree on the vote.

At the end of 2007 the ratification process had yet to be completed, pending appointment of the two U.S. Commissioners and their alternates. Appointment of the Commissioners and formal ratification of the agreement are expected during 2008.

Species in Foreign and International Waters

The Marine Mammal Protection Act directs the Commission to "recommend to the Secretary of State appropriate policies regarding existing international arrangements for the protection and conservation of marine mammals, and suggest appropriate arrangements for the protection and conservation of marine mammals." Many marine mammal species and populations elsewhere in the world face major conservation challenges. Some species are in danger of extinction in the immediate future, and others are being extirpated in parts of their range. This report highlights some of the non–U.S. species and populations at greatest risk and identifies issues that must be addressed to conserve them. No attempt has been made to treat the subject comprehensively. The species and populations described here are only a sample of those for which significant new information became available to the Commission during 2007. More detail is provided on species and issues in which the Commission was actively engaged (e.g., funding or development of conservation measures) in 2007, particularly the vaquita and western population of North Pacific gray whales.

Yangtze River Dolphin (Baiji)

The Yangtze River dolphin or baiji (*Lipotes vexillifer*) is the last representative of an entire family of mammals (Lipotidae) and is nearly, if not completely, extinct. Between 6 November and 13 December 2006 an international group of scientists conducted a comprehensive visual and acoustic survey throughout the known range of the baiji in the Yangtze River between Yichang and Shanghai. They failed to sight or acoustically detect any baiji. Less intensive annual surveys during 1997–1999 resulted in counts of 4 to 17 animals. The lack of sightings during the 2006 survey may mean that the last few baiji have disappeared and that the species is extinct (Turvey et al. 2007). An unconfirmed sighting in August 2007 gave some hope that a few baiji might still exist. If any do remain, they are very few in number, and the species is on the verge of extinction.

The factors leading to the baiji's decline are all human-related and include the degradation and loss of habitat due to waterway management (e.g., dam and embankment construction to divert water for agriculture, to generate hydroelectric power, and to control floods); fisheries interactions (e.g., illegal electrical fishing, entanglement and hooking, competition for prey); vessel strikes; and contaminants. Limited efforts to establish a breeding population of baiji in a seminatural reserve have failed, and despite more than two decades of scientific discussions and expressions of concern, few tangible conservation measures have been implemented.

Although it appears to be too late to save the baiji, conservation efforts are still needed to protect other organisms, including some large aquatic vertebrates, in the Yangtze River that face the same or similar threats. These include the endangered Yangtze finless porpoises and the critically endangered Yangtze sturgeon, the Chinese paddlefish (the world's largest riverine fish), and the Chinese alligator. Awareness of the baiji's extinction should lead to heightened concern about other endangered species in China and around the world, but whether it will result in more precautionary and effective conservation efforts remains to be seen. The factors that drove the baiji toward extinction are typical of the threats

facing aquatic and marine wildlife in many nations. The political, economic, and logistical challenges to effective conservation on the Yangtze River are common to many countries and ecosystems. In 2007 the Commission provided support for a project to evaluate the factors that led to the apparent demise of the baiji and to investigate why, in this instance, conservation efforts failed (see Chapter V).

Ganges River Dolphin

Ganges River dolphins (*Platanista gangetica gangetica*) inhabit the Ganges–Brahmaputra–Meghna and Karnaphuli–Sangu River systems of India and Bangladesh. Surveys conducted in portions of their range suggest a total population of at least 1,200 and perhaps as many as 1,800 animals, but no rangewide population estimate is available. These river dolphins have been nearly extirpated in Nepal, and they have been depleted in other badly degraded parts of their historical range. The International Union for Conservation of Nature (IUCN) considers the species *P. gangetica* and both currently recognized subspecies, *P. g. gangetica* and *P. g. minor*, to be endangered. Threats to Ganges River dolphins include fisheries interactions (e.g., entanglement in fishing gear, possibly competition for prey); habitat fragmentation, degradation, and loss caused by development; pollution (e.g., agricultural runoff, human sewage); and direct killing in a few areas for various purposes (e.g., to obtain bait for fisheries or oil for medicinal purposes).

Waterway management (barrages, damming, and diversion for agriculture and other purposes) fragments populations, degrades downstream habitat, and reduces flow in the natural river channels. The threats associated with waterway management will increase if India proceeds with the Rivers Interlink Water Transfer Project, designed to link the major rivers of India to control water distribution and flow. The Commission supported an investigation into the potential effects of this project on Ganges River and Irrawaddy dolphins in the Sundarbans Delta (Smith et al. 2006b). The final report, submitted in 2006, indicated that both species are dependent on estuarine features associated with freshwater flow, including low salinity and the presence of confluences (i.e., river branches and stream inflows), and both species are especially vulnerable to habitat loss from upstream damming or diversion of water and saltwater intrusion from rising sea levels.

In July 2006 the Departments of Forests and Fisheries in Bangladesh and the Wildlife Conservation Society launched the Bangladesh Cetacean Diversity Project. The project was initiated to protect the diverse and abundant cetacean fauna in a belt of estuarine, coastal, and pelagic waters about 120 km wide and extending across the world's largest contiguous mangrove forest in the Sundarbans and offshore to the Swatch-of-No-Ground (SoNG) undersea canyon. This belt supports globally significant populations of several species at risk, including Ganges River dolphins, Irrawaddy dolphins, and finless porpoises, as well as large groups of Indo-Pacific humpback, Indo-Pacific bottlenose, spinner, and pantropical spotted dolphins, and a population of Bryde's whales that may be resident. A Protected Area Network for Cetacean Diversity (PANCD) has been proposed for "hot spots" of Ganges River and Irrawaddy dolphin abundance in waterways of the Eastern Sundarbans Reserve Forest and in the area encompassing the head of the SoNG, which supports populations of Bryde's whales and spinner and spotted dolphins. The proposed protected area would include waters in Bangladesh and India. If these cetacean populations and their habitat can be well protected, the region could serve as a safe refuge for freshwater, coastal, and deep-sea canyon cetaceans whose populations are disappearing elsewhere in Asia.

In 2006 Oil India Limited and the Kazakhstan oil exploration firm Caspi Shelf proposed to conduct seismic surveys along a 175-km stretch of the Brahmaputra River in Assam that is used by Ganges River dolphins. The survey would have involved low-frequency pulses generated by air guns and explosives and was originally scheduled to begin in November of 2006 and continue for two years. Guwahati University conducted an environmental impact assessment of the proposed action, and authorities held a public hearing on 30 October 2006. Several international environmental organizations, including IUCN, International Whaling Commission (IWC), Whale and Dolphin

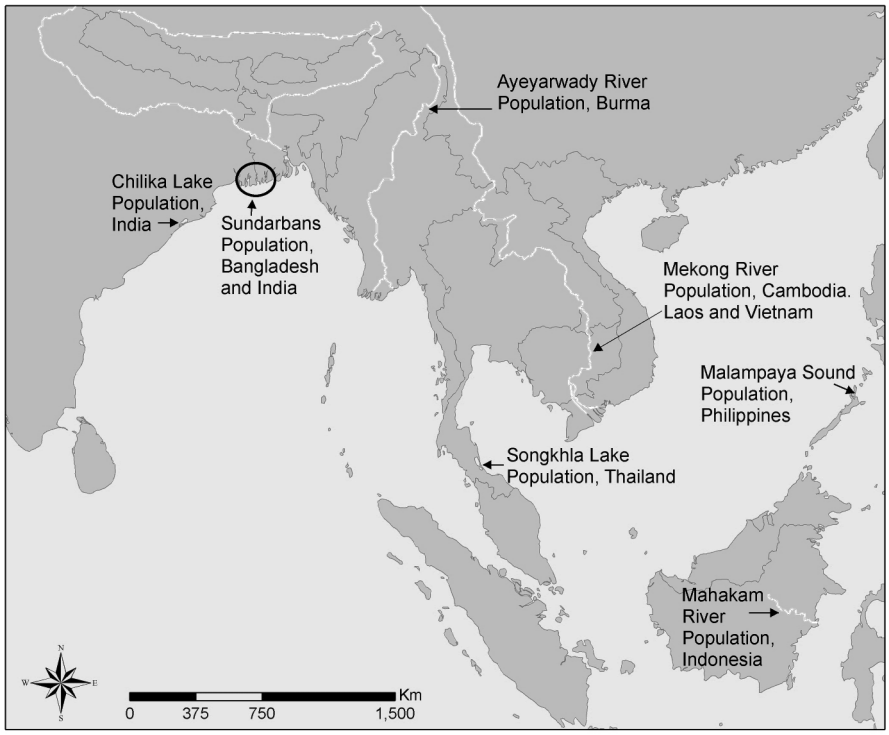

Figure IX-2. Five of the seven known populations of Irrawaddy dolphins are classified as critically endangered by IUCN.

Conservation Society, and World Wildlife Fund–India, expressed concerns regarding the proposal and the environmental impact assessment. The project was postponed pending a more rigorous assessment and a better mitigation plan designed specifically for dolphins.

In April 2007 the IWC and the IUCN Cetacean Specialist Group responded to a request from Oil India by recommending changes to the environmental impact assessment and possible mitigation measures. Because surveys were to take place in a riverine environment, it was thought that sound propagation patterns and restrictions on dolphin movements may expose them to harmful sound levels. Therefore, IWC and IUCN recommended that baseline data be collected on the sound sources and sound propagation as well as on the behavior and distribution of dolphins. They recommended the establishment of a safety zone based on analysis of the baseline data, rigorous monitoring before and during seismic operations, and halting or postponing operations if dolphins are observed in the safety zone. They also recommended that surveyors not use explosives, schedule their operations to avoid critical time periods, and avoid "herding" animals ahead of the operations. At the end of 2007 the responsible parties had not completed the environmental impact assessment, determined the necessary mitigation measures, or initiated the surveys.

Irrawaddy Dolphin

Irrawaddy dolphins (*Orcaella brevirostris*) are distributed sparsely in tropical and subtropical estuaries and in the waterways of mangrove forests in the Indo-Pacific region. Freshwater populations occur in the Mahakam, Ayeyarwady (formerly Irrawaddy), and Mekong River systems as well as in two large lake or lagoon systems—Songkhla in Thailand and Chilika in India (Figure IX-2). IUCN has classified five isolated subpopulations of Irrawaddy dolphins as critically endangered. These subpopulations are located in the Ayeyarwady River of Burma (59–72 animals), Mahakam River of Indonesia (67–70), Malampaya Sound of the Philippines (77), Mekong River of Laos, Cambodia, and Vietnam (minimum of 127), and Songkhla Lake (fewer than 50) (Smith et al. 2004, Smith et al. 2007). The population in Chilika Lake, although not on the IUCN Red List, is estimated to consist of only 85 individuals, with relatively high mortality from boat strikes and entanglement in gillnets (Smith et al. 2007). A 2002 survey of the waterways in the Bangladesh portion of the Sundarbans mangrove forest resulted in an estimate of approximately 200 Irrawaddy dolphins inhabiting that region (Smith et al. 2006a).

Threats to Irrawaddy dolphins are similar to those facing Ganges River dolphins, including fisheries interactions; habitat fragmentation,

degradation, and loss caused by development; pollution; waterway management; and direct killing for various purposes. The primary threat for Irrawaddy dolphins seems to be mortality caused by entanglement in fishing gear, particularly gillnets. Recent studies estimate that entanglement in gillnets is the cause of nearly 90 percent of the annual mortality of Irrawaddy dolphins in the Mekong River (Beasley et al. 2007) and about two-thirds in the Mahakam River (Kreb and Budiono 2005). In 2005 the Cambodian government approved the "Royal Decree on Determination of Protected Areas and Conservation of Dolphins," which established nine core conservation zones in the Mekong River and prohibited gillnetting and other activities that could harm dolphins in those areas. Electrical fishing also has been a concern in the Aweyarwady River, but in 2005 the government of Burma prohibited the use of electricity to catch fish.

As mentioned in the previous discussion of Ganges River dolphins, the India Rivers Interlink Water Transfer Project could affect both Ganges River dolphins and Irrawaddy dolphins. In addition, several dams have been proposed along the Aweyarwady River, and a project-launching ceremony took place for the first of those dams in May 2007. Dams and waterway management projects decrease the amount of fresh water available to dolphins downstream and can increase the concentrations of contaminants.

In addition to those threats, mining for gold poses a risk of mercury contamination in the Aweyarwady River. In early 2005 the government of Burma banned gold mining in the river, but it still occurs in the tributaries and mercury contamination may still pose a risk. Between July 2005 and March 2006, 18 dolphin carcasses were recovered in the Mekong River, including 2 adults, 1 juvenile, and 16 calves. Among other things, the recent calf deaths may indicate a problem with environmental contaminants although analyses of mercury in dolphin tissue indicated that levels were not high.

In 2007 the Wildlife Conservation Society published a status review of five freshwater populations of Irrawaddy dolphins along with an action plan for addressing threats facing them (Smith et al. 2007). The action plan highlights common actions needed for all five populations and more specific actions needed for individual populations. As mentioned in the Ganges River dolphin section, the Wildlife Conservation Society and the Bangladesh Cetacean Diversity Project have identified a hot spot of cetacean abundance and diversity in Bangladesh, leading them to propose a Protected Area Network for Cetacean Diversity.

Vaquita

The vaquita (*Phocoena sinus*) is the world's smallest porpoise. It is one of four extant species of the genus *Phocoena* and is found only in the northern Gulf of California. It is a cryptic, elusive animal that occurs in small groups and spends little time at the surface. It was formally described in 1958 and has proved extraordinarily difficult to study. Much of what is known about the species comes from vaquitas killed incidentally in fishing nets.

The vaquita is listed as critically endangered by IUCN and as endangered under both the Official Mexican Standards and the U.S. Endangered Species Act. Data collected in 1997 suggested a total population size of 567 vaquitas (95 percent confidence limits of 177 to 1,073 [Jaramillo et al. 1999]). The International Committee for the Recovery of the Vaquita (Comité Internacional para la Recuperación de la Vaquita [CIRVA]) estimated further decline to between 250 and 450 vaquitas by 2005. In 2007 Jaramillo et al. (2007) concluded that abundance may have declined to only about 150 animals. Their estimate was based on modeling predictions using the 1997 estimate of population size along with estimates of fishing effort, the bycatch rate per unit of fishing effort, and the natural history of the vaquita. Under the best conditions, the maximum growth rate (i.e., a product of survival and reproductive rates) is expected to be about 4 percent annually. Results from acoustic studies are consistent with a continued decline of the species (A. Jaramillo, pers. comm.). Although all of the information regarding the vaquita is tinged by uncertainty, there is no doubt that the species is faced with an extreme risk of extinction.

The primary threat to the vaquita is mortality in gillnets. Observer data and interviews with

fishermen between January 1993 and April 1994 suggested 39 vaquitas were killed annually in gillnet fisheries (mainly for shrimp, charro, sharks, and sierras) operated by fishermen from El Golfo de Santa Clara, one of the three main fishing villages in the northern gulf (D'Agrosa et al. 2000). Although the Mexican government does not currently have a rigorous program to monitor bycatch of vaquitas, the evidence suggests that high levels of bycatch have continued. In 2004, for example, six vaquitas were known to have been killed within a six-month period (Dalton 2004). Those six deaths were reported by fishermen who, as a group, have a strong incentive not to report such incidents.

Three other potential threats to the vaquita have been offered to explain the species' decline (Rojas-Bracho and Taylor 1999). The first—reduction in survival or reproduction secondary to high levels of contaminants—is not consistent with the existing information. The tissues of animals killed in the fisheries do not indicate that contaminants are an important concern. The second threat is habitat degradation from reduced flow of the Colorado River into the gulf as the result of water use in the United States. Although water flow has been dramatically reduced, which has altered the ecology of the delta, available evidence indicates that the vaquita population has not been affected. Animals taken in the fisheries have been in good body condition, indicating that they are finding sufficient prey resources in the northern Gulf of California despite the reduced flow. The third threat is inbreeding depression, given the low numbers of breeding animals. Such depression tends to result in the more frequent expression of deleterious genes, and this may affect survival and reproduction. Although the existing evidence does not indicate that inbreeding depression is a current problem, it could well become a significant threat if the population is kept small over a long period of time. The only available mechanism to address this potential problem is to make sure the population grows.

Removal of entangling gear from the vaquita's range is the only measure that will allow population recovery. Two principal means of doing so are under consideration. The first is a permanent buyout of gillnet fishermen in the region, coupled with the development of alternative ways for them to make a living. The second is a temporary buyout allowing time for alternative methods of catching fish and shrimp to be developed. In recent years, for example, the World Wildlife Fund has funded research and development on traps that might be used to catch shrimp. In addition, the Mexican government has been testing the use of suriperas for catching shrimp. Suriperas are small nets that can be towed behind the small pangas used by the artisanal fishermen who dominate the shrimp fishery. Whatever approach is taken, four things are clear. First, the vaquita population cannot sustain additional mortality due to fishing. Second, the entangling gear must be removed. Third, whatever solution is adopted, it should also address the socioeconomic consequences of the changes imposed on the fishermen. And fourth, the approach taken must be monitored and enforced to ensure that bycatch is reduced or eliminated to allow recovery and long-term conservation of the vaquita population.

The United States has a role to play and a responsibility to fulfill in vaquita conservation and recovery. It imports most of the shrimp taken in the Gulf of California gillnet fisheries. The United States also was an important, if not the primary, market for other species taken in the northern gulf, such as totoaba.

The United States has contributed to vaquita conservation efforts. U.S. scientists have collaborated extensively with Mexican scientists to study the species, and a number of U.S. scientists are members of CIRVA, the international vaquita recovery team. The United States has funded several surveys using both visual and acoustic methods, supported development of assessment methods, and provided various types of biological, ecological, and economic expertise. Although these efforts have helped to call attention to and describe the problem, a great deal more will be required to solve it.

To date, conservation and recovery efforts have been led by scientists from the Mexican National Marine Mammal Program, National Institute of Ecology, in Ensenada, Mexico. CIRVA was formed by the Mexican government in 1996 and met in 1997, 1999, and 2004. It focused initially on

scientific research to assess abundance, distribution, and threats but has focused more recently on the implementation of recovery actions. Since its initial assessments, CIRVA has recommended phasing out all gillnet and trawl fisheries in the upper Gulf of California and Colorado River Delta Biosphere Reserve and expanding the reserve to ensure that it encompasses all known vaquita habitat.

On 8 September 2005 the Mexican Ministry of Environment established a vaquita refuge encompassing approximately 80 percent of the current vaquita range (Figure IX-3). A protection program within the refuge was established in December of that year, banning gillnetting and trawling in a portion of the refuge. The Sonora and Baja California governments (the two states bordering the vaquita's area of distribution) also were awarded $US 1 million to be used for compensating fishermen who were negatively affected by establishment of the refuge. Unfortunately, $US 1 million falls far short of the amount needed to adequately compensate the fishermen, and fishing has continued.

In 2005 two vaquita meetings were held in conjunction with the biennial conference of the Society for Marine Mammalogy in San Diego. At those meetings, Mexican authorities from the Departments of Environment and Fisheries met with international scientists to discuss threats facing vaquitas, the relative merits of various mitigation strategies proposed by CIRVA (including banning gillnets in the core habitat area), the potential for using acoustic techniques to monitor the population, results from recent acoustic surveys, and scientific research required to better understand the vaquita and assess its conservation status.

In 2006 the Mexican government initiated studies to determine the utility of suripera nets for catching shrimp. The results were initially promising and additional testing is still under way in cooperation with fishermen from the three main fishing communities of the northern gulf. In 2006 the Marine Mammal Commission sponsored a historical review of vaquita conservation efforts, which was published in *Mammal Review* (Rojas-Bracho et al. 2006). The Commission also sponsored an updated assessment of the vaquita for the IUCN Red List, which reaffirmed the species' status as critically endangered (http://www.iucnredlist.org/search/details.php/17028/all).

In February 2007 Mexican President Calderón announced the Conservation Program for Species at Risk (Programa de Conservación de Especies en Riesgo, PROCER), which includes the vaquita among the five highest-priority species. Also in 2007 the Mexican government committed $US 4 million to vaquita conservation—$1 million to enforcement efforts and $3 million to sustainable community development programs. The funds were intended to support alternatives to gillnet fishing. The Mexican government has sought to protect vaquitas largely through voluntary efforts and has not yet im-

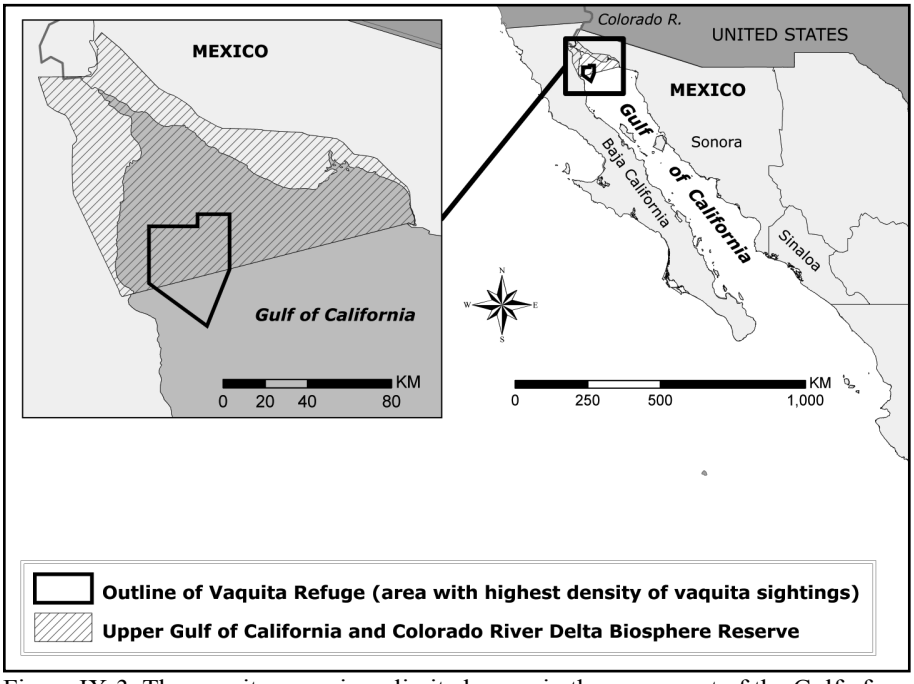

Figure IX-3. The vaquita occupies a limited range in the upper part of the Gulf of California, 80 percent of which has been set aside by the Mexican government as a refuge.

posed regulations. It has, however, retained the option of imposing mandatory restrictions. At the end of 2007 several studies by Mexican economists, with some collaboration with economists from the United States, were under way to estimate the resources that would be required to make the transition away from the use of gillnets.

Various non-governmental efforts also were under way to facilitate those governmental initiatives. They include attempts by a number of non-governmental organizations (World Wildlife Fund and The Nature Conservancy) to raise $US 5 million each. Other organizations such as Alto Golfo Sustentable have been working at the local level in the affected fishing communities to promote the transition to acceptable fishing practices and develop socioeconomic alternatives.

Finally, on 16–18 October 2007 the trilateral Commission for Environmental Cooperation sponsored a workshop in Ensenada, Mexico, to develop a North American conservation action plan for the vaquita. Staff and a member of the Marine Mammal Commission's Committee of Scientific Advisors on Marine Mammals participated in the workshop and contributed to drafts of the plan. The Commission for Environmental Cooperation consists of representatives from Canada, the United States, and Mexico and was established under the North American Free Trade Agreement. The plan, nearing completion at the end of 2007, is expected to emphasize immediate removal of entangling fishing gear from the vaquita's range, compensation for fishermen whose livelihoods are affected, development of socioeconomic alternatives for those fishermen choosing to seek alternative livelihoods, a program to develop alternative gear types, and enforcement of all fishing restrictions. In addition, the plan is expected to provide a more extensive list of tasks to accomplish those objectives and ensure a long-term, sustainable solution to vaquita conservation.

Indo-Pacific Humpback Dolphin

Indo-Pacific humpback dolphins (*Sousa chinensis*) occur in disjunct populations in nearshore marine and estuarine waters of Australia, Southeast Asia, and much of the Indian Ocean and western Pacific coastline from Africa to China. A small distinct population, consisting of only approximately 100 individuals, was discovered in Taiwan in 2002 (Wang et al. 2007a). These animals inhabit a narrow (less than 3 km from shore) segment of coastal waters about 100 km long from the estuary of the Tongsiao River to Taisi along the west coast of Taiwan. The primary threats facing this population are reduced river flow into estuaries; habitat loss (e.g., due to land reclamation); entanglement in fishing gear; discharges of industrial, agricultural, and municipal pollutants; and disturbance by underwater noise.

International scientists and conservationists gathered in 2004 and 2007 for workshops on conservation of this humpback dolphin population (Wang et al. 2004, Wang et al. 2007c). Participants at the 2007 workshop developed a conservation action plan (Wang et al. 2007b) that identified several measures necessary to conserve and recover the population, including (1) prohibiting the use of gillnets and trammel nets in all waters inhabited by the dolphins; (2) limiting dolphin-watching tourism operations to land-based platforms; (3) formally designating areas of important dolphin habitat; (4) evaluating the potential impacts of all existing, planned, and future development projects that could affect the dolphins; and (5) requiring effective mitigation of the impacts from those projects. The Taiwan Sousa Working Group was convened in 2007. The group consists of experts from Japan, the United States, Canada, Taiwan, Hong Kong, and the United Kingdom. The purpose of the group is to support implementation of the listed measures.

Iran Dolphin Strandings

During the autumn of 2007 two mass mortality events involving at least 152 dolphins occurred along the Gulf of Oman coast of Iran (Figure IX-4). The Iran Department of Environment and the Regional Organization for Protection of the Marine Environment based in Kuwait requested that the IUCN Cetacean Specialist Group provide assistance in investigating the causes of the events. The Marine Mammal Commission provided partial support for travel costs for the investigative team of a cetacean biologist and a veterinary pathologist. The team visited Iran from 21–25 November 2007. Additional support for the investigation was provided by the Regional Organization for Protec-

tion of the Marine Environment, Iran Department of Environment, and the University of Las Palmas de Gran Canaria, Spain.

During the visit, the investigative team visited the beaches where the two events had occurred (Figure IX-4) and met with individuals and agencies involved in the original responses to the events and the subsequent investigations. The team reviewed information, photographs, biological samples, and video recordings from each event and provided the following summary and conclusions, which will be described more fully in a final report in 2008.

The first event involved 79 spinner dolphins that apparently died at sea and then washed ashore on 20 September 2007. Based on the fairly limited evidence, the leading hypothesis to explain the stranding is fishery interactions. Dead, decomposed dolphins washed ashore during a short period of time at different points along the same stretch of coast; several dolphins bore evidence of traumatic injuries; and the stranding event was spatially and temporally coincident with an active fishery. However, the investigative team considered the evidence to be circumstantial rather than conclusive.

The second event involved 73 striped dolphins that stranded alive on 24 October 2007. The evidence suggested that this stranding resulted from the animals becoming entrapped by the complex coastal configuration and then dying due to "stranding stress syndrome." The factors (natural or human-related) that might have caused them to enter the estuary, which is not their typical habitat, are not known. However, the investigative team suggested that the mass stranding probably was not caused by fisheries, harmful algal blooms, or contamination by oil or chemical spills because additional evidence (e.g., mortality of other species in the same area) for those causes was lacking.

Finally, the two mass mortality events occurred a month in time and more than 170 km apart, involved different dolphin species, and exhibited many different characteristics. The team considered the two mass strandings to be separate events.

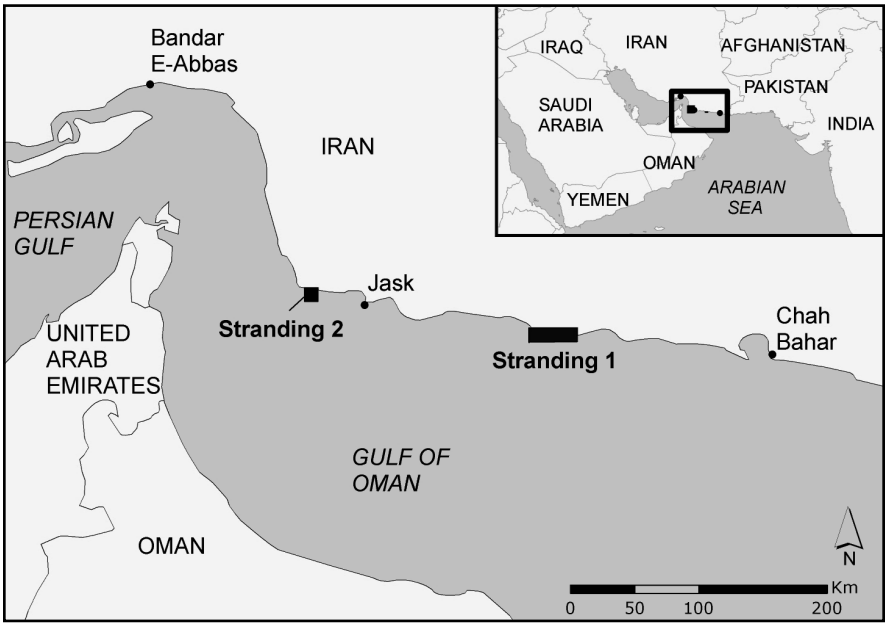

Figure IX-4. At least 152 spinner and striped dolphins died during two mass strandings in the Gulf of Oman during 2007.

Solomon Islands Dolphins

In 2003 approximately 100 dolphins, most of them Indo-Pacific bottlenose dolphins (*Tursiops aduncus*), were captured live in the Solomon Islands, and 28 of them were exported to a public display facility in Mexico. The export of these dolphins was controversial because the size and stock structure of the exploited population were completely unknown before the capture and export. The international trade of live dolphins is subject to control under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which requires, among other things, that the exporting country verify that the export "will not be detrimental to the survival of the species." Several organizations contended that reliable data on the affected population were not available to justify such a "non-detriment" finding. In mid-September 2003, at the invitation of the Solomon Islands government, a two-person team conducted a fact-finding visit to the

Solomon Islands and concluded that reliable data were not available to assess the impact of the capture and export operation. The Commission's 2003 and 2004 annual reports provide additional descriptions of the export and related activities.

In 2004 a general survey of cetaceans and associated habitats in the Solomon Islands was conducted as part of a "Solomon Islands rapid ecological assessment" (Kahn 2006). The survey provided useful information regarding the distribution of 11 cetacean species but was not designed to assess the abundance and stock structure of dolphin populations that could be affected by capture and export operations.

Following the international controversy surrounding the dolphin exports in 2003, no live dolphins were exported from the Solomon Islands in 2004, and in 2005 the Solomon Islands banned the export of dolphins. In June 2007 the Solomon Islands became a party to CITES and, during the same month, rescinded the ban on dolphin exports. In October 2007 the Solomon Islands exported 28 Indo-Pacific bottlenose dolphins to the United Arab Emirates. The Commission is not aware of any new information that has been collected on Indo-Pacific bottlenose dolphins in the Solomon Islands since 2003 that would allow a robust assessment of the potential impact of the ongoing capture and export operation on the exploited population.

Western Gray Whales off Sakhalin Island, Russia

The western North Pacific population of gray whales (*Eschrichtius robustus*) is listed as critically endangered by the International Union for Conservation of Nature (IUCN). The historical abundance of western gray whales is poorly known, but they were drastically reduced by commercial whaling and were thought to be extinct by the mid-1900s. A few whales were seen in the early 1970s, and observations increased in the 1980s off the northeastern coast of Sakhalin Island, Russia, in the Sea of Okhotsk. Seasonal studies of the population were initiated in 1994, and in 2007 the population included about 121 whales one year of age or older (i.e., excluding calves). Four calves were documented in 2006, although survey conditions were poor, and nine were documented in 2007. The best estimate of population growth during the period from 1994 to 2006 is 2.9 percent annually. In the 24 months preceding May 2007, four females were killed by entanglement in fishing gear off the coast of Japan. Marine mammal population dynamics are sensitive to female mortality, and the addition of even just two deaths of females annually sharply reduces the probability of recovery for this population (Cooke et al. 2006).

Each year from June to November the whales use two main feeding areas off the northeastern Sakhalin coast. These coastal waters appear to favor gray whale prey, which are almost exclusively benthic (e.g., amphipods, isopods). These waters also overlie large oil and gas reserves (Reeves et al. 2005). The Russian Federation has divided the Sakhalin shelf into nine project areas for the purposes of controlling the commercial development of those reserves. Development is ongoing in three project areas and planned in several others. The most advanced project is Sakhalin II, which is being undertaken by the Sakhalin Energy Investment Company (SEIC). This project began commercial production in 1999, although oil has been produced only during the months of June to November when nearby waters are sufficiently free of ice. Phase 2 of Sakhalin II, which is nearing completion, involves the construction of a new Piltun-Astokhskoye (PA-B) platform, a platform at Lunskoye (south of the feeding areas), pipelines from these new platforms and the existing Molikpaq (PA-A) platform to a shoreline processing facility, a pipeline down the center of the island to Prigorodnoye on Aniva Bay, a processing facility at Prigorodnoye, and an export terminal in Aniva Bay. At the export terminal, both liquefied gas and oil will be loaded on tankers for distribution to world markets.

The platforms and pipelines of Sakhalin II are in close proximity to the gray whale feeding areas and pose a number of risks to the whales. In 2004 IUCN convened a panel of experts to review SEIC's Phase 2 plans and activities. The panel's report (Reeves et al. 2005; http://cms.iucn.org/wgwap/index.cfm) focused on four main threats: construction and operational noise, oil spills, vessel/whale interactions and collisions, and degradation of the whales' feeding habitat. It included initial modeling results indicating that even relatively small changes

in vital rates, particularly survival rates, could have significant effects on recovery if those rates remain low over time. The report emphasized that recovery of the western gray whale population would depend on minimizing cumulative effects and that a robust monitoring program was needed. Finally, the report called for the creation of a comprehensive, range-wide strategy for conservation of western gray whales.

IUCN sponsored several meetings after the completion of the initial panel report, primarily to give SEIC an opportunity to respond to the report and to give international lenders an opportunity to discuss the relevant conservation issues. In those meetings it quickly became evident that a number of risks would require ongoing oversight and problem-solving, particularly with respect to Phase 2 construction activities. In 2006 IUCN officially formed the Western Gray Whale Advisory Panel (WGWAP) to conduct continuing reviews of Sakhalin II activities. To the extent possible, the panel was expected to help SEIC anticipate potential risks to gray whales and their habitat and identify measures to prevent or mitigate those risks. The panel held its first meeting in November 2006 and met again in April and November 2007. All meeting reports (found at the Web site listed earlier) have maintained their primary focus on the potential effects of construction and operational noise, oil spills, vessel-whale interactions and collisions, and degradation of the whales' feeding habitat.

Noise: The primary concern related to noise is that it could reach levels that cause injury (e.g., temporary or permanent reduction in hearing sensitivity) or, more likely, changes in behavior, distribution, or foraging efficiency and, ultimately, reproduction or survival. This concern applies particularly to mother-calf pairs and pregnant females.

Construction activities near the gray whale feeding grounds were at their peak in 2005 and 2006, with the towing and setting of the concrete gravity-based structure for the PA-A platform in 2005 and the burial of pipelines from the PA-A and PA-B platforms in 2006. Additional platform construction occurred in the Lunskoye area but was not expected to pose a risk because the area is well south of the feeding grounds. The primary sources of noise during these activities were the engines and propellers of vessels involved in towing and setting the concrete structure on the ocean floor and in burying the pipelines.

SEIC used acoustic and behavioral monitoring systems to determine if construction noise was affecting the whales. These systems were not in place for the entire construction seasons because construction was initiated as early as possible after the breakup of sea ice to complete as much work as possible before the arrival of most whales. Although the advisory panel appreciated the reasoning behind this approach, it also suggested that monitoring efforts should have been given sufficient priority to have monitoring teams on site and ready to operate when construction started. The late start of monitoring added considerable uncertainty to analyses of effects.

Over the course of several years the panel (or its predecessors) and SEIC had discussed criteria that should be used to determine when noise levels are high enough to require modification of the construction activities or temporary shutdown of those activities. As construction proceeded, the company modeled and monitored noise levels and adjusted its construction plans to reduce the amount of noise on the feeding grounds. However, the panel expressed concern about the company's adherence to its own noise criteria once construction was under way. Also, the parties disagreed on whether monitoring had been adequate and the number of whales likely to have been disturbed on the feeding grounds was low enough.

To increase their ability to detect effects of noise on the whales, scientists working for SEIC combined the sound and behavioral data (obtained from shore sites) into a multivariate analysis. The results for the 2005 season suggested that whales moved slightly offshore during the construction, but also that the loudest sounds to which they were exposed were from research boats involved in photo-identification and behavior studies. The advisory panel reviewed the analysis, commended the analysts, and recommended that the analysis be extended to include the 2006 data. It also recommended a more robust review of the analysis not only to investigate the effects of noise on the whales, but also to model and better understand the whales' use of their near-

shore habitat. Planning for a more rigorous analysis was still under way at the end of 2007.

In a general sense, the challenge has been to establish criteria that would protect the whales while minimizing disruption to the construction schedule. Establishment of start-adjust-stop criteria is complicated by the fact that characteristics of the noise vary (e.g., in loudness, frequency, duration), and the characteristics most likely to affect the whales are not known. For 2005 the criteria were based primarily on estimated received sound levels and their duration. For 2006 the panel recommended a variation of the 2005 criteria that also accounted for the total sound energy that might be received by whales on the feeding ground; that is, a dose-based approach with the dose determined for multiple time periods of up to 24 hours.

With most of the construction completed by the end of 2007, the concern regarding noise has shifted to seismic surveys used to evaluate the subterranean oil and gas reserves. Seismic surveys are conducted every three to five years to characterize the oil fields, determine the effects of extraction on them, and guide the placement of new wells. A seismic survey is planned for 2009. This survey will employ loud airgun pulses in the vicinity of the primary feeding ground.

To address this concern, the panel and SEIC formed a task force to consider measures to minimize effects. The task force considered the following issues and approaches to mitigation:

- the possibility of conducting on-ice seismic profiling in winter when whales are not present
- modeling studies to predict sound levels in the feeding ground
- visual surveys to precede seismic surveys to determine if the area is clear of whales
- ramp-up to give animals in the vicinity a chance to respond and move away
- real-time monitoring of sound levels to ensure that levels do not exceed safe thresholds
- shutdown if whales are sighted within 1.5 km of the survey vessel
- visual monitoring of ensonified areas by shore- or vessel-based observers and
- prohibitions on nighttime surveys unless the area has been surveyed visually and determined to be free of whales no more than six hours prior to the onset of the seismic survey

The task force recommended a review of previous seismic surveys in the area and noted the need to evaluate evidence that western gray whales responded to those surveys by changing their distribution. The seismic task force presented its findings at the November 2007 meeting and was to continue its deliberations into 2008 as needed to minimize potential effects of these surveys.

Oil Spill Prevention and Response: Oil spills have been a major concern since the beginning of this project due to the proximity of the platforms and pipelines to the feeding grounds. In design and construction, the emphasis has been on prevention of spills because responses to large spills or spills in difficult environmental conditions, such as those around Sakhalin Island, are expected to be marginally effective at best. The waters around the northeastern portion of the island are ice-covered for about half of the year, and even in ice-free months, the logistics of working in this area are challenging. In addition to potential environmental costs, the consequences of a significant spill can be highly disruptive and expensive for the oil and gas company. In view of the strong incentive for the company to avoid such events, and because other reviews of this project have focused on prevention measures, the WGWAP has focused its attention on the oil spill response strategy.

That strategy is based on three tiers involving response by the company (tier 1), regional authorities (tier 2), and national and international organizations (tier 3). Preparations for oil spill response are complex, involving command and control structures, modeling of spill behavior, infrastructure including aircraft and vessels, extensive equipment and supplies, training and practice sessions, response technology, research into response methods (particularly in ice), disposal of waste, and restoration of affected habitat. The three major scenarios of concern in relation to potential impacts on wildlife, including gray whales, are vessel spills (especially tankers), pipeline leaks, and platform spills.

Tanker accidents are the most common source of large oil spills, and Sakhalin II, Phase 2 should

actually reduce the risk of a tanker spill by using pipelines to move oil and gas from the PA-A platform to shore, replacing the current system that uses a floating storage facility for offloading directly to tankers. At the completion of Phase 2, tankers associated with this project should no longer occur near the feeding grounds. Thus, the risk of vessel spills will be reduced and concern will shift from tankers to support vessels, such as those used for crew changes, maintenance, and spill response.

The risk of a spill was initially reduced, at least in the vicinity of the feeding grounds, when SEIC changed its plans and rerouted the pipelines so that they lie well south of the Piltun feeding area before turning westward to shore. Pipeline construction and maintenance includes regularly scheduled cleaning and inspection, as well as pressure and flow-based systems for monitoring the transfer of oil and detecting leaks. The best industry standard at present is detection of a leak equivalent to about 0.4 percent of daily throughput. The SEIC pipelines are expected to approach that standard, with reliable detection of leaks of 1 percent or less. However, with a daily throughput of 70,000 to 90,000 barrels of oil, these systems could fail to detect leaks approaching 700 to 900 barrels per day, which could cause extensive environmental damage. To address this concern, the advisory panel and SEIC agreed on measures to monitor the pipeline route regularly to detect such leaks.

The primary concern with regard to the platforms is the risk of a large blowout. Although the currents in the area are predominantly to the south, surface winds, currents, and tides could carry oil to the feeding grounds in a matter of hours, long before a vigorous response could be mounted to a large spill. From 2005 to 2007 the advisory panel (or preceding panels) reviewed SEIC's response plans and made numerous recommendations regarding oil spill responses. Key recommendations and considerations included the following:

- SEIC should not use dispersants in or near the feeding grounds, as they are often more toxic than the oil itself and may have more severe effects on the whales' prey.
- Response plans and efforts should give special attention to protection of Piltun Lagoon and the Piltun feeding area.
- Practical planning documents should be completed covering all reasonably likely contingencies.
- Response efforts in the feeding areas may have to be curtailed in shallow waters where they would disperse the oil into the benthic environment; in such cases it may be more prudent to allow the oil to wash ashore for cleanup from the beach.
- Response methods for oil spilled in ice-covered waters are not sufficiently well developed and further research and development are needed.
- Burning may or may not be an effective response, depending on the tendency of the oil to burn and on the properties of the residue.
- Monitoring should be conducted to determine the interaction of whales and their prey with spilled oil and to assess the immediate and long-term biological consequences.
- Extensive training and practice are required in the field to ensure that respondents are well prepared to work in the environmental conditions characteristic of this area.
- Training and practice drills also should involve command and control structures, which will require complex monitoring, communication, and decision-making.
- Effective response will require careful disposal of wastes, the volume of which may be greater than the spill itself.
- Long-term response efforts may require restoration of nearshore ecosystems such as lagoons and other wetlands, beaches, and tidal or nearshore areas.

The nature and success of an oil spill response also depend on the characteristics of the oil. The crude oil from the Sakhalin Island reservoirs is light and volatile. Although such oils are generally more toxic to marine life, they also evaporate more rapidly and pose less of a long-term risk than is posed by less volatile oils, such as the oil spilled by the *Exxon Valdez* in Alaska in 1989.

Ship Strikes: Ship traffic poses two types of risk to whales: disturbance due to noise and death or injury from ship strikes. Most of the vessels operating in the area from 2005 to 2007 were involved in construction (e.g., tugboats, vessels used in constructing the platforms and

burying the pipelines). As activities shift in 2008 from construction to operations, fewer vessels are expected to be active in the area. Traffic should consist primarily of crew change boats, ships or barges transferring supplies and equipment, and the vessels on standby for oil spill response.

To address the risks of ship strikes, SEIC placed observers on a number of vessels, established traffic corridors, and restricted speeds in portions of the corridors where whales are most likely to occur. To date, no strikes on gray whales have been reported, and the limited information available suggests that there have been relatively few close calls. To characterize the risk of ship strikes, the WGWAP and SEIC attempted to use data collected by onboard observers to assess the likelihood of detecting whales. Although the analyses were not as informative as was hoped, SEIC indicated its intention to continue the observer program and to maintain the speed and corridor restrictions indefinitely.

Habitat degradation: The habitat of gray whales along the northeastern Sakhalin Island coast is dynamic. The primary (Piltun) feeding area runs northward from the mouth of the Piltun Lagoon and extends out to a depth of about 20 m. The bottom is primarily fine sand and silt and is churned regularly by waves and surf, as well as by ice-gouging each winter. Another feeding area is located to the south and offshore in depths of about 30 to 50 m. Due to its greater depth, this area is not disturbed by surf conditions and ice-gouging. Also, it does not appear to be used as often or as intensively by the whales, and mother-calf pairs are sighted only in the nearshore portion of the Piltun feeding area.

The habitat could be degraded by construction and drilling activity or by spills or leaks of toxic materials including oil, cutting muds, etc. Over the years, the various gray whale panels have expressed concern about long-term or accumulating leaks or discharges that could slowly degrade the benthic habitat, thereby reducing or contaminating whale prey. The habitat and associated benthic communities exhibit considerable annual variation, and the panels have urged SEIC to implement a carefully designed sampling study to establish baseline information.

Such studies have been and are being conducted by Russian scientists under contract to SEIC and Exxon Neftegas, and the current advisory panel has urged that those studies be continued over time to determine if the habitat has been degraded by the oil and gas development activities. The information collected also may improve understanding of how the whales use this habitat.

Research: Research on this population began in earnest in 1994. Since then, much of the effort has focused on determining the population's abundance and composition, reproductive rate, health and condition, behavior on the feeding grounds, and responses to various human activities related to oil and gas development (e.g., seismic surveys). Several groups have conducted research but with little coordination among them and, at times, a sense of competition rather than cooperation.

Photo-identification has been the principal tool for characterizing the population because these whales can be identified individually from patterns of pigmentation and scarring. Two separate teams of investigators have engaged in photo-identification with little cooperation or exchange of information, despite concern that duplication of effort could expose the whales to more disturbance by small boats than is necessary. The WGWAP raised this concern and established a task force to facilitate the exchange of catalogues, solicit a review by an independent expert, assess the degree of duplication, develop means to avoid duplication, and enhance the value of the photo-identification data. The task force's work continues.

In 2007 SEIC suggested that it intended to reduce the level of population monitoring because construction was nearing an end and the drilling, extraction, and transport phase would soon begin. The WGWAP objected to the idea of reduced monitoring effort as oil and gas activities would continue to pose some risk to the whales, and it is vital that potential long-term effects be evaluated.

Other Aspects of Conservation: In addition to the risks from Phase 2 of Sakhalin II, the western gray whale population is at risk from the oil and gas activities of other companies operating on the Sakhalin shelf and from various human activities elsewhere in eastern Asia. The population may be affected by incidental mortality in fishing gear,

entanglement in debris, ship strikes, contaminants, noise, disease, and harmful algal blooms. The whales' migratory routes and area(s) of reproductive activity (equivalent to the lagoons of Baja California, Mexico, for eastern gray whales) have not been identified, and the risks they face in winter are unknown. Each year, a subset of the animals (i.e., "skinny whales") is observed on the feeding grounds in poor condition. The factors causing this are not known, but poor condition may affect the animals' ability to reproduce and survive, and therefore influence whether the population recovers or declines. IUCN is planning a range-wide western gray whale workshop in Japan during the fall of 2008 to develop a more comprehensive recovery effort.

Finally, at several of its meetings, the WGWAP has discussed satellite telemetry as a way to investigate the migratory routes and reproductive habitat of western gray whales. Telemetry has been used with a number of species, and it has proved to be a useful tool for studying the distribution, movements, and behavior of large whales.

One major concern, however, is that satellite telemetry requires that instruments be attached to the whales, and the attachment methods could cause unintentional harm. A range of methods has been used with other marine mammals (e.g., harnesses, glue, suction), but whales pose special challenges, particularly when the instruments must stay attached for weeks or months to be effective. Over time, tagging technology has improved and the current state of the art involves thin, cylindrical instruments that are shot or injected through the whale's skin into the blubber, fascia, and muscle layers. Such application methods can cause a wound that leads to infection, local necrosis, and, at least potentially, more serious health effects.

To enable scientists to discuss such potential effects, the Marine Mammal Commission and National Marine Fisheries Service held a workshop in conjunction with the 16th Biennial Conference of the Society for Marine Mammalogy in San Diego, California, in 2005. The purpose of the workshop was stated as follows.

> Acknowledging the many important benefits of tagging large whales, the purpose of this workshop is to identify potential adverse effects of tagging, consider the evidence regarding the significance of such effects, consider research to better describe them, and consider potential mechanisms to avoid or mitigate them if necessary. Ultimately, our purpose is to promote the conservation of marine mammals through better decision-making and science.

Participants recognized that considerable progress had been made in the technology and application of telemetry instruments but also acknowledged that major uncertainties remained. Discussions identified a number of studies that could improve tagging methods and help resolve the concerns about tagging effects. Similar developmental processes have led to improvement of biopsy procedures and other invasive techniques used in marine mammal research.

Both the WGWAP and the International Whaling Commission's Scientific Committee have been discussing the advisability of attaching satellite tags to western gray whales. In the report from its November 2006 meeting, the WGWAP concluded that such work should be conducted but only after certain conditions had been met. Among those, the panel wished to review a report from the 2005 workshop. At the end of 2007 the report was nearing completion under a memorandum of agreement between the Marine Mammal Commission and IUCN.

Mediterranean Monk Seal

The Mediterranean monk seal (*Monachus monachus*) is regarded as Europe's most endangered marine mammal (Figure IX-5). It is listed as endangered under the U.S. Endangered Species Act and as critically endangered by IUCN. Significant threats to the Mediterranean monk seal include habitat degradation and loss, fisheries interactions (entanglement in fishing gear and shooting by fishermen who perceive monk seals to be competitors), disease (e.g., morbillivirus), harmful algal blooms, and disturbance. Pollution due to organochlorines (e.g., PCBs) could be an emerging threat to the Mediterranean monk seal as well. Borrell et al. (2007) tested tissue samples

from Mediterranean monk seals in the eastern Mediterranean (Greece) and the eastern Atlantic. They found that the seals in the Mediterranean had higher levels of organochlorines than their Atlantic counterparts, and that the levels in some individuals were similar to those known to cause immune suppression and reproductive failure in other pinnipeds (e.g., Ross et al. 1996).

The Mediterranean monk seal has been extirpated from most of its range, and the population is now highly fragmented. Recent estimates suggest a total population of fewer than 600 animals (Johnson et al. 2006). Before 1997 the largest single colony of approximately 300 seals was found in the eastern Atlantic at Ras Nouadhibou (formerly Cap Blanc) Peninsula, which is located at the border between Mauritania and Western Sahara on Africa's northwestern coast (Forcada et al. 1999). A mass mortality at that site in 1997, attributed to either morbillivirus or saxitoxin, reduced the colony by 50 to 65 percent. Following the establishment of a no-fishing zone in 2001 and the elimination of disturbances in the vicinity of the breeding caves, the number of animals (except pups that exhibit high mortality) found dead on the beaches south of the colony notably decreased, and the number of animals using the breeding caves and the number of adult males occupying territories near the reserve increased. Recent estimates suggest that the colony may comprise 150 seals (Working Group 2005). The only other breeding colony of Mediterranean monk seals in the Atlantic is in the Desertas Islands of Madeira (Portugal), with approximately 30 seals (Working Group 2005).

In June 2007 the fourth meeting of the Working Group of the Mediterranean Monk Seal in the Eastern Atlantic took place in Funchal, Madeira. At previous meetings the working group developed an action plan (Working Group 2005), and the objective of this latest meeting was to define and agree on the priority actions to be funded for conservation of the seals in each participating country. The priorities identified at the meeting included monitoring and protection of the Ras Nouadhibou and Madeira colonies, taking measures to enlarge the geographic range of the Ras Nouadhibou colony, and establishing emergency protocols for both Atlantic populations in case of catastrophes. In October 2007 a Memorandum of Understanding for the protection of the Eastern Atlantic Populations of the Mediterranean Monk Seal was concluded under the auspices of the Convention on the Conservation of Migratory Species of Wild Animals and signed by the governments of Mauritania, Morocco, Portugal, and Spain.

Okinawa Dugong

The waters surrounding the Japanese island of Okinawa are home to a small, demographically isolated population of dugongs (*Dugong dugon*). The exact size of this population is unknown, but only 10 dugongs were sighted during surveys conducted in 1998 and 1999 (Shirakihara et al. 2007). The government of Japan has listed the Okinawa dugong population as a Natural Monument, reflecting its place as an important component of the culture and history of native Okinawans. In 2007 the Japanese Ministry of Environment classified the Okinawa dugong population as critically endangered.

Figure IX-5. The Mediterranean monk seal is considered as Europe's most endangered marine mammal. (Photograph ©, International Fund for Animal Welfare/Richard McLanaghan.)

In recent years, concerns have been raised regarding the planned construction of a U.S. Marine Corps airbase within Henoko Bay, which is considered to be prime dugong habitat. The original plan was to build an offshore airstrip in an area of coral reefs and sea-grass beds, which had the potential to harm dugongs through loss of sea-grass meadows, pollution, vessel strikes, and both physical and acoustical disturbance. Concerns regarding the impact of the planned base on dugongs prompted local protests that delayed pre-construction survey activities. In September 2003 a coalition of conservation groups filed a lawsuit against the U.S. Department of Defense (*Okinawa Dugong* v. *Rumsfeld*, now known as *Okinawa Dugong* v. *Gates*). The plaintiffs requested that the Department comply with the National Historical Preservation Act by conducting a comprehensive public assessment of the effects of the project on dugongs. In May 2007 a motion for summary judgment was submitted by the plaintiffs, and a decision is expected early in 2008.

In 2006 the United States and Japan reached a final agreement on realignment of U.S. troops in Japan. That agreement included the closing of the U.S. Marine Corps airbase at Futenma and the construction of a replacement facility in Henoko Bay. The plans for the base have been modified to relocate the planned airstrip closer to shore but would still require filling in areas of Henoko Bay, with uncertain consequences for Okinawa dugongs.

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Chapter X

REAUTHORIZATION OF THE MARINE MAMMAL PROTECTION ACT

The Marine Mammal Protection Act was enacted in 1972 and has since been reauthorized and amended several times. The most recent reauthorization of appropriations to carry out the directives of the Act was signed into law in 1994 and expired at the end of fiscal year 1999. Nonetheless, unless repealed, or allowed to lapse through a sunset clause, the statute remains in force, and Congress may continue to appropriate funds to implement it, as it has done since 1999.

Congress began the process to reauthorize the Marine Mammal Protection Act in 1999. The Subcommittee on Fisheries, Wildlife, and Oceans of the House Natural Resources Committee held hearings on reauthorization issues in June 1999, April 2000, October 2001, June 2002, and July and August 2003. The Senate Committee on Commerce, Science, and Transportation held a hearing on the reauthorization of the Marine Mammal Protection Act in July 2003. The Commission participated in all of the hearings except the one in August 2003, which was a field hearing convened in San Diego, California, to consider the impacts of increasing pinniped populations on fisheries and recreational activities. Commission testimony presented at the other hearings can be found in the appendices of previous annual reports and on the Commission's Web site (www.mmc.gov).

The Administration Bill

The Marine Mammal Commission and the other federal agencies with responsibilities under the Marine Mammal Protection Act entered into interagency discussions beginning in 1999 to identify issues that they believed merited attention during the reauthorization of the Act and to begin to formulate a recommended Administration bill that could be transmitted to Congress for its consideration. Recommended bills were transmitted to Congress in 2000, 2002, 2003, and 2005. Detailed summaries of those proposed bills can be found in previous annual reports. With a new Congress being convened in 2007, the Administration considered whether to submit a new reauthorization bill for consideration by legislators. Although possible updates and other changes to the earlier Administration proposals were discussed among the involved agencies, no new recommended bill was transmitted to Congress during 2007.

Action in the 110th Congress

During the 2006 session of Congress, the House of Representatives passed H.R. 4075, "The Marine Mammal Protection Act Amendments of 2006," which would have amended several provisions of the Act. It did not include general reauthorization provisions but would have reauthorized appropriations for activities under Title IV of the Act and for a new Title V that would implement the United States–Russia polar bear agreement (see Chapter VIII) through fiscal year 2010. The Senate passed a scaled down version of H.R. 4075, which included only provisions related to the United States–Russia polar bear agreement. The House and Senate versions of the bill were not reconciled before Congress adjourned. It was thought that Congress would consider similar legislation in 2007, but no broad-based reauthorization bill was introduced during the 2007 congressional session. Rather, legislators opted to introduce bills targeted at specific issues. These included—

- H.R. 1006, which would have amended and reauthorized appropriations for the John H. Prescott Marine Mammal Rescue Assistance Grant Program
- H.R. 1007, which would have repealed the zero mortality rate goal under section 118 of the Marine Mammal Protection Act to reduce the mortality and serious injury of marine mammals incidental to commercial fisheries to insignificant levels approaching a zero rate and replaced it with a more general goal of reducing incidental and serious injury of marine mammals, taking into account the economics of the involved fisheries, the availability of existing technology, and applicable fishery management plans
- H.R. 1769, which would have amended section 120 of the Marine Mammal Protection Act to establish alternative measures for authorizing the intentional lethal taking of sea lions preying on endangered and threatened species of salmon within the waters of the Columbia River and its tributaries (sea additional discussion in Chapter II)
- H.R. 2327 and S. 1406, which would have eliminated authority under section 104(c)(5) of the Marine Mammal Protection Act to import polar bear trophies from Canada
- H.R. 3639, which would have provided additional guidance for the recovery program for southern sea otters, including development and implementation of a health assessment plan, creation of a grant program for sea otter research, and establishment of a southern sea otter recovery implementation team.

Despite introduction and consideration of these bills, no amendments to the Marine Mammal Protection Act were enacted during the first session of the 110th Congress.

Chapter XI

PERMITS AND AUTHORIZATIONS TO TAKE MARINE MAMMALS

The Marine Mammal Protection Act places a moratorium 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. The Act also allows certain exceptions, one providing 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. Permits also are available for the taking of marine mammals in the course of educational or commercial photography and for importing polar bear trophies from certain populations in Canada. The Marine Mammal Commission is to review all permit applications with the exception of those for the importation of polar bear trophies. Activities related to the review of permits are discussed in this chapter.

Another of the Act's exceptions provides for the granting of authorizations by the National Marine Fisheries Service and the Fish and Wildlife Service for the taking of small numbers of marine mammals incidental to activities other than commercial fishing, provided that the taking will have only a negligible impact on the affected stocks. Small-take authorizations and incidental harassment authorizations are discussed in this chapter. The taking of marine mammals incidental to commercial fishing operations is authorized under separate provisions of the Marine Mammal Protection Act and is discussed in Chapter VII.

Permit Application Review

Permits for scientific research, public display, species enhancement, and photography all involve the same four-step review process: (1) individuals or organizations submit permit applications to either the National Marine Fisheries Service or the Fish and Wildlife Service; (2) the Service conducts an initial review, publishes a notice of receipt of the application in the *Federal Register* inviting public review and comment, and transmits the application to the Marine Mammal Commission; (3) the Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, reviews and transmits its recommendation to the Service; and (4) the Service takes final action after consideration of comments and recommendations from the Commission and the public. If captive maintenance of animals is involved, the Service seeks the views of the Animal and Plant Health Inspection Service on the adequacy of facilities, animal husbandry and care programs, and transportation arrangements.

Once a permit is issued, the responsible agency can amend it, provided that the proposed change meets the applicable 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. The Commission reviews proposed amendments to permits, except those considered under the National Marine Fisheries Service's permit regulations to be of a minor nature (i.e., those that do not extend the duration of the research beyond 12 months, result

in the taking of additional numbers or species of animals, increase the level of take or risk of adverse impact, or change or expand the location of the research).

During 2007 the Commission reviewed 31 permit applications submitted to the National Marine Fisheries Service and 8 permit applications submitted to the Fish and Wildlife Service. Of the applications forwarded from the National Marine Fisheries Service, 29 were for scientific research, 1 was for commercial/educational photography, and 1 was for public display. All of the applications forwarded from the Fish and Wildlife Service were for scientific research. In addition, the Commission reviewed 20 permit amendment requests submitted to the Services (16 to the National Marine Fisheries Service and 4 to the Fish and Wildlife Service). In general, the Services adopted the Commission's recommendations concerning these permit actions. The proposed activities, the Commission's recommendations, and the agencies' responses are summarized in Appendix A.

Review of the Scientific Permit Process

In mid-2006 the National Marine Fisheries Service's Office of Protected Resources established an in-house team to review the length of time and the type and quantity of information required for permit application reviews and to make recommendations for possible improvements. As part of the review, the Service is examining its procedures and substantive requirements regarding the purposes, criteria, and mechanisms that should be used to process, evaluate, and issue scientific research permits. Given the special role that the Marine Mammal Commission plays in reviewing permit applications, the Service has requested input from the Commission on these topics as the Service's permit process is evaluated. Members of the Service's permit review team met informally with representatives from the Commission to discuss this topic on 24 May 2006. Major agenda items included clarification of the objectives of the Service's scientific review process as set out under relevant statutes, clarification of the definitions and criteria needed to achieve the objectives of the scientific review process, and identification of the administrative and procedural elements of an ideal and efficiently working permit process. The permit review was ongoing at the end of 2007.

General Authorization for Scientific Research

Amendments to the Marine Mammal Protection Act enacted in 1994 enable the National Marine Fisheries Service and the Fish and Wildlife Service to use streamlined procedures to authorize research that involves taking by Level B harassment only (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). Between 6 and 19 researchers a year have obtained letters confirming that their activities fit within this "general authorization" and that such research is allowed without a permit. During 2007, 19 letters of confirmation were issued under the general authorization by the National Marine Fisheries Service. For certain types of research, this streamlined process has alleviated delays associated with issuing permits. However, the general authorization does not apply to activities that may take endangered or threatened marine mammals. In its testimony before the House Resources Committee's Subcommittee on Fisheries, Wildlife, and Oceans in June 1999, the Commission recommended that the general authorization be expanded to apply to all marine mammals. Such a proposal has yet to be included in the recommended Marine Mammal Protection Act reauthorization bills submitted to Congress by the Secretary of Commerce and the Secretary of the Interior because these agencies believe that amending the Endangered Species Act would be a more appropriate way to implement such a change.

Polar Bear Trophy Imports

Amendments to the Marine Mammal Protection Act enacted in 1994 allow the Secretary of the Interior to issue permits authorizing the importation of polar bear trophies from sport hunts conducted in Canada, provided that certain findings are made. Among other things, the Secretary must find that

Canada has a monitored and enforced sport-hunting program that is (1) consistent with the purposes of the Agreement on the Conservation of Polar Bears and the Marine Mammal Protection Act and (2) based on scientifically sound quotas that will ensure the maintenance of the affected population stock at a sustainable level. Currently, imports of trophies are approved from 6 of 13 management units identified by Canada. Imports from a seventh management unit (M'Clintock Channel) are approved only for bears that were legally harvested prior to 1 April 2000. Imports from other management units are not allowed, pending receipt of additional information sufficient to make the findings required under the Marine Mammal Protection Act. At the end of 2007 the Fish and Wildlife Service was continuing to consult with Canada and to review information concerning changes to Nunavut's polar bear program and the implication of those changes and recent abundance estimates for authorizing trophy imports under the Marine Mammal Protection Act. If warranted based on that review, the Service is expected to publish a proposed rule in 2008 to revise the list of approved management units.

Although the Commission comments to the Service as to whether a polar bear management unit meets the criteria to qualify for importation, it does not comment on individual permit requests to import trophies. Since regulations authorizing the importation of polar bear trophies from Canada were published in 1997, 953 import permits have been issued. Of these, 132 were issued in 1997, 60 in 1998, 142 in 1999, 76 in 2000, 70 in 2001, 52 in 2002, 68 in 2003, 108 in 2004, 61 in 2005, 71 in 2006, and 113 in 2007.

As discussed in Chapter III, on 9 January 2007, the Fish and Wildlife Service published a proposed rule on 9 January 2007 to list polar bears rangewide as threatened under the Endangered Species Act. If such a listing is finalized, polar bears will be considered depleted under the Marine Mammal Protection Act and the importation of polar bear trophies from Canada will no longer be allowed.

Small-Take Authorizations

Section 101(a)(5) of the Marine Mammal Protection Act allows U.S. citizens to obtain authorization to unintentionally take small numbers of marine mammals incidental to activities other than commercial fishing when they meet certain conditions. Applicants can utilize this provision 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. This provision applies to the incidental taking of both depleted and non-depleted species and populations. All forms of incidental taking, including lethal taking, may be authorized by regulation under section 101(a)(5)(A). Section 101(a)(5)(D), added to the Act in 1994, provides a streamlined alternative to the rulemaking required to secure a small-take authorization when the taking will be by harassment only.

Authorizations under section 101(a)(5)(A) require that regulations be promulgated that set 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 for incidental taking by 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. The Secretary may issue authorizations under section 101(a)(5)(A) for periods up to five years. The Secretary may issue incidental harassment authorizations under section 101(a)(5)(D) for periods up to one year. Both types of authorizations may be renewed.

During 2007 the Commission reviewed 21 requests for small-take authorizations, 2 under section 101(a)(5)(A) and 19 under section 101(a)(5)(D). The proposed activities, the Commission's recommendations, and agency responses to the Commission's recommendations are summarized in Appendix A.

Appendix A

2007 MARINE MAMMAL COMMISSION RECOMMENDATIONS AND AGENCY RESPONSES

3 January **To:** National Marine Fisheries Service

Issue: Proposed rule for the 2007 List of Fisheries under the Marine Mammal Protection Act

Recommendation: The Commission recommended that the National Marine Fisheries Service (a) increase and maintain funding for the Alaska marine mammal observer program at levels sufficient to provide timely assessment of marine mammal takes in Alaska's state-managed fisheries or develop alternative measures to assess such takes; (b) observe the California halibut bottom trawl fishery and reevaluate its classification once reliable information on interactions with marine mammals becomes available; (c) reclassify both the California lobster, prawn, shrimp, rock crab, fish pot fishery and the Washington/Oregon/California crab pot fishery as Category II fisheries based on interactions with humpback whales; (d) expedite analyses of humpback whale stock structure in the North Pacific and increase efforts to observe entangled and stranded whales in southeastern Alaska to obtain a more accurate estimate of serious injury and mortality rates incidental to pot fisheries; (e) develop a scientifically sound estimate of the North Pacific sperm whale population size and its potential biological removal (PBR) level to evaluate the potential impacts of fishery interactions; (f) expand efforts to collect reliable information on serious injury and mortality rates of marine mammals incidental to Gulf of Mexico fisheries; and (g) describe the level of observer coverage for each fishery when it publishes the List of Fisheries.

Agency Response: The final List of Fisheries for 2007 was published in the *Federal Register* on 28 March 2007 and became effective on 27 April 2007. In response to the Commission's recommendations, the Service stated, among other things, that (a) due to the high cost of supporting an observer program in Alaska, it is investigating alternatives to implementing full observer programs in these fisheries, such as observing focused portions of the fisheries; (b) observers will be placed on the California halibut bottom trawl fishery beginning in January 2007; (c) it has initiated a review of the trap/pot fisheries to determine whether recategorization of the California lobster, prawn, shrimp, rock crab, fish pot fishery or the Washington/Oregon/California crab pot fishery is appropriate. The Service further responded that (d) preliminary results from the recently concluded study of humpback whales in the North Pacific may be available in 2008 for consideration during preparation of the draft List of Fisheries for 2009; (e) resources currently are not available to assess the abundance of North Pacific sperm whales to calculate a PBR level; and (f) high priority has been placed on investigating bottlenose dolphin stock structure in the Gulf of Mexico, efforts to update abundance estimates are under way, and the Gulf of Mexico menhaden purse-seine fishery has been reclassified as a Category II fishery based on documented serious injury and mortality to bottlenose dolphins.

17 January **To:** National Marine Fisheries Service

Issue: The need for the Service's research facilities to establish Institutional Animal Care and Use Committees (IACUCs) as required under the Animal Welfare Act

Recommendation: The Commission recommended that the National Marine Fisheries Service take immediate action to either (1) take the necessary steps to establish IACUCs or (2) provide the Commission with a detailed explanation as to why these requirements do not apply to the marine mammal research being conducted by the Service. The Commission further recommended that the

Service's permits office refrain from issuing permits for research that is invasive or may harm or substantially disturb marine mammals to applicants who have not satisfied the requirements of the Animal Welfare Act, including review and approval of such activities by an IACUC.

Agency Response: The Service responded by letter of 27 February 2007, stating that a team will be set up to evaluate the establishment of regional Institutional Animal Care and Use Committees and that the team's findings will be provided to the Service's Science Board and Assistant Administrator for Fisheries.

29 January **To:** National Marine Fisheries Service

Issue: Draft Recovery Plan for the Hawaiian Monk Seal

Recommendation: The Commission recommended that the agency place highest priority on funding activities likely to contribute directly to monk seal recovery by increasing survival rates of adult and juvenile females and promoting an increase in the number of seals in the main Hawaiian Islands. It further recommended that the Service (a) adopt the proposed biological criteria for downlisting the species; (b) use a three-category classification of threats that links the definition of threat categories to definitions used for assigning task priorities; (c) provide brief descriptions of work required to carry out each listed task; (d) expand the list of recovery tasks to include studies of monk seal foraging patterns in the main Hawaiian Islands, the preparation of a report analyzing past efforts to mitigate shark predation, the removal of sharks known to be preying on monk seals, the development of a plan for guiding decisions on when and where to move seals at risk of human interactions in the main Hawaiian Islands, and an assessment of procedures to protect seals that haul out on recreational beaches in the main Hawaiian Islands; (e) consult with the Hawaiian Monk Seal Recovery Team to reassess priorities and projected costs assigned to identified tasks; and (f) distinguish between costs in the implementation schedule that should be part of the core monk seal recovery and those more appropriately authorized under other statutes or by other funding sources.

Agency Response: On 20 August 2007 the Service responded, stating that it had made substantial modifications to the draft plan based on the Commission's comments. The Service noted, among other things, that it reevaluated and revised cost estimates for identified tasks, added a number of recommended tasks, highlighted the importance of developing a captive care program to improve juvenile female survival, reorganized parts of the plan, and revised the analysis of threats to the species.

30 January **To:** National Marine Fisheries Service

Issue: An application from the Army Corps of Engineers–Portland District 6 to take small numbers of Steller sea lions, California sea lions, and Pacific harbor seals by harassment incidental to the repair of the south jetty at the mouth of the Columbia River in Clatsop County, Oregon

Recommendation: The Commission recommended approval, provided that the monitoring and mitigation activities proposed in the Service's *Federal Register* notice are carried out as described.

Agency Response: The Service issued the incidental harassment authorization on 17 April 2007 consistent with the Commission's recommendation.

30 January **To:** National Marine Fisheries Service

Issue: An application from the California Department of Transportation to take small numbers of California sea lions, Pacific harbor seals, and gray whales incidental to construction of a replacement for the east span of the San Francisco–Oakland Bay Bridge

Recommendation: The Commission recommended approval, provided that the monitoring and mitigation activities proposed in the Service's previous and recent *Federal Register* notices are carried out as described.

Agency Response: The incidental harassment authorization was issued on 1 May 2007, consistent with the Commission's recommendation.

7 February **To:** Florida Fish and Wildlife Conservation Commission

Issue: The Florida Fish and Wildlife Conservation Commission's Draft Manatee Management Plan, *Trichechus manatus latirostris*

Recommendation: The Commission recommended that the Florida Commission (a) expand the plan and identify the source and confidence interval for the estimate of 2,181 mature animals in the population; (b) delete measurable biological goal number 1 concerning annual adult survival rates or revise it to identify an adult survival rate that would be sufficient to ensure that the population increases toward its carrying-capacity level; (c) replace measurable biological goal number 2 concerning warm-water carrying capacity with a new goal specifying that, in addition to the minimum number of mature animals set by goal 3, a certain proportion of the overall population of Florida manatees (e.g., 50 percent) are using natural warm-water refuges for winter survival before Florida manatees could be removed from the state's list of imperiled species; and (d) expand the description of measurable biological goal number 3 (minimum number of mature Florida manatees) by providing both the legal and scientific basis for proposing a recovery goal (i.e., 2,500 mature animals) that is substantially lower than the state's adopted threshold for adding or removing a species or population from the state's imperiled species list.

Agency Response:

7 February **To:** National Marine Fisheries Service

Issue: A request from James T. Harvey, Ph.D., for authorization to capture up to 670 harbor seals annually over a five-year period in central California, Puget Sound, and Glacier Bay, Alaska; accidentally kill two harbor seals annually; and harass up to 2,910 harbor seals, up to 45 California sea lions, and up to 20 northern elephant seals annually during research to determine the ecological role of harbor seals in the nearshore system and to monitor the health of harbor seals along the coasts of California, Oregon, Washington, and southeast Alaska

Recommendation: The Commission recommended that the permit be issued with provisions.

Agency Response: The permit was issued on 20 April 2008. The Commission's recommended provisions were adopted.

9 February **To:** National Marine Fisheries Service

Issue: Applications submitted by ConocoPhillips Alaska, Inc., and Union Oil Company of California to take small numbers of beluga whales, Pacific harbor seals, harbor porpoises, Steller sea lions, and killer whales incidental to conducting open-water seismic operations in Cook Inlet, Alaska

Recommendation: The Commission recommended approval of the requests, provided that, among other things, (a) the applicants be required to institute monitoring and mitigation measures sufficient to afford the potentially affected marine mammal species adequate protection from sources of disturbance; (b) the period of observation be extended from 15 to 30 minutes before it is assumed that an animal has moved beyond the safety zone; and (c) observations be carried out during all ramp-up procedures to gather data regarding the effectiveness of ramp-up as a mitigation measure.

Agency Response: The incidental harassment authorization was issued on 30 March 2007. The Commission's recommendations were adopted.

14 February **To:** National Marine Protected Areas Center, Office of Ocean and Coastal Resource Management, NOAA

Issue: Draft Framework for Developing the National System of Marine Protected Areas

Recommendation: The Commission recommended that the Marine Protected Areas Center work with its federal, state, tribal, and other partners to (a) adopt and implement the framework; (b) analyze marine managed areas to determine the level and nature of protection they provide and develop a more informative scheme for categorizing such areas so that the level of protection is evident; (c) establish specific, explicit, measurable, and precautionary goals for the national system based on the anticipated nature, size, and distribution of marine protected areas required to ensure healthy marine ecosystems; and (d) evaluate the current inventory of MPAs, identify gaps in the system based on target goals, and devise a strategy to address those gaps.

Agency Response:

15 February **To:** National Marine Fisheries Service

Issue: A permit request from the Northeast Fisheries Science Center to (a) harass various species of cetaceans, including right whales, during vessel and aircraft line-transect and photo-identification surveys in waters within or near the U.S. Exclusive Economic Zone from Florida to Maine; (b) biopsy-sample up to 60 right whales and suction-cup tag up to 40 right whales annually; (c) capture, sample, conduct ultrasound examination, and tag harbor and gray seals; and (d) harass harp and hooded seals incidental to the research activities on harbor and gray seals

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit had not been issued at the end of 2007.

20 February **To:** National Marine Fisheries Service

Issue: A request from the Southwest Fisheries Science Center to amend a permit authorizing the capture, handling, tagging, and release of up to 710 Antarctic fur seals and up to 20 leopard seals annually at Cape Shirreff, South Shetland Islands, Antarctica, to study the life history, abundance, and distribution of Antarctic pinnipeds. The permit-holder requested that the permit be amended to increase the authorized number of research-related mortalities to three adult or juvenile Antarctic fur seals, five Antarctic fur seal pups, and two adult or juvenile leopard seals annually.

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit amendment was issued on 14 March 2007. The Commission's recommended provisions were adopted.

22 February **To:** National Marine Fisheries Service

Issue: A proposal to list the North Pacific right whale (*Eubalaena japonica*) and the North Atlantic right whale (*E. glacialis)* as endangered under the Endangered Species Act to recognize North Atlantic and North Pacific right whales as separate species

Recommendation: The Commission recommended that the National Marine Fisheries Service (a) adopt the proposed rules separately listing the two species as endangered; (b) prepare, adopt, and implement a recovery plan for the North Pacific right whale as soon as possible; (c) revise the draft status review and write the final listing rules to indicate that right whale species in the North Pacific and North Atlantic Oceans each likely compose two separate (eastern and western) populations and should be managed as such; and (d) conduct the necessary research and analyses to determine whether these are distinct population segments that warrant separate management under the Endangered Species Act.

Agency Response: The final rule had not been published at the end of 2007.

22 February **To:** National Marine Fisheries Service

Issue: An application from ConocoPhillips, Alaska, Inc., to harass ringed seals incidental to conducting on-ice geotechnical operations as part of a site clearance survey north of Cross Island, Alaska, in spring 2007

Recommendation: The Commission recommended approval with provisions, including that mitigation measures are carried out as described in the application and the Service's *Federal Register* notice, and that trained dogs be used for locating ringed seal lairs and other structures.

Agency Response: The Service issued the incidental harassment authorization on 13 April 2007, adopting the Commission's recommendation regarding mitigation measures. The Service agreed that the use of trained dogs is the best method to detect ringed seals in winter, but that the use of experienced subsistence hunters should be an alternative before the ringed seal pupping season begins in mid-March.

26 February **To:** U.S. Fish and Wildlife Service

Issue: Draft Interim Visitor Services Plan for the Midway Atoll National Wildlife Refuge and its possible impact on Hawaiian monk seals and spinner dolphins

Recommendation: The Commission recommended that the Service (a) adopt measures identified in the draft plan to prevent visitor impacts on Hawaiian monk seals; (b) clarify that those measures include a 500-ft approach limit around monk seal mother-pup pairs; (c) apply the 500-ft shoreline approach limit proposed for powerboats to independent kayakers and limit closer approaches by kayaks to small groups led by an FWS employee or FWS-approved guide; (d) consult with the National Marine Fisheries Service to identify areas of the fringing reef that should be protected to avoid disturbance of monk seals; (e) consult with the National Marine Fisheries Service to identify appropriate approach distances or other measures necessary to prevent divers or watercraft from disturbing spinner dolphins; (f) limit all activities with the potential to disturb Hawaiian monk seals or spinner dolphins and all access to areas where such disturbance may occur to tours accompanied by an FWS employee or FWS-approved guide until planned sign posting is completed and an enforcement officer is present at the atoll; and (g) consult with the National Marine Fisheries Service on steps to monitor compliance with protective measures and to assess potential visitor impacts on Hawaiian monk seals before approving the interim plan.

Agency Response: The Service's Draft Interim Visitor Services Plan for the Midway Atoll National Wildlife Refuge was approved on 23 May 2007. In its response to the Commission, the Service stated, among other things, that the mandatory orientation for visitors will include all aspects of appropriate behavior if a Hawaiian monk seal is encountered, a visual demonstration of a 150-ft distance, specific indicators of wildlife behavioral responses to disturbance, as well as appropriate visitor response to being approached by wildlife. Also, a map of preferred monk seal sites has been developed and these areas will be avoided by visitor activities. In addition, the Service will work with the National Marine Fisheries Service to review Hawaiian monk seal "hot spots" and will avoid any areas where monk seals are seen on the emergent reef, and to develop a monitoring plan to assess impacts to Hawaiian monk seals from the visitor program.

2 March **To:** National Marine Fisheries Service

Issue: Proposed recovery plan for the southern resident stock of killer whales (*Orcinus orca*)

Recommendation: The Commission recommended that the Service (a) revise the delisting and downlisting criteria to be more explicit and measurable; (b) revise biological criterion 2, requiring "no significant increases in mortality rate for any sex or age class," to be more precautionary with respect to numbers of reproductive males and females that would be required before consideration

of downlisting or delisting; (c) assign high priority to monitoring population status; (d) assign high priority to monitoring and evaluation of the effectiveness of recovery actions; and (e) clarify the relationships among specific delisting or downlisting criteria, recovery measures, and research and monitoring activities to ensure internal consistency in the recovery program.

Agency Response: The final recovery plan had not been published at the end of 2007.

6 March **To:** National Marine Fisheries Service

Issue: Regulations to govern the taking of Cook Inlet beluga whales by Alaska Natives

Recommendation: The Commission noted that an updated trend analysis of the population concludes that there is a 98 percent probability that the growth rate of the Cook Inlet beluga population is below 2 percent and an 81 percent probability that the population is declining. The Commission stated that the new estimate also solidifies the view that the population remains below 350 whales, the level below which no harvest would be allowed under the Service's proposed long-term harvest regime. The Commission reiterated the recommendation made in its 8 March 2006 letter that the Service's final rule provide sufficient flexibility to allow the Service to reduce or suspend hunting during the interim harvest period until the population shows clear evidence that it is recovering fast enough that it could continue to recover while being harvested. The Commission further recommended that the Service use its unilateral authority to suspend the 2007 harvest if the Cook Inlet Marine Mammal Council members are unwilling to voluntarily forego hunting.

Agency Response:

6 March **To:** National Marine Fisheries Service

Issue: A request from Mystic Aquarium to amend a permit that authorizes the permit-holder to (1) conduct nutritional research on captive Steller sea lions and (2) receive, import, and export samples from a variety of pinniped and cetacean species, some of which are listed under the Endangered Species Act, for research on marine mammal health. The permit-holder requested that the permit be amended to increase the number of animals from which blood samples may be received, imported, or exported from 500 pinnipeds and 500 cetaceans per year to 5,000 pinnipeds and 5,000 cetaceans per year.

Recommendation: The Commission recommended approval, provided that the conditions currently contained in the permit remain in effect.

Agency Response: The permit amendment was issued on 14 May 2007, consistent with the Commission's recommendation.

8 March **To:** National Marine Fisheries Service

Issue: An application from Shell Offshore, Inc., to harass ringed seals, bearded seals, and spotted seals incidental to conducting an on-ice marine geophysical research and development program in the U.S. Beaufort Sea from March to May 2007

Recommendation: The Commission recommended approval, with provisions, including that the safety zone for pinnipeds be enlarged to the 180 dB re 1 µPa (root mean square) isopleths because the seals' susceptibility to sounds when in lairs may be higher and options for avoiding sound sources more limited.

Agency Response: The Service responded that the 190 dB re 1 µPa (root mean square) is used in estimating the onset of temporary threshold shift for pinniped hearing underwater when exposed to pulse sounds from airguns during seismic surveys. The Service considered these criteria to be

conservative in terms of preventing TTS [temporary threshold shift] occurrence in pinnipeds. Also, the Service stated that establishing a larger safety zone would compromise the effectiveness of monitoring since a larger area would have to be observed and would not necessarily provide extra protection for seals. The Service noted that trained dogs will be used to find seal structures and any seismic activities will be at least 500 m away from the nearest seal structure, which corresponds to a zone with sound pressure levels below 180 dB re 1 μPa on its outer boundary; (2) most acoustic energies from the airgun are emitted under the water and may not even be audible to seals in lairs; and (3) ringed seals have a number of lairs and breathing holes available in their area.

14 March **To:** U.S. Fish and Wildlife Service

Issue: Harassment of manatees by the public in Kings Bay, Florida

Recommendation: The Commission reiterated its recommendation that the Service review and revise its educational materials for divers to advise explicitly that touching manatees is not acceptable. The Commission also recommended that the Fish and Wildlife Service immediately develop and implement new regulations requiring divers to maintain a distance of at least 10 feet from manatees and to back away from any animal that approaches them. The Commission further noted that the Service's approach for addressing public interactions is inconsistent with that of the National Marine Fisheries Service and that such inconsistency may cause unnecessary confusion for the public

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Agency Response:

16 March **To:** National Marine Fisheries Service

Issue: A request from Robin W. Baird, Ph.D., to amend a permit authorizing the harassment of 35 species of cetaceans and 4 species of pinnipeds in U.S. and international waters in the Pacific Ocean during the conduct of aerial and vessel surveys and photo-identification studies, and suction-cup tagging to study the species' diving and nighttime behavior, population numbers, and social organization and interspecific interactions. The permit-holder requested that the permit be amended to authorize the tagging with satellite and VHF radio tags of up to 20 animals per year of several cetacean species, primarily in Hawaiian waters.

Recommendation: The Commission recommended approval with provisions, including that, to the extent practicable, post-tagging monitoring of attachment sites be conducted.

Agency Response: The permit amendment was issued on 29 May 2007. The Commission's recommended provisions were adopted.

19 March **To:** National Marine Fisheries Service

Issue: A request from Terri Williams, Ph.D., to amend a permit authorizing the capture, handling, sampling, tagging, recapture, and release of up to 20 Weddell seals annually over a five-year period and the harassment of up to 40 Weddell seals annually incidental to the research activities. The permit-holder requested that the permit be amended to authorize a change in scheduling of the research; change the schedule for capturing and handling animals from 20 animals annually for five years to 50 animals annually for two years; reduce the size of the data recorder by 50 percent; and use open-flow respirometry metabolic measurements instead of doubly labeled water analysis for assessing metabolic rates to allow the measurement of detailed seasonal changes in metabolism.

Recommendation: The Commission recommended approval provided that the conditions currently contained in the permit remain in effect.

Agency Response: The permit amendment was issued on 5 April 2007, consistent with the Commission's recommendation.

21 March **To:** National Marine Fisheries Service

Issue: A permit application from Daniela Maldini, Okeanis, requesting authorization over a five-year period to harass bottlenose dolphins during vessel surveys, photo-identification, and behavioral observations, and to biopsy-sample up to 180 adult bottlenose dolphins over five years to investigate stock structure, demographics, residency patterns, and toxicity loads of coastal and offshore animals off the coast of California, primarily in Monterey Bay and Santa Monica Bay

Recommendation: The Commission recommended, contingent upon receipt and approval by the Service, in consultation with the Commission of additional information concerning several aspects of the proposed research.

Agency Response: The permit request was denied on 4 April 2007.

23 March **To:** National Marine Fisheries Service

Issue: The Service's five-year reviews of the status of fin whales, sperm whales, and southern right whales under provisions of the Endangered Species Act

Recommendation: The Commission noted that all three species occur in several ocean basins and as multiple populations, and it is likely that some or many of those populations are both separate and significant. The Commission stated that, as such, they need to be identified and assessed individually as discrete population segments. The Marine Mammal Commission recommended that for each species the Service compile and review all available information on population structure and use that information to identify discrete population segments and assess the status of each of the individual populations.

Agency Response: The five-year review of the status of the southern right whale was published in October 2007.

2 April **To:** National Marine Fisheries Service

Issue: An application from Oregon, Washington, and Idaho seeking lethal removal authority for pinnipeds preying on salmon and steelhead in the Columbia River

Recommendation: To ensure that the review being conducted by the Pinniped-Fishery Interaction Task Force is fully consistent with the letter and spirit of the Marine Mammal Protection Act, the Commission recommended that the task force (a) consider and explain in detail what constitutes a "significant negative impact" from sea lion predation on endangered and threatened salmonid stocks in the Columbia River; (b) review all available information on the various salmonid stocks in the Columbia River, their status under the ESA, and their temporal overlap with each other and with the occurrence of pinnipeds in the Columbia River, as well as all available information on fishing and other forms of human-related take of those stocks; (c) describe the specific sea lion individuals that are having significant negative impacts on salmonid stocks in the Columbia River so that, to the extent possible, only those animals are subject to lethal removal; (d) consider whether lethal removal authority should be limited to individually identifiable (e.g., marked) animals that are actively engaged in predation of listed salmonid stocks at the dam rather than being based on past involvement in such predation or involvement in other areas of the river; (e) take a hard look at the justification for the number of any lethal removals that it recommends be authorized based on (1) all available information about the presence and behavior of sea lions near Bonneville Dam, (2) experience at Ballard Locks, (3) evidence that most of the predation may be caused by a few individuals, and (4) other relevant information; (e) assess the feasibility of non-lethal alternatives to lethal removal in light of the number of such removals it believes are necessary. The Commission further recommended that an individual associated with the Commission be appointed to the task force.

Agency Response: Effective 4 September 2007, the Task Force was established. It consisted of 18 members including designated employees of the Department of Commerce, scientists knowledgeable about pinniped-fishery interactions, representatives of affected conservation and fishing community organizations, Indian Treaty Tribes, the states, and the U.S. Army Corps of Engineers, which operates the Bonneville Dam. On 6 November 2007 the Service requested the Commission's review and comments on the Task Force's recommendations. The Commission responded by letter of 23 November 2007 (see that date).

2 April **To:** National Marine Fisheries Service

Issue: Draft Programmatic Environmental Impact Statement on the Effects of National Marine Fisheries Service Permitted Scientific Research Activities on Threatened and Endangered Steller Sea Lions and Depleted Northern Fur Seals

Recommendation: The Commission recommended that (a) the draft be revised to include a thorough discussion of the costs and benefits of an adaptive experimental approach to assess potential fishery effects; (b) the Service develop a research implementation plan that provides the functional framework for establishing annual research and recovery priorities in accordance with the recovery plan; (c) the draft be revised to include (1) the data and/or assumptions about the rates of post-research mortality and non-lethal effects on Steller sea lions and northern fur seals, and (2) information on such rates from scientific reports and other data sources such as photo-identification databases and telemetry reports; (d) greater emphasis be given in the document to evaluating potential unintended effects of research activities; (e) the Service and other researchers seek to optimize the value and minimize the costs of their research strategies by identifying and using "best practices" whenever possible; (f) any alternative chosen by the Service include additional coordination, mitigation, and monitoring measures to minimize the potential impacts of the research on Steller sea lions, northern fur seals, and their habitats and on the availability of these species for subsistence hunters; and (g) the Service collect and maintain information on the handling of individual animals from endangered, threatened, and depleted species in a database that, over time, will provide a basis for judging whether adverse effects are occurring as a result of cumulative takes during scientific studies.

Agency Response: The final programmatic environmental impact statement was completed in May 2007 and an official Record of Decision was signed on 18 June 2007. In response to the Commission's recommendations, the Service stated, among other things, that (a) the purpose and need for the proposed action is to award grants and issue permits under section 104 of the Marine Mammal Protection Act and section 10 of the Endangerd Species Act to facilitate research-associated recovery and conservation of Steller sea lions and northern fur seals; (b) it agreed that a research implementation plan should be developed that addresses, among other items, a framework for guiding research in accordance with the recovery and conservation plans; (c) the final statement has been revised to include additional documentation and research results to support the estimates and risk classifications used in the mortality assessment tables; and (d) it plans to collaborate with researchers and other stakeholders to develop protocols for assessing impacts of research on animals.

2 April **To:** U.S. Fish and Wildlife Service

Issue: A permit request from Lance G. Barrett-Lennard, Ph.D., for authorization to take by harassment up to 120 northern sea otters in Alaska waters over two field seasons to study the vigilance behavior of the animals in response to killer whales

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit was issued on 11 May 2007. The Commission's recommended provisions were adopted.

6 April **To:** National Marine Fisheries Service

Issue: A request from the National Marine Mammal Laboratory to amend a permit authorizing the harassment of various species of cetaceans in U.S., international, and Antarctic waters in the course of observational and photo-identification activities, biopsy sampling, and tagging over a five-year period. The permit-holder requested that the permit be amended to increase the number of gray whales that can be biopsy-sampled and tagged, increase the number of killer whales from stocks other than the southern resident stock that can be biopsy-sampled and tagged, and authorize the taking by harassment of dwarf and pygmy sperm whales; rough-toothed, pantropical spotted, Hawaiian spinner, and striped dolphins; and melon-headed whales in Hawaiian waters during dedicated and/or opportunistic aerial and vessel surveys, photo-identification, tagging, and biopsy sampling.

Recommendation: The Commission recommended approval, provided that the conditions currently contained in the permit remain in effect.

Agency Response: The permit amendment had not been issued at the end of 2007.

6 April **To:** National Marine Fisheries Service

Issue: A permit request from The Whale Center of New England for authorization to take by harassment up to 400 humpback whales, 250 fin whales, and 100 sei whales during photo-identification studies; up to 75 of the 400 humpback whales, 75 of the 250 fin whales to be biopsy-sampled annually; and up to 40 humpback whales, 20 fin whales, and 25 sei whales to be suction-cup tagged annually, to assess the health, status, and trends of these species off the U.S. Atlantic coast

Recommendation: The Commission recommended approval of the requested permit with provisions.

Agency Response: The permit had not been issued at the end of 2007.

9 April **To:** Fish and Wildlife Service

Issue: The Service's petition finding and proposed rule to list the polar bear (*Ursus maritimus*) under the Endangered Species Act as a threatened species throughout its range

Recommendation: The Commission recommended that the Service (a) list the polar bear as threatened throughout its range; (b) collaborate with other range states to develop, expand, and enhance national and international conservation programs for polar bears, including protection of their habitat; (c) conduct a post-listing, Arctic-wide review of future management and research needs to ensure that those needs are identified and proactively addressed; (d) designate as critical habitat those terrestrial areas on the North Slope of Alaska used by polar bears for maternity denning as soon as the listing becomes final; (e) consider designating as critical habitat areas of multiyear or annual pack ice north of Alaska that may provide suitable maternity denning habitat for polar bears; (f) implement a long-term study to monitor the denning success and the survival rates of adult female polar bears in the most important terrestrial denning habitats in northern Alaska; (g) implement a study to evaluate the importance of terrestrial habitat for polar bears seeking summer refuge and to identify management actions needed to minimize the occurrence of human–polar bear interactions and maximize the probability of survival of the animals; (h) implement a study to identify important feeding areas and movement/migration corridors and consider designating those areas as critical habitat; and (i) consider ways in which the conservation benefits of allowing imports of sport-hunted polar bear trophies from well-managed populations in Canada (1) could be retained when the listing of polar bears is made final and (2) could be strengthened to enhance, rather than diminish, the long-term viability of polar bear populations.

Agency Response: No action had been taken on the proposed listing at the end of 2007.

11 April **To:** Department of State

Issue: A need for a concerted effort to save the vaquita from extinction, both as a vital element of the Gulf of California ecosystem and as an invaluable part of Mexico's natural heritage

Recommendation: The Commission, under authority of the Marine Mammal Protection Act, advised the Department of State to promote joint action and investment by the Mexican and U.S. governments to achieve the needed socioeconomic transition necessary for vaquita conservation.

Agency Response:

11 April **To:** National Marine Fisheries Service

Issue: An application from Northeast Gateway Energy Bridge and Algonquin Gas Transmission to take by harassment various species of seals, toothed whales, and baleen whales, including North Atlantic right whales, incidental to the construction and operation of a deep-water port in Massachusetts Bay.

Recommendation: The Commission recommended approval of the request provided that (a) all marine mammal mitigation, monitoring, and reporting measures identified in the *Federal Register* notice are included in the authorization, and that the applicant be required to install a near-real-time passive acoustic array; (b) the authorization explicitly identify which construction and operation activities would be suspended when whales are detected within specified distances; (c) the authorization include criteria and procedures for suspending and resuming construction activities using passive acoustic monitoring to detect whales and other protected species; (d) consistent with navigational safety, tankers using the port restrict speeds to 10 knots at all times when transiting the Stellwagen Bank National Marine Sanctuary and between 1 March and 30 April when in those portions of the Race Point management area that are outside sanctuary boundaries; and (e) vessels of less than 300 gross tons carrying supplies or crew between the shore and the construction site contact the appropriate authority before leaving shore or the construction site for reports of right whale sightings and, consistent with navigational safety, restrict speeds to 10 knots or less within five miles of any recent sighting locations.

Agency Response: The Service issued the incidental harassment authorization on 7 May 2007. The Service agreed with most of the Commission's recommendations. It disagreed with the recommendation of setting specified shutdown criteria for each construction and operation activity for a specified received level, noting that it is virtually impossible to do this because of the complexity of oceanographic and ocean bottom topographical features and the wide range of construction and operation equipment being used for the project. The Service noted that the applicant will adopt the most conservative estimates of "take" by using the largest zone of influence (34 km^2, or 13.1 mi^2) for 120 dB re 1µ Pa in shallow water (40 m, or 131 ft) in their calculation, regardless of the type of construction and operation activities.

20 April **To:** National Marine Fisheries Service

Issue: A request from the Southwest Fisheries Science Center to amend a permit authorizing over a five-year period the harassment of various species of pinnipeds and cetaceans in U.S. Pacific and international waters in the course of observational and photo-identification activities, biopsy-sampling, and tagging. The permit-holder requested that the permit be amended to reorganize the take table to reflect annual takes instead of five-year cumulative takes; increase the authorized number of individuals of several cetacean species to be biopsy-sampled, tagged, and harassed during aerial and vessel surveys; collapse authorized takes of six cetacean stocks to the species level; authorize Antarctic minke whales as a species to be harassed during aerial and vessel surveys and to be biopsy-sampled; add four new categories for classifying cetaceans that are observed but not identifiable during surveys; add several cetacean species/stocks to those that may be harassed and biopsy-sampled in the Southern and Pacific Oceans; and satellite-tag up to 50 non-endangered killer whales in Antarctic waters.

Recommendation: The Commission recommended approval, provided that the conditions currently contained in the permit remain in effect.

Agency Response: The permit amendment had not been issued at the end of 2007.

2 May **To:** National Marine Fisheries Service

Issue: Regarding 13 permit applications requesting authorization to continue and/or initiate research on the ecology and biology of threatened and endangered Steller sea lions and depleted northern fur seals to better understand the cause(s) of their declines

Recommendation: The Commission provided specific comments regarding each individual application and the general recommendation that the Service approve the applications, provided that (a) the Service address the Commission's recommendations concerning the draft programmatic environmental impact statement for the proposed actions; (b) the Service appoint (1) implementation teams to develop implementation plans for the Steller sea lion recovery plan and northern fur seal conservation plan, and (2) a research review group to oversee and coordinate the combined activities of all the programs conducting research on these populations; (c) when required by the Animal Welfare Act, research proposed in each of the subject permit applications be reviewed and approved by Institutional Animal Care and Use Committees (IACUCs), and confirmation of IACUC review and approval be required as part of the application process for all scientific research permits; (d) the Service require implementation plans and applicable permits to incorporate science-based methods for assessing the impact of research activities whenever there is a reasonable basis for concern about their impacts; (e) each research permit applicant be required to report on related research activities in the previous year; (f) the Service establish and maintain a database on the various procedures (e.g., capture, anesthesia, instrument attachment, surgery) done on individually recognizable Steller sea lions and northern fur seals and evaluate the information in that database to resolve uncertainties concerning the potential for adverse research effects; and (g) the use of general anesthesia be required for branding activities and similarly painful procedures, with adequate justification and specific authorization required in advance for any proposed exceptions.

Agency Response: The Service's responses to the Commission's recommendations regarding the draft programmatic environmental impact statement are discussed in Chapter III of this report. On 21 June 2007, the Service issued permits to the National Marine Mammal Laboratory; the Alaska Department of Fish and Game; the University of Alaska Fairbanks; the Alaska SeaLife Center; the Oregon Department of Fish and Wildlife; Kate Wynne, University of Alaska Fairbanks; Markus Horning, Oregon State University; the North Pacific Universities Marine Mammal Research Consortium; the Aleut Community of St. Paul Island; and the Aleut Community of St. George Island. Amendments to permits to the Alaska SeaLife Center, the North Pacific Universities Marine Mammal Research Consortium, and Markus Horning were issued on 19 July and 28 August 2007.

3 May **To:** U.S. Fish and Wildlife Service

Issue: An application from Edward Keith, NOVA Southeastern University, requesting authorization to take by harassment over a two-year period up to 30 Florida manatees during approaches on foot or by boat to study the effectiveness of sonar forward-looking fish-finder devices in detecting manatees

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit was issued on 20 August 2007. The Commission's recommended provisions were adopted.

10 May **To:** National Marine Fisheries Service

Issue: An application from Shell Offshore, Inc., to take by harassment bowhead, gray, and beluga whales, and ringed, spotted, and bearded seals incidental to conducting open-water offshore exploratory drilling on Outer Continental Shelf oil lease blocks in the Beaufort Sea off Alaska

Recommendation: The Commission recommended that the Service defer approval of the request until the applicant had explained how the number of marine mammals likely to be taken has been calculated; provided a full analysis of the likely impacts of the action on beluga whales and a clear description of how potential impacts on bowhead and beluga whales will be mitigated to ensure that they are taken only in small numbers, and has committed to conclude a conflict avoidance agreement with beluga whale subsistence hunters, and until the Service has adopted sufficient safeguards to ensure that the action will not have an unmitigable adverse impact on Alaska Native subsistence hunting for beluga whales at Point Lay and Wainwright.

Agency Response: The incidental harassment authorization was issued on 25 October 2007.

10 May **To:** National Marine Fisheries Service

Issue: An application from Scripps Institution of Oceanography to take by harassment small numbers of marine mammals incidental to conducting a seismic survey in the northeastern Indian Ocean

Recommendation: The Commission noted the uncertainties concerning the effects of sound on beaked whales and possibly other species, and stressed that caution is therefore warranted and recommended that the Service issue the requested authorization, provided that the applicant is required to conduct all practicable monitoring and mitigation measures that reasonably can be expected to protect the potentially affected marine mammal species from serious injury.

Agency Response: The Service issued the incidental harassment authorization on 20 June 2007. The Service adopted the Commission's recommendation.

21 May **To:** National Marine Fisheries Service

Issue: A permit application from the National Marine Fisheries Service, Office of Science and Technology, requesting authorization to take up to 375 beaked whales, 203 short-finned pilot whales, 263 Risso's dolphins, 299 melon-headed whales, and 113 sperm whales by harassment during close approaches for photo-identification, tagging, and playback studies between June and October 2007

Recommendation: The Commission recommended approval with provisions, including that the Service consult with the applicant regarding the steps that will be taken to monitor any animals that appear to be injured or disoriented during the playback experiments and to recover and necropsy any animals that may have died as a result of the activities.

Agency Response: The Service issued the permit on 14 August 2007. The Commission's recommended provisions were adopted.

24 May **To:** National Marine Fisheries Service

Issue: A permit application from the North Slope Borough, Department of Wildlife Management, requesting authorization to collect and transport tissues from subsistence-hunted and stranded (dead) marine mammals (i.e., 100 bearded seals, 100 ringed seals, 100 spotted seals, 100 ribbon seals, 60 bowhead whales, 100 beluga whales, 10 minke whales, and 10 gray whales) annually over a five-year period for use in a variety of health-related analyses

Recommendation: The Commission recommended approval.

Agency Response: The permit was issued on 18 July 2007, as recommended by the Commission.

24 May **To:** National Marine Fisheries Service

Issue: An application from United Launch Alliance to take by harassment Pacific harbor seals, California sea lions, and northern elephant seals incidental to activities related to the Delta IV/Evolved

Expendable Launch Vehicle at South Vandenberg Air Force Base, California

Recommendation: The Commission recommended approval, provided that all reasonable measures will be taken to ensure the least practicable impact on the subject species and that the required mitigation and monitoring activities be carried out as described in the Service's *Federal Register* notice and the application.

Agency Response: The incidental harassment authorization was issued on 18 June 2007. The Service adopted the Commission's recommendation.

25 May **To**: Hawaii Department of Land and Natural Resources

Issue: A request from the Pacific Islands Fisheries Science Center for a permit to conduct shark control activities for the purpose of halting the decline and promoting the recovery of the Hawaiian monk seal population at French Frigate Shoals and restoring the affected marine ecosystem so that it also includes the seals

Recommendation: The Commission noted that the proposed work (1) will provide important insights that will improve future management of this shark predation problem and (2) does not pose a significant risk to the shark population or the ecosystems, whereas it could be critical for the monk seal population. The Commission stated that postponing or failing to conduct the proposed work may subject the monk seal population to further losses, which it clearly cannot tolerate. Consequently, the Commission urged the Department to approve the permit.

Agency Response:

30 May **To:** National Marine Fisheries Service

Issue: A draft programmatic environmental impact statement on the Marine Mammal Health and Stranding Response Program

Recommendation: The Commission recommended that the Service revise the draft statement to (a) provide an update on the status of final reports of unusual mortality events, explore ways to promote completion and circulation of final reports more promptly, and identify actions that the Service can take to improve the synthesis and use of data from unusual mortality events; (b) discuss the criteria that the Service intends to use in its review and approval or disapproval of recommended releases of marine mammals, and plans for such releases, by rehabilitation facilities; (c) identify the types of information that would be included in protocols for monitoring released animals; (d) specify actions that the Service plans to take to ensure that rehabilitation facilities are in compliance with the Interim Standards for Rehabilitation Facilities; (e) elaborate on the Service's plans for developing draft guidelines to govern when public display of marine mammals undergoing rehabilitation will be authorized, including opportunities for the Commission, the affected facilities, and the public to review the draft guidelines before their adoption; and (f) discuss alternatives for addressing overcrowding at rehabilitation facilities, issues associated with the placement of non-releasable marine mammals in public display facilities, and criteria for making on-site evaluations of the likelihood that stranded marine mammals can be successfully rehabilitated and released.

Agency Response: A revised impact statement had not been published at the end of 2007.

4 June **To:** U.S. Fish and Wildlife Service

Issue: A permit application from the U.S. Geological Survey, Alaska Science Center, requesting authorization to capture, measure and weigh, sample, biopsy-sample, tag, mark, conduct bioelectrical impedance measurements on, and release up to 100 polar bears annually over five years and to import

an unspecified number of blood, tissue, and tooth samples collected from polar bears taken legally in Canada, Greenland, Norway, and Russia and to export samples to researchers in those countries

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit was issued on 30 August 2007. The Commission's recommended provisions were adopted.

4 June **To:** National Marine Fisheries Service

Issue: A permit application from Scripps Institution of Oceanography requesting authorization to photo-identify, biopsy-sample, and suction-cup tag various numbers of up to 31 species of cetaceans off the U.S. West Coast and offshore of the main Hawaiian Islands over a five-year period

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit had not been issued at the end of 2007.

14 June **To:** National Marine Fisheries Service

Issue: A permit application from Robert A. Garrott, Ph.D., requesting authorization to annually capture, tag, weigh, tissue sample, and release up to 1,125 Weddell seals and to approach up to 2,000 additional Weddell seals up to 10 times annually to read tags during population surveys within 500 km of McMurdo Sound, Antarctica, over a five-year period

Recommendation: The Commission recommended approval with provisions.

Agency Response: The Service issued the permit on 5 September 2007, as recommended by the Commission.

19 June **To:** National Marine Fisheries Service

Issue: A permit application from Brent Stewart, Ph.D., J.D., requesting authorization to conduct research on crabeater, Ross, leopard, and Weddell seals in Antarctica

Recommendation: The Commission recommended that (1) consideration of the application by the Service be suspended pending receipt of necessary information for review by the Commission and its Committee of Scientific Advisors, and (2) if the information is not provided, the Service invoke section 216.33(c)(4) of its permit regulations and consider the application to have been withdrawn.

Agency Response: The Service denied the permit on 23 July 2007.

26 June **To:** National Marine Fisheries Service

Issue: The Service's draft summary and evaluation of the five-year review of the southern right whale listing under the Endangered Species Act

Recommendation: The Commission agreed with the review's conclusion that no change is needed in the classification of this species as endangered. The Commission concurred with the report's conclusion that southern right whales likely consist of several distinct population segments and seconded the recommendation for a full analysis to identify these possible segments. However, the Commission recommended that such analysis be deferred to allow the Service's limited staff and resources to be directed toward right whale recovery in the North Pacific and North Atlantic Oceans where populations are at considerably greater risk of extinction.

Agency Response:

29 June **To:** National Marine Fisheries Service

Issue: An application from Eglin Air Force Base, Florida, to take by harassment various species of cetaceans incidental to air-to-surface gunnery tests and training activities within the Eglin Gulf Test and Training Range in the Gulf of Mexico

Recommendation: The Commission recommended approval of the request provided that (a) the applicant be required to conduct all practicable monitoring and mitigation measures that reasonably can be expected to protect the potentially affected marine mammal species from serious injury; (b) the Service require that the applicant's annual report of activities include a detailed assessment of the effectiveness of sensor-based monitoring in detecting marine mammals and sea turtles in the area of operations; (c) the Service require the applicant to provide additional information to support its request for the revision of sea state restrictions; (d) the Service provide a rational explanation for what appears to be an assumption that marine mammals would have to experience sound levels well above that required to cause a temporary threshold shift before they would experience a behavioral disturbance; and (e) the Service provide more reasonable justification for its models and assumptions that lead to the conclusion that no animals will be killed during the course of a full year of such exercises.

Agency Response: The incidental harassment authorization had not been issued at the end of 2007.

5 July **To:** U.S. Fish and Wildlife Service

Issue: Regarding the Service's proposal to (1) promulgate regulations under section 101(a)(5)(A) of the Marine Mammal Protection Act to authorize the Alaska Oil and Gas Association to take by nonlethal means polar bears and Pacific walruses incidental to year-round oil and gas exploration and development activities in the Chukchi Sea and along the adjacent western coastline of Alaska, and (2) issue an incidental harassment authorization under section 101(a)(5)(D) of the Act to Shell Offshore, Inc., to take by harassment various species of marine mammals incidental to conducting offshore oil and gas exploration activities during the 2007 open-water season

Recommendation: The Commission recommended that the Service defer final rulemaking until it (a) conducts a more extensive analysis of the proposed oil and gas exploration activities that considers (1) the direct effects of these operations on walrus and polar bear populations, (2) the potential or likely effects of other oil and gas activities, climate change, and additional anthropogenic risk factors, and (3) the possible cumulative effects of all these activities and processes over time; and (b) has identified proposed mitigation measures that are applicable to all Letter of Authorization holders and that minimize the impact on walruses and polar bears so that the public is given the opportunity to evaluate the efficacy of those measures. The Commission further recommended that the applicant, and other appropriate agencies and organizations develop a broad-based population monitoring and impact assessment program to ensure that these activities, in combination with other risk factors, are not (1) individually or cumulatively having population-level effects on polar bear and walrus populations and (2) adversely affecting the availability of these marine mammals for subsistence uses by Alaska Natives; and require a monitoring program that focuses initially on the need to collect baseline information sufficient to allow future analyses of effects and require that such baseline information be collected before the proposed oil and gas exploration operations commence. Additionally, the Commission recommended that, should the Service choose as an interim measure to proceed with the issuance of an incidental harassment authorization to Shell Offshore, Inc., it condition the authorization to require that all practicable monitoring and mitigation measures be implemented to afford walruses and polar bears adequate protection from sources of behavioral disturbance.

Agency Response: The final rule had not been published at the end of 2007.

5 July **To:** National Marine Fisheries Service

Issue: A request from Alejandro Acevedo-Gutierrez to amend a permit authorizing the harassment of up to 4,000 harbor seals annually during aerial and vessel surveys and scat collections in Washington

waters over a five-year period. The permit-holder is requesting that the permit be amended to increase the number of harbor seals authorized to be harassed to 9,400 animals during aerial and boat surveys and scat collections at haul-out sites in Skagit and eastern San Juan Counties and Padilla and Samish Bays.

Recommendation: The Commission recommended approval provided that the conditions currently contained in the permit remain in effect and that long-term monitoring be conducted to ensure that the authorized activities are not having an adverse impact on the subject animals.

Agency Response: The Service issued the permit amendment on 8 August 2007, as recommended by the Commission.

5 July **To:** National Marine Fisheries Service

Issue: A request from Joe Mobley, Ph.D., to amend a permit authorizing the conduct of aerial and vessel surveys, biopsy-sampling, and tagging of North Pacific humpback whales and various other species of cetaceans in Hawaiian waters over a five-year period. The applicant is requesting that the permit be amended to authorize the taking by harassment of up to 250 humpback whales annually during sound-playback studies in waters off Maui and possibly other inshore areas of the main Hawaiian Islands.

Recommendation: The Commission recommended approval, provided that the conditions contained in the permit remain in effect.

Agency Response: The permit amendment had not been issued at the end of 2007.

9 July **To:** National Marine Fisheries Service

Issue: An application from FEX L.P. to take by harassment bowhead, gray, and beluga whales and ringed, bearded, and spotted seals incidental to towing of barges from West Dock Causeway in Prudhoe Bay, Alaska, to Cape Simpson or Point Lonely in the Beaufort Sea during the 2007 open-water season

Recommendation: The Commission recommended approval, provided that all reasonable measures are taken to ensure the least practicable impact on the affected marine mammal species and the proposed mitigation and monitoring activities are carried out as described in the Service's *Federal Register* notice and the application.

Agency Response: The incidental harassment authorization was issued on 9 August 2007. The Service adopted the Commission's recommendation.

10 July **To:** National Marine Fisheries Service

Issue: An application from Shell Offshore, Inc., and WesternGeco, Inc., to take by harassment bowhead, gray, beluga, killer, minke, and fin whales and ringed, spotted, and bearded seals incidental to conducting seismic surveys during the open-water season in the Chukchi and Beaufort Seas

Recommendation: The Commission recommended, among other things, that the Service conduct a more extensive analysis of the applicant's proposed operations that considers (1) the direct effects of the proposed operations, (2) the potential or likely effects of other currently authorized and proposed oil and gas activities, climate change, and additional anthropogenic risk factors, and (3) the possible cumulative effects of all of these activities over time. The Commission further recommended that the Service work with the applicant and other appropriate agencies and organizations to develop a broad-based population monitoring and impact assessment program to ensure that these activities, in combination with other risk factors, are not (1) individually or cumulatively having any significant adverse population-level effects on marine mammals or (2) having an unmitigable adverse effect on the availability of marine mammals for subsistence uses by Alaska Natives.

Agency Response: The incidental harassment authorization was issued on 20 August 2007.

11 July **To:** National Marine Fisheries Service

Issue: A proposed rule to authorize the U.S. Navy to take marine mammals incidental to operating Surveillance Towed Array Sensor System Low Frequency Active sonar over a five-year period

Recommendation: The Commission requested that the 15-day comment period be extended to at least 30 days, and perhaps as long as 60 days, to give the Commission and others adequate time to digest the proposed rule and associated materials and to formulate comments and recommendations.

Agency Response: The final rule was published on 21 August 2007, with an effective date of 16 August 2007. The Commission's recommendation was not adopted.

19 July **To:** U.S. Fish and Wildlife Service

Issue: A permit application from the U.S. Geological Survey, Alaska Science Center, requesting authorization to annually capture, anesthetize, blood and biopsy-sample, tag, and conduct physiological studies on Pacific walruses in the Chukchi Sea over a five-year period

Recommendation: The Commission recommended that the Service defer issuance of the requested permit until the applicant (a) provides a comprehensive description of the proposed drug trials and confirms that a marine mammal veterinarian experienced in anesthetizing walruses would be present for all captures requiring anesthesia; (b) provides a more precise description of the methods to be used and the estimated number of animals that would be involved in the proposed dietary and physiological studies; and (c) the Service and applicant resolve all additional discrepancies and information gaps identified by the Commission.

Agency Response: The permit was issued on 7 November 2007. The Commission's recommendations were adopted.

19 July **To:** National Marine Fisheries Service

Issue: A permit application from Mystic Aquarium requesting authorization to obtain or import an adult male Steller sea lion from Dolphinarium Harderwijk in the Netherlands, up to nine female Steller sea lions from the Vancouver Aquarium in Canada, and a non-releasable one-year-old male Steller sea lion from the Marine Mammal Center in Sausalito, California; and to receive, import, and export samples from up to 5,000 cetaceans and 5,000 pinnipeds annually over a five-year period

Recommendation: The Commission recommended approval with provisions, including that the Service establish a mechanism to determine, on a case-by-case basis, that any specimens to be imported were not acquired from marine mammals taken in high-seas driftnet fisheries, during the taking of large whales in a manner not approved by the International Whaling Commission, or in violation of the laws of the country of origin.

Agency Response: The permit was issued on 4 June 2007, consistent with the Commission's recommendations.

24 July **To:** National Marine Fisheries Service

Issue: A proposed rule to authorize the U.S. Navy to take marine mammals incidental to operating Surveillance Towed Array Sensor System (SURTASS) Low Frequency Active (LFA) sonar over a five-year period

Recommendation: Because the Service's limited 15-day comment period was not sufficient for the Commission to conduct a full review or to allow it to consult with its Committee of Scientific Advisors

on Marine Mammals, the comments and recommendations provided were those of the Commission staff. Among other things, the staff questioned whether the available data adequately demonstrate the effectiveness of the proposed combined visual, passive acoustic, and active acoustic monitoring. The staff expressed the belief that such a demonstration is possible, given current practices in similar marine mammal survey and mitigation protocols. The staff therefore suggested that the Service require the applicant to conduct such studies as are needed to verify and quantify the effectiveness of the proposed monitoring approach. The staff suggested that the Service closely monitor the development of monitoring technologies as they emerge and encourage the Navy to devote time and resources to the verification and validation of the performance of new sensors to support an informed judgment of their utility for avoiding unintentional adverse effects on marine mammals.

Agency Response: The final rule was published on 21 August 2007 with an effective date of 16 August 2007.

26 July **To:** U.S. Fish and Wildlife Service

Issue: A permit application from Hubbs–Sea World Research Institute to conduct a comprehensive study of the reproductive biology of Florida manatees on two manatees being maintained at Sea World Orlando over a five-year period

Recommendation: The Commission recommended that the Service approve the requested activities with provisions.

Agency Response: The permit was not issued at the end of 2007.

26 July **To:** National Marine Fisheries Service

Issue: Regarding a request from Markus Horning, Ph.D., to amend a permit authorizing scientific research on up to 120 rehabilitated California sea lions annually for five years. The permit-holder requested that the permit be amended to authorize the injection of up to 12 California sea lions with exogenous ACTH and the injection of a control group of up to six California sea lions with a sterile saline solution.

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit amendment was issued on 28 August 2007. The Commission's recommended provisions were adopted.

27 July **To:** National Marine Fisheries Service

Issue: A draft programmatic environmental impact statement for seismic surveys in the Beaufort and Chukchi Seas, Alaska, prepared by the National Marine Fisheries Service and the Minerals Management Service

Recommendation: The Commission recommended, among other things, that the Service revise the draft statement to (a) provide consistent and thorough descriptions of the alternatives and the zones that will be implemented under the alternatives, the effectiveness of monitoring activities to detect animals within those zones, and whether and how 120-dB zones will be used to deal with moving animals; (b) better justify the use of 12 animals as a threshold for 120- and 160-dB zones and describe the number of animals that may be taken through the course of each season and year as a more informative basis for determining potential population impacts; and describe how the 120-, 160-, 180, and 190-dB zones will be implemented under poor sighting or flying conditions; (c) analyze each alternative with regard to the Marine Mammal Protection Act requirements of incidental take authorizations to ensure that those requirements are satisfied; (d) analyze the potential impacts of the proposed actions on each marine mammal species commonly found in the action area for each of the alternatives being evaluated,

including not only the analytical conclusions but also the rationale for them; (e) identify the species likely to be subject to cumulative impacts from human activities and climate change, assess the nature and degree of such impacts, and indicate how, if at all, the proposed action is expected to add to those impacts, including direct effects as well as ecological effects; and (g) analyze the potential effects, including cumulative effects, of the proposed seismic surveys on all Alaska Native subsistence harvests. The Commission further recommended that (h) the Service identify key whale habitats in the Chukchi and Beaufort Seas planning areas and that the Minerals Management Service modify the existing Alaska Outer Continental Shelf geological and geophysical exploration stipulations to require that all vessels use speeds of 10 knots or less when in those key habitat areas, when whales are seen within one mile of a vessel, or when vessels are under way in conditions that limit visibility to less than one mile; (i) the Minerals Management Service work with the oil and gas industry to explore, develop, and implement, to the maximum extent possible, ways of obtaining essential information without the need for large-scale seismic surveys; (j) the Minerals Management Service develop and implement a new strategy for collecting geophysical information that involves the sharing of data and thus eliminates the redundancy from multiple seismic surveys being conducted over the same area to suit the needs of different companies; (k) the National Marine Fisheries Service and the Minerals Management Service develop their proposed temporal/spatial/operational restrictions and publish them in the *Federal Register* to allow for public review and comment; and alternative 8 be modified to include a 120-dB zone and then be selected as the preferred alternative in the final programmatic environmental impact statement.

Agency Response: The final programmatic environmental impact statement was not published at the end of 2007.

3 August **To:** National Marine Fisheries Service

Issue: The Service's proposal to list the Cook Inlet beluga whale as an endangered species under the Endangered Species Act

Recommendation: The Commission recommended that the National Marine Fisheries Service (a) move swiftly to complete the process of listing the Cook Inlet beluga whale population as endangered under the Endangered Species Act; (b) expand its research efforts to investigate the factors that may have negative effects on the population and to identify possible remedial actions; and (c) identify and designate critical habitat for Cook Inlet beluga whales as soon as possible.

Agency Response:

3 August **To:** U.S. Fish and Wildlife Service

Issue: A request from the Fish and Wildlife Service, Marine Mammals Management, for renewal and amendment of a permit authorizing the taking by harassment of up to 100 polar bears in the Beaufort Sea and up to 300 bears in the Chukchi Sea annually during aerial surveys and to capture, sample, tag, and release up to 400 bears annually to obtain information on abundance, habitat use, reproduction, survival, and condition of polar bears in those areas

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit was renewed and amended on 30 August 2007. The Commission's recommended provisions were adopted.

9 August **To:** National Marine Fisheries Service

Issue: A request from PRBO Conservation Science to amend a permit authorizing the taking of up to five species of pinnipeds to study and monitor population trends, health, and ecology of pinnipeds at the Farallon Islands, Point Reyes Peninsula, Ano Neuvo Island, San Francisco Bay, and in Sonoma County over a five-year period. The permit-holder requested that the permit be amended to authorize the harassment of up to 20 Steller sea lions each year incidental to the conduct of research activities on

California sea lions and northern elephant seals.

Recommendation: The Commission recommended approval, provided that the conditions of the original permit remain in effect.

Agency Response: The permit amendment had not been issued at the end of 2007.

13 August **To:** National Marine Fisheries Service

Issue: An application from Eglin Air Force Base, Florida, to take by harassment Atlantic bottlenose dolphins and Atlantic spotted dolphins incidental to Naval Explosive Ordnance Disposal School training operations in the northern Gulf of Mexico

Recommendation: The Commission noted that the proposed activities are unchanged from those authorized in 2005 and 2006, and therefore referred the Service to the Commission's letters of 8 July 2005 and 21 August 2006 regarding those earlier requests.

Agency Response: The Service issued the incidental harassment authorization on 9 October 2007.

15 August **To:** National Marine Fisheries Service

Issue: A permit application from the New Jersey Department of Environmental Protection to take by harassment up to 30 species of cetaceans and up to 4 species of pinnipeds during shipboard and aircraft transect surveys to obtain information on the species' distribution and abundance over a five-year period

Recommendation: The Commission recommended approval but noted that a potential extension of the survey period in the future, as discussed by the applicant, would result in the potential harassment of additional numbers of animals and, consequently, would require an amendment to the permit to authorize such additional taking.

Agency Response: The permit was issued on 20 December 2007. The Service adopted the Commission's recommendation.

15 August **To:** National Marine Fisheries Service

Issue: A permit application from Jonathon Millman to take by harassment up to 300 harbor seals and up to 50 gray seals by close approach during filming activities for the purpose of acquiring film footage for public television

Recommendation: The Commission recommended approval.

Agency Response: The permit was issued on 6 August 2007.

15 August **To:** U.S. Fish and Wildlife Service

Issue: Regarding a request from Jennifer Miksis-Olds, Ph.D., to amend a permit authorizing the harassment of up to 75 manatees annually during acoustic playbacks of boat noise. The permit-holder requested that the permit be amended to authorize the use of an additional type of acoustic stimulus to that already approved for use under the permit.

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit amendment was issued on 30 August 2007. The Commission's recommended provisions were adopted.

20 August **To:** National Marine Fisheries Service

Issue: A request from PRBO Conservation Science to take by harassment California sea lions, Pacific harbor seals, northern elephant seals, and Steller sea lions incidental to research on seabirds on the Southeast Farallon Island, Ano Nuevo Island, and Point Reyes National Seashore, California
Recommendation: The Commission recommended that the permit be approved.

Agency Response:

20 August **To:** National Marine Fisheries Service

Issue: The Service's revised draft recovery plan for the western and eastern distinct population segments of Steller sea lions

Recommendation: The Commission recommended that the National Marine Fisheries Service (a) move quickly to finalize and implement the recovery plan; (b) develop a plan for (1) implementing conservation and mitigation actions necessary to promote recovery, (2) monitoring the effectiveness of those actions, and (3) conducting and coordinating the research needed to guide recovery efforts; (c) implement a rigorous experimental research program to assess the effects of fisheries on sea lions and their critical habitat; and (d) place a high priority on addressing the concerns noted under recovery action 3.5 ("evaluate and reduce the direct and indirect impacts of research activities") to (1) avoid or minimize effects that may contribute to the cumulative impacts of human activities, (2) ensure that unintended research effects do not bias research results, and (3) ensure that important research on Steller sea lions can continue without unnecessary interruptions or constraints.

Agency Response:

20 August **To:** U.S. Fish and Wildlife Service

Issue: A permit application from the University of Massachusetts requesting authorization to take by harassment over a three-year period up to 30 free-ranging Florida manatees annually during approaches to carry out manatee detection studies using newly developed ultrasonic imaging technology

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit was issued on 7 November 2007. The Commission's recommended provisions were adopted.

21 August **To:** National Marine Fisheries Service

Issue: A permit application from Scripps Institution of Oceanography to take by harassment various marine mammal species incidental to conducting an ocean-bottom seismography deployment and a magnetic, bathymetric, and seismic survey program off the Oregon coast in the Pacific Ocean

Recommendation: The Commission recommended approval with provisions, including that the applicant be required to conduct all practicable monitoring and mitigation measures that reasonably can be expected to protect the potentially affected marine mammal species from serious injury.

Agency Response: The incidental harassment authorization was issued on 4 September 2007. The Commission's recommendations were adopted.

24 August **To:** National Marine Fisheries Service

Issue: A permit application from Rachel Cartwright, Ph.D., to take by harassment over a five-year period up to 540 Pacific humpback whales annually in the waters off Maui, Hawaii, during photo-identification, above- and underwater observations and filming, focal follows, and collection of sloughed

skin and to harass various species of cetaceans incidental to the research on humpback whales

Recommendation: The Commission noted that the application lacks detailed information concerning (1) the specific hypotheses being tested, (2) the parameters that will be measured, and (3) the data to be collected and how they will be analyzed. The Commission suggested that the Service request that the applicant provide assurance that the research objectives are likely to be fully met and that the results are likely to add to the knowledge of humpback whale biology and ecology and/or help to address conservation issues. The Commission recommended that, upon resolution of this issue, the requested permit be granted with provisions.

Agency Response: The permit had not been issued at the end of 2007.

27 August **To:** National Marine Fisheries Service

Issue: The Service's proposed rulemaking regarding the List of Fisheries for 2008

Recommendation: The Commission (a) concurred with the Service that the California yellowtail, barracuda, and white sea bass drift gillnet fishery should be elevated from a Category II to a Category I fishery because the estimated annual serious injury and mortality of long-beaked common dolphins incidental to the fishery exceeds 50 percent of the stock's potential biological removal level; (b) commended the Service for describing all Category I and II fisheries within the *Federal Register* notice publishing the proposed List of Fisheries; (c) reiterated a previous recommendation that the Service describe the level of observer coverage for each fishery when it publishes the List of Fisheries; (d) reiterated previous recommendations that the Service (1) expedite its investigation of bottlenose dolphin stock structure in the Gulf of Mexico, (2) expand its efforts to collect reliable information on serious injury and mortality rates of marine mammals incidental to Gulf of Mexico fisheries, and (3) reevaluate the classification of Gulf of Mexico fisheries as information becomes available; (e) commended the Service for its support of depredation studies and encourages the Service to continue and enhance its efforts to evaluate and address this developing issue; and (f) commended the Service for its support of efforts to address concerns regarding trap and pot fisheries and encourages the Service to continue its work with regional fisheries management councils to improve monitoring and mitigation of serious injury and mortality rates incidental to those fisheries.

Agency Response:

14 September **To:** U.S. Fish and Wildlife Service

Issue: Regarding a request from the Fish and Wildlife Service, Marine Mammal Management, Anchorage, Alaska, to amend a permit authorizing the conduct of aerial surveys, capture, sampling, tagging, and release of up to 500 Alaska sea otters over a five-year period. The permit-holder requested that the permit be amended to authorize the collection of an unspecified number of sea otters found dead during the conduct of systematic beach surveys.

Recommendation: The Commission recommended approval, provided that the conditions contained in the original permit remain in effect.

Agency Response: The permit amendment was considered to be minor in nature, and the amendment was issued on 20 July 2007 prior to receipt of the Commission's recommendation.

14 September **To:** U.S. Fish and Wildlife Service

Issue: A permit application from the North Slope Borough, Department of Wildlife Management, to annually collect and transport tissues from up to 40 subsistence-hunted and 10 stranded (dead) polar bears and up to 100 subsistence-hunted and 20 stranded (dead) walruses, to be used in a variety of health-related analyses

Recommendation: The Commission recommended approval, provided that specimens are transferred only to those persons authorized to conduct these analyses and studies under separate permits.

Agency Response: The permit was issued on 7 November 2007. The Commission's recommendation was adopted.

17 September **To:** National Marine Fisheries Service

Issue: Regarding the Service's final environmental impact statement on amendments to the Atlantic Large Whale Take Reduction Plan

Recommendation: The Commission recommended that the National Marine Fisheries Service promptly prepare a supplemental environmental impact statement that evaluates the use of time/area fishing closures in known high-use right whale habitats—including all designated critical habitat and seasonal management areas—as a means of reducing the number of right whales that become entangled in fishing gear.

Agency Response:

20 September **To:** National Marine Fisheries Service

Issue: The Service's draft environmental impact statement on issuing annual quotas to the Alaska Eskimo Whaling Commission for the subsistence hunt of bowhead whales from 2008 through 2012

Recommendation: The Commission recommended that the National Marine Fisheries Service adopt the bowhead whale subsistence quota as proposed. The Commission further recommended that (a) monitoring efforts to assess population size and trends be maintained through the upcoming quota period, and (b) those efforts be augmented to document any future changes in health, nutrition, reproduction, and survival of bowhead whales.

Agency Response:

20 September **To:** National Marine Fisheries Service

Issue: A permit application from Eduardo Mercado III, Ph.D., requesting authorization to take by harassment over a five-year period up to 230 humpback whales annually in waters off the northwestern coast of Puerto Rico to study the species' hearing and perception and to identify how anthropogenic noise sources might interfere with the animals' communication; and to harass several species of cetaceans incidental to the research on humpback whales

Recommendation: The Commission recommended approval, with provisions.

Agency Response: The permit had not been issued at the end of 2007.

20 September **To:** National Marine Fisheries Service

Issue: A request from the National Marine Mammal Laboratory to amend a permit authorizing the taking by harassment (capture, tagging, sampling) of fur seals from the eastern Pacific stock in Alaska during annual censuses. The permit-holder requested that the permit be amended to authorize additional sampling and tagging of the fur seals currently authorized to be captured.

Recommendation: The Commission recommended approval, provided that the conditions included in the existing permit remain in effect.

Agency Response: The permit amendment was issued on 3 October 2007. The Commission's recommendation was adopted.

20 September **To:** National Marine Fisheries Service

Issue: A request from the Southwest Fisheries Science Center to amend a permit authorizing the capture, handling, tagging, and release of up to 710 Antarctic fur seals and 20 leopard seals annually at Cape Shirreff, South Shetland Islands, Antarctica, over a five-year period. The permit-holder requested that the permit be amended to authorize the collection of vibrissae from any animal currently authorized to be captured, to collect tissue samples for DNA analysis and to bleach-mark up to 50 adult Antarctic fur seals.

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit amendment was issued on 3 October 2007. The Commission's recommended provisions were adopted.

21 September **To:** National Marine Fisheries Service

Issue: A permit application from the Hawaii Marine Mammal Consortium for authorization to take by harassment humpback whales during vessel surveys, photo-identification, underwater photography and video recording, photogrammetry, and passive acoustic recording and the collection of sloughed skin and whale fecal matter as part of long-term studies of the individual life histories, social roles, migration, habitat use, distribution, and reproductive status of North Pacific humpback whales

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit had not been issued at the end of 2007.

21 September **To:** National Marine Fisheries Service

Issue: A permit application from Mystic Aquarium proposing to acquire from U.S. rehabilitation facilities up to 28 stranded pinnipeds over a five-year period for purposes of public display and opportunistic non-invasive research

Recommendation: The Commission recommended approval with provisions, including that the permit as issued requires that the primary source of the animals be those determined by the attending veterinarian, in consultation with behavioral experts and consistent with the Service's draft release criteria for stranded, rehabilitated marine mammals, to have a poor chance of post-release survival, and that the transfer or retention of animals determined to be releasable be authorized as a secondary source only if non-releasable animals are unavailable or determined to be unsuitable for the applicant's purposes.

Agency response: The permit had not been issued at the end of 2007.

2 October **To:** U.S. Navy, Pacific Missile Range Facility

Issue: Regarding the Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS) on its planned Navy Pacific Fleet training and defense-related research on the Hawaii Range Complex (HRC)

Recommendation: The Commission recommended that the Navy (a) create an alternative of reduced or no-range use and adequately document the likely consequences for national defense readiness, to be weighed against whatever reductions in environmental risk would be obtained by the no-action or reduced action alternative; (b) provide a comprehensive description of the proposed dose-response relationships and the manner in which they will be used; and (c) provide a comprehensive description of the various monitoring and mitigation measures that might be used, evaluate the performance of those measures taking into account existing marine mammal monitoring and mitigation data, and instigate planning to evaluate and address the strengths and shortcomings of the proposed measures.

Agency Response:

9 October **To:** U.S. Fish and Wildlife Service

Issue: The Service's management of interactions between swimmers and divers and manatees in Florida's Crystal River Refuge

Recommendation: The Commission recommended that the Fish and Wildlife Service (a) develop and implement regulations to prohibit swimmers and divers from approaching manatees closer than 10 feet and require that they back away from any animals that approach them; (b) include as part of the suite a regulation to prohibit people from touching animals; (c) modify its public outreach materials to reflect such provisions; and (d) consult with representatives of the National Marine Fisheries Service to develop guidelines for human interactions with free-ranging marine mammals and to ensure that the guidelines of both agencies are consistent and protective of the animals.

Agency Response: The agency has stated that the Commission's concerns will be considered during development of the refuge management plan.

10 October **To:** National Marine Fisheries Service

Issue: A permit application from Gary Matson, Matson's Laboratory, LLC, proposing to obtain and import up to 2,000 pinniped teeth (except walrus teeth) annually for histological analysis of age determination and to export microscope slide preparations of analyzed tooth sections over a five-year period

Recommendation: The Commission recommended approval with provisions, including that the permit-holder maintains records indicating the source of each specimen and the circumstances under which it was collected; and periodically provide reports to the Service sufficient to demonstrate that each specimen was legally taken and is being used only for bona fide scientific purposes.

Agency Response: The Service issued the permit on 28 November 2007 and adopted the Commission's recommendations.

10 October **To:** National Marine Fisheries Service

Issue: A request from Markus Horning, Ph.D., to amend a permit authorizing the capture, sampling, tagging, and release of up to 48 Weddell seals in McMurdo Sound, Antarctica, and to harass up to an additional 250 Weddell seals in the course of conducting the research. The permit-holder requested an amendment to authorize the collection of additional blood samples; leave satellite data transmitters on adult females >18 years of age until the transmitters fall off; opportunistically attach satellite transmitters to adult females >21 years of age; and opportunistically collect fecal samples for export to the United States for analysis of corticosterone levels.

Recommendation: The Commission recommended approval with provisions, including that the Service, in consultation with the National Science Foundation, identify means for investigating possible cumulative effects of research on the same population of Weddell seals to ensure that population parameters such as reproduction, somatic growth, survival, and distribution are not being adversely affected.

Agency Response: The permit was issued on 21 November 2007. The Commission's recommendations were adopted.

12 October **To:** National Marine Fisheries Service

Issue: The Service's draft 2007 stock assessment reports for marine mammals

Recommendation: The Commission recommended that the National Marine Fisheries Service (a) follow up on a recent workshop to incorporate passive acoustics into survey methods; (b) work with federal and state fisheries management agencies and industry to develop a funding strategy to support

stronger observer programs for collecting data on incidental mortality and serious injury; (c) work with co-management partners to establish biologically meaningful stock boundaries for harbor seals in Alaska and, if continued co-management negotiations are required, incorporate in the 2008 SARs biologically meaningful boundaries for prospective harbor seal stocks in Alaska; (d) build on recent advances in tag technology to pursue large-scale use of tags to better understand aspects of population dynamics that surveys alone cannot reveal; (e) reconvene or initiate take reduction teams to address fishery interactions with the Gulf of Maine harbor porpoise stock and the Hawaii false killer whale stock; (f) adjust stock assessment guidelines to ensure that methods for identifying strategic stocks are consistent in the different regions of the country; (g) seek to develop a more effective means of assessing transboundary stocks and the effects of human activities on them at the planned joint meeting of the Service's scientific review groups; and (h) develop a consistent process for incorporating non-fishery sources of mortality in the stock assessment reports.

Agency Response:

22 October **To:** U.S. Fish and Wildlife Service

Issue: New information from the U.S. Geological Survey pertinent to the Service's 9 January 2007 proposed rule to list the polar bear (*Ursus maritimus*) as a threatened species under the Endangered Species Act

Recommendation: The Commission recommended that the Fish and Wildlife Service (a) list all populations of polar bears as threatened throughout their range in the foreseeable future with the exception of those populations that inhabit the divergent ice and seasonal ice eco-regions, and (b) list those populations of polar bears that inhabit the divergent ice and seasonal ice eco-regions as endangered.

Agency Response: No action had been taken on the listing at the end of 2007.

6 November **To:** National Marine Fisheries Service

Issue: A request by the National Marine Mammal Laboratory to amend a permit authorizing the conduct of aerial, ground, and boat surveys of pinnipeds and the capture, sampling, branding, tagging, physiological testing, and recapture of harbor seals, California sea lions, Steller sea lions, and northern elephant seals over a five-year period in Oregon and Washington. The permit-holder requested that the permit be amended to authorize it to conduct additional procedures on up to 20 harbor seals annually.

Recommendation: The Commission expressed concern that the Service continues to issue permits to the National Marine Mammal Laboratory and other National Marine Fisheries Service applicants despite their failure to establish Institutional Animal Care and Use Committees. The Commission reiterated its recommendation that the Service's National Marine Mammal Laboratory and other Science Centers be brought into compliance with Animal Welfare Act regulations. Further, the Commission recommended that the Service defer approval of this and other scientific permit requests from within the agency until such committees have been established and have found the proposed research to be consistent with the Animal Welfare Act requirements.

Agency Response: The permit was issued on 19 November 2007. The Service did not adopt the Commission's recommendation that issuance of the permit be deferred until the National Marine Mammal Laboratory and the Service's other Science Centers are in compliance with Animal Welfare Act regulations.

6 November **To:** National Marine Fisheries Service

Issue: A permit application from Ann M. Zoidis to take humpback whales by harassment during close approach for photo-identification and behavioral observation and underwater passive acoustic recording, as well as harassment of several species of small cetaceans incidental to humpback whale

studies. The purpose of the research is to study social sound production in humpback whales in the waters off Hawaii.

Recommendation: The Commission recommended that the Service defer issuance of the requested permit until the applicant has provided additional information needed to assess whether the proposed studies constitute bona fide research as defined by the Marine Mammal Protection Act.

Agency Response: The permit request was denied on 4 December 2007. The Service stated that the scope of the proposed research was too broad to enable a determination of whether the research objectives could be met and if the manner in which the research would be conducted was consistent with the provisions of the Marine Mammal Protection Act and the Endangered Species Act.

8 November **To:** National Marine Fisheries Service

Issue: A request from the Alaska SeaLife Center to amend a permit authorizing research on up to 20 stranded harbor seals undergoing rehabilitation at the Center annually. The permit-holder requested that the permit be amended to authorize the same research activities on ringed, spotted, ribbon, and bearded seals (up to 25 individuals of each species).

Recommendation: The Commission recommended approval, provided that the Service (a) not authorize any release of ice seals rehabilitated outside their usual range unless and until it can provide rigorous assurance that released animals do not pose a risk to the wild population; (b) if it believes that ice seals rehabilitated outside their usual range should be considered as candidates for eventual release, not authorize any research that could undermine the suitability of such animals for release, including their possible exposure to diseases that may adversely affect the health of wild populations; and (c) is satisfied that the applicant will monitor animals subjected to multiple procedures for signs of excessive stress that may unnecessarily compromise their health and potentially confound the results of the research.

Agency Response: The permit had not been issued at the end of 2007.

21 November **To:** U.S. Fish and Wildlife Service

Issue: A request from the Alaska Science Center, U.S. Geological Survey, to amend a permit authorizing the conduct of scientific research on up to 150 northern sea otters over five years. The permit-holder requested that the permit be amended to authorize continuation of the research for an additional five years; an increase in the number of sea otters authorized to be captured, handled, surgically implanted with TDR/transmitter packages, released, and recaptured and released; injection of Evans blue dye in a subset of the animals captured; and an increase in the number of sea otters authorized to be harassed incidental to the research on target animals.

Recommendation: The Commission recommended approval with provisions, provided that the permit holder is required to provide additional information concerning certain aspects of the proposed amendment request.

Agency Response: The permit amendment had not been issued at the end of 2007.

23 November **To:** U.S. Fish and Wildlife Service

Issue: Regarding the status and conservation of southern and northern sea otters in the coastal waters of California and Washington

Recommendation: With regard to southern sea otters, currently listed as threatened under the Endangered Species Act, the Commission recommended that the Service (a) ensure that funding and other support necessary to continue annual counts of the mainland and San Nicolas Island sea otter populations and the sea otter stranding response program are maintained at current levels; (b) ensure that research funding is adequate to investigate the role of contaminants, biotoxins, and pathogens in

the mortality of stranded sea otters and to conduct complementary studies of sea otter foraging; (c) complete and publish the environmental impact statement and record of decision on the future of the San Nicolas Island translocation program; (d) take immediate steps to review and adopt a revised southern sea otter stock assessment report; and (e) consult with the National Marine Fisheries Service to ensure adequate observer coverage of fisheries likely to take southern sea otters incidentally, particularly fisheries in areas to the immediate north and south of the population's mainland range. With regard to northern sea otters in Washington state, the Commission recommended that the Service (a) consult with the National Marine Fisheries Service, National Park Service, Washington Department of Fish and Wildlife, and tribal authorities to organize and expand a cooperative volunteer stranding network along the Olympic Peninsula to retrieve and analyze carcasses and tissue samples from stranded sea otters and other marine mammals; (b) consult with the Washington Department of Fish and Wildlife, the Coast Guard, regional shipping interests, and others to establish necessary caches of stranding-related equipment within the Washington sea otter population's range and to make arrangements with appropriate facilities and personnel for the expeditious treatment and care of oiled otters; (c) take immediate steps to review and adopt a revised stock assessment report for the northern sea otter stock in Washington state; and (d) consult with the National Marine Fisheries Service, tribal authorities, and other relevant groups to ensure adequate oversight of gillnet and trap-fishing efforts within the range of the Washington sea otter population and for placing observers aboard fishing vessels that may pose a significant risk of incidentally taking sea otters.

Agency Response:

23 November **To:** National Marine Fisheries Service

Issue: A report and recommendations submitted by the Columbia River Pinniped-Fishery Interaction Task Force regarding an application from Oregon, Washington, and Idaho seeking authority for the intentional lethal taking of California sea lions preying on salmonids in the Columbia River

Recommendation: The Commission recommended that the Service (a) provide sufficient supporting documentation to justify its decision regarding potential sea lion removals; (b) determine whether individually identifiable pinnipeds are having a significant negative impact on salmonids; (c) clearly articulate a quantitative standard for any finding that California sea lions in the Columbia River are having a significant negative impact on salmonid stocks; (d) compare the estimated level of removals of ESA-listed salmonids by pinnipeds with authorized levels of incidental and directed take from other sources and explain why some sources are considered significant while others are not; (e) identify the level at which predation of salmonids by pinnipeds no longer would be considered significant and adopt that level as the goal of any authorized removal program; (f) establish clear criteria for differentiating between those individually identifiable pinnipeds having a significant negative impact on salmonid stocks and subject to lethal removal and those that are not; (g) reject the proposal to allow removal of all California sea lions simply on the basis that they appear in a specified area; (h) if the Service adopts Lethal Option 1, which was recommended, with little supporting rationale, by a majority of the Task Force, explain its basis for determining that a single observed predation event or attempt is an appropriate measure of significance; (i) prioritize and phase the removals based on additional selection criteria that will more appropriately filter those animals that warrant removal from those that do not; (j) and work with other agencies to pursue development of non-lethal alternatives for addressing the pinniped predation problem and, in particular, take steps to facilitate the development and testing of electrical field barrier technology.

Agency Response: The draft environmental assessment (EA) on the three states' Marine Mammal Protection Act request for authority to lethally remove California sea lions had not been published at the end of 2007.

27 November **To:** National Marine Fisheries Service

Issue: The Service's draft five-year status review for the Caribbean monk seal (*Monachus tropicalis*)

Recommendation: The Commission recommended, with regret, that the National Marine Fisheries Service proceed with steps to remove the Caribbean monk seal from the Endangered Species Act's List of Endangered and Threatened Wildlife on grounds that the species is now extinct.

Agency Response: The Service was taking steps to declare the species extinct at the end of 2007.

30 November **To:** National Oceanic and Atmospheric Administration

Issue: Regarding the briefings provided by National Marine Fisheries Service representatives at the Commission's and its Committee of Scientific Advisors' annual meeting on 28–30 August 2007 in Vancouver, Washington, to review information and issues related to the management of marine mammals and their ecosystems along the U.S. West Coast

Recommendation: Because several of the topics discussed at the meeting seem pertinent not only to the Service, but also to NOAA generally, the Commission recommended that the National Oceanic and Atmospheric Administration (a) continue to support research on the causes of harmful algal blooms as well as on methods to forecast and mitigate them and their harmful effects on marine mammals, fisheries, and human health; (b) expand the research that it funds and conducts to understand and mitigate the effects of anthropogenic noise on marine mammals and other components of the marine environment; and (c) enhance data management by (1) establishing marine mammal data archives needed to support conservation research and inform ocean resource management, (2) setting corresponding data standards for NOAA and National Marine Fisheries Service scientists and others contributing to the archives, (3) budgeting the necessary funds for infrastructure to maintain the marine mammal datasets, and (4) making the datasets broadly available to resource managers in other agencies, the scientific community, and the public.

Agency Response: No response had been received from the Administration at the end of 2007.

30 November **To:** National Marine Fisheries Service

Issue: Regarding the briefings provided by National Marine Fisheries Service representatives at the Commission's and its Committee of Scientific Advisors' annual meeting on 28–30 August 2007 in Vancouver, Washington, to review information and issues related to the management of marine mammals and their ecosystems along the U.S. West Coast.

Recommendation: The Commission recommended that the Service (a) work with state fisheries management agencies and organizations and industry representatives to develop a strategy by which the fishing industry provides at least partial funding for observer programs; (b) initiate steps to incorporate animal health-related information in stock assessments and bolster regional efforts to address health issues by establishing a marine mammal health coordinator in each of the Service's regions; and (c) use the planned joint meeting of the regional scientific review groups to consider alternative methods for managing marine mammal/human interactions that might be more effective in a data-poor environment.

Agency Response: No response had been received from the Service at the end of 2007.

30 November **To:** National Marine Fisheries Service

Issue: A permit application from Kathryn Ono, Ph.D., to conduct research on harbor seals and gray seals in the Gulf of Maine to examine expanding populations of harbor and gray seal stocks

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit was issued on 18 December 2007. The Commission's recommended provisions were adopted.

3 December **To:** U.S. Fish and Wildlife Service

Issue: The Service's draft recovery crediting guidance for carrying out recovery programs under the Endangered Species Act

Recommendation: The Commission expressed its belief that the draft guidelines are ill-advised and inconsistent with requirements of the Endangered Species Act and recommended that the Service withdraw the proposed recovery crediting guidance until such time as the Endangered Species Act is amended to provide specific authority for implementing such an approach and a clearer set of guidelines is developed.

Agency Response: No action had been taken on the guidelines at the end of 2007.

3 December **To:** National Marine Fisheries Service

Issue: A request from Kenneth C. Balcomb III, to amend a permit authorizing the take by harassment of southern resident killer whales annually during photo-identification and aerial vessel surveys throughout their range, primarily in waters off Washington state and southern Alaska. The permit-holder requested that the permit be amended to allow satellite tagging of up to six adult and subadult male southern resident killer whales annually for two years.

Recommendation: The Commission recommended approval with provisions.

Agency Response: The permit had not been issued at the end of 2007.

14 December **To:** National Marine Fisheries Service

Issue: The Service's proposed rule to designate two specific areas (one in the Gulf of Alaska and the second in the Bering Sea) as critical habitat for the North Pacific right whale (*Eubalaena japonica*)

Recommendation: The Commission noted that a similar proposed rule was previously published by the Service in the 2 November 2005 *Federal Register* and that the Commission had commented on by letter of 3 January 2006. The Commission provided a copy of that letter and noted that its position as reflected in the letter has not changed.

Agency Response: A final rule had not been published at the end of 2007.

17 December **To:** National Marine Fisheries Service

Issue: An advance notice of proposed rulemaking on revisions to the Service's implementing regulations governing the issuance of permits for scientific research and enhancement activities involving marine mammals

Recommendation: In addition to providing specific suggestions and recommendations regarding changes to various provisions of the regulations, the Commission noted that it is incumbent upon the National Marine Fisheries Service, the Fish and Wildlife Service, and all those involved to make the permitting process as effective and as efficient as possible; a careful examination of the regulations is a good place to start; and after the conclusion of the currently proposed rulemaking, the Service should consider whether further changes are needed to ensure that the process is functioning smoothly, equitably, and in a manner that accomplishes permitting objectives with the least burden on the researchers. The Commission noted that it would be pleased to participate in such a larger review process.

Agency Response: The Service was reviewing comments received at the end of 2007.

19 December **To:** National Ocean Service

Issue: The National Ocean Service's development of a natural resources science plan for the Papahanaumokuakea Marine National Monument

Recommendation: The Commission recommended that the natural resources science plan for the Papahanaumokuakea Marine National Monument place high priority on research projects that support the Service's Hawaiian monk seal recovery program, including (a) studies to help understand the ecology of Hawaiian monk seals within Northwestern Hawaiian Islands ecosystems; (b) expanded research to determine fine-scale movements and foraging patterns of Galapagos sharks and other top predators at French Frigate Shoals; (c) identification of the need to continue studies of marine debris accumulation rates in atoll lagoons near monk seal haul-out sites; (d) assessment of remote technology to detect floating debris that could be removed before it reaches important wildlife habitats within the Monument; (e) research on spinner dolphin populations using the atolls in the area, including their abundance, demography, movements, habitat-use patterns, and foraging behavior; (f) initiation of year-round passive acoustic sampling and periodic visual surveys to determine the abundance and trend of humpback whales and to collect identification photos and biopsy samples to evaluate their relationships with other groups of humpback whales; (g) long-term monitoring research on the oceanic and atmospheric conditions of the Northwestern Hawaiian Islands and their ecosystems; and (h) provisions for holding periodic meetings for scientists, managers, and other people working on or interested in science projects conducted in the Monument.

Agency Response: The Service was working on the plan at the end of 2007.

21 December **To:** National Marine Fisheries Service

Issue: A permit application submitted by Samuel Wasser, University of Washington, to take by harassment up to 89 southern resident killer whales and up to a total of 15 transient, offshore, and northern resident killer whales annually during vessel surveys, photo-identification activities, and the collection of fecal samples from killer whales year-round in Puget Sound and the Georgia Basin, Washington.

Recommendation: The Commission recommended approval with provisions. The Commission noted, however, its continued concern that the multiple research projects being conducted on southern resident killer whales could cumulatively have significant impacts on the population, especially when combined with other factors that may be adversely affecting southern resident killer whales.

Agency Response: The permit had not been issued at the end of 2007.

31 December **To:** National Marine Fisheries Service

Issue: Applications from CGG Veritas and Shell Offshore, Inc., to take by harassment ringed seals, bearded seals, and spotted seals incidental to on-ice marine geophysical and seismic surveys in the U.S. Beaufort Sea from February to May 2008

Recommendation: The Commission recommended approval of the requests provided that the proposed monitoring and mitigation measures are carried out as described in the applications and the Service's *Federal Register* notice and if other species of marine mammals (e.g., beluga whales or bowhead whales) are observed in the vicinity of the surveys, activities be suspended until the animals depart or authorization to take such species is issued.

Agency Response: The incidental harassment authorization had not been issued at the end of 2007.

Appendix B

SELECTED LITERATURE PUBLISHED ELSEWHERE RESULTING FROM COMMISSION-SPONSORED ACTIVITIES

Note: Through 2002 the Commission's Annual Report to Congress included an appendix listing publicly available books and articles reporting on work that had been supported in full or in part by the Commission. With the introduction of the Commission's Web site (www.mmc.gov) in 2003, this appendix was made available on line and is no longer included in the printed report. Because the on-line document contains reports only through 2002, we provide an addendum to the Web page document in this year's report, listing such publications issued since 2002. In addition, the Commission provides continuing support for two periodicals in the marine mammal field: *Sirenews*, published by the non-profit organization Sirenian International, and the *Latin American Journal of Aquatic Mammals*, published by Sociedad Latinoamericana de Especialistas en Mamiferos Acuaticos, Rio de Janeiro, Brazil.

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Bluhm, B.A., and R. Gradinger. 2008. Arctic marine mammals and climate change: Regional variability in food availability for Arctic marine mammals. Ecological Applications 18(Supp):S77–S96. (MMC contract EE0000359)

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Hovelsrud, G.K., M. McKenna, and H.P. Huntington. 2008. Arctic marine mammals and climate change: Marine mammal harvests and other interactions with humans. Ecological Applications 18(Supp):S135–S147. (MMC contract EE0000359)

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Laidre, K.L., I. Stirling, L.F. Lowry, O. Wiig, M.P. Heide-Jorgensen, and S.H. Ferguson. 2008. Arctic marine mammals and climate change: Quantifying the sensitivity of Arctic marine mammals to climate-induced habitat change. Ecological Applications 18(Supp):S97-S125. (MMC contract EE0000359)

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Metcalf, V., and M. Robards. 2008. Arctic marine mammals and climate change: Sustaining a healthy human-walrus relationship in a dynamic environment: Challenges for comanagement. Ecological Applications 18(Supp):S148–S156. (MMC contract EE0000359)

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