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COMMISSION



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Annual Report to Congress

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

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Chapter I

INTRODUCTION

This is the 33rd Annual Report of the Marine Mammal Commission, covering the period 1 January through 31 December 2005. The purpose of the report is to provide timely information on management issues and events under the purview of the Marine Mammal Commission in 2005. The Commission submits its reports to Congress pursuant to section 204 of the Marine Mammal Protection Act of 1972. The Commission also provides its reports to federal and state agencies, public interest groups, the academic community, private citizens, and the international community. Collectively, these reports describe the evolution and progress of U.S. policies and programs to conserve marine mammals and their habitats. To ensure accuracy, federal and state agencies and knowledgeable individuals review report drafts before publication.

The Marine Mammal Commission was established under Title II of the Act and is an independent agency of the Executive Branch. It is charged with reviewing and making recommendations on domestic and international actions and policies of all federal agencies with respect to marine mammal protection and conservation and with carrying out a related research program.

The Commission consists of three members nominated by the President and confirmed by the Senate. The Marine Mammal Protection Act requires that Commissioners be knowledgeable in marine ecology and resource management. The Commission Chairman, after consultation with the Council on Environmental Quality, the Smithsonian Institution, the National Science Foundation, and the National Academy of Sciences, and with the concurrence of other Commissioners, appoints the nine members of the Committee of Scientific Advisors on Marine Mammals. The Marine Mammal Protection Act requires that committee members be scientists knowledgeable in marine ecology and marine mammal affairs.

Appropriations to the Marine Mammal Commission in the past five fiscal years have been as follows: FY 2001, \$1,696,260; FY 2002, \$1,956,000; FY 2003, \$3,050,000; FY 2004, \$1,856,000 plus a transfer of \$1,194,000 from the National Oceanic and Atmospheric Administration; and FY 2005, \$1,890,000 plus a transfer of \$1,190,826 from the National Marine Fisheries Service. The Commission's appropriation for FY 2006 is \$2,000,000.

Beginning in 2004 the Commission structured its annual meetings and annual reports around ecosystem-level issues and major threats to ma-

rine mammals, as had been suggested by participants in the Commission's 2003 Consultation on Future Directions in Marine Mammal Research. At the 2005 annual meeting, held in Anchorage, Alaska, on 12–14 October, experts presented information on Alaska marine ecosystems, climate change, subsistence hunting, direct and indirect effects of fishing, contaminants and diseases that affect marine mammals, and increasing tourism and coastal development in Alaska. The Commission also heard numerous presentations and discussions of specific marine mammal issues in Alaska.

The organization of this report reflects a transition toward an ecosystem-based approach to management. Chapter II describes major elements of such an approach, using examples and highlighting issues from Alaska. The remarkable and diverse Alaska marine environment, coupled with active involvement of a wide array of federal, state, tribal, nongovernmental, industry, and public interests, provides an important opportunity to develop an approach to ecosystem-based management that could serve as a model for the rest of the country. Chapter III examines issues facing Alaska Natives as they seek a stronger role in co-management of marine mammals while coping with the daunting effects of climate change on the ecosystems vital to their subsistence-based cultures. Chapters IV and V describe issues pertaining to species of special concern in Alaska (Chapter IV) and elsewhere (Chapter V). Chapters VI through XII discuss important 2005 events and activities involving research, management, and conservation of marine mammals in other marine ecosystems under U.S. jurisdiction, as well as in foreign and international waters.

Chapter II

SPECIAL FOCUS—ALASKA MARINE ECOSYSTEMS

Alaska's marine environments have long been recognized for their remarkable beauty and wonder. These vast waters and coastlines provide habitat for a great diversity and biomass of marine life, including at least 36 stocks of marine mammals. They also provide abundant resources—the huge fish stocks of the Bering Sea/Aleutian Islands and the Gulf of Alaska regions and energy-rich coastal oil and gas deposits along Alaska's North Slope, in the Chukchi Sea, and in Cook Inlet. World-renowned coastlines provide outstanding environs for tourism and recreation, and Alaska Native subsistence cultures have persisted for thousands of years harvesting the rich biota of these remote and often harsh coastal environments (see map of Alaska region, Fig. 1).

Maintaining the health and stability of marine ecosystems is the principal aim of the Marine Mammal Protection Act. To that end, marine scientists and managers now seek to broaden the traditional research, management, and conservation approach, heretofore based primarily on single species or single issues, to take into account the connectedness of all components of marine ecosystems. This new approach, termed “ecosystem-based management,” recognizes that ecosystems are not merely random collections of species but are biological communities linked internally and to their abiotic environment by complex trophic and energetic interactions. Plainly speaking, to protect and conserve marine mammals, managers and decisionmakers must also protect the ecosystems of which they are a part. Thus, the purpose of this transition to an ecosystem-oriented approach is to promote management that will optimize the human use of the resources with minimum impact on the system to which they belong. Scientists, managers, users, decision-makers, and all others who have an interest in those ecosystems will develop a broader understanding of the effects of human activities, direct and indirect, and will be enabled to make decisions taking into account multiple factors.

Despite the conceptual challenges associated with this transition, considerable progress has been made over the past several decades, and further progress is being pursued. The Administration's Ocean Action Plan recently reaffirmed the U.S. commitment to this transition, stating that “[t]he Administration will continue to work towards an

ecosystem-based approach in making decisions related to water, land, and resource management....”

Properties of Marine Ecosystems

The transition to ecosystem-based management has been challenging because marine ecosystems are inherently complex. Although they are not always thought of in this way, ecosystems integrate all lower levels of biological organization (cell, tissue, organ, individual, population, biological community). Despite this complexity, various patterns emerge at the ecosystem level that are not evident at the lower levels, such as food webs for transfer of energy and nutrients. The study of those patterns enhances our understanding of ecosystem function and ultimately will promote better management of human activities that affect them.

In many respects, ecosystems share certain fundamental properties with other levels of biological organization. Whether scientists are studying the structure and function of a cell or the structure and function of an ecosystem, their approaches are similar in a few important respects. Each level consists of various biological components or parts—in cells these are referred to as organelles (e.g., nuclei, mitochondria, ribosomes), whereas in ecosystems they are generally populations of various component species. Those components undertake or are involved with each other in certain processes and



Figure 1. Alaska marine ecosystems.

interactions, which are biochemical in cells and ecological in ecosystems. At both levels, these components interact with and draw resources from their surrounding habitat (or the medium in which they occur) based on its physical and chemical properties, and they produce various products (i.e., goods and services) that can be exported or extracted for use elsewhere. The overall status of each level of organization is not simply a function of any single component or interaction but rather is a function of all the components and their cumulative interactions. For a variety of reasons, these properties change over time and space, adding variation or dynamics to what would otherwise be relatively deterministic and predictable functions. The following sections highlight these fundamental properties to point out how consideration of them facilitates ecosystem management in Alaska and elsewhere.

Biological Components

Taken together, the biotic components of marine ecosystems are often characterized as biological diversity, or “biodiversity,” which is an assessment of the variety of an ecosystem’s biological units weighted by their relative abundance, or biomass. Through ecological and evolutionary processes, these units compose taxonomic hierarchies at the species, subspecies, stock (or population stock), and individual levels. Determining which level to use as the focus of conservation efforts is a crucial and somewhat controversial task. The idea of choosing small management units has led to concerns that management requirements could become impractically large (consuming available management resources) or excessively restrictive with regard to human activities. The alternative of choosing large units has led to the concern that management measures would not be sufficiently protective and would thereby fail to maintain ecosystem function over ecological or evolutionary time scales. For conserving and managing marine mammals, the Marine Mammal Protection Act establishes the appropriate conservation unit as the stock, or population stock, 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.”

Such units have both ecological and evolutionary significance, are considered essential to the natural functioning of healthy marine ecosystems, and therefore are believed to warrant the protections bestowed by the provisions of the Act. Correctly identifying marine mammal stocks, or stock structure, is an important—if not essential—precursor for assessing population status, and over the past several decades, considerable research has focused on this task. Genetics research, in particular, provides insights that scientists have not been able to gain by other methods. This information helps scientists understand the degree of reproductive mixing among stocks of the same subspecies or species, their history, their vulnerability to risk factors including the potential effects of small population size, variation in demographic trends and ecological traits, the evolutionary potential of stocks to adapt when faced with significant environmental variation, and so on. In Alaska, recent genetics research has revealed important stock structure among harbor seals (see the section on this species in Chapter IV). In Alaska’s marine ecosystems, and particularly in the Arctic, additional work of this type is needed to assess stock structure, investigate the role of different stocks in marine ecosystems, and provide a stronger basis for conservation of ecosystem biodiversity.

Ecological Processes and Interactions

Ecosystem components are linked through various processes and interactions, including primary production by phytoplankton and macrophytes, consumption of that production by herbivores, predation by one or more trophic levels of predators, competition within trophic levels for prey, and various forms of symbiosis (i.e., parasitism, commensalism, mutualism). These processes determine the transfer of energy and nutrients from one component of an ecosystem to another, linking them into complex food webs. These food web connections and their relative strengths impart trophic structure to the ecosystem. Although the relationship between ecosystem complexity and stability is still a matter of inquiry and debate, increasing connectivity may increase stability, enhancing an ecosystem’s ability to resist change when perturbed and its resilience

or capacity to recover when altered by such perturbations. Such structure is determined in part by the availability of energy and nutrients needed for primary production and transmitted up through the system (i.e., bottom-up effects) and in part by the influence of top-level predators that impose structure through predation on intermediate trophic levels (i.e., top-down effects). The nature and strength of such influences, and the interactions between or among them, vary over time and space. Recent controversy over the effects of Alaska's groundfish fisheries on Steller sea lions exemplifies both the difficulty and the importance of characterizing the interactions that determine the trophic structure of those ecosystems. In part, the debate is whether fishing contributes to the sea lion decline because it reduces their prey (a bottom-up effect) or whether killer whale predation on sea lions has caused their decline (a top-down effect). Similarly, one of the major concerns related to climate change in the Arctic is based on predicted changes in food web composition and dynamics due to loss of seasonal sea ice. The end result could be a bottom-up effect that could cascade through food web interactions, reaching even the top predators of the ecosystem, namely polar bears and killer whales.

Habitat

The biological community of a marine ecosystem is shaped in part by the ecological interactions among its members (biotic components) and in part by the physical and chemical properties of the ecosystem, or its abiotic habitat. The role of these abiotic habitat properties is receiving increasing attention in the study and management of marine mammals. More studies are being conducted to correlate the distribution, movements, and behavior (e.g., foraging) of marine mammal species with the physical and chemical properties of their environment. The aim is to identify the factors or properties that determine marine mammal natural history patterns. Those factors may affect marine mammals directly (e.g., setting geographic limits on the range occupied) or indirectly (e.g., by determining the distribution of their preferred prey). Climate change is expected to change the physical and chemical properties of Alaska's seas dramatically, with adverse consequences for biodiversity and ecological interactions. Reductions in the distribution and persistence of seasonal and "permanent" sea ice especially will have many significant impacts in the Arctic, including changes in the rate and distribution of primary production, and the food webs based on that pro-

duction, and loss of habitat for marine mammals and other biota dependent on sea ice for a variety of purposes.

Goods and Services

Marine environments produce or provide a range of goods and services of great social and economic benefit. Most important, they play vital roles in water, mineral, and atmospheric cycles that maintain an environment suitable for life. They also provide food, recreation, oil and gas, minerals, transportation, and raw materials for industry. They dilute and disperse wastes including sewage and various chemical and radioactive pollutants. And they are an essential consideration in national security inasmuch as they constitute the environment in which the U.S. Navy must protect the nation. Fishing, oil and gas production, and recreation are the three mainstays of the Alaska economy and are therefore vital to the future of the state. The challenge is to use these goods and services in a manner that promotes the economic well-being of the state without compromising the long-term capacity of marine ecosystems to provide them.

Natural Ecosystem Variation

Ecosystems have long been thought of as relatively constant—hence, the "balance of nature" paradigm, which assumes constancy in ecosystem biodiversity, ecological interactions, and physical and chemical habitat. If marine ecosystems functioned in a relatively constant manner, their ability to produce important goods and services would be more readily understood and predicted and the extraction of goods and services from them more easily managed. But marine ecosystems are revealing themselves as sometimes highly variable, exhibiting various cycles, trends, and patterns that range from more or less predictable to highly enigmatic. In Alaska and throughout the North Pacific, scientists conduct large-scale oceanographic and meteorological research projects to describe these various types of variation (e.g., the North Pacific Oscillation, the Arctic Oscillation, and regime shifts and interannual variation) and explain their potential causes and effects.

Much remains to be learned about natural variability, and the associated uncertainty presents a substantial challenge for scientists and managers. The primary objective of the Marine Mammal Protection Act is to maintain the health and stability of marine ecosystems by protecting them from

excessive alteration by human activities. The most obvious approach for assessing such alteration is by using various measures of change. However, when changes occur, the causes are not always clear, and determining whether such changes are a function of natural variability or a result of human activities often is complex and controversial, as has been evident with regard to the Steller sea lion decline and the role of human activities in climate change. Because our intent is to protect marine ecosystems from undue human perturbations, as prescribed in the Marine Mammal Protection Act, it is imperative that we develop the scientific capabilities necessary to distinguish natural from anthropogenic causes of ecosystem change. Doing so is confounded by the fact that assessing natural patterns of ecosystem variation takes decades or longer. Our societies are rarely patient enough to allow such investigations to be completed before they initiate activities that may affect ecosystems. Fisheries are a classic example of a situation where scientists and managers generally do not require assessment of the target stocks and their inherent patterns of variability before fishing is initiated, thus confounding effective management aimed at avoiding excessive fishery effects. Understanding natural ecosystem variability is one of the key challenges that must be addressed if ecosystems are to be managed in a sustainable manner. Lacking such understanding, the Commission advocates a precautionary approach that provides a suitable level of assurance that undesirable effects will be avoided.

Stability, Health, and Status

In view of our increasing understanding of ecosystem variation, the concept of stability may need to be revisited inasmuch as it would be unrealistic to assume a degree of constancy that does not reflect natural variation. Previously, stability has been viewed as relative constancy in the numbers or biomass of the various components of ecosystems, with variation tempered by natural processes that favor equilibrium. That view of stability must be modified to accommodate new information about natural processes that contribute to ecosystem variability. For example, failure to recognize the occurrence and effects of oceanographic regime shifts leads to an unreasonable expectation of constancy in the distributions and abundances of marine organisms. At the same time, overestimation of natural variability and dynamics could lead to unwarranted rationalization of human effects that are incorrectly attributed to natural phenomena. Revamping the

concept of stability will require careful long-term studies of marine ecosystems, both in areas where human impacts are minimal and in areas where those impacts can be reliably separated from natural variation.

The concept of ecosystem health also may need to be revisited to incorporate a realistic allowance for ecosystem variability. This concept requires general elaboration because ecosystem health has not been clearly and comprehensively defined and the lack of specificity undermines efforts to provide the appropriate level of protection. Progressive efforts have been made in this regard, such as the use of the optimum sustainable population level as the guiding principle for management of marine mammals under the Marine Mammal Protection Act and the use of overfishing and overfished guidelines for fisheries management under the Magnuson-Stevens Fishery Conservation and Management Act. At the same time, however, management efforts to implement these guidelines have fallen short in a number of situations. Furthermore, a number of threats to marine mammals and marine ecosystems persist and are growing, and they have not been addressed effectively. Such threats include the introduction of pollutants into the marine environment; eutrophication that leads to dead zones; harmful algal blooms; introduced species; the spread of disease; increasing levels of commercial shipping; increasing levels of anthropogenic sound; increasing coastal development and associated loss and degradation of vital coastal regions including wetlands, estuaries, and bays; increasing tourism and recreation that, however well intended, pose some risks to natural marine ecosystems; and, perhaps most important, the consequences of climate change. Even in the remote reaches of Alaska, such threats must be addressed if we are to achieve the goal of maintaining ecosystem health.

The concept of ecosystem status is related to the concepts of stability and health and can be defined in terms of the ecosystem properties already noted. For example, ecosystem status is often evaluated based on whether an ecosystem's biodiversity has been significantly altered or diminished by decline or loss of certain species, subspecies, stocks, or populations. The goal of maintaining marine mammal stocks within their optimum sustainable population range is intended to ensure that those stocks remain functioning elements of their ecosystem's biodiversity. Disruption of key ecological processes and interactions may provide a second measure of ecosystem status as might be evident in significantly altered trophic structure. The practice

of “fishing down the food web” (i.e., overfishing the upper trophic levels within an ecosystem so that fisheries must progressively target species from lower trophic levels) is an example in which ecosystem trophic structure has been diminished. The interactions of species with their habitats provide a third basis for evaluating ecosystem status. The observed and projected loss of sea ice resulting from climate change is an example of habitat degradation expected to have profound effects on the structure and function of arctic ecosystems and, thus, their status. Finally, the status of an ecosystem may be assessed on the basis of its ability to provide important goods and services. Overfishing exemplifies the loss of ecosystem productivity that results when stocks are excessively reduced. Thus, ecosystems are multifaceted and may be diminished by a wide range of risk factors or issues. Assessing their status will require a broad and comprehensive set of explicit measures.

Human Activities and Interactions with Marine Ecosystems

Humans are active components of marine ecosystems, seeking to reap the many benefits that can be derived from them. At the broadest level, the oceans exert a dominant role in the earth/ocean/atmosphere system that controls climate and sustains life as we know it. In addition, humans extract food, energy, and raw materials from the oceans; go to them for recreation and tourism; use them to disperse and dilute wastes; use them to transport goods between nations and continents; and build our national defense strategies around them. In Alaska, the marine environment plays a critical role in the state’s culture and economy through subsistence traditions, commercial fishing, coastal development and tourism, and energy extraction.

At the same time, human activities have the potential to pose considerable risks to marine ecosystems, as was recognized with the passage of the Marine Mammal Protection Act, the Endangered Species Act, the National Environmental Policy Act, and a suite of other environmental statutes. The resulting adverse consequences have been at the center of a number of controversies involving Alaska’s marine ecosystems in the past few decades. The following are some of the major issues

that were considered at the Marine Mammal Commission’s annual meeting on 12–14 October 2005.

Climate Change

The earth’s climate is changing—or is being changed—and the accumulating evidence indicates that these changes pose significant risks to Alaska marine ecosystems. The relative influence of natural versus human-related causes is still a matter of debate, but the conclusion that human activities contribute to climate change is beyond dispute. A number of natural phenomena lead to changes in climate, including variations in the intensity of solar radiation and the distance between the sun and the earth (which changes not only on a seasonal basis but also over longer time periods), volcanic eruptions, and continental drift. These are impervious to human control. The primary contribution of human activities is through emission of greenhouse gases that trap energy in the atmosphere. Human activities also contribute to climate change by altering the reflective properties of the earth’s surface (i.e., its “albedo”), which can result in increased heat absorption at the surface and reduced reflection back into space, as is occurring from the loss of both sea and terrestrial ice. Thus far, virtually all discussion of measures to control climate change has focused on reducing emissions of greenhouse gases.

The physical, chemical, biological, and ecological manifestations of climate change are becoming evident at all latitudes, but polar regions are expected to experience more warming due to the poleward transfer of heat by oceanographic and atmospheric currents. The broadscale consequences of arctic climate change have been described comprehensively in the Arctic Climate Impact Assessment, available at <http://www.acia.uaf.edu/>.

In Alaska’s marine systems, climate change is altering a wide range of physical and chemical ecosystem properties. Air temperatures in Alaska have increased 2 to 3°C over the past half century, are expected to increase another 1 to 4°C before the end of this century, and are likely to continue to increase after that if sufficient preventive actions are not taken. Summer sea ice cover has decreased to about 70 percent of its geographical extent three decades ago, and projections indicate that by the end of the century summer sea ice could decrease to the point where the Arctic would be icefree in the summer months. The rate of ice loss can be expected to accelerate over time because the multiyear pack ice has become thinner. Measurements

from the 1990s indicate that ice thickness decreased by 1 to 1.5 m (3.3 to 4.9 ft) compared with that of the late 1950s to mid-1970s. In northern Alaska the date of ice breakup or melt is now about 10 days earlier than in the 1970s. The loss of sea ice will lead to increased absorption and decreased reflection of solar energy, thereby contributing to further change. Precipitation is expected to increase on the order of 4 to 14 cm (1.6 to 5.5 in) annually. The amount of freshwater input to the sea already has increased due to the melting of glaciers and permafrost. Melting permafrost releases methane, which is a major greenhouse gas that contributes further to climate change. Additional changes are expected in the cycles of various chemical compounds, and the oceans are becoming more acidic due to the absorption of carbon dioxide. Further, changes in temperature, freshwater input, and energy absorption may alter both surface and deepwater oceanic circulation patterns. These and other changes, individually and collectively, may have secondary consequences well beyond our ability to predict. The literature on climate change is steadily providing new surprises, such as the rapid disintegration of the Larsen B ice shelf in the Antarctic, the accelerating decline of Greenland glaciers, and the increased acidification of the ocean. It is important to recognize that all of these changes are essentially beyond our control unless preventive measures are taken to address the ultimate factors driving climate change.

Although climate change may have some direct effects on arctic marine mammals, the most serious effects are expected to be manifested indirectly through changes in habitat or secondary to increasing human presence and activity in the Arctic. The loss of sea ice is expected to be the principal habitat-related effect because ice appears to play an essential role in the ecology of many of these marine mammals. Sea ice is used as a platform on which seals and walrus haul out to rest, pup, nurse and care for their young, and molt. Sea ice also is a central feature of their foraging habitat, and arctic marine mammals appear adapted to foraging near the ice edge, in pack ice, or under the ice. Ringed seals may best exemplify the apparent dependence of marine mammals on sea ice. They not only feed under the ice, but they also build their pupping lairs in snow drifts on the ice. Polar bears, in turn, appear to depend primarily on ringed seals for prey, and the effects of declining sea ice on ringed seals already is having significant secondary effects on polar bears in some areas. Bearded seals, an alternative prey for polar bears, eat a diversity of benthic prey

and therefore may be better able to tolerate changes in ecosystem trophic structure secondary to climate change. They use sea ice as hauling platforms and may lose access to offshore foraging areas with the retreat of sea ice. Walrus also depend on sea ice for a number of purposes, including using it as resting platforms near their shallow-water foraging areas. The loss of sea ice will be devastating to walrus unless they can find alternative resting sites close enough to foraging areas that meet their energetic demands. Native hunters have remarked that walrus hunting is become difficult because the ice is farther north. Both bearded seals and walrus may be exposed to terrestrial predators if the loss of sea ice forces them to haul out on land.

Cetacean species also will be affected by climate change and the loss of sea ice although the nature of those effects is not as apparent. Bowhead whales forage both near the ice edge and in open waters. The loss of ice-edge productivity may have a significant impact on them. Gray whales are generally expected to benefit from the reduction of sea ice because they feed on benthic communities and will gain access to areas that were previously inaccessible. However, the benthic invertebrate productivity at their feeding grounds in the northern Bering Sea and Chukchi Sea has been reduced. Beluga whales may be affected by loss of sea ice, particularly if it leads to a reduction in arctic cod, one of their common prey items and considered a keystone species in arctic marine environments. Beluga whales, bowhead whales, and other marine mammal species also may become more vulnerable to killer whales as sea ice declines because they will not be able to retreat to areas of pack ice to avoid predation.

Changes in temperature and habitat also may lead to the introduction of non-arctic species expanding their range northward from subarctic and temperate regions. These “new” species could include parasites and disease vectors that pose a threat to arctic marine mammals. The associated risks may be exacerbated if the affected marine mammals have not been exposed to the new diseases and parasites and their immune systems are not primed to respond adequately.

In addition to these and other consequences of habitat change, human activities are expected to increase in the Arctic as a consequence of warmer temperatures and longer open-water seasons. Such activities may include commercial shipping, development of new commercial fisheries, increasing military activities, expanded oil and gas operations,

increasing tourism, and coastal development to support the other activities. These, in turn, may increase a number of risk factors for marine mammals, including disturbance through human presence or noise, ship strikes, direct and indirect interactions with fisheries, exposure to contaminants, and loss of important habitat for reproduction and feeding.

The ability of arctic marine mammals to cope with the indirect effects of habitat change and the consequences of increasing human presence and activities will depend in part on the plasticity of their natural history patterns and their ability to adapt at a pace sufficiently rapid to keep up with climate change and associated environmental impacts. It is doubtful that they have been faced with the rate and extent of changes they are experiencing now and are expected to experience in coming decades. The consequences may be either positive or negative depending on species-specific habitat requirements and adaptive abilities. For those unable to keep pace, the outcome could include extirpation throughout large portions of their range and, conceivably, extinction.

Caught squarely in the middle of these changes, Alaska Natives are threatened with the loss of the cultures and traditions that have sustained them for thousands of years. They have noted the decreasing availability or access to marine mammals because of changes in the ice that they, like the polar bear, use as a hunting platform. They have noted changes in the palatability of some marine mammals and have become wary and anxious about the risks from increasing contaminants in their native diet. Although seeking to remain true to the traditions of their past, they are justifiably concerned for their future in the face of climate change and the consequences of expanding non-Native influences on their arctic homelands.

Fisheries

About half of the total annual fisheries catch in the United States comes from Alaska waters. The Gulf of Alaska and the Bering Sea, in particular, support some of the largest fisheries in the world, both in terms of biomass landed and market value. In addition to their great value, however, fisheries pose threats that extend beyond the target stock and require an ecosystem perspective for comprehensive management. The National Marine Fisheries Service and the North Pacific Fishery Management Council have attempted to manage fisheries in Alaska in such a way as to promote ecosystem stability and provide some protection for marine

mammals. At its 2005 annual meeting, the Marine Mammal Commission reviewed ecosystem-related issues stemming from commercial fisheries and commended the Service and the Council for their leadership and progress to date. Nevertheless, further work is needed to complete the transition to ecosystem-based fishery management, and management agencies in Alaska seem poised to provide the needed leadership. At the end of 2005 the Commission was developing a letter to the Service regarding future research and management needs pertaining to the direct and indirect effects of fishing on Alaska's marine ecosystems.

Among other things, the ecosystem effects of fishing include reduction of the fished stock and the resulting effects on the associated food web and bycatch of non-targeted species, including marine mammals. The essence of fishing is that it reduces the biomass of the exploited stocks by removing a portion for human purposes. The current fishing strategy used under the Magnuson-Stevens Fishery Conservation and Management Act aims to achieve the optimum yield from each exploited fish stock. "Optimum" is defined in the Act as the maximum sustainable yield reduced as necessary to take into account economic, social, and ecological factors, of which the latter should include protection of the marine ecosystem. Determining how to account for these considerations is one of the great challenges associated with ecosystem-based fisheries management.

To achieve the optimum yield from each exploited stock, current fishing strategies in Alaska seek to reduce the biomass of a whole suite of targeted groundfish stocks to as low as 40 percent of expected biomass in the absence of fishing, with the aim of extracting the maximum sustainable yield (generally assumed to occur at 35 percent of pristine levels) with a 5 percent buffer. However, fish biomasses vary, measurements of biomass can include considerable error, and fishing practices are not always consistent with guidelines. Thus, reductions of more than 60 percent are not uncommon. Proposed changes to fishing regulations would allow fishing to continue to the point at which the biomass of an exploited stock is reduced by 80 percent before rebuilding is required. Determining the effects of such large biomass reductions on ecologically related species, including marine mammals such as the Steller sea lion, has been at the center of major controversies in Alaska. A 2002 review commissioned by the North Pacific Marine Fishery Council found that the evidence needed to assess the ecological effects of this fishery management

strategy is not available and that it is not clear that this strategy is consistent with the goal of sustaining healthy marine ecosystems.

At the end of 2005 the Marine Mammal Commission was preparing a letter to the National Marine Fisheries Service to recommend that the Service expand existing research efforts aimed at addressing the question of how much fish biomass can be removed without causing significant adverse effects on marine ecosystems. Research also is needed to address questions related to the effects of fish harvests that are concentrated in space and time, as well as identifying modifications required for fishing in ecosystems that are strongly influenced by natural or anthropogenic factors other than fishing (e.g., regime shifts and climate change). The Commission believes that a more adaptive, experimental approach to fisheries research and management is needed to address such uncertainties and ensure that ecological factors and protection of marine ecosystems are properly taken into account in ecosystem-based fishery management.

The second type of ecosystem effect is related to injury or mortality of non-target species, referred to as bycatch. In many respects, bycatch exemplifies the kind of unintended effect that led to a call for a broader ecosystem-based approach to management of human activities in the marine environment. In Alaska, the amount of bycatch is assessed by two primary observer programs: the groundfish observer program and the Alaska marine mammal observer program. The groundfish observer program focuses on groundfish fisheries in the Gulf of Alaska and the Bering Sea/Aleutian Islands region. It provides high levels of coverage leading to relatively precise estimates of the amount of injury and mortality. The data show a marked reduction in the number of marine mammals killed annually from a high of thousands when the fisheries were developing—and conducted almost exclusively by foreign vessels—to a few dozen in the current and entirely domestic fisheries. The progress probably reflects some degree of selection against bold animals (i.e., those willing to interact with fishing operations) but primarily appears to be the result of modified fishing practices. This groundfish observer program is funded largely by the fishing industry. It has been exemplary in many respects, and at its annual meeting the Commission commended the National Marine Fisheries Service, the North Pacific Fishery Management Council, and the groundfish fishing industry for their effective implementation of this program.

The Alaska marine mammal observer program, in contrast, places observers in state-man-

aged nearshore fisheries for the purpose of monitoring interactions between the fisheries and marine mammals. The National Marine Fisheries Service conducts this program, and funding has been inconsistent and insufficient to achieve its stated purpose. A number of fisheries have not been observed since enactment of the 1994 amendments to the Marine Mammal Protection Act, which were intended to achieve better assessment of marine mammal/fishery interactions. At the end of 2005 the Commission was considering whether to recommend that the National Marine Fisheries Service increase the level of funding for this observer program so that it provides useful and reliable information on the level of interactions. To fund this program, the Commission may recommend that the Service work with the Alaska Board of Fisheries and the Commercial Fisheries Division of the Alaska Department of Fish and Game to develop a fair and sustainable means for funding observer coverage. An alternative approach, also under consideration by the Commission, would be to recommend that the Service terminate the Alaska marine mammal observer program and use the funds to improve monitoring of the marine mammal stocks that may interact with the fisheries of concern.

An important distinction between the groundfish observer program and the Alaska marine mammal observer program is that the former treats the killing of marine mammals incidental to fisheries as a bycatch problem for which the fisheries should assume responsibility, including funding. In contrast, the latter treats marine mammal bycatch as a protected species problem, and the fisheries are not held responsible for the consequences of their activities. The Marine Mammal Commission believes and has long argued that the burden of proof for addressing marine mammal injury and mortality in fisheries should be treated as a fisheries bycatch issue with the associated responsibilities for funding, prevention, monitoring, and mitigation belonging to the fisheries. The role of marine mammal management should be to oversee this effort in a manner that ensures marine mammal conservation.

Coastal Development

The coastline of the State of Alaska is as long as those of all the other states combined, and much of it is remote and undeveloped. Development is occurring but tends to be concentrated in limited areas, such as on the North Slope and in Cook Inlet. A range of activities may be involved, such as oil and gas operations, road and bridge construction,

port development or expansion, and tourism. Such activities are managed by a number of federal and state agencies, including the Minerals Management Service, the Army Corps of Engineers, and the State of Alaska's Department of Natural Resources Coastal Management Program. When applicable, developers and the agencies are required to comply with the provisions of a number of federal laws, including the National Environmental Policy Act, the Endangered Species Act, the Coastal Zone Management Act, and the Marine Mammal Protection Act. Development activities may pose a number of risks to coastal ecosystems through disturbance, introduction of noise and contaminants, vessel activities, and loss of coastal habitat.

A number of development projects that are either under way or under consideration in Cook Inlet illustrate the potential for incidental and unintended consequences of human activities on marine ecosystems and the need to be more mindful of their indirect effects. Construction of a bridge over the Knik Arm of upper Cook Inlet has been proposed, additional construction and development projects are under consideration or being planned near the port of Anchorage, tourism activities are expanding, and oil and gas development is ongoing in Cook Inlet. Each of these activities has the potential to adversely affect the Cook Inlet ecosystem, including habitat for the Cook Inlet stock of beluga whales. This stock has declined severely since the 1970s, primarily from excessive subsistence harvest. Subsistence harvesting was nearly halted in the late 1990s and the population was designated as depleted under the Marine Mammal Protection Act in 2000. In spite of the low level of harvest (one or two whales per year), the population has failed to recover as expected. Because harvests are no longer believed to be limiting population growth, other factors must be responsible for the population's failure to recover. On 27 June 2005 the Marine Mammal Commission wrote to the National Marine Fisheries Service commenting on the Service's draft Conservation Plan for the Cook Inlet Beluga Whale. Among other things, the Commission recommended that the conservation plan contain a specific section on the habitat needs of the whale population, the risks to that habitat from development activities in Cook Inlet, and steps to be taken to address those risks (see the section on this population in Chapter IV).

Construction at the Red Dog Mine in northwestern Alaska provides another example of coastal

development with potentially adverse ecosystem effects. The mine extracts zinc ore and other metals that are hauled to the coast by truck and loaded onto a barge to be ferried offshore to a larger vessel for transport. Several alternatives to facilitate the loading of the ore have been proposed, including the development of a 1,450-ft (442-m) trestle offshore where the ore could be loaded directly from trucks to transport vessels. The development of the trestle would require considerable dredging to open and maintain the affected offshore region at a depth suitable for large vessels. Dredged materials would be transported farther offshore for dumping and dispersal.

On 27 December 2005 the Marine Mammal Commission wrote to the Army Corps of Engineers to comment on a draft environmental impact statement for the Red Dog Mine project. The impact statement considered four alternative actions, including a no-action alternative, with the trestle option as the tentatively recommended plan. The Commission pointed out that a number of marine mammals occur in the affected area, including bowhead, beluga, gray, and killer whales; harbor porpoises; ringed, bearded, and spotted seals; walrus; and polar bears. The Commission acknowledged that the draft statement had generally recognized the potential risks to marine mammals, including noise-related disturbance from construction activities and vessel traffic, disturbance of marine mammal haul-out areas and migratory paths, ship strikes, and exposure of marine mammals to contaminants from dredging and disposal of dredged materials. However, the Commission did not believe that the draft statement included a full analysis of the associated risks, and it recommended that additional consideration be given to them before finalization of the impact statement. Specifically, the Commission recommended that the Corps (1) provide a more up-to-date and comprehensive assessment of existing information on the marine mammals in the area, (2) clearly describe the possible individual and cumulative effects of the proposed actions on each of those marine mammal species, and (3) describe those effects in the context of other human activities that may affect or are affecting those marine mammals. The Commission expected the Army Corps of Engineers to expand its impact statement accordingly or respond to the Commission in the first quarter of 2006. The Pebble Mine on the Alaska Peninsula is proposed for an important salmon-production watershed, and raises similar concerns.

Oil and Gas

The Minerals Management Service manages the oil and gas development and production in Alaska's marine ecosystems in areas outside state waters. The mission of the Service's Environmental Studies Program is to "develop information needed for assessment and management of environmental impacts on the human, marine, and coastal environments of the outer continental shelf, and monitor to detect changes in the quality and productivity of the environment subsequent to leasing and development on the outer continental shelf." Since the mid-1970s the Service has overseen 22 lease sales in eight planning areas and the drilling of 84 exploration wells. The Service manages these activities in five-year cycles, with the next cycle scheduled to run from 2007 to 2012. Oil and gas production in Alaska has occurred primarily along the North Slope and in the Beaufort Sea and Cook Inlet, but additional lease sales are being considered for the Chukchi Sea/Hope Basin area and the Norton Basin area. Also, the State of Alaska is considering submitting a request to the President to allow sales in the North Aleutian Basin.

Oil and gas activities pose a number of risks to marine ecosystems and marine mammals. Construction and seismic exploration activities generate noise that may disturb marine mammals or other wildlife. Construction and general operation may release contaminants to the environment with a range of potential consequences depending on the type and amount of material released, oceanographic conditions around the release site (including the presence of sea ice), the characteristics of the habitat affected, and the animals that use that habitat. Oil spills of any sort have the potential to be devastating, as was demonstrated by the 1989 *Exxon Valdez* spill. Transport of oil by ships appears to pose a larger risk of a serious spill than platform operations and transport by pipeline. Potential spills in or under ice are of particular concern because there are no proven, effective methods for recovering oil in the presence of ice. The oil and gas industry has developed or is developing a wide range of measures to minimize potential impacts of contaminants and oil spills, such as reinjection of drilling wastes, use of highly sensitive pipeline leak detection systems, development of elaborate spill prevention and response plans including spill trajectory modeling, and development of various technologies for detecting, containing, and recovering spilled oil. However, even under good conditions, recovery of

oil from large spills has proven to be relatively ineffective, emphasizing the importance of prevention.

Since the mid-1970s the Bureau of Land Management (initially) and the Minerals Management Service (subsequently) have spent about \$286 million on studies aimed at predicting, preventing, and managing possible adverse effects of oil and gas operations. Those studies have focused on a wide range of categories including physical oceanography, the fate and effects of oil spills, protected species, biology, socioeconomics, and various multidisciplinary and other studies. About \$90 million has been spent on studies pertaining to protected species.

In past years, the Marine Mammal Commission has made numerous recommendations for research and management activities to assess, prevent, minimize, and mitigate the potential adverse effects of oil and gas operations on marine mammals and marine ecosystems. Those recommendations have focused on the need to assess baseline conditions in the vicinity of oil and gas operations and to assess the potential effects of (1) disturbance from noise and human presence and activities, (2) exposure to contaminants, and (3) habitat modification, with particular focus on bowhead whales, ringed seals, and polar bears. The Commission also has commented extensively on the need for long-term monitoring of potentially affected marine mammal populations to detect the cumulative effects of oil and gas operations that may not be evident in any particular location or time. Such monitoring is particularly important in view of the long-term changes in arctic marine ecosystems that are expected as a result of climate change.

From an ecosystem perspective, Marine Mammal Commission recommendations have been based on three general concerns regarding oil and gas development and production, whether on the North Slope; in the Beaufort, Chukchi, and Bering Seas; in Cook Inlet; or elsewhere. First, and most obvious, is the concern that such operations will result in a large-scale accident or event that causes severe damage to marine ecosystems. The *Exxon Valdez* oil spill provides a lesson and a constant reminder that such events can have severe and long-lasting consequences over large geographic areas. The second concern is that even in the absence of abrupt, large-scale events, oil and gas exploration and production and all the accompanying activities can slowly degrade pristine areas that once supported an abundance of marine life. In this case,

ecosystem transformation occurs through the accumulating effects of multiple subtle, but nonetheless destructive, incidental effects. Such effects were most recently described in a 2003 National Research Council review of the “Cumulative Environmental Effects of Oil and Gas Activities on Alaska’s North Slope.” The effects described therein may accumulate at a slow pace that precludes detection in the absence of essential baseline information and rigorous, long-term monitoring. Such effects are likely to be exacerbated when multiple projects operate in the same area, as is often the case because oil and gas fields are generally spread over sufficient area that they support multiple, concurrent production platforms. The third general concern is that current and projected use of fossil fuels is all part of a socioeconomic pattern of energy consumption that poses risks to all ecosystems, marine and terrestrial, through global warming. With regard to this phenomenon, modern societies to date have

failed to exhibit the cautious, forward-looking, and measured planning and control that is essential for sustaining healthy ecosystems.

Tourism

Although much of Alaska’s coast remains undeveloped, tourism is growing and coastal development projects are increasing in number, size, and type. Such activities already affect marine mammals at certain sites. For example, cruise ships that approach the glacial fjords of Disenchantment Bay, Tracy Arm Wilderness Area, Glacier Bay National Park, and Aialik Bay (see Fig. 2) disturb harbor seals, which use these areas for pupping, nursing, resting, and breeding. Such impacts are likely to increase as tourism activities expand.

Similarly, the whale-watching industry in Alaska has increased recently and may affect humpback whales foraging in Auke Bay and Lynn Canal



Figure 2. Southeast Alaska coastline locations at which tourism and coastal development projects have an effect on marine mammals.

and both humpback and killer whales in the Kenai Fjords area (see Fig. 1). Whale-watching activities may cause disturbance or injury and mortality from ship strikes. Data suggest that this risk is increasing, particularly in southeastern Alaska where the majority of strikes have been reported. At least 36 ship/whale collisions occurred between 1986 and 2004, and an additional 12 collisions were reported in 2005. The watercraft most frequently involved or implicated in ship strikes are whale-watching vessels, cruise ships, and small recreational pleasure craft.

At the Marine Mammal Commission's 2005 annual meeting, representatives of the Alaska Region of the National Marine Fisheries Service indicated that the Service had taken and is taking a number of important steps to address the risks to marine mammals from tourism activities, including instituting (in 2001) statewide regulations for approaching humpback whales, the species most commonly involved in ship strikes, and working cooperatively with other agencies and organizations (e.g., the Forest Service, the National Park Service, the North Gulf Oceanic Society) to educate vessel operators and the public about the need for regulations and the requirements imposed by those regulations. The Commission commended the Service for its actions thus far and, at the end of 2005, was developing recommendations for expanding the Service's efforts to address the impacts of tourism on marine mammals in Alaska's coastal ecosystems. Such recommendations are expected to include:

- Ensuring that effective monitoring and reporting systems are in place to characterize the nature and extent of tourism activities and their potential impacts on marine mammals. In some situations, such as the disturbance of harbor seals by cruise ships in glacial fjords, this will require the collection of baseline information on seal behavior and population parameters and the monitoring of trends in that information over time. In other situations, such as vessel interactions with large whales, this will require an effective monitoring and reporting system for assessing the frequency and nature of interactions, where such interactions occur, and their consequences for marine mammal populations. These monitoring and reporting systems should be developed and implemented in cooperation with stranding networks;
- establishing additional regulations to avoid adverse impacts on marine mammals, including, where required, speed zones and no-entry zones;
- monitoring compliance with and enforcing existing and new regulations;

- developing and implementing educational strategies to inform tourism companies and the public of the risks associated with their activities and their responsibilities for complying with regulations aimed at reducing such risks; and
- working with other federal agencies, state agencies, private organizations, and the public (e.g., the U.S. Fish and Wildlife Service, the Forest Service, the National Park Service, the Alaska Department of Fish and Game, the University of Alaska Sea Grant Marine Advisory Program, Watchable Wildlife, Inc.) to promote and achieve coordinated strategies for avoiding marine mammal disturbance and developing marine mammal viewing guidelines and a code of conduct for vessel operations.

From an ecosystem perspective, tourism presents a dilemma in that it poses both risks and benefits to the ecosystem. The risks stem from the potential for visual and auditory disturbance, vessel strikes, and the introduction of contaminants. In essence, these risks can result in habitat degradation, causing marine mammals and other marine life to avoid or abandon that habitat. The benefits are derived from a better-educated public that is more likely to place high value on and provide support for healthy marine ecosystems. Careful monitoring and management are necessary to ensure a proper balance so that important marine habitat is not damaged by too much attention, as has commonly happened in popular terrestrial and coastal habitats.

Partnerships to Promote Ecosystem Research and Management

Scientists and managers from a variety of agencies, organizations, and programs are attempting to address the issues already discussed and other issues affecting Alaska's marine ecosystems. The National Oceanic and Atmospheric Administration (NOAA) has played, and must continue to play, a central role in these efforts. NOAA has established as one of its four mission goals to "protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management." NOAA defines its ecosystem approach to management as being one that is "geographically specified, adaptive, takes account of ecosystem knowledge and uncertainties, considers multiple external influences, and strives to balance diverse societal

objectives. Implementation will need to be incremental and collaborative.” NOAA has established an ecosystem goal team that has initiated efforts to implement an ecosystem-based approach to the management of living marine resources at the regional level. For example, NOAA cooperates with regional fishery management councils to develop regional fishery ecosystem management plans. Further, NOAA contains a number of agencies and programs that are pursuing activities consistent with and supportive of ecosystem-based research and management. For the past several years the National Marine Fisheries Service, which assumes responsibility for research and management of the majority of marine mammals in U.S. waters, has been engaged in stock assessment improvement programs for both fisheries and protected resources, and these programs include efforts to promote the collection of information needed for an ecosystem approach to management.

NOAA activities complement those of many other agencies, organizations, and stakeholders. The U.S. Geological Survey and the U.S. Fish and Wildlife Service have research and management programs for polar bears, walruses, and sea otters in Alaska. The Minerals Management Service has conducted extensive research on the potential local effects of oil and gas operations. The North Pacific Fishery Management Council is often cited as the most progressive of the eight such councils, based, in part, on its growing attention to ecosystem issues. The National Science Foundation sponsors extensive research through various offices and programs, such as the Office of Polar Programs. The Arctic Research Consortium of the United States coordinates the planning and execution of multi- and interdisciplinary marine research on behalf of the National Science Foundation and the National Park Service. The Arctic Research Commission sets research policy and priorities for the arctic region, promotes research in conjunction with the National Science Foundation, and promotes interagency cooperation on research. Each year the North Pacific Research Board makes recommendations to the Secretary of Commerce concerning ecosystem-related issues in the Gulf of Alaska, Bering Sea, and Arctic Ocean, and it is currently designing a plan for a Bering Sea Integrated Research Program. The State of Alaska contributes to research and management through its Department of Fish and Game and to research through the multiple schools and programs of the University of Alaska. Private organizations, such

as the Alaska SeaLife Center and the Prince William Sound Science Center, also conduct pertinent research. Alaska Natives, who are being directly affected by many of the changes mentioned earlier, are assuming a greater role in marine mammal management and research through external grants and co-management agreements with federal agencies. Their knowledge of the animals and ecosystems, gained through centuries-old subsistence traditions, represents a valuable resource.

In keeping with a true ecosystem approach to research and management, however, it is not sufficient simply to have multiple agencies, organizations, and stakeholders working individually toward an ecosystem approach. Just as the diverse biological components in a region must interact to form a functioning ecosystem, so too the collective agencies, organizations, and stakeholders must interact and cooperate to ensure a comprehensive research and management approach that facilitates use of marine ecosystems in a manner that also ensures that ecosystem health and stability are maintained. Here, too, considerable progress has been made. The Interagency Bering Sea Task Force, created by the NOAA’s Alaska Fisheries Science Center in concert with the U.S. Fish and Wildlife Service and the U.S. Geological Survey, North Pacific Research Board, Alaska Ocean Observing System, Alaska Department of Fish and Game, University of Alaska Fairbanks, Alaska SeaLife Center, and Arctic Research Commission, is an example of such coordination. Other examples include co-management agreements between Alaska Native organizations and the National Marine Fisheries Service or the U.S. Fish and Wildlife Service (see Chapter III), and cooperative arrangements for research on harbor seals and killer whales. All of these efforts demonstrate the utility and efficacy of cooperation and should be commended.

Still, more of this type of cooperation is essential. Partnerships promote effective communication and cooperation and optimize the likelihood that common goals and objectives will be achieved even in the face of limited or transient resources. Partnerships often operate with less cost and help minimize the waste that occurs when opportunities for research and management are missed or activities are unnecessarily redundant due to ineffective communication. The research and management activities under way on the marine ecosystems of Alaska are not independent, and their effort and results will be enhanced if they take advantage of the synergies

that develop from effective partnerships. Partnerships should be viewed as investments in effective long-term stewardship of marine ecosystems.

For that reason, at the end of 2005 the Marine Mammal Commission was anticipating recommending to NOAA that it take the lead in establishing a framework for a marine ecosystem council that would bring all involved parties together for the purpose of promoting a comprehensive, coordinated ecosystem research and management strategy. Given Alaska's history of progressive research and management, this region seems well suited to lead such an effort and provide a model for other regions of the country.

Elements of an Ecosystem-Based Research and Management Strategy

Based on information presented and discussed at its 2005 annual meeting, the Commission identified a number of important elements of an ecosystem-based research and management strategy. At the end of 2005 the Commission was preparing a letter to NOAA recommending consideration of these elements as it seeks to achieve its mission of protecting, restoring, and managing the use of coastal and ocean resources through ecosystem-based management. These elements are briefly discussed in the following sections.

Specific, Measurable, Robust Management Standards

Controversies in the management of marine ecosystems, including those in Alaska, are exacerbated by uncertainty about management objectives and standards under the prevailing statutes. Statutory goals are indicative of broad intent, but the achievement of those goals often is confounded by a lack of specificity in the objectives or the standards that guide management policies and activities. The resulting uncertainty increases the risk of management error, possibly leading to levels of protection that are either excessive or inadequate.

Some standards have been specified and are measurable. Definitions under the Marine Mammal Protection Act and implementing regulations

issued by the National Marine Fisheries Service and the U.S. Fish and Wildlife Service for the terms "optimum sustainable population," "depleted," and "negligible incidental take" allow clear determinations as to whether those standards are being met. Problems are encountered in the implementation of these standards more as a result of the lack of information for assessing stocks against the standards than because of vagueness in the standards themselves.

Other standards, such as those established under the Endangered Species Act, require greater specificity if they are to be used effectively and consistently for the conservation of species and ecosystems. Additional work is needed to ensure that standards such as "jeopardy," "adverse modification of critical habitat," "recovery criteria," "risk classification," and "threat evaluation" are specified, objective, and measurable in a manner consistent with the broader goals of the governing legislation.

Development of specific standards for ecosystem-based management (as opposed to single-species management) will be a challenge because those standards likely will need to incorporate measures of ecological interactions. Some such measures are available and others must be developed, but they will be difficult to characterize and quantify. Nonetheless, developing criteria that can be used as standards is essential to guide management and measure its success, thereby providing assurance that management efforts will sustain healthy marine ecosystems into the future.

Integrated Research and Management at International, National, Regional, and Local Levels

To initiate comprehensive, efficient, and effective ecosystem-based research and management, integration is needed both within and between multiple levels of organization or jurisdiction—international, national, regional, and local. At the international level, integration is essential because marine ecosystems and many marine mammal populations span national borders. Thus, important tasks (e.g., stock assessment and prevention and mitigation of human-related threats) require shared knowledge and coordinated protection measures. Coordination also is needed at the national, regional, and local levels, and the framework (e.g., a marine ecosystem

council) mentioned earlier seems essential to promote communication and collaboration among different agencies and organizations involved in ecosystem research, management, and conservation.

Description of Natural Ecosystem Dynamics

As already noted, the perception of ecosystems has shifted from one based on a single, stable equilibrium to one of multiple, more-or-less stable equilibria marked by periodic transitions or “regime shifts” or, in some cases, nearly constant change. In fact, ecosystems change over a range of temporal and spatial scales. Such change includes variation about central tendencies as well as short- and long-term shifts in those central tendencies themselves. Assessment of change in ecosystem structure and function requires long-term, broadscale studies designed to elucidate physical, chemical, biological, and ecological patterns and to understand both the factors causing such change and the consequences for ecosystem components and processes. A better understanding of the forces that drive population trends in marine mammals and other species is required so that those forces can be taken into account in management strategies.

The increasing number of research programs to collect long-term data series of oceanographic and atmospheric conditions and to relate observed physical and chemical patterns to biological and ecological changes provides evidence of a growing appreciation for research into ecosystem dynamics. In this regard, the Alaska Fisheries Science Center’s efforts to annually update and publish such indices in the Ecosystem Considerations chapter of the Stock Assessment and Fishery Evaluation Reports are commendable. More studies and publications of this type are needed if we are to improve our understanding of ecosystem dynamics and, in turn, establish realistic management goals that distinguish between natural phenomena and those driven by human activities.

Distinguishing Natural vs. Anthropogenic Changes

Distinguishing between natural and human-caused phenomena in the marine environment is one of the great challenges for ecosystem-based management. Nowhere has the intensity of this debate been more evident than in the controversy over the role of

human activities in driving climate change. Distinguishing between natural and anthropogenic effects also has been the central issue in the Steller sea lion controversy, which has involved competing hypotheses about the effects on sea lions of climate change, killer whale predation, and fishing. More generally, the need to distinguish between human effects and natural phenomena underlies the intent of Congress when it passed a suite of laws in the 1960s and 1970s to establish standards for managing conflicts between human activities and conservation of the environment.

The distinction between natural and human-caused phenomena is confounded by at least three factors. First, natural ecosystem dynamics create a complex background for human activities, sometimes severely confounding efforts to identify, characterize, and quantify human effects. Second, adequate baseline information on natural ecosystems is rarely collected before they are perturbed, thereby precluding the opportunity to compare and contrast their characteristics and patterns under natural versus perturbed conditions. Instead, human activities often are well established before any serious effort is made to collect the information needed to evaluate potential effects. Precautionary, adaptive approaches requiring the collection of baseline information to provide a basis for evaluating effects before they become serious or irreversible are all too often rejected out of a sense of economic urgency or apparent conflict with other priorities. Fisheries are a classic example of a case in which the information needed to assess potential effects on fished stocks and on stocks caught incidentally often is not collected, assembled, and analyzed until years after the fishery has begun. By that time, the fishery is so well established that collection of baseline information is virtually impossible and adaptive manipulation to assess human impacts is often vigorously resisted. Third and finally, there has been a reluctance to address and manage the underlying factors causing changes in the marine environment. The U.S. Census Bureau estimates that by 2050 the U.S. population will increase by about 125 million people and the world population will increase by 2.5 to 3.0 billion people. In recent years, world fisheries catch has been stable (with notable overfishing) at about 80 to 85 million metric tons. If human populations increase and fisheries catch remains constant, the gap between supply and demand will grow, creating greater pressure to increase fishing effort in spite of adverse effects on the affected marine ecosystems. Under such pressure, the need to distinguish between natural and

perturbed ecosystem states may become secondary to fisheries production, thereby undermining the aim of maintaining healthy marine ecosystems. Each of the above obstacles must be acknowledged and overcome if we are to monitor and manage anthropogenic effects in such a way as to maintain healthy ecosystems.

Assessment Programs That Inform Management Regarding All Current and Future Threats

The agenda for the Commission's 2005 annual meeting struck a balance between discussions of ecosystem-scale issues and discussions of species or populations whose conservation status is of special concern. Three patterns emerged from the discussions. First, marine mammal populations in Alaska, and marine ecosystems in general, are subject to threats that can be expected to increase if they are not appropriately managed. Climate change, fisheries, toxic contamination, disease, coastal development, and oil and gas activities all pose increasing risks to marine ecosystems, particularly when viewed cumulatively.

Second, the distribution of research and management efforts among all the potentially affected marine mammal species has been markedly uneven. Of the three dozen or so stocks included in the Alaska Region's stock assessment reports, abundance estimates are lacking for about one-third, and coefficients of variation (i.e., measures of precision) are available for only about one-half of those with abundance estimates. For many stocks, a decline of 50 percent or more could go undetected using the current stock assessment approach. For some species, such as ringed seals, spotted seals, bearded seals, and ribbon seals, virtually no data are available for stock assessment, despite the fact that those species are experiencing major environmental changes due to warming and reduction of sea ice in the Arctic. It is plausible that some or all of those species have already experienced significant, albeit undetected, declines.

Third, in view of the many threats to marine mammals in Alaska, the current approach to assessment is not adequate to ensure that the populations are being conserved as significant, functioning elements of healthy marine ecosystems, which is the stated goal of the Marine Mammal Protection Act. Because of their relevance to fisheries, ecosystem and marine mammal issues in the Bering Sea and Gulf of Alaska receive far greater consideration

than similar issues in the Arctic. Additional attention to arctic marine mammal and ecosystem issues is clearly needed. Unanticipated situations may at times force managers to focus on specific issues or species. But with a forward-looking research and management strategy in place, such crises should become exceptional rather than the norm. Integration of research and management into a comprehensive, ecosystem-based framework would help to anticipate and avoid such crises.

Interdisciplinary Programs That Integrate Information on Complex Food Webs

Many of the threats to marine mammals and marine ecosystems in Alaska involve ecological interactions that are transmitted through food webs. Climate change in the Arctic is being driven by physical changes that likely will affect the timing, location, nature, and magnitude of primary production. Those changes will have secondary and tertiary (and so on) consequences for consumers from zooplankton to invertebrates and fish to marine mammals, including top predators such as killer whales and polar bears. Understanding how changes in the physical environment will be transmitted through arctic food webs will require expertise from a broad range of scientific disciplines and traditional knowledge. Similarly, description of the full effects of fishing on marine ecosystems will require a number of scientific disciplines.

NOAA agencies are developing a growing number of interdisciplinary marine research programs. The Commission supports those programs. However, it is not clear that they are, as yet, sufficiently comprehensive in scope and participation. The Fisheries Oceanography Coordinated Investigation (FOCI) program of the Pacific Marine Environmental Laboratory and the Alaska Fisheries Science Center is an example of an important program designed to examine the ecology of pollock stocks in the North Pacific. Although this program has provided important information for fisheries management, it also could have provided opportunities for broader ecological studies (e.g., of the links between ocean conditions and pollock recruitment and of the links between pollock biomass and pollock predators). These opportunities were not realized, due apparently to a lack of funding but also due to a lack of communication and coordination among a broader range of scientific disciplines. However, the Southeast Bering Sea Carrying Capacity Program

did make substantial progress in this direction and provided a mechanism for detecting change through permanent moorings, which remain in place more than a decade later. The point here is that the essence of ecosystem-based research is the investigation not only of the individual components, but also of their interactions. The study of such interactions requires interdisciplinary research, which should be encouraged whenever possible. A large marine ecosystem-based framework for research and management would facilitate the communication needed for such interdisciplinary work. NOAA is moving in this direction, but more needs to be done or critical research and management opportunities related to climate change, fishery impacts, and other ecosystem-level effects will be lost.

The Interactive, Cumulative Nature of Environmental Issues and Risk Factors

Ecosystems are subject to a range of concurrent or geographically overlapping influences that may interact. Thus, the intellectual framework for studying ecosystem dynamics and managing human effects on them must be expanded to address the cumulative effects of multiple factors rather than the simpler effects of individual factors. In statistical terms, this means expanding from a univariate to a multivariate mindset; in ecological terms the expansion is from population dynamics to community ecology.

Discussions at the Commission's annual meeting provided many examples of the need for such intellectual expansion to address management issues in Alaska. Animals exposed to contaminants may have weakened immune systems that are less resistant to diseases, which in turn may be more prevalent because of increased exposure to disease vectors associated with climate change. Natural regime shifts in ocean parameters may reduce prey for sea lions or fur seals, thereby making them more vulnerable to competition from fisheries and, if they spend more time at sea foraging, more vulnerable to predation by killer whales.

Investigating, understanding, and mitigating such impacts will require powerful research approaches suitably scaled to assess spatial and temporal variability and account for the many factors that may be influencing marine ecosystems. Just as marine wildlife must integrate and adjust to all of these factors, scientists also must adjust their research approaches if they are to develop the types of infor-

mation necessary for managing marine ecosystems. Here, again, more holistic research approaches will emerge naturally from a framework that integrates multiple issues and brings together a diversity of scientists, managers, and stakeholders for collective problem-solving in an ecosystem context.

Enhancing Predictive Capacity to Anticipate and Prevent Adverse Effects

Future generations will judge ours, in part, by how well we conserve marine and terrestrial ecosystems. Efforts to avoid significant adverse impacts on marine ecosystems can be divided into those intended to prevent impacts and those intended to minimize or mitigate them as or after they occur. Prevention is essential where minimization and mitigation are limited in their effectiveness. Our ability to prevent adverse impacts depends largely on our ability to predict them. Thus, effective management requires predictive capability.

Climate change illustrates the need for prediction and prevention where possible. The expected loss of arctic sea ice will have profound consequences for arctic ecosystems generally and marine mammals specifically. A number of marine mammal populations could be extirpated throughout large portions of their ranges. If such consequences cannot be addressed by after-the-fact mitigation efforts, then preventive measures are essential.

Threats to arctic ecosystems could result not only from climate change *per se* (e.g., loss of ice) but also from the expansion of human activities as a result of changing arctic conditions (e.g., increased shipping, oil and gas operations, fishing, tourism, and coastal development). Here, too, the extent to which adverse effects are avoided will depend on whether we predict those effects in advance and take the actions needed to prevent them.

A More Rational Basis for Funding

The amount and distribution of funding for research and management is an important indicator of the value that society places on ecosystem health and related issues. The distribution of funding, in particular, reflects the overall structure of the research and management strategies of NOAA and other responsible organizations. At its annual meeting, the Commission discussed the allocation of research and management funds in Alaska. Three major patterns emerged.

First, the distribution of research funds is markedly uneven among the large marine ecosystems in Alaska waters. The vast majority of ongoing research is directed at increasing our knowledge of the Bering Sea and Gulf of Alaska, particularly for the purposes of fisheries management. The results of that research are greatly improving the scientific understanding of how various components of those ecosystems interact, but the heavy emphasis on fisheries-related matters, although not inappropriate in itself, has been at the expense of other important conservation issues, particularly in the Beaufort and Chukchi Seas. The need for research in the Beaufort and Chukchi Seas specifically, and the Arctic generally, has been highlighted by the growing evidence of climate change and its current and expected profound effects on marine mammals, marine ecosystems, and the subsistence cultures that depend on them. Many of the marine mammal stocks in those regions are expected to experience severe declines in the coming decades. Based on the loss of ice habitat that has already occurred, it is reasonable to hypothesize that those declines are already under way. Existing assessment methods and information are insufficient to provide the essential baseline data needed to describe such changes. The need for information on arctic regions will only increase in the future, and a more rational basis is needed for distributing the limited available funds for research and management among the major ecosystems in Alaska waters.

Second, within each region, long-term, broad-scale research is needed to examine patterns of temporal and spatial variation and trends in the physical, chemical, biological, and ecological changes causing and resulting from ecosystem change. Until recently, funding strategies for research have been based largely on projects that were relatively short term (one to three years) and were limited in geographic scope. The primary motivation for much of this approach has been to provide fisheries managers with the information necessary to set annual limits on removals from target, non-target, and protected stocks. In contrast, ecological trends and processes in marine ecosystems often occur over much longer periods and across broader geographic ranges. In recent years, more expansive programs (many of which are carried out or sponsored by NOAA) have been implemented to investigate these temporal and spatial patterns. Such programs must be encouraged to identify long-term measures of ecosystem status and variation, elucidating natural bottom-up and top-down forcing mechanisms, and assessing the long-term effects of anthropogenic forcing. This

will require a more stable funding base. Changes in research strategies and funding require adjustments in infrastructure (e.g., availability of ships), technology (e.g., construction and testing of electronic equipment), and personnel (e.g., employing sufficient staff with the requisite skills and experience). Highly variable and unpredictable funding can increase the likelihood that resources will be wasted and diminish a research program's overall effectiveness, particularly for long-term, broadscale research. Reluctance to commit funds for long-term research is understandable to an extent, given annual budget cycles and the inherent uncertainty in federal funding at the departmental or agency level. However, such reluctance often appears to stem from a misunderstanding that these studies are simply a form of monitoring that does not warrant support. Long-term, broadscale research is more than monitoring—it is essential for understanding (a) the characteristics of healthy marine ecosystems, (b) changes in those characteristics over time and space, (c) the cumulative effects of human activities on ecosystems, and (d) reasonable ways by which to mitigate those effects. The National Science Foundation formalized this concept when it initiated its Long-Term Ecosystem Research program in 1980, but more work of this kind is needed, especially by agencies with responsibilities for research and management of marine mammals. The SEARCH program, currently under development by the National Science Foundation, is a promising approach toward studying pan-arctic trends.

Third, the distribution of research and management effort for various marine mammal species also has been markedly uneven. For example, the recent annual funding for Cook Inlet beluga whales, which number about 350 animals, is less than \$100,000 (barely enough to conduct an annual aerial survey), although funding for the western population of Steller sea lions, which numbers more than 30,000, has been in the millions to tens of millions of dollars per year over the past decade, in part because of the implications of the sea lion decline for fisheries. Similar contrasts in the scale of funding can be drawn between the Steller sea lion and various other pinnipeds (e.g., ice seals) and cetaceans (e.g., harbor porpoise, Dall's porpoise) that receive little attention but may be at significant risk from human activities. In the case of the North Pacific right whale, the species' short-term persistence is at issue.

Thus, a more thoughtful, broader rationale must be developed to support essential research and management for all species. Integrating research

and management into a comprehensive ecosystem-based framework would facilitate such a rationale.

A more rational basis is needed for determining the amount and allocation of funding for research and management activities for Alaska. A well-defined and adequately funded ecosystem-based framework should promote the organization,

communication, and collaboration of participating agencies, organizations, and stakeholders; encourage a broader perspective or understanding of ecosystems and threats to them; give better direction to research and management efforts; and provide greater assurance that human activities do not have excessive adverse effects on those ecosystems.

Chapter III

ISSUES OF CONCERN TO ALASKA NATIVES

Since its enactment in 1972, the Marine Mammal Protection Act has recognized the importance of marine mammals to Alaska Natives and the importance of protecting their traditions and subsistence-based cultures. The Act includes an exemption allowing the taking of marine mammals by Alaska Natives for subsistence purposes or for purposes of creating and selling authentic Native articles of handicrafts and clothing, provided that the taking is not accomplished in a wasteful manner. This importance also is reflected in the Act's charge to the Commission to "recommend to the Secretary [of Commerce and the Interior], other appropriate Federal officials, and Congress such additional measures 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."

Toward this end, the Commission endeavors to work closely with Alaska Native organizations on legislative initiatives (see, for example, discussion of Marine Mammal Protection Act reauthorization in Chapter IX), international matters (see the discussion of the polar bear treaty in Chapter VIII), and other matters of particular concern to Alaska Natives. Since 1986 the Commission has appointed a Special Advisor on Alaska Native Affairs to offer a Native perspective to Commission deliberations and to apprise the Commission of issues of interest to the Alaska Native community. These individuals have provided valuable insights to the Commission on the nature and importance of Alaska Native subsistence cultures, as well as the value of traditional ecological knowledge of marine mammals in Alaska.

Recognizing the shared role that federal resource agencies and Alaska Native subsistence hunters play in conserving marine mammal stocks at sustainable levels, Congress amended the Marine Mammal Protection Act in 1994, adding section 119 to authorize the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to enter into cooperative agreements with Alaska Native organizations "to conserve marine mammals and provide co-management of subsistence use by Alaska Natives." Under such agreements, the Services are authorized to provide grants to Alaska Native organizations for several purposes, including collecting and analyzing data on marine mammal populations,

monitoring the harvest of marine mammals for subsistence uses, participating in research conducted by federal agencies and others, and developing co-management structures with federal and state agencies. Section 119 indicates that it was not intended to expand or change the respective jurisdiction of federal, state, or tribal governments. As such, co-management agreements under that authority cannot place enforceable restrictions on the numbers of marine mammals taken for subsistence purposes unless such authority was already available (e.g., through formal rulemaking to protect depleted species or under other some other authority, such as tribal ordinances for tribe members, the Whaling Convention Act for bowhead whales, and the Fur Seal Act for fur seals on the Pribilof Islands). As discussed in Chapter IX, the responsible federal agencies and several Alaska Native organizations have been pushing for an amendment to the Marine Mammal Protection Act that would enable the parties to co-management agreements to establish and enforce such limitations.

Following enactment of section 119, the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and the Biological Resources Division of the U.S. Geological Survey entered into negotiations with the Indigenous People's Council for Marine Mammals (IPCoMM) to develop an "umbrella agreement" for negotiating cooperative agreements with individual Alaska Native organizations. IPCoMM was formed under the auspices of

the Alaska Federation of Natives and is composed of Alaska Native organizations and tribal commissions and councils whose membership engages in subsistence uses of marine mammals. IPCoMM represents the Native community on matters related to marine mammals and includes most, if not all, of the Alaska Native marine mammal commissions. An umbrella agreement was concluded on 27 August 1997. That agreement, which is available on the National Marine Fisheries Service's Web site (<http://www.fakr.noaa.gov/protectedresources/umbrellaagr97.pdf>), is designed to provide a foundation for developing cooperative agreements, promote the sustained health of marine mammal species, and provide mechanisms for dispersing funds to support co-management efforts. With respect to funding, the parties agreed to establish two panels—one for marine mammals under the jurisdiction of the Commerce Department, the other for species under the jurisdiction of the Department of the Interior—to develop protocols and timetables for the application, review, and awarding of funds made available under section 119, establish co-management priorities, and evaluate proposals for funding. More often, however, funding has been directed to specific Alaska Native organizations in annual appropriation legislation.

Prior to the addition of section 119 to the Act, the only cooperative agreement related to marine mammals between the federal oversight agencies and an Alaska Native organization was the agreement between the National Oceanic and Atmospheric Administration and the Alaska Eskimo Whaling Commission, originally entered into in 1986. This agreement was established to govern aboriginal subsistence whaling for bowhead whales authorized by the International Whaling Commission. In enacting section 119, Congress held this agreement up as a model for the envisioned cooperative agreements under the new provision.

Since enactment of section 119, the National Marine Fisheries Service has entered into five additional cooperative agreements with Alaska Native organizations. Those agreements are with the Alaska Beluga Whale Committee, the Alaska Native Harbor Seal Commission, the Cook Inlet Marine Mammal Council (for Cook Inlet beluga whales), the Tribal Government of St. George (for fur seals and Steller sea lions), and the Tribal Government of St. Paul (for fur seals and Steller sea lions). In addition, the National Marine Fisheries Service and two other Alaska Native organizations, the Aleut Marine Mammal Commission and the Ice Seal Committee, are currently in the process of concluding coopera-

tive agreements. The U.S. Fish and Wildlife Service has three cooperative agreements in place. They are between the Service and the Alaska Sea Otter and Steller Sea Lion Commission, the Alaska Nanuq Commission (polar bears), and the Eskimo Walrus Commission. The U.S. Fish and Wildlife Service also works with other groups through sub-agreements to the statewide species-based agreements.

At its 2005 annual meeting, the Commission reviewed actions that have been taken to establish and implement cooperative agreements between the Services and Alaska Native organizations under the Marine Mammal Protection Act and to survey co-management activities in general. In addition to IPCoMM, which helped the Commission organize that portion of the meeting, representatives from 19 Alaska Native organizations participated in the meeting. The Commission heard from all of the Alaska Native organizations that have entered into cooperative agreements under the Marine Mammal Protection Act. In addition, presentations were made by the Aleut Marine Mammal Commission, the Ice Seal Committee, the Bristol Bay Marine Mammal Council, the Qayassiq Walrus Commission, the Bristol Bay Native Association, the Sitka Marine Mammal Commission, the Hoonah Indian Association, and the Southeast Inter-tribal Fish and Wildlife Commission. A presentation also was made by the North Slope Borough's Department of Wildlife Management.

The Commission had asked participants to discuss progress made to establish co-management structures, the strengths and weaknesses of those structures, activities being carried out by Alaska Native organizations, and ways in which the Commission might help encourage and strengthen the co-management process. Several Native organizations indicated that they are involved in harvest management and monitoring activities. Some had adopted measures designed to avoid wasteful take. The Sitka Marine Mammal Commission noted that it recently had established a tannery to help hunters make better use of the marine mammals they harvest.

Most of the organizations are participating in research activities, generally in cooperation with federal or state agencies or with universities or independent researchers. Ongoing research activities include population assessments, biosampling programs, contaminant studies, studies of marine mammal diets through analyses of fatty acids, research into predator/prey relationships (e.g., between polar bears and ice seals and between marine mammals and fish stocks), and studies into

distribution and movement patterns using satellite telemetry. Some speakers noted that participation in these programs is helping to build and strengthen research capabilities in Native communities and trust in the agencies.

Many of the organizations also stressed their role as information conduits between resource agencies and subsistence hunters. The groups track issues of interest to their members, collect and disseminate information, provide a locus for hunters to develop positions on emerging issues, and serve as advocates on behalf of Native interests. Many of the organizations are working with their members to collect and preserve traditional knowledge concerning marine mammals and Native practices. Some groups also work with industry to design plans for mitigating possible adverse impacts of development activities on the availability of marine mammals for subsistence uses. The Eskimo Walrus Commission and the Alaska Nanuuq Commission are working with hunters in Russia (Chukotka) to help them develop and implement management plans for shared marine mammal resources and to obtain samples from marine mammals taken in Russia.

The speakers at the Commission's meeting represented a diversity of Alaska Native organizations, some of which focus on activities related to single species whereas others represent subsistence users from specific geographic areas. Some are well established and others have been formed only recently. The speakers, nevertheless, hit certain common themes. There was a generally positive view toward the level of cooperation that has developed between the resource agencies and Alaska Native organizations. Nevertheless, some speakers thought that the process could be improved. They noted, for instance, that there is a need to increase the consistency between the processes for funding and developing cooperative agreements used by the National Marine Fisheries Service and the U.S. Fish and Wildlife Service. Several organizations also spoke to the need to establish and maintain stable funding sources for co-management activities. There also was general support for amending the Marine Mammal Protection Act to allow parties to co-management agreements to adopt enforceable harvest limits to ensure the conservation of marine mammal stocks taken for subsistence. Many groups expressed concern about, and the need to address, other factors that may be adversely impacting marine mammals in Alaska. These included climate change, disturbance of marine mammals by cruise ships, industrial development, pollution, and habitat

loss. Other concerns were more narrowly focused. For example, the Alaska Nanuuq Commission stressed the need for Congress to enact legislation to implement the bilateral U.S.–Russia polar bear agreement. Natives from Southeast Alaska thought that more needed to be done to address the “overabundance” of some marine mammal species that may be reducing the availability of other resources used by Natives.

At the end of 2005 the Commission was in the process of writing to the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and IP-CoMM concerning its review of activities taken to implement section 119. The Commission believes that substantial progress has been made over the past decade to establish cooperative partnerships between federal agencies and Alaska Native organizations and expected to commend the participants in that process for the level of cooperation and collaboration that they have achieved. The Commission believes, however, that the issues facing Alaska Natives, such as the effects of climate change on the availability of marine mammals for subsistence uses, are becoming more complex and will require greater attention in the future. The Commission therefore was likely to recommend that a more comprehensive review of co-management efforts be undertaken than was possible at the Commission's meeting. Such a review would look more closely at what is and is not working effectively under the existing cooperative agreements. Some issues had already been identified at the Commission's meeting, such as the following:

- the need for more stable and predictable funding for the activities of Alaska Native organizations under section 119 agreements;
- the need to clarify the role of the State of Alaska in cooperative agreements;
- an examination of marine mammal populations for which additional coverage or better coordination among agencies and organizations may be needed;
- an assessment of the efficacy of harvest monitoring programs and ways that they might be improved and expanded; and
- consideration of the need for changes in the umbrella agreement between IPCoMM and the responsible federal agencies.

The Commission also believes that such a review would provide an opportunity to examine research activities being carried out by the parties to cooperative agreements and could be used to identify ways in which research programs and

cooperation could be improved. Ideally, the type of review envisioned by the Commission would enable agencies and Alaska Native organizations to engage in long-range planning that would establish budgets and set priorities for co-management activities over the next five to ten years.

With respect to funding issues, the Commission anticipated making a recommendation that participants in the co-management process develop a comprehensive, long-term strategic plan that could be presented to Congress to identify the needs of these programs. The Commission agrees with the participants at its annual meeting that stable funding sources are needed but also recognizes that increased funding for expanding co-management activities may not be forthcoming. As such, the Commission expected to recommend that funding considerations need to be factored into decisions as to whether additional cooperative agreements are pursued and how they might best be structured.

The Commission also expected to highlight the need to expand the existing authority under the Marine Mammal Protection Act, as recommended by the Administration and Alaska Native organizations, to enable the federal agencies and Alaska Native organizations to establish enforceable harvest limits before a stock is designated as depleted. The need for such an amendment is underscored by the overharvest of Cook Inlet beluga whales (see Chapter IV) that could not be curtailed until after the stock had become depleted.

The Commission also was likely to call for improved harvest monitoring as an element of cooperative agreements between the Services and Alaska Native organizations. In this regard, the U.S. Fish and Wildlife Service has established marking and tagging regulations for the three species of Alaska marine mammals under its jurisdiction. Those regulations require hunters to provide information on marine mammals taken for subsistence and handicraft purposes and provide a mechanism for tracking the origin of certain marine mammal parts. The U.S. Fish and Wildlife Service also has established a network of “taggers” in several Na-

tive villages where marine mammals are taken. Although this system appears to be working well, animals that are struck and lost are not marked and tagged, and assessing the numbers of such animals removed from the affected populations remains a challenge. As such, the Commission anticipated encouraging the parties to cooperative agreements to consider ways to address this issue and otherwise strengthen monitoring programs.

For species under National Marine Fisheries Service jurisdiction, only Cook Inlet beluga whales are subject to marking and tagging requirements. Although the Commission recognizes that such programs may not be needed for all marine mammals taken by Native hunters, the Commission was likely to recommend that the Service consider establishing improved reporting programs for those species for which harvest data are lacking or are of questionable reliability. If the Marine Mammal Protection Act is amended to allow for full harvest management by the federal resource agencies jointly with Alaska Native organizations before a stock becomes depleted, real-time data on the numbers of animals being taken will become all the more important.

The Commission also was likely to raise a permitting issue specific to the National Marine Fisheries Service. Some Native organizations have expressed frustration with the Service’s requirement that Natives obtain separate research permits to collect and transfer marine mammal specimens to otherwise permitted researchers. The Commission believes that there are less-burdensome alternatives that would satisfy the requirements of the Marine Mammal Protection Act and expected to note these in its letters to the Service and IPCoMM.

Although follow-up letters on Native subsistence issues had not been sent as of the end of 2005, the Commission had consulted informally with the Services and IPCoMM about conducting a comprehensive review of co-management activities. The initial reactions were positive and the Commission is anticipates sponsoring a review in the near future.

Chapter IV

ALASKA SPECIES OF SPECIAL CONCERN

From its southeastern inland waters to the far reaches of the Aleutian Islands and along its coastal Arctic plain, Alaska is a state rich with marine mammals. The state's varied marine environs support a mix of at least 36 marine mammal stocks including large and small whales, dolphins, porpoises, seals, sea lions, walruses, sea otters, and polar bears. The first interactions between these species and humankind likely began thousands of years ago, involving indigenous peoples along the Asian North Pacific coast. Some of these migrated eastward along the Aleutian arch toward North America, and since that time—in fact, probably well before—marine mammals have been vital to subsistence cultures throughout the North Pacific, including Alaska. Interactions with Western people and cultures are relatively recent, probably beginning with explorations of Vitus Bering in the late 1720s. Since then, the interactions of Alaska marine mammals and Westerners have been varied and controversial, sometimes leading to extensive declines in marine mammal species (e.g., northern fur seals, sea otters, and bowhead whales). Even as recently as the turn of the new century, marine mammals in Alaska have been at the center of a number of controversies regarding the effects of human activities on marine ecosystems. The expansion to an ecosystem approach as described in Chapter II is not intended to obviate the need for sound management at the species level but rather to complement such management. Individual species will continue to face specific threats or circumstances that demand focused management and research. With that in mind, this chapter of the Commission's report describes a set of Alaska species whose status is of special concern.

North Pacific Right Whale (*Eubalaena japonica*)

The North Pacific right whale is one of the world's most endangered mammals. The list of endangered and threatened species under the Endangered Species Act currently includes right whales in both the North Atlantic and North Pacific Oceans as part of a single species (northern right whales, *E. glacialis*). However, genetic and morphological data indicate that right whales in the two oceans are separate species. Although the evidence is not conclusive, historical whaling records suggest that there are two separate populations of North Pacific right whales—an eastern population that occurs in the eastern Bering Sea and Gulf of Alaska in summer and a western population that inhabits waters off eastern Asia. Both populations were nearly exterminated by commercial whaling from the mid-1800s to the early 1900s. Because of depletion by whaling, an international ban on commercial hunting of all right whales was adopted in the mid-1930s.

Stock Status

Although very little is known about the status of the western North Pacific right whale population, some scientists believe that it may number in the hundreds. Information on the eastern population suggests that it numbered in the low hundreds in the early 1960s and may have been increasing at that time. However, the population was nearly eliminated during an episode of illegal hunting by Soviet whalers in the early 1960s that involved the reported killing of 372 right whales in the eastern Bering Sea and Gulf of Alaska. Thereafter, documented sightings in the eastern North Pacific declined abruptly and, and those observed were scattered across coastal waters from Mexico and Hawaii to Alaska, where most opportunity for observation occurred. Because none of those sightings included calves, it appeared that the population might no longer be viable and would decline to extinction as the remaining individuals died.

In the summer of 1996, however, four right whales, possibly including a cow/calf pair, were sighted in the eastern Bering Sea. From 1997 to

2003 surveys resulted in annual sightings of between 3 and 13 whales. In August 2004 a whale was implanted with a satellite-linked tracking device and led scientists to an area in the eastern Bering Sea where 25 whales were observed feeding over the course of three separate sightings. Although some of the observed whales were resightings of the same individuals seen on different days, the results doubled the previous record for sightings within a single summer and included three cow/calf pairs. Photoidentification records and biopsy samples gathered since 1996 indicate that the surviving population numbers at least 23 individuals, including 16 males and 7 females. The area was surveyed again in the summer of 2005, but no whales were observed.

Although a few sightings in recent decades have been made in the North Pacific and Gulf of Alaska south of the Aleutian Peninsula and Kodiak Island off southern Alaska, most have occurred over the continental shelf in the southeastern Bering Sea (see Fig. 3). Most sightings also have occurred in summer and early fall and involved whales engaged in feeding behavior. These sightings occurred within a broader area of the Bering Sea and North Pacific Ocean where most historical commercial catches were recorded, suggesting that the southeastern Bering Sea and waters south of Kodiak Island comprise at least part of the remaining population's summer feeding grounds.

During its 2005 annual meeting, the Marine Mammal Commission reviewed information on the status of eastern North Pacific right whales and related research efforts. At the end of 2005 the Commission was preparing comments and recommendations to the National Marine Fisheries Service on its efforts to promote recovery of the population. Through the use of hydrophones to detect and locate right whale vocalizations and satellite-linked telemetry tags to track individual whales, the National Marine Fisheries Service has made effective use of limited resources for aerial and shipboard surveys to locate, photograph, and biopsy right whales. Given the vast, remote area in which eastern North Pacific right whales may occur and the small number of remaining individuals, the research results to date have been a significant accomplishment.

The most pressing need for protecting this population is to document the activities and movements of the remaining whales so that human-related threats can be identified and managed. For this purpose, the Commission expected to recommend that the Service assign high priority to research

aimed at documenting right whale movements and distribution, including aerial, shipboard, and acoustic surveys; sightings from platforms of opportunity; satellite telemetry; and continued review of historical whaling records. In addition, the Service is examining all photographs of North Pacific right whales for evidence of scars that may have been caused by interactions with fishing gear or ships.

Critical Habitat Proposal

Based on sightings made during the 1990s, the Center for Biological Diversity petitioned the National Marine Fisheries Service in October 2000 to designate a large area in the southeastern Bering Sea as critical habitat for right whales under the Endangered Species Act. The Marine Mammal Commission commented in support of the petition on 11 July 2001. On 20 February 2002 the Service announced that, although the petitioned action may be prudent, the Service could not determine the essential biological requirements for the population based on available information and had therefore decided that designation of critical habitat was not warranted at that time.

In October 2004 the Center for Biological Diversity filed a lawsuit asserting that the Service's denial of the petition constituted a violation of protection requirements under the Endangered Species Act. A U.S. District Court judge agreed and, in a 14 June 2005 ruling, he found the Service's decision not to designate critical habitat to be arbitrary and capricious and ordered the Service to publish a critical habitat proposal within four months. The Service responded to the order with a proposal published in the *Federal Register* on 2 November 2005 to designate two areas covering a total of 36,750 square miles as critical habitat for North Pacific right whales. The first area included a large part of the southeastern Bering Sea east of the Pribilof Islands and north of the Alaska Peninsula. That area circumscribed most right whale sightings documented since the early 1980s. The second included a much smaller area south of Kodiak Island over a submarine canyon where three right whales had been seen feeding.

At the end of 2005 the Commission was deliberating comments to the Service on the new proposal. Recommendations being considered include expansion of the new proposal to take into account potential feeding areas outside the proposed boundaries that may be needed to promote recovery of the population and include the eastern Aleutian Island passes through which right whales migrate between

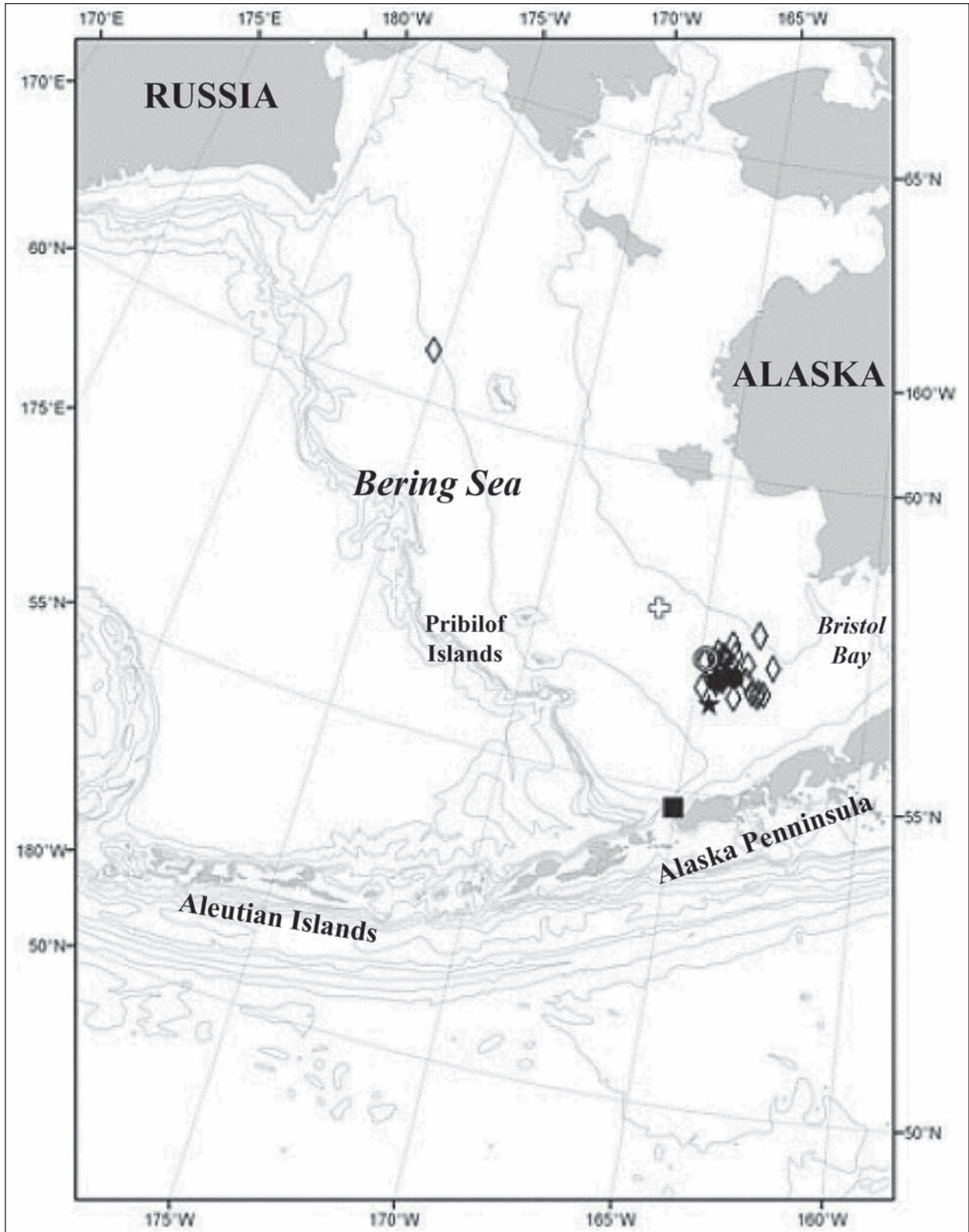


Figure 3. Sightings of North Pacific right whales in waters west of 160°W and east of 180°W from 1982 to 2002. Symbol change denotes month: April (closed square), June (open circle), July (open diamond), August (open cross), September (closed circle), and October (closed star). Figure courtesy of K. E. W. Shelden.

the North Pacific Ocean and Bering Sea. To help identify additional areas for inclusion within the critical habitat, the Commission was considering recommendations that the Service continue to review sighting and catch records over the past century to identify areas where whale concentrations overlap areas with prey concentrations that may serve as important feeding grounds and undertake research needed to assess habitat-use patterns, stock structure, population abundance, and risk factors that may impede recovery. Such vital studies will, of course, require funds to carry out the work.

Cook Inlet Beluga Whale (*Delphinapterus leucas*)

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

The most isolated stock of beluga whales in U.S. waters is found in Cook Inlet and is separated from the other four stocks by the Alaska Peninsula (see Fig. 4). Because of their proximity to Anchorage, beluga whales in Cook Inlet are exposed to the activities occurring around the largest urban coastal area in Alaska. Analyses by the National Marine Fisheries Service of beluga whale sightings in Cook Inlet over the past 30 years indicate that the stock's summer range has contracted substantially in recent years. Compared with sightings in the 1970s and 1980s, animals are rarely seen now in offshore waters or the lower reaches of the inlet. In June, when the National Marine Fisheries Service conducts aerial surveys of the population, beluga whales are concentrated in a few groups in the upper reaches of the inlet around the Susitna River delta, Knik Arm, Turnagain Arm, and Chickaloon Bay.

Stock Status

The National Marine Fisheries Service designated the Cook Inlet beluga whale stock as depleted under the Marine Mammal Protection Act on 31 May 2000. The Service determined in 2000 that listing the stock under the Endangered Species Act was not warranted at that time, primarily because overharvest by subsistence hunters, 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 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. In light of recent population trends, however, the Commission has recommended that the Service reconsider its Endangered Species Act listing decision.

Aerial surveys of beluga whales in Cook Inlet have been conducted by the National Marine Fisheries Service annually in June or July since 1994. Data from those surveys indicate that the Cook Inlet beluga whale population declined from an estimated 653 individuals in 1994 to 347 in 1998. That constitutes about a 47 percent decline in four years. As discussed later, the high level of taking by subsistence hunters that contributed to this decline ended in 1998, and it was assumed that the population would show signs of increase once this source of mortality had been regulated. Based on abundance estimates collected over the past six years, this does not appear to be the case. The Service had predicted that the population would increase by between 2 and 6 percent per year in the absence of any hunting. However, no such increase has been detected, despite the fact that subsistence hunters reported taking only five whales between 2000 and 2005. Based on its 2005 surveys, the Service estimated the abundance of the Cook Inlet beluga whale population to be 278 (CV = 0.18). This is the lowest estimate for any year since the Service began conducting systematic surveys in 1994 and nearly 90 fewer animals than the 2004 estimate. Although this single point estimate does not necessarily mean that the population declined precipitously during the previous year, when analyzed in the context of other recent estimates it creates an unsettling picture. That analysis estimates that there is a 93 percent probability that the growth rate of the population is less than 2 percent and a 71 percent probability that it is negative (i.e., that the population is declining). Abundance estimates dating back

to 1994, and the confidence limits around those estimates, are provided in Figure 5.

On 28 June 2005 the Service published a notice of availability of draft revised stock assessments for several stocks, including the Cook Inlet beluga whale. The Service proposed changes to the Cook Inlet beluga report to reflect new population estimates and trend data and provided updated information on subsistence taking, predation by killer whales, distribution, strandings, and fisheries observer coverage. Stock assessments for Cook Inlet beluga whales and other species are available on the Service's Web site at <http://www.nmfs.noaa.gov/pr/sars>.

The Commission commented on the draft stock assessments by letter of 26 September 2005. In its general comments, the Commission questioned the practice of calculating a potential biological removal level other than zero for stocks that are declining in the absence of known human impacts. In light of the most recent trend analysis, this likely applies to Cook Inlet beluga whales. In comments specific to the Cook Inlet stock of beluga whales, the Commission also took issue with the recovery factor that the Service is using to calculate the potential biological removal level for this stock. As in past years, the Service used a recovery factor of 0.3, which is halfway between the recovery factor of 0.1, the default factor for stocks listed as endangered, and 0.5, the default factor for depleted and threatened stocks or stocks of unknown status. Consistent with the recommendation made by the

Alaska Scientific Review Group, the Commission believes that using a recovery factor of 0.1 for Cook Inlet beluga whales is appropriate. The Commission noted that using this lower recovery factor would be consistent with its recommendation (discussed later in this section) that the stock be listed as endangered under the Endangered Species Act.

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 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 Cook Inlet beluga whales. The draft conservation plan is available on the Service's Web site at <http://www.fakr.noaa.gov/protectedresources/whales/beluga/mmpa/draft/conservation-plan032005.pdf>. The draft plan provides a review of the biology and life history of Cook Inlet beluga whales and assesses 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, including stranding events, predation, disease, and environmental change. The Service considered nine types of human-induced factors that could be af-

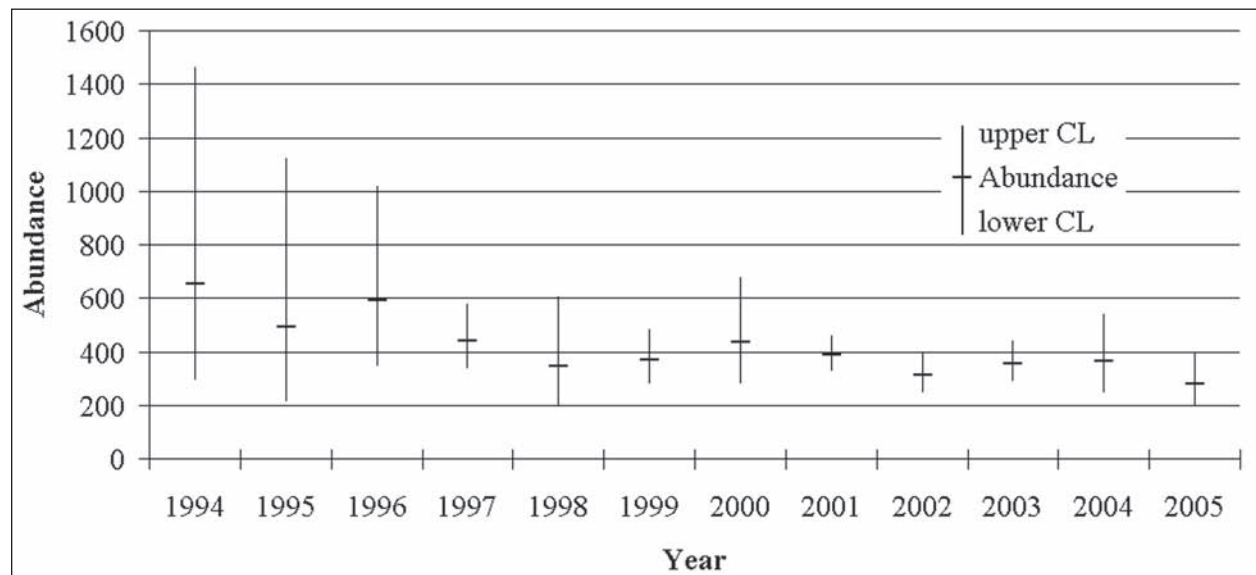


Figure 5. Abundance estimates (and upper and lower 95 percent confidence limits) of Cook Inlet beluga whales, 1994–2005. Data courtesy of the National Marine Fisheries Service.

fecting the stock. These included subsistence hunting, commercial fishing and its potential effects 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 possibly research. The draft plan also laid out a proposed conservation strategy based on the identified threats to the stock, including proposed monitoring and research plans.

A separate section of the draft conservation plan discussed the status of the population with respect to possible listing under the Endangered Species Act. The Service summarized its finding from 2000 that listing was not warranted and noted that abundance estimates since then are not consistent with the assumption that overharvesting by subsistence hunters was the only factor contributing to the stock's decline and that controlling such hunting would lead to recovery. The Service therefore indicated its intention to initiate a new status review of the stock under the Endangered Species Act in conjunction with the development of the conservation plan.

The Marine Mammal Commission provided extensive comments on the draft conservation plan by letter of 27 June 2005. The Commission believed that, although the draft plan contained much valuable information, substantial restructuring and rewriting was needed to make it a useful document for guiding recovery actions. 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.

In particular, the Commission believed that the section of the plan describing the conservation strategy and setting forth an outline of recovery actions needed to be reworked. In this regard, the Commission recommended that the strategy be organized under the following five subsections: (1) population monitoring, (2) habitat use and conservation, (3) factors potentially affecting reproduction and birth rates, (4) factors potentially affecting survival, and (5) related management actions. The last category would include activities that are not directly related to understanding or addressing possible causes of the population's decline or rate of recovery but that may be useful tools for achieving recovery, such as public education and outreach, enforcement, administrative matters, and so forth.

The Commission also commented on the section of the draft plan concerning possible listing of

the Cook Inlet beluga whale population under the Endangered Species Act. The Commission noted that a review of the status of the population is a priority issue that needs to be addressed promptly. However, the Commission was concerned that coupling such a review with development of the conservation plan would delay making a listing determination. In fact, the Commission believed that the case for listing was so clear that it questioned whether the status review envisioned by the Service was necessary and recommended that the Service move directly to publish a proposed listing rule. The Commission noted that, if a listing action were pursued expeditiously, the final conservation plan could be structured to reflect, or at least anticipate, the additional conservation tools that would be available under the Endangered Species Act.

With respect to the merits of a listing determination, the Commission observed that the Service has already determined that the Cook Inlet beluga whale population constitutes a distinct population segment. It is a slow growing (K-selected) stock that has been reduced to a critically low level that, despite almost no removals by subsistence hunters over the past six years, has shown no signs of recovery. By way of comparison, the Commission noted that abundance of the Cook Inlet beluga whale population is approximately the same as that of the North Atlantic right whale, which the Service considers to be critically endangered. The sole basis for the Service's determination in 2000 that listing was not warranted was the belief that subsistence hunting, the only factor then believed to have contributed to the observed decline of the population in the 1990s, had been sufficiently controlled to allow for recovery of the stock. However, the data collected since then strongly suggest that the Service's conclusion was incorrect. In the absence of any appreciable take by subsistence hunters, the population has not increased as expected and may have continued to decline.

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 if a stock has been determined to be depleted or has been listed as endangered or threatened.

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 1). Part of the impetus for the large number of beluga whales taken during the mid-1990s was the availability of commercial outlets in Anchorage for beluga whale muktuk (a popular Native food composed of the epidermis and underlying blubber). 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. The high levels of subsistence taking are 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 to 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 a beluga whale 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. 106-522) that extended indefinitely the prohibition on hunting Cook Inlet beluga whales unless authorized by the National Marine Fisheries Service through a cooperative agreement. Shortly before that, in October 2000, the Service had published proposed regulations that would govern the hunting of Cook Inlet beluga whales under the Marine Mammal Protection Act. As discussed later in this section, that rulemaking, although nearing completion, was still pending at the end of 2005.

The Service entered into cooperative agreements with the Cook

Inlet Marine Mammal Council each year between 2000 and 2003 to authorize a limited subsistence hunt. The agreements for 2000, 2001, and 2003 authorized a single strike in each of those years, with the understanding that those strikes would be allocated to the native village of Tyonek. The 2002 agreement authorized two strikes, with one being allocated to Tyonek and the other to the remaining community of Alaska Native hunters in the Cook Inlet area.

Under the strike limits agreed to by the parties to the rulemaking, it was anticipated that two strikes would be allocated to Native hunters for 2004. However, in December 2003 the Service indicated that 20 dead stranded beluga whales, in addition to the one whale taken for subsistence in 2003, had been reported in Cook Inlet. Under a stipulation agreed to by the rulemaking parties, all hunting was to be suspended if the number of "unusual mortalities" exceeded 18 in any year. As such, the Native hunters agreed to refrain from taking any whales in 2004. Thus, no cooperative agreement was concluded in 2004 and no hunting occurred.

The Service entered into a cooperative agreement with the Cook Inlet Marine Mammal Council

Table 1. Reported Alaska Native subsistence take of Cook Inlet beluga whales, 1993–2005

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

¹ Estimated value (see 2002 stock assessment report).

² Represents a minimum value.

Data courtesy of the National Marine Fisheries Service.

for 2005, authorizing two strikes for the year. One strike was allocated to the native village of Tyonek and the other to the Cook Inlet community of Alaska Native marine mammal hunters. Both strikes were used, resulting in the landing of two male whales.

Regulation of Native Harvest

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

Based in part on the Commission's advice, the Service published a proposed rule on 4 October 2000 to establish harvest limitations. At about the same time, the Service issued a draft environmental impact statement reviewing federal actions associated with the management and recovery of Cook Inlet beluga whales. The preferred alternative identified in the statement was the issuance of regulations to establish an annual strike limit of two beluga whales until the Cook Inlet stock is no longer depleted. This alternative was reflected in the proposed rule.

A formal hearing at which the proposed regulations were considered was held by the Service in Anchorage in December 2000. The Commission participated as one of seven parties at the hearing. As discussed in previous annual reports, the parties subsequently agreed to an interim quota allowing six strikes between 2001 and 2004. The parties further requested that the judge retain jurisdiction over the issue of strike limits for 2005 and subsequent years and agreed to a process for developing a long-term, science-based harvest regime that (1) provides reasonable certainty that the population will recover within an acceptable period of time, (2) takes into account the uncertainty with respect to the population dynamics and vital rates of the

Cook Inlet beluga whale population, (3) allows for periodic adjustments of allowable strike levels based on the results of abundance surveys and other relevant information, (4) provides assurance that the strike levels will not be reduced below those for 2001–2004 unless substantial information indicates that taking must be reduced to allow recovery of the stock, and (5) can be readily understood by diverse constituencies. The National Marine Fisheries Service was tasked with providing its recommendation for the long-term management regime to the judge by 15 March 2004.

After considering comments from the Commission and other parties on a draft plan, the Service submitted its proposed subsistence harvest management plan to the administrative law judge on 30 April 2004. It was this proposal that was considered at a second rulemaking hearing held in Anchorage in August 2004. The plan incorporated a “25-95 criterion” that would establish harvest limits so as to provide a 95 percent probability that the delay in recovery time for the stock would not exceed 25 percent, as compared with allowing no harvest. However, the criterion would be applied only when the Cook Inlet beluga stock was experiencing a positive growth rate. The Service noted that “[w]hen no growth or a decline in the population occurs, the 25-95 goal would require that the harvest be reduced to zero.” The Service believed that it should balance the Act's recovery goal with the desire to provide subsistence opportunities to Alaska Natives. As such, the Service proposed to reduce, but not immediately eliminate, the number of authorized strikes if the beluga stock declined below its current level. The plan submitted by the Service also retained a five-year extension of the interim harvest levels because the Service believed that the “existing data do not provide sufficient resolution on the population trends within this stock to support the management strategy which will be used in subsequent five-year intervals.”

The Service's proposed plan included a harvest table for determining the allowable five-year harvest levels at various population sizes and under three different population trends—increasing, stable, and declining. No taking would be allowed if the best estimate of the population declined below 260 whales, which would ensure, with 95 percent confidence, that whales are not removed from a population of fewer than 200. The narrative accompanying the table indicated that this corresponded to an “effective population size” (i.e., the number of reproductively active females in the population) of as few as 60 animals. The table also set forth the

number of “unusual mortalities” that would trigger suspension of the harvest at different population sizes.

The Commission submitted three documents for consideration at the 2004 hearing: a declaration from Daniel Goodman, Ph.D.; rebuttal testimony from Dr. Goodman; and a response to the initial filings from other parties. Those documents supported the Commission’s view that the proposed plan failed to meet three of the elements for the long-term regime as stipulated by the parties after the 2000 hearing. The Commission believed that the proposed plan did not provide reasonable certainty of population recovery, did not respond correctly to the uncertainty or the available evidence about the population dynamics, and failed to reduce the harvest rate below the interim minimum as soon as substantial information demonstrates that such a reduction is needed to ensure population recovery. A core failure of the Service’s proposed plan was that it ignored the existing information about the population dynamics of the Cook Inlet beluga population. It relied on the optimistic assumption that the population is growing at a rate of between 2 and 6 percent when available data indicate an actual growth rate that is considerably smaller. The Commission also commented that the “floor” of 260 whales proposed by the Service, below which no harvesting would be allowed, was too low and inconsistent with established principles of conservation biology. As for the proposed mechanism for reducing the allowable harvest for a declining population, the Commission noted that this was too insensitive because it demanded a 95 percent confidence that the trend is declining. Because of this misplaced burden of proof, the probable performance of this aspect of the plan was such that it will be triggered at about the same time as the census floor clause. As such, the Commission found this measure to be largely meaningless.

During the hearing, which occurred on 2–4 August 2004, the parties were afforded the opportunity to present direct testimony and cross-examine other parties’ witnesses. Parties also were given the latitude to propose and examine alternative harvest strategies that were responsive to weaknesses identified in the Service’s original proposal. In the course of the hearing, the administrative law judge expressed concern that the proposed harvest levels were being established based on theoretical estimates of the growth potential of the population rather than using the data derived from the Service’s abundance surveys. Also, although sympathetic to the needs of subsistence hunters, the judge indi-

cated that he was reluctant to recommend a regime that would allow the beluga population to decline significantly below its current numbers.

At the conclusion of the hearing, the judge agreed to give the parties an opportunity to continue to explore alternative harvest management regimes and to seek a consensus among the Native hunters, the Service, and the Commission. As part of this process, the Commission developed a set of criteria for governing the establishment of allowable harvest limits. These criteria sought to recognize the cultural needs of Native hunters but, in view of the poor status of this population, also sought to assure timely recovery of the stock, assure that the delay in the time-to-recovery is not excessive, and guard against further decline of the stock when at a level considered to be “severely depleted.” Although not explicitly stated, the Commission observed that the proposed criteria would operate such that no harvest would be allowed if the population was declining or not growing, but that once the population began to recover, brief periods of decline or lack of growth would not automatically result in suspension of the harvest. The Commission proposed that the long-term harvest regime should have a 95 percent certainty of achieving recovery to the stock’s optimum sustainable population level within 100 years and should have a 95 percent certainty of terminating harvest within 10 years if that goal was not being met. The Commission further recommended that the regime should provide a 95 percent certainty that the cumulative take would delay recovery by no more than the greater of five years or 25 percent, as compared with a scenario of no subsistence harvest and no incidental take. The last element recommended by the Commission applied to “severely depleted” stocks, those below one-half of their optimum sustainable population level using the “best” estimate of stock abundance. For the Cook Inlet beluga whale, this would apply when the best estimate of the population’s abundance was below 390 individuals. The Commission proposed that the long-term harvest regime provide a 95 percent certainty that a severely depleted stock not be allowed to decline by more than an additional 5 percent before terminating the harvest.

The Commission’s proposal also backed away somewhat from its earlier position recommending an all-male harvest. Although still concerned about the potentially greater impact of removing breeding-age females, the Commission noted that so little is currently known about the age and sex structure of the stock that the impact of preferentially harvesting some subsets of animals cannot accurately

be predicted. The Commission therefore recommended that additional research into stock structure be required as a priority matter and that the harvest regulations be flexible enough to address the implications of the research results.

After consulting with the parties to the rule-making early in 2005, the presiding judge determined that it was unlikely that the parties would be able to come to consensus on all of the outstanding issues. Accordingly, on 7 March 2005 the judge issued an order establishing a briefing schedule for the parties to address those issues. During fall 2004 the Native Village of Tyonek developed a proposed harvest regime that met some, but not all, of the criteria proposed by the Commission. That proposal was modified further by the National Marine Fisheries Service to conform more closely to the Commission's criteria, but, as discussed below, failed to provide adequate safeguards in some respects.

The National Marine Fisheries Service filed a motion for issuance of a recommended decision on 31 March 2005. The Service also submitted a final revised proposal for governing the taking of Cook Inlet beluga whales by subsistence hunters. Under the proposed plan, harvest limits would be established for five-year intervals based on the abundance estimates from the previous five years and the estimated growth rate derived from the series of abundance estimates. No harvest would be allowed whenever the five-year average of the population estimate fell below 350 whales. The proposed plan included a table that identified the harvest limits that would be established at different population levels and under high, intermediate, and low growth-rate scenarios. The Service noted that the proposed harvest limits were predicated on the assumption that mortality rates and growth rates in the population will remain fairly constant from year to year. To respond to situations when this is not the case, the Service's proposal included a provision that would adjust the allowable harvest limits if an unusually high number of mortalities were detected in a given year. The Service indicated that it would conduct annual abundance surveys in 2005 and 2006 but that future surveys could be scheduled every other year if sufficient to meet the data requirements of the plan.

The motion filed by the Service admitted that its proposed harvest regime "cannot provide reasonable certainty that the population will recover within an acceptable period of time to the point where it is no longer depleted" because factors other than subsistence taking seem to be contributing to the lack of recovery. Nevertheless, the Service believed that the proposed harvest limits under

its plan would not have a detectable effect on the population and would allow a subsistence harvest to continue while other possible causes were being investigated. Further, the Service's proposal would terminate the harvest if the population continued to decline.

The Commission filed its response to the Service's motion on 15 April 2005. The Commission believed that the new plan filed by the Service was an improvement over earlier proposals. In particular, the Commission noted that the Service had responded properly to past Commission comments by using empirically derived population data to establish harvest limits and by raising the floor at which all harvest would be terminated. However, deficiencies in other parts of the plan persisted. In this regard, the Commission indicated that the Service's proposal did not (1) satisfy the stipulations agreed to by the parties for governing the long-term harvest of Cook Inlet beluga whales, (2) provide for sufficiently quick responses to population declines or continued low growth rates, and (3) provide reasonable certainty that future survey efforts will be sufficient to provide data of equal or better quality to those collected during the past 10 years. As a consequence, the Commission did not think that the plan provided adequate assurance that it would achieve timely recovery of the Cook Inlet beluga whale population or determine rapidly enough when recovery was not occurring and respond accordingly.

The Commission took issue with the balancing of the goals of achieving the recovery of depleted stocks with the need to provide subsistence opportunities for Alaska Native hunters, as reflected in the Service's proposal. Although recognizing the importance of subsistence hunting, the Commission argued that, under the provisions of the Marine Mammal Protection Act, allowance for subsistence hunting and other types of taking is clearly secondary to achieving the recovery goals of the Act. Consistent with this view, the Commission advocated that the Service's plan be revised to reduce or suspend the harvest more quickly when the growth of the stock is low. In this regard, the Commission noted that the proposed regime would allow harvests to continue for the next 30 years despite little or no growth in the population, provided that the five-year average abundance did not dip below 350 whales.

The Commission also expressed concern over the Service's statement that monitoring efforts for the Cook Inlet beluga whale population might diminish in coming years. Less extensive or less frequent surveys are likely to increase uncertainty in

population estimates, resulting in a reduced ability to detect declines or stalled recovery. As such, the Commission recommended that the harvest plan be amended to be more precautionary if the statistical precision of the surveys declines from that achieved in recent years.

The Commission agreed with the Service's proposal to incorporate a 25-95 criterion into its plan and noted that this standard should be sufficiently responsive for increasing populations. The Commission expressed concern, however, that the plan was not responsive enough to situations where the population is not growing or growing very slowly. Although recovery may be precluded entirely under some scenarios, the Commission observed that, even with no harvest, there are some situations where the decision to allow harvests to continue at the proposed rates could determine whether or not recovery occurs.

In discussions subsequent to the 2004 hearing, the Commission opposed establishment of an interim harvest of eight whales for the five-year period 2005–2009. Instead, the Commission recommended that the interim period be limited to three years. The basis for this recommendation was four-fold. First, the way that the takes would be allocated would result in an increase in the number of strikes allowed, something that is not warranted given recent population trends. Second, there should be enough information to begin management under the long-term harvest regime sooner than 2010. Third, the harvest level that would be allowed under the interim harvest regime was more than 1.5 times that which would likely be allowed under the long-term regime. Fourth, harvesting in the early years will have the greatest impact on recovery of the stock. Thus, caution is particularly needed during the interim period. Despite these reasons for adopting a shorter interim harvest period, the Commission acquiesced to the Service's proposal because it believed that the allowable harvest under the proposed long-term regime and current population trends was likely to be one whale per year in 2009 and 2010. As such, the difference between using a three-year versus a five-year interim harvest period amounted to a single strike of a whale.

The Commission also supported the inclusion of a provision to reduce or suspend an otherwise authorized harvest if an unusual number of mortalities is detected. However, the Commission voiced concern with the particulars of the Service's proposal, which used the period since 1999 as the baseline for what constitutes "normal" mortality rates. The

Commission noted that no discernible growth in the population has occurred since 1999. As such, this may already have been a period of unusually high mortality. If this is the case, waiting until that level of mortality is exceeded before adjusting the harvest limits would not provide adequate protection for the population. The Commission also expressed concern about the Service's ability to detect dead beluga whales throughout Cook Inlet. Although this may be less important if the temporal and spatial distribution of dead whales does not vary much from year to year, it could lead to substantial undercounting in some years if a large proportion of mortalities occurs in remote areas or at times when they are less likely to be detected.

The other parties to the proceeding, all of which represented subsistence hunters, also filed responses to the Service's proposed plan. Generally, those parties believed that the proposal put forward by the Service unnecessarily restricted subsistence hunting opportunities. The native village of Tyonek, the only party besides the Commission to provide a detailed response, advocated that the floor beyond which hunting not be allowed be set at 310 whales. Tyonek also thought that the number of whales that could be taken under periods of intermediate growth for a population of between 350 and 399 whales should be increased somewhat over that proposed by the Service. Tyonek believed that the Service's unusual mortality provision was misguided in that it used a correction factor of two to account for undetected whales and penalized hunters when mortalities were high in a single year but not when averaged over several years. Tyonek agreed with the Commission that requiring annual population surveys should be an essential element of the harvest management plan. However, Tyonek also questioned the accuracy of the aerial surveys conducted by the National Marine Fisheries Service and recommended that they be augmented by on-the-ground counts by hunters. Tyonek also argued that the Commission lacked standing to participate as a party to rulemakings such as this and should be excluded from the remainder of the proceeding.

The National Marine Fisheries Service filed a rebuttal brief on 25 April 2005 to respond to the criticisms of its proposed plan made by the other parties. The Service reiterated many of the points made in its initial filing. On the only wholly new point raised in the reply briefs, the question of Commission standing, the Service took the position that the Commission should continue in its role as a party to the rulemaking.

After considering all of the materials submitted by the parties, the administrative law judge issued a recommended decision on 8 November 2005. His decision included a summary of the procedural history of the rulemaking and set forth several findings of fact. As threshold matters, the judge found that the Service's positions on disputed issues were not entitled to any deference and would be evaluated under a preponderance of the evidence standard. The judge also agreed with the Commission's argument that recovery of depleted stocks is the first consideration in evaluating the proposed harvest regimes and that providing subsistence opportunities is a secondary consideration.

With respect to the Service's proposed harvest management plan, the judge found that it was supported by the preponderance of the evidence. The judge was unwilling to embrace the Commission's recommendation that the plan be geared to achieve recovery of the stock within 100 years because, given the uncertainty of the dynamics of the Cook Inlet beluga whale population, it may be impossible to achieve that goal even with no harvests. Rather, the judge recommended that the agency maintain maximum flexibility to achieve the Act's recovery goal instead of adopting fixed rules that quantify recovery criteria.

The judge found that, as a matter of law, the floor below which harvesting should be suspended needed to be established at a population size around that which prompted Congress to enact a moratorium on harvests in 1999 (about 367 whales.) Recognizing that abundance estimates are not precise population counts, the judge found that the proposed floor of 350 whales was a reasonable reflection of congressional intent.

The judge believed that the concerns voiced by the Commission and Tyonek about the proposed unusual mortality provision were nothing more than a request for "better science when better scientific evidence is not currently available." He further noted that neither party had come forward with better scientific evidence than that relied upon by the Service. Although the judge is correct that the Commission was seeking "better science" on this point, his recommended decision ignored the more crucial question of how best to protect a marine mammal stock in the face of such uncertainty. As for the Commission's call for additional research to verify the assumptions underlying the Service's proposal, the judge deferred that issue for agency consideration when it establishes priorities for research on Cook Inlet beluga whales.

Because of uncertain funding and possible competing agency priorities, the judge was reluctant to require that the Service commit to annual abundance surveys as part of the recommended harvest management plan. He did, however, agree with the Commission's related point that the survey effort needed to remain at a level capable of detecting a population decline to 350 whales with reasonable certainty. The recommended decision also rejected Tyonek's proposal to require that aerial surveys be augmented by on-the-ground counts, which evidence provided at the hearing indicated are less reliable.

The recommended decision also addressed the sex and age composition of future harvests. The judge noted that the regulations would establish a long-term harvest regime and, because of the uncertainty with respect to the optimal harvest composition, thought it best to address this issue through co-management agreements rather than regulations.

As for the question of the Commission's standing, the judge rejected Tyonek's objection as being untimely.

Applicable regulations require the Service to publish notice of the recommended decision in the *Federal Register* for a 20-day public comment period. At the end of 2005 the Service was preparing that notice, which it expected to publish early in 2006.

Killer Whale, AT1 Stock (*Orcinus orca*)

Three "ecotypes" of killer whales (*Orcinus orca*) inhabit the eastern North Pacific. They are distinguishable on the basis of their genetics, acoustics, foraging patterns, and prey. The limited data available suggest that they also differ in distribution and movement patterns although these overlap to some degree. Killer whales of the "resident" ecotype appear to have smaller, more predictable distributions. Killer whales of the "transient" ecotype appear to have larger distributions, are less predictable in their movements, and may spend less time in any given local area. Killer whales of the "offshore" ecotype are seen much less frequently and appear to have still larger distributions that are farther offshore. Residents and transients differ significantly in their diets. Existing information indicates that in the North Pacific resident killer whales prey on fish, whereas transient killer whales prey on other

marine mammals. Offshore killer whales, although poorly studied, appear to prey primarily on fish.

The National Marine Fisheries Service recognizes three biological stocks of transient killer whales in the North Pacific: the West Coast transient stock, the AT1 transient stock, and the Gulf of Alaska transient stock. The AT1 stock is genetically and acoustically distinct from other transient stocks, does not associate with other transients, and has a much more restricted home range, suggesting that AT1 animals have been reproductively isolated from other pods of transient killer whales for quite some time. As a result, AT1 killer whales are recognized as a separate stock, even though they are few in number.

The AT1 stock of transient killer whales inhabits the Prince William Sound and Kenai Fjords region. The stock was stable at 22 whales in the late 1980s but lost nine members following the 1989 *Exxon Valdez* oil spill in Prince William Sound. The stock has continued to decline to eight whales in 2004. Female members of the AT1 stock have not produced a surviving calf since 1984. As a result of this failure to reproduce, the AT1 stock is on the verge of extinction. The National Marine Fisheries Service listed the stock as depleted under the Marine Mammal Protection Act in 2004.

Although research on AT1 killer whales has been limited in winter months, substantial research has been conducted on them over the past 15 years, primarily by members of an independent research group, North Gulf Oceanic Society. Researchers have conducted extensive behavioral and acoustic studies of the stock and have discovered, among other things, that AT1 whales prey primarily on harbor seals and Dall's porpoises although they also occasionally prey on harbor porpoises and northern fur seals. In addition to the effects of the *Exxon Valdez* oil spill, high levels of contaminants (PCB and DDT congeners) and the dramatic decline in harbor seal abundance within Prince William Sound over the past 20 years may be contributing to the lack of recovery by the AT1 stock.

The fundamental question facing managers and scientists is whether anything can be done to promote recovery of the AT1 stock. The biological viability of the stock is clearly questionable under such dire circumstances. Nonetheless, a rigorous review of potential recovery options should be undertaken before this stock is simply abandoned to the assumption that it is doomed to imminent extinction. At least two research objectives seem

worthy of pursuit. First, the course of either extinction or recovery should be observed carefully to learn as much as possible about the fate and dynamics of extremely small populations on the verge of extinction. Second, rigorous efforts might be undertaken to determine, to the extent possible, the causes for the failure of this stock and, particularly, its reproductive failure. With regard to management, recovery efforts could include precautionary avoidance, minimization, or mitigation of known human-related factors that may be contributing to the decline. In addition, although it seems unlikely because of the diet of these animals, the potential for captive breeding should be thoughtfully considered before it is ruled out. Finally, the decline of this stock should be documented to the extent possible so that future scientists and managers possibly faced with similar situations have the benefit of all our currently available knowledge.

Ice-Associated Seals

Four species of seals in the waters surrounding Alaska are associated with sea ice at least seasonally. Ringed seals (*Phoca hispida*), bearded seals (*Erignathus barbatus*), spotted seals (*Phoca largha*), and ribbon seals (*Histriophoca fasciata*) all haul out on sea ice to rest, molt, give birth, and nurse their pups. Each species, however, occupies a distinct ecological niche.

Ringed seals are perhaps the most adapted to sea ice of any of the northern seals. They use sea ice that is anchored to land (shorefast ice) for much of the winter and spring and can be found in pack ice throughout the Arctic Ocean in the summer. Ringed seals maintain breathing holes through the ice, which can be up to two or three meters thick, by continually abrading away ice along the inside of the holes with their claws. They also carve lairs out of snowdrifts that form over some of those breathing holes and use those lairs to rest, give birth, and nurse their pups, all out of sight beneath the snow. Ringed seals prey on Arctic cod and a variety of invertebrates that are associated with sea ice and generally restricted to very cold waters.

Bearded seals generally are found in loose, mobile pack ice or along cracks in larger floes or shorefast ice. They maintain breathing holes but with much less frequency than ringed seals. Bearded seals are primarily benthic foragers, preying on

various invertebrates and demersal fishes. As bottom-feeders, they tend to remain in shallower waters over the continental shelf.

Spotted seals are closely related to harbor seals and behave much like them during the summer, hauling out on shore and acting as generalist coastal predators. In the late fall, when sea ice begins to advance southward, spotted seals leave their coastal haul-out sites and haul out on ice instead, which provides easier access to both offshore foraging grounds and ice-associated prey such as arctic cod. They most commonly are observed on small ice floes close to the ice edge although tracking data indicate that some animals can be found in the interior ice pack hundreds of miles from the edge.

Ribbon seals are the most pelagic of the Arctic ice seals. They appear to use sea ice only during pupping and molting seasons in late spring when sea ice is at its maximal extent in the Bering Sea. When the ice retreats, some ribbon seals apparently follow it north into the Chukchi Sea, but many remain in the Bering Sea. During the summer and fall they remain at sea and do not haul out on ice or on land. Recent tracking data indicate that ribbon seals travel extensively throughout the Bering Sea and the Aleutian Island chain in summer.

These species are all predators exploiting various niches in the Arctic ecosystem, and all are considered important elements of the ecosystem. Although general features of their biology have been described, their population status and dynamics are poorly understood. Abundance estimates are not available for any of these species in U.S. waters although recent surveys of ringed seals may lead to a minimum estimate. All four species are harvested for subsistence by Alaska Natives. Consistent with previous recommendations from the Marine Mammal Commission, efforts are under way to improve collection of harvest data to provide better estimates of the number of animals taken.

In the past, ice-associated seals have been assumed to be relatively abundant and not at risk of being overharvested or of significant interactions with commercial fisheries. Some concerns have been raised about potential impacts of oil and gas operations, particularly the potential for oil spills, habitat degradation, and/or disturbance of animals. Ringed seals, which inhabit the shorefast ice often used as a platform for oil and gas exploration, probably are most vulnerable to those potential impacts, but again the population has been assumed to be

large enough to withstand any local effects. Recent evidence of climate-induced changes in sea ice conditions, however, has drawn more attention to ice-associated seals, which are likely to be very sensitive to such changes. All four species may already be affected by changes in the seasonal availability of sea ice, and they also may be affected by changes in the distribution and abundance of their prey, which is often linked to the timing and duration of sea ice cover in specific regions.

Even with those concerns, little federal funding has been provided for research and management of any of these species. Limited abundance and distribution surveys have been conducted in recent years, primarily in coastal waters. In addition, several tracking studies have been conducted, providing insights into the movements and distributions of each species. Biosampling of harvested animals has been supported sporadically at low levels through recent decades, providing limited information regarding animal condition, diet, contaminant loads, and reproductive rates. For many years the Marine Mammal Commission has recommended increased funding for research and management of all four ice seal species.

The Commission also recommended formation of a co-management group for ice-associated seals. To that end, the Ice Seal Working Group was formed in 2004, with Alaska Native hunters (the Ice Seal Committee) and state and federal marine mammal biologists among its membership. The group met several times in 2004 and 2005 and developed a research plan and a draft co-management agreement, which the Commission anticipates will be finalized in early 2006. The co-management effort, combined with national and international concerns regarding climate change, may elicit increased funding for research and management of these species.

Harbor Seal (*Phoca vitulina*)

Harbor seal abundance throughout much of Alaska declined by 60 to 80 percent between the mid-1970s and the 1990s for unknown reasons. Beginning in the mid-1990s harbor seal numbers in some regions stabilized or began to recover slowly. In other areas, they have continued to decline.

Since the 1994 amendments to the Marine Mammal Protection Act, which included provisions for assessment of marine mammal stocks, harbor seals in Alaska have been divided into three stocks: the Bering Sea stock, the Gulf of Alaska and Aleutian Islands stock, and the Southeast Alaska stock. Recent genetic analysis by the National Marine Fisheries Service's Southwest Fisheries Science Center indicates that harbor seal population structure in Alaska is more complex, comprising at least 12 distinct biological stocks. Population trend data support the evidence for stock structure at finer scales. Within the Southeast Alaska stock, for example, the number of harbor seals in Glacier Bay has declined rapidly over the past decade while seals near Ketchikan have increased and those near Sitka have remained fairly stable. Similarly, within the Gulf of Alaska stock, Kodiak Island seals have increased since the mid-1990s while Prince William Sound seals declined throughout the 1990s and may have stabilized or started to increase since 2000.

The Marine Mammal Commission and Alaska Scientific Review Group have recommended repeatedly that the National Marine Fisheries Service recognize this new stock structure based on the best available data for harbor seals. Formal recognition has been delayed, in part, by negotiations with the Alaska Native Harbor Seal Commission, the Service's co-management partner for harbor seals. At the Marine Mammal Commission's annual meeting, the Service and the Alaska Native Harbor Seal Commission suggested that substantial progress had been made in those negotiations but that more input was required from individual hunters and hunting communities before an updated stock structure could be finalized. Although the identification of stock structure is largely a biological task, Alaska Natives understandably have been concerned about the impact that designation of new stocks might have on their ability to hunt harbor seals for subsistence purposes.

The primary concern of both the Service and the Alaska Native Harbor Seal Commission regarding harbor seals is the seals' failure to recover in some areas. Harbor seals may be affected by a range of risk factors, including direct and indirect fishery interactions, subsistence harvesting, disease, contamination, and predation by killer whales. In addition, the recovery of seals in some areas may be impeded by repeated disturbance resulting from tourist activities, including large cruise ships, small charter boat tours, and kayak tours. Such tourist activities are increasing rapidly in Alaska waters.

The National Marine Fisheries Service, the Alaska Department of Fish and Game, the Alaska SeaLife Center, other independent researchers, and, more recently, the Alaska Native Harbor Seal Commission have conducted harbor seal research for the past decade. That research includes state-wide abundance surveys by the National Marine Fisheries Service and regional trend surveys by the Alaska Department of Fish and Game. Those surveys provided the evidence described here for distinct regional trends in abundance although the cause or causes for those differing trends are still unknown. Considerable effort has been focused on developing new survey techniques for use under difficult conditions, such as dispersed ice fields in glacial fjords, and on improving survey estimates by adjusting for the effects of environmental conditions during surveys. Additional regional studies of diet and foraging behavior have provided insight into the ecology of harbor seals, as have intensive tracking studies in specific regions.

Based on the above, the key issues for harbor seal research and management in the State of Alaska appear to be resolving stock structure, identifying and responding to the causes for decline in some regions, and furthering collaboration among the major research and management partners, including the National Marine Fisheries Service, the Alaska Native Harbor Seal Commission, the State of Alaska, and the Alaska SeaLife Center. Such collaboration has increased considerably in recent years through co-management efforts, as well as cooperative research planning and shared funding. Further collaboration is needed to promote the kinds of partnerships that are central to an ecosystem-based approach to research and management.

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

Steller (northern) sea lions are the largest of all sea lion and fur seal species (Family Otariidae). They are found along the rim of the North Pacific from the Channel Islands in southern California to Hokkaido, Japan, and north into the Bering Sea and Sea of Okhotsk. Historically their center of abundance has been in the Aleutian Islands and Gulf of Alaska, where nearly three-fourths of all Steller sea lions in U.S. territory have been found (see Fig 6). Steller sea lions haul out on land to mate, bear their young,



Figure 6. Steller sea lion range.

nurse, avoid predators, and rest. The location of rookeries (where reproduction occurs) and haul-out areas is probably based on proximity to food sources, protection from both terrestrial and marine predators, topography, surf conditions, and other factors. Steller sea lions are generally considered non-migratory, although some individuals, particularly juveniles and adult males, may disperse widely outside the summer breeding season. Most adult sea lions return to the site of their birth for reproduction.

Stock Structure

Steller sea lion population structure is consistent with, and generally referred to as, a metapopulation—a larger population consisting of multiple subpopulations with limited gene flow among the various subpopulations. For this species, the degree of genetic exchange among the various rookeries or subpopulations appears to be determined primarily

by distance, with the amount of exchange decreasing as the distance between rookery sites increases. Within their overall distribution (from California to Japan), gene flow is interrupted between southeastern Alaska and the central Gulf of Alaska and between the Commander Islands (at the western end of the Aleutian Islands) and the nearest rookeries on the Kamchatka Peninsula. At present, only an eastern stock (located to the east of 144° west longitude) and a western stock (west of that line) are recognized officially. It is likely that in the near future the western stock will be split to recognize a third “Asian” stock of Steller sea lions distributed along the Kamchatka coast, in the Sea of Okhotsk, and among the Kuril Islands.

Trends in Abundance

In the 1950s worldwide abundance of Steller sea lions was estimated at 240,000 to 300,000 animals. Since then, abundance has declined markedly

Table 2. Counts of adult and juvenile (non-pup) Steller sea lions in the U.S. western stock at rookery and haul-out trend sites¹ by region², 1975–2004

Year	Gulf of Alaska			Aleutian Islands			Western Stock in Alaska
	Eastern	Central	Western	Eastern	Central	Western	
1975	—	—	—	19,769	—	—	—
1976	7,053	24,678	8,311	19,743	—	—	—
1977	—	—	—	19,195	—	—	—
1979	—	—	—	—	36,632	14,011	—
1985	—	19,002	6,275	7,505	23,042	—	—
1989	7,241	8,552	3,800	3,032	7,572	—	—
1990	5,444	7,050	3,915	3,801	7,988	2,327	30,525
1991	4,596	6,270	3,732	4,228	7,496	3,083	29,405
1992	3,738	5,739	3,716	4,839	6,398	2,869	27,299
1994	3,365	4,516	3,981	4,419	5,820	2,035	24,136
1996	2,132	3,913	3,739	4,716	5,524	2,187	22,211
1998	2,110	3,467	3,360	3,841	5,749	1,911	20,438
2000	1,975	3,180	2,840	3,840	5,419	1,071	18,325
2002	2,500	3,366	3,221	3,956	5,480	817	19,340
2004	2,536	2,944	3,512	4,707	5,936	898	20,533

¹ “Trend” sites are selected sites that are counted regularly to provide an index of trends in population abundance.

² Data courtesy of the National Marine Fisheries Service (unpublished);

Fritz, L. W., and C. Stinchcomb. 2005. NOAA Tech. Memo. NMFS-AFSC-153;

Sease, J. L., and C. J. Gudmundson. 2002. NOAA Tech. Memo. NMFS-AFSC-131; and

Sease, J. L., W. P. Taylor, T. R. Loughlin, and K. W. Pitcher. 2001. NOAA Tech. Memo. NMFS-AFSC-122.

throughout the central and western part of the species’ range (Table 2). The western stock has declined by about 85 percent since the mid- to late 1970s, and at some sites sea lions have nearly disappeared. The decline was first noticed in the eastern Aleutian Islands but then spread westward and eastward to include all areas west of 144° west longitude. The rate of decline was most severe in the late 1980s when the number of sea lions in the central and western Gulf of Alaska and eastern and central Aleutian Islands dropped precipitously. Counts continued to decline, although at a slower rate, until the early 2000s (Table 2). The most recent counts indicate that the population may have stabilized or even increased slightly.

Counts of Steller sea lions at Russian sites reveal a decline at least initially consistent with that for the remainder of the current western stock although not as severe (only limited data are available but suggest a decline of about two-thirds). Counts in this region have been relatively stable since the early 1990s. As in the rest of the west-

ern stock, trends in abundance vary considerably among rookeries and regions. Abundance at rookeries in the Sea of Okhotsk and on some Kuril Islands may be stable or increasing slightly, but counts at rookeries on the Kamchatka Peninsula have been consistently depressed and some rookeries have been abandoned altogether.

Counts of Steller sea lions in the eastern stock have increased at an average of two to three percent annually for the past several decades. The observed population growth in that region reflects recovery from periods of intentional sea lion killing in the early to mid-1900s.

Status under the Endangered Species Act

The National Marine Fisheries Service has lead responsibility for management of Steller sea lions. In Alaska, its research and management partners include the Alaska Department of Fish and Game,

North Pacific Fishery Management Council, University of Alaska, Alaska SeaLife Center, North Pacific Universities Marine Mammal Research Consortium, Alaska Sea Otter and Steller Sea Lion Commission, the tribal governments of the Pribilof Islands, and a number of other non-governmental conservation organizations.

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

In 1997 the Service split the species into two distinct population segments and designated the population west of 144° west longitude as endangered, while maintaining the threatened status for the population east of that line. The split was based on the species' geography, demography, and genetics. No changes were made to the critical habitat designation.

In 2001 the Service appointed a new Steller Sea Lion Recovery Team composed of various scientists, managers, and stakeholders familiar with, involved in, or affected by recovery efforts. The team's sole task has been to revise the Steller Sea Lion Recovery Plan. The team met periodically from 2002 to 2005 and is expected to complete the draft revised plan for transmittal to the Service early in 2006. Pending Service review and approval, the revised plan may be available for public review some time in 2006. The plan is expected to include a comprehensive assessment of threats to Steller sea lions and to give new direction to research efforts aimed at understanding the decline of the western population and facilitating its recovery. The plan also is expected to include recovery criteria for downlisting or delisting of the western population and delisting of the eastern population.

Causes of the Decline

The causes of the decline of the western population of Steller sea lions have been a matter of extensive

debate and controversy. Available baseline information on the population before the mid-1970s is sparse. This led the National Research Council, in a 2003 review of the decline and the potential role of fisheries, to conclude that "the cause, or causes, of the early phase of the sea lion decline will likely remain a source of speculation and debate." Existing information does not indicate that disease, pollution, or entanglement in marine debris have been significant contributors to the decline. Some recent evidence suggests that sea lions in Alaska have relatively high concentrations of some contaminants, but the evidence is not consistent with the geographic pattern of the decline. Known contributing factors include commercial harvests of sea lions from the late 1950s to the early 1970s, killer whale predation, other legal and illegal killing (which has not been and probably cannot be quantified), subsistence harvests by Alaska Natives, and incidental catch in the trawl fisheries in the Bering Sea and the Gulf of Alaska and other fisheries. Suspected contributors to the decline include natural environmental changes and competition with commercial fisheries. Existing data and analyses indicate that at least the early phases of the decline of the western population resulted from poor growth and survival of juveniles and low reproductive success. The evidence for poor juvenile growth and survival is based on field observations and population modeling. The evidence for low reproductive success is based on observations of low pregnancy and birth rates, slow growth (leading to older age at maturity), and changes observed in the age structure of the population. These data are all consistent with the hypothesis that, at least in the 1970s and 1980s, nutritional stress contributed to the decline.

In the late 1990s debate regarding the causes of the nutritional stress focused on the relative importance of fisheries versus the environment, both of which may affect the quality and quantity of prey available to sea lions. Scientists recognized the potential for competition between fisheries and Steller sea lions in the late 1970s and early 1980s when fishery management plans were being developed, but only limited progress has been made in investigating this hypothesis since then. An alternative hypothesis has been that the sea lion decline was due to a shift in environmental conditions that led to a change in available prey species to those that are of less nutritional value to sea lions. These two possibilities have been difficult to distinguish because they are expected to have similar effects on sea lions and because the existing fishery management strategy allows fishing throughout the regions

of concern and does not provide suitable control regions for comparing environmental versus fishery-related effects.

More recently, killer whale predation also has been suggested as a possible cause of the decline of sea lions, or at least of their failure to recover. One “cascade” hypothesis posits that the killing of about 500,000 large cetaceans in the Bering Sea and North Pacific Ocean in the 1950s to the 1970s reduced prey for transient (mammal-eating) killer whales. The killer whales were then forced to shift their foraging patterns by increasing predation on, and sequentially depleting, harbor seals, northern fur seals, Steller sea lions, and sea otters and, perhaps, other small marine mammals. Another hypothesis is that killer whale predation is sufficient to impede recovery of Steller sea lions, irrespective of any cascade effects initiated by whaling. These hypotheses have been soundly challenged and are the source of considerable controversy. For example, although bioenergetic modeling indicates that killer whales could deplete these species as hypothesized, there is relatively little quantitative evidence that they did, in fact, cause such declines. The important exception involves the decline of sea otters in the central and western Aleutian Islands region, where the evidence is relatively convincing. As described in Chapter X of this report, Congress has requested that the Marine Mammal Commission review the ecological role of killer whales to assess their potential role in the decline of these species. That review is under way and the report likely will be transmitted to Congress in 2006.

Debate over the causes of the Steller sea lion decline illustrates an important lesson in marine mammal and marine ecosystem management. It is clear that multiple factors either have or may have contributed to their decline. Analysis of these factors (e.g., commercial harvesting, regime shifts, fishing patterns, and, perhaps, killer whale predation) is confounded by the fact that their importance likely has changed over time. Much of the debate regarding “the cause” has pitted one factor against another, in part due to opposing perspectives on the role of fishing. This focus on which factor caused the decline is almost certainly an oversimplification inasmuch as there is evidence for multiple causes and the decline reflects their cumulative impact. If these effects are independent of each other, they may simply be added. However, it is likely that at least some of them interact, resulting in synergistic effects. For example, if Steller sea lions were nutri-

tionally stressed by oceanic regime shifts, they may have been more vulnerable to fisheries competition. Also, if they were nutritionally stressed from either competition or oceanic regime shifts or both, then they may have been forced to spend more time at sea foraging, where they would be more vulnerable to killer whale predation. Nutritional stress might also have increased their susceptibility to disease and contaminants. Thus, the univariate mindset that motivates a search for a single cause belies the complex interactions that likely have led to the decline of the western population of Steller sea lions.

Unraveling that complexity requires an overall management strategy based on rigorous scientific study of the potential factors affecting marine ecosystems, including those factors related to human activities. In spite of uncertainty about potential fishery effects, fisheries in Alaska waters will continue to operate because of their economic importance. Nonetheless, to ensure that those fisheries and the ecosystems in which they occur are sustained in a healthy state, an adaptive approach is needed to combine experimental research and precautionary management of the fisheries with the aim of developing a better understanding of potential fishery effects and finding ways to mitigate those effects without placing unnecessary constraints on the fisheries. Such an approach, as proposed in 2003 by a National Research Council panel investigating the decline of Steller sea lions, should benefit both the fisheries, inasmuch as a scientifically grounded management strategy provides a more predictable basis for planning, and the ecosystem, inasmuch as fisheries effects are likely to be better described and minimized. Several key issues regarding fishery effects on marine ecosystems are described earlier in this chapter.

Fisheries Management

The Alaska groundfish fisheries are managed under fishery management plans required by the Magnuson-Stevens Fishery Conservation and Management Act. The plans are developed by the North Pacific Fishery Management Council and the National Marine Fisheries Service. Because they establish the conditions under which the fisheries are conducted, the plans ultimately determine the nature and extent of fishery effects on the associated marine ecosystems, including listed species and critical habitat. The Service and the Council are required to assess the potential environmental effects of the fisheries

in accordance with the National Environmental Policy Act, the Endangered Species Act, and the Marine Mammal Protection Act.

Between 1990 (when the species was first listed under the Endangered Species Act) and 1998, the Service took a number of actions and established a number of regulations to reduce possible effects of commercial fisheries on Steller sea lions. At the same time, questions were raised regarding the suitability and sufficiency of those actions to protect these ecosystems in general and Steller sea lions in particular. From 1998 to the end of 2002 the debate over the adequacy of fishery measures escalated and involved a range of actions by the Service and the Council, section 7 consultations under the Endangered Species Act, supplemental environmental impact statements under the National Environmental Policy Act, lawsuits, and external reviews by outside scientists. The chronology of these events from 1998 to the end of 2002 is described in the Commission's 2001 and 2002 annual reports. The primary focus of the debates during that period, and continuing to the present, pertain to the overall effect of fishing on the local, regional, and global biomass of prey species; the amount of prey taken from Steller sea lion critical habitat; the basis for management measures that give unequal protection to different areas within critical habitat; and the dispersal of fishing effort and catch in time and space to avoid localized depletion of prey. In October 2005 the North Pacific Fishery Management Council recommended to the National Marine Fisheries Service that it reinitiate section 7 consultation under the Endangered Species Act based on new information collected as a result of a significant increase in research funding, particularly in 2001 and 2002.

Research Studies, Funding, and Permits

The National Marine Fisheries Service, Steller Sea Lion Recovery Team, Alaska Department of Fish and Game, North Pacific Universities Marine Mammal Research Consortium, Alaska SeaLife Center, North Pacific Fishery Management Council, Alaska Sea Otter and Steller Sea Lion Commission, and a number of universities and private organizations all conduct or recommend research on the Steller sea lion. As already noted, the revised Steller Sea Lion Recovery Plan, which is expected to be completed in 2006, should give renewed direction for research

needed to address the contentious issues regarding fishery effects and other factors that may be inhibiting the recovery of the western population of Steller sea lions.

In fiscal year 2001 Congress increased the Service's funding for Steller sea lion research to \$43.15 million from \$4.85 million in 2000. The Service dispersed this funding among 25 research institutions for a total of about 150 different studies. More than half (\$27.3 million) of the total 2001 budget was provided to research organizations outside the federal government. Research themes included Steller sea lion life history, foraging, abundance, vital rates, and population viability; fish stock assessment; ecosystem composition and dynamics; predation; physiology, energetics, condition, disease, parasites, contaminants; and other anthropogenic effects. A substantial portion of the 2001 funding (\$15 million) supported about 30 competitive grants (Steller Sea Lion Research Initiative). Those grants were aimed at investigating hypotheses about the effects of fishing, environmental change, disease, contaminants, predation, and other anthropogenic factors.

The total research budget in 2002 was about the same (\$40.15 million), but a larger portion (\$25.65 million) was directed to federal agency research. The Service used 2002 funds to support nearly 200 research projects, all of which were consistent with the general research framework developed the previous year. Several research coordination meetings were held in 2002, with a focus on modeling, evaluation of killer whale predation, fatty acid analyses of sea lion prey, and the presence and effects of contaminants.

From 2003 to 2005 federal funding for Steller sea lion research was reduced by half to about \$20–23 million annually. The reduction made it impossible to maintain the same level of research that occurred in 2001 and 2002, with cuts reducing the level of research on each topic and eliminating all research on certain topics.

The marked increase in funding for Steller sea lion research in 2001 was something of an anomaly for marine mammal research in that it effectively doubled the total annual amount of U.S. funding for research on all marine mammals. Clearly, the increase resulted in some considerable benefits in terms of the amount of research conducted and information gained. At the same time, however, the boost in funding followed by an equally abrupt reduction two years later raised questions about the

funding of marine mammal research and the most effective way to manage that research. Four of the more important concerns follow.

First, is it possible to use such an unplanned increase in funds efficiently when conducting research on marine mammals in remote and inhospitable places, such as the North Pacific and the Bering Sea? Here, the basic concern was that marine mammal research often requires considerable resources that may not be readily available and may take time to develop or prepare. The most important of these are trained and experienced personnel, support services, and logistics.

Second, are the many studies pulled together quickly well focused on key issues, well designed to rigorously investigate those issues, and well coordinated to avoid unnecessary duplication? When this funding became available, the Service appointed a research coordinator and held several workshops to promote better focus, design, and coordination. At the same time, however, it was not clear that there was adequate time for various researchers to coordinate efforts and share data. It also was not clear that the research topics reflected a suitable balance between investigations of sea lion biology and ecology versus fishery patterns and effects.

Third, with the extensive amount of research being conducted on wild animals, could the direct and incidental effects of such research become a factor in sea lion dynamics? On this topic, questions were raised about the number of times rookeries and haul-outs would be disturbed and whether such disturbance might affect the distribution of animals or interrupt mother/pup bonds during the nursing period. Questions were also raised about research methods being used and the possibility that they might influence study results (e.g., could branding of pups cause a significant number of unintended deaths?).

Finally, although the Steller sea lion decline warrants thorough investigation, questions were raised as to whether funneling millions of dollars toward research on this single species was reasonable if conservation needs for other endangered populations at equal or greater risk of extinction were going unmet. Perhaps the most glaring example is to compare the millions of dollars of funding for research on the western population of about 30,000 sea lions with the inadequate funding for research on the Cook Inlet population of beluga whales, which numbers about 350 animals in total and receives just enough support to fund an annual survey to estimate population size.

The first three of these questions were identified in a series of Commission letters to the Service

(27 July 2001, 2 August 2002, 19 May 2005, and 10 June 2005). These issues were also highlighted by the Humane Society of the United States when, in September 2005, it filed a lawsuit challenging permits issued for research on sea lions. In response to the Commission's concerns and the lawsuit, the Service published a notice in the *Federal Register* on 28 December 2005 announcing its intent to prepare an environmental impact statement regarding the issuance of Steller sea lion research permits. That impact statement also will address the issuance of permits for research on northern fur seals, which are declining and therefore the subject of increased research attention. The preparation of the impact statement will begin in 2006 with public meetings to solicit information on these matters.

The fourth of these questions regarding the equity and adequacy of funding is a matter under consideration by the Commission. In 2006 the Commission plans to resume its annual survey of federal funding for marine mammal research, which should provide a better basis for identifying and resolving such inconsistencies in funding.

The challenge is to develop a funding system that is proactive and deliberate rather than reactive, provides a reasoned and comprehensive basis for addressing the information needs for managing all species, recognizes the logistical, temporal, and spatial constraints on research in remote regions, and seeks to maximize the conservation value of research conducted over time.

Northern Fur Seal (*Callorhinus ursinus*)

Northern fur seals occur seasonally in waters around the North Pacific rim from southern California north to the Bering and Okhotsk Seas and south to Honshu Island, Japan. Animals are also found in pelagic waters in the northern North Pacific. The majority of the total northern fur seal population hauls out and reproduces on the Pribilof Islands in the Bering Sea. From the time of the islands' discovery in 1786 until 1984, northern fur seals on the Pribilofs were subjected almost continuously to commercial harvest at rookeries and haul-out sites on land and, until 1911, at sea. Estimates of preharvest abundance range from about 1.5 to 3 million animals, but poorly managed harvests—particularly in the late 1800s after the United States purchased Alaska and took control of the Pribilofs—reduced the population to about 200,000 animals by the early 1900s.

In 1911 the United States, Great Britain (for Canada), Russia, and Japan signed the North Pacific Fur Seal Treaty, which prohibited pelagic sealing (which took more females than males) and brought the land-based harvest to a temporary halt. In 1918 the on-land harvest was resumed but focused solely on juvenile males. Under this management strategy, the Pribilof Islands population recovered to about 1.5 to 2 million seals by the mid-1950s. Annual pup production was nearly 500,000 pups, about 450,000 of which were born on St. Paul Island. Between the late 1950s and the early 1970s, two additional harvests were conducted. The first involved the killing of about 300,000 adult females whose pups died as well. The second involved a pelagic take of about 50,000 animals, the majority of which were females. Ostensibly, the purpose of the female harvests was to improve the production of juvenile males for the harvest based on the assumption that a reduction in the number of adult females would result in a density-dependent increase in reproduction. In addition, Japan had been pushing for a reduction of the fur seal herd on the grounds that the seals were competing with its post-World War II fisheries. The purpose of the pelagic harvest was to collect information on northern fur seal pelagic ecology although the harvest also served to reduce the herd.

In response to the harvests, the Pribilof Islands population declined sharply. In the mid-1970s, after the harvests had been discontinued, the estimated number of pups born (the most reliable measure of population size) began to increase but then, unexpectedly, began to decline again for reasons that are still not understood. Pup production stabilized in the 1980s and early 1990s at about 200,000 pups annually but began to decline again in the late 1990s and is still declining.

In contrast to trends on the Pribilof Islands, a northern fur seal rookery was founded on Bogoslof Island in the central Aleutian Islands in the early 1980s, and production there has grown over the past few decades to more than 12,000 pups in 2005. Estimated abundance at several Russian fur seal rookeries has increased in recent years although not to a level that compensates for the losses at the Pribilof Islands.

The causes of the declines observed since the mid-1970s are undetermined. Northern fur seals are still taken for subsistence purposes on the Pribilof Islands, but the harvests are not thought to have significant population consequences because the take is generally less than 1,000 animals a year and the harvested animals are almost exclusively juvenile males. Other possible causes of the decline include

direct and indirect fishery interactions, disease, contaminants, changing ocean conditions, and predation. The relative importance of any of these risk factors remains unclear. Recent research has focused on fur seal diet, foraging behavior, and seasonal migrations. Results of those studies indicate that female fur seals from different rookeries on the Pribilof Islands use distinct foraging grounds during the summer while they are supporting their pups. The extent to which prey composition, biomass, and size distribution on those foraging grounds have been altered by commercial fishing or changes in oceanographic conditions is not clear. During the winter, fur seals disperse from their rookeries and haul-out sites and move throughout the North Pacific, with some animals heading to coastal foraging sites along the U.S. West Coast and others foraging in the central North Pacific. The broad dispersal of fur seals from individual rookeries during their winter migration means that animals from one rookery could encounter and be affected by a variety of natural or anthropogenic conditions far from their original rookery, potentially complicating the task of identifying specific causes of the population decline.

Funding for northern fur seal research and management activities has been both low and variable in recent years, hampering efforts to understand the ongoing decline and promote recovery. In particular, long-term monitoring of survival and reproductive rates will be necessary to understand which demographic portions of the population are being affected, which would facilitate investigation of the causes of the decline. Northern fur seals were listed as depleted under the Marine Mammal Protection Act in 1988. The National Marine Fisheries Service prepared a conservation plan for the species in 1993 and intends to revise that plan in 2006.

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. They were severely depleted by harvesting in the latter half of the 1700s and throughout the 1800s. When sea otters were finally given protection from harvesting in 1911, only 13 small remnant colonies remained, 6 of them within the bounds of the current Southwest Alaska stock.

The Southwest Alaska stock of sea otters is a part of the subspecies *E. l. kenyoni* and extends from Attu Island in the western Aleutian Islands to Kamishak Bay in Cook Inlet. Based on geographical barriers and morphological and genetic differences, the stock is considered distinct from the Russian subspecies to the west (*E. l. lutris*) and the south-central and southeastern Alaska stocks of *E. l. kenyoni* to the east.

Following cessation of harvesting in 1911, the Southwest Alaska stock recovered to an estimated abundance of 94,050 to 128,650 animals in 1976. The stock may have increased further until the 1980s, when it began a precipitous decline. The most recent estimate of abundance is 41,865 individuals based on aerial surveys flown in 2000–2004 and covering the stock's entire range. More recent site-specific surveys indicate that the decline is continuing, at least in some areas.

The decline has not been evenly distributed throughout the stock's range. The overall decline since 1976 has been between 55 and 67 percent, but in some areas declines have exceeded 90 percent. The animals in this stock do not exhibit evidence of food limitation, abnormal levels of disease, effects of contaminants, or reduced reproduction. Only small numbers are killed in fishing gear or by Alaska Native subsistence hunters. The leading hypothesis to explain the decline, at least in the central Aleutian Islands region, is predation by killer whales. This hypothesis is based on the contention that removal of about 500,000 large whales in the Bering Sea and the North Pacific in the 1950s to 1970s reduced the prey available to killer whales, which then switched 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 although the link to whaling is speculative. Whether killer whales have caused the decline of the otter species in other areas is not clear and remains highly controversial. This issue currently is being examined by the Marine Mammal Commission (see Chapter XI for a discussion of the Commission's special project on the ecology of killer whales) and in 2006 will be summarized in a report to Congress.

Regardless of the causes of the decline, the rapidly diminishing Southwest Alaska sea otter stock is becoming more vulnerable to other risk factors, such as disease and oil spills, as its numbers decline. In 2001 the Center for Biological Diversity petitioned the U.S. 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. The Service argued that the best estimate of population size for the entire Alaska sea otter population exceeded considerably 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 assessment reports accordingly. Based on information obtained from additional sea otter surveys, the Service decided to list the Southwest Alaska stock as threatened under the Endangered Species Act. That listing was finalized on 9 August 2005. Since then, the Service has taken steps to convene a recovery team and initiate the development of a recovery plan for the population. At the end of 2005 the recovery team's first meeting was planned for early in 2006.

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 comprising approximately 20,000 to 25,000 bears. Polar bears evolved to exploit the arctic sea ice niche and are found wherever sea ice is present for a substantial part of the year. However, 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. Polar bear stocks appear to be declining worldwide, and the Polar Bear Specialist Group of IUCN–The World Conservation Union has recommended that the species' status be elevated from “low risk” to “vulnerable.”

Two populations of polar bears are found within the jurisdiction of the United States. The Beaufort Sea stock numbers about 1,800 animals and is shared with Canada. Animals in the population are considered to be in good health although there is recent evidence of stress due the retreat of ice in summer. The Chukchi/Bering Seas stock, estimated at 2,000 animals, is shared with Russia. Little information is available on the status of the Chukchi/Bering Seas stock, but anecdotal evidence

suggests that unregulated harvest by Russian Natives on the Chukotka Peninsula may be reaching unsustainable levels.

Within the United States, the U.S. Fish and Wildlife Service has lead agency responsibility for management of polar bears. At the Commission's 2005 annual meeting, Service representatives provided an update on the agency's polar bear management program. The Commission also heard from representatives of the U.S. Geological Survey, which is engaged in research on polar bears, and the Alaska Nanuuq Commission, the Native organization representing villages in northern and northwestern Alaska on matters related to the conservation and sustainable use of polar bears.

The most serious conservation issues facing polar bear populations are the potential effects of climate change and contaminants; the potential overharvest of bears, especially in Russia; and the impact of human development on polar bear habitat. The potential effects of climate change, particularly in the Arctic, are discussed generally in Chapter II in the section on issues affecting Alaska's marine ecosystems and more specifically as they pertain to polar bears in a following section on possible listing of the species under the Endangered Species Act. The taking of bears by subsistence hunters from the two stocks that occur in Alaska is discussed in the next section. The taking of polar bears by sport hunters in Canada and possible changes to the stocks from which trophies may be imported into the United States are discussed in Chapter X.

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. Both stocks of polar bears that occur in Alaska are taken by subsistence hunters (Table 3). The numbers taken since 1988 are provided by the U.S. Fish and Wildlife Service's marking and tagging program instituted in that year. Those data, however, present only a part of the picture, inasmuch as each of these two stocks is shared with Canada (Beaufort Sea stock) or Russia (Chukchi/Bering Sea stock) and is subject to hunting in those countries as well.

In 1988 the North Slope Borough, representing polar bear hunters in Barrow, Nuiqsut, Wainright, Atqasuk, and Kaktovik, entered into a management agreement with the Inuvialuit Game Council, representing hunters in Canada, for the shared southern Beaufort Sea stock of polar bears.

Table 3. Numbers of polar bears reported taken in Alaska Native harvests, 1980–2005

Harvest Year ¹	Total Taken	Chukchi/ Bering Sea 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	125	91	34
1988–1989	142	83	59
1989–1990	103	78	25
1990–1991	82	60	22
1991–1992	61	34	27
1992–1993	80	42	38
1993–1994	127	77	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	95	51	44
2001–2002	108	75	33
2002–2003	65	26	39
2003–2004	63	21	42
2004–2005	60	33	27

¹ Harvest year is 1 July to 30 June.

Data courtesy of the U.S. Fish and Wildlife Service.

This agreement remains in place and, in some respects, is more restrictive than the provisions of the Marine Mammal Protection 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 and cubs less than 1.5 m (5 ft) in length. In addition, the parties to the agreement jointly establish annual hunting limits designed to ensure a sustainable harvest, which are divided between the parties before the hunting season. As

reported by a representative of the Alaska Nanuq Commission at the Marine Mammal Commission's 2005 annual meeting, the agreement has resulted in the southern Beaufort Sea stock being well studied and maintained in good health although the Natives have begun to see signs of stress in the population due, presumably, to the retreat of sea ice as a result of climate change.

The situation concerning the Chukchi/Bering Seas stock is markedly different. Although the United States and Russia have concluded a bilateral agreement to conserve this stock, that agreement has yet to be implemented. The status of the bilateral agreement and steps being taken by the United States to implement it are discussed in Chapter VIII. Currently, Native people in Russia are legally prohibited from hunting polar bears. Nevertheless, anecdotal information suggests that hunting is occurring and that large numbers of bears are being taken. According to the Alaska Nanuq Commission, the number of bears being taken in Chukotka is "alarming" and unsustainable. The unregulated taking of polar bears in such high numbers underscores the need to implement the bilateral agreement with Russia, which will establish hunting limits for Natives in both countries and strengthen enforcement capabilities. It was not surprising that at the Commission's 2005 annual meeting the Nanuq Commission identified passage of domestic legislation to implement the bilateral agreement as its top priority.

Petition 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 petitioner claimed 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 petitioner thought it likely that average annual temperatures in the Arctic will rise more than 7° C and summer sea ice coverage will decline by more than 50 percent and possibly disappear completely. The petition also noted the conclusion reached in a recent paper by recognized polar bear experts that "polar bears are unlikely to survive as a species if there is an almost complete loss of summer sea-ice cover...."

The Center for Biological Diversity contended that even the partial loss of sea ice has the potential to drive the polar bear to extinction within the

foreseeable future. It noted that the projected loss of sea ice will adversely affect polar bear survival and reproduction by:

- shortening the season during which ice is available as a platform for hunting seals;
- increasing the distance between the ice edge and land, thereby making it more difficult for female bears to reach preferred denning areas;
- requiring bears to travel through fragmented sea ice and open water, which uses more energy than walking across stable ice formations;
- reducing the availability of ice-dependent prey, such as ringed seals; and
- requiring bears to spend more time on land, thereby increasing the potential for adverse human-polar bear interactions.

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 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 breakup 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.

Under the provisions of the Endangered Species Act, the U.S. 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 is promptly to 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 Service had yet to make its 90-day finding on the petition when, on 15 December 2005, the Center for Biological Diversity and two other environmental groups that had joined in the petition filed suit in U.S. district court seeking to compel issuance of a finding. While that action was pending, the petitioner submitted additional information to the Service in support of a listing. If, as was the case

here, the petitioner requests that the Service consider the new information in making the 90-day finding, the Service takes the view that this constitutes a new petition that restarts the 90-day clock. It is expected that the Service will publish a finding early in 2006.

Research Activities

Much of the discussion of polar bear issues at the Commission's 2005 annual meeting focused on the various research programs for this species. Much of what scientists have learned about the changes in the distribution of polar bears and habitat-use patterns attributable to climate change has come from surveys being conducted by the U.S. Fish and Wildlife Service and the U.S. Geological Survey. Aerial surveys have been conducted since 2000 and have documented a strong relationship between the number of bears onshore and the distance to the pack ice—the farther the ice was from shore, the more bears were counted onshore. The surveys also detected a large number of bears associated with particular sites, most notably Barter Island, with 74 percent of the observed bears in one recent year being found within 12 km (7.5 mi) of the island. The Service attributes this unusually high density to the availability of bowhead whale carcasses as an alternative food resource. The Service is concerned that increased use of such areas, some of which are close to ongoing oil and gas activities on the North Slope, increases risk that an oil spill would pose to Alaska polar bear populations.

The increasing frequency with which polar bears are using coastal areas, including areas inhabited by people, is also reflected in data collected under the Service's marking and tagging program for bears taken by Native hunters. Data summarized using three-year averages suggest a steady increase in the number of bears taken when a human safety issue was involved. This trend is likely to continue as sea ice retreats and polar bears spend more time onshore and search for alternative food sources. The Service

anticipates that studies of feeding behavior, habitat use, and time budgets will be useful in developing community-based polar bear interaction plans.

The agencies also are instituting capture/recapture programs to sample animals and assess various measures of the population. Recent analyses of the Beaufort Sea population support the view that this is a population under stress. Since the mid-1980 skull measurements and weights of cubs of the year at the time they emerge from their dens have declined steadily. Similar trends have been detected in subadult animals and adult male bears. Female bears are giving birth more often than in the past, but the number of females accompanied by yearlings the following year is down. This suggests that fewer cubs are surviving and that females, which normally remain with their cubs for two and a half years, are reentering the breeding pool early. Thus, although there is a high birth rate, recruitment to the population is low.

Other projects are looking at more specific threats to polar bears. For example, a biomonitoring program is developing baselines for levels of organochlorines, heavy metals, and other contaminants in polar bears. Modeling efforts are under way to improve oil-spill trajectories associated with oil and gas development and production in areas inhabited by polar bears and other marine mammals.

Participants at the Commission's meeting emphasized the need for expanded research concerning the Chukchi/Bering Seas stock. Needed studies include developing abundance estimates, conducting range-wide aerial surveys, and measuring population parameters. In particular, the Service identified a pressing need to conduct aerial abundance surveys on Wrangell and Herald Islands, as well as the Chukotka mainland. Such assessments will be crucial for establishing sustainable harvest limits once the bilateral agreement is in place. Unfortunately, many of these critically important studies are being deferred pending implementation of the U.S.–Russia bilateral polar bear agreement.

Chapter V

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 4). 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 2005 special attention was directed to a number of endangered, threatened, or depleted species or populations, including North Atlantic right whales, the beaked and bottlenose whales, southern resident killer whales off the state of Washington, Hawaiian monk seals, and Florida manatees. Activities regarding conservation of these species are addressed in this chapter. Activities related to conservation and management of cetacean and pinniped species in Alaska and the Arctic are discussed in Chapter IV.

In addition to the species mentioned here, many marine mammal species and populations in other areas of the world also face major conservation challenges. The Marine Mammal Protection Act recognizes those species and the value of conserving them. Limited funding and personnel have constrained the Commission's efforts to promote their conservation. Although the Commission has not been involved in oversight or management of many such species and populations, several are discussed briefly in this chapter to increase society's awareness of their plight and to encourage greater efforts to protect and conserve them.

North Atlantic Right Whale ***(Eubalaena glacialis)***

The North Atlantic right whale was driven nearly to extinction by centuries of commercial whaling that continued through the early 1900s. An eastern North Atlantic population off the coasts of Europe and northwestern Africa now consists of only a few

individuals, and the western North Atlantic population off the United States and Canada currently numbers about 350. Each year, pregnant females and some juveniles migrate from summer feeding grounds off New England and southeastern Canada to winter calving grounds off Florida and Georgia. Where most adult males and non-pregnant females spend the winter is largely unknown although at least a few animals appear to remain in the Gulf of Maine and perhaps other northern feeding grounds year-round.

The National Marine Fisheries Service has lead responsibility for the recovery of North Atlantic right whales. It is assisted by other federal agencies (particularly the Coast Guard, the Navy, and the Army Corps of Engineers), state agencies, industry groups, research organizations, and environmental groups. Contributions by these agencies and organizations are guided by a right whale recovery plan updated by the Service in 2005 (see a following section on revision of the plan). In addition, the Service has convened two regional implementation teams—one for northeastern feeding grounds off New England and the other for the southeastern

Table 4. 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 2005

Common Name	Scientific Name	Status	Range
Manatees and Dugongs			
West Indian manatee	<i>Trichechus manatus</i>	E/D	Caribbean Sea and North Atlantic from southeastern United States to Brazil; Greater Antilles; Bahamas
Amazonian manatee	<i>Trichechus inunguis</i>	E/D	Amazon River basin of South America
West African manatee	<i>Trichechus senegalensis</i>	T/D	West African coast and rivers; Senegal to Angola
Dugong	<i>Dugong dugon</i>	E/D	Northern Indian Ocean from Madagascar to Indonesia (including Red Sea and Arabian Gulf); Philippines; Australia; southern China
Otters			
Marine otter	<i>Lontra felina</i>	E/D	Western South America; Peru to southern Chile
Southern sea otter	<i>Enhydra lutris nereis</i>	T/D	Central California coast
Northern sea otter, Southwest Alaska population	<i>Enhydra lutris kenyoni</i>	E/D	Aleutian Islands to Cook Inlet, Alaska
Seals and Sea Lions			
Caribbean monk seal	<i>Monachus tropicalis</i>	E/D	Caribbean Sea and Bahamas (extinct)
Hawaiian monk seal	<i>Monachus schauinslandi</i>	E/D	Hawaiian Archipelago
Mediterranean monk seal	<i>Monachus monachus</i>	E/D	Mediterranean and Black Seas; northwestern African coast; Madeira
Guadalupe fur seal	<i>Arctocephalus townsendi</i>	T/D	Baja California, Mexico to southern California
Northern fur seal	<i>Callorhinus ursinus</i>	D	North Pacific Ocean from California to Japan; Bering Sea
Western Steller sea lion	<i>Eumetopias jubatus</i>	E/D	North Pacific Ocean from Japan to Prince William Sound, Alaska (west of 144° west longitude)
Eastern Steller sea lion	<i>Eumetopias jubatus</i>	T/D	North Pacific Ocean from Japan to Prince William Sound, Alaska (east of 144° west longitude)
Saimaa seal	<i>Phoca hispida saimensis</i>	E/D	Lake Saimaa, Finland
Whales, Porpoises, and Dolphins			
Baiji	<i>Lipotes vexillifer</i>	E/D	Yangtze River, China
Indus river dolphin	<i>Platanista minor</i>	E/D	Indus River, Pakistan
Vaquita	<i>Phocoena sinus</i>	E/D	Northern Gulf of California
Northeastern offshore spotted dolphin	<i>Stenella attenuata attenuata</i>	D	Eastern tropical Pacific Ocean
Coastal spotted dolphin	<i>Stenella attenuata graffmani</i>	D	Eastern tropical Pacific Ocean
Eastern spinner dolphin	<i>Stenella longirostris orientalis</i>	D	Eastern tropical Pacific Ocean
Mid-Atlantic coastal bottlenose dolphin	<i>Tursiops truncatus</i>	D	Atlantic coastal waters from New York to Florida
Cook Inlet beluga whale	<i>Delphinapterus leucas</i>	D	Cook Inlet, Alaska
Northern right whale	<i>Eubalaena glacialis</i>	E/D	North Atlantic and North Pacific Oceans; Bering Sea
Southern right whale	<i>Eubalaena australis</i>	E/D	South Atlantic, South Pacific, Indian, and Southern Oceans
Killer whale, AT1 population	<i>Orcinus orca</i>	D	Prince William Sound; Kenai Fjords, Alaska
Killer whale, Southern resident population	<i>Orcinus orca</i>	E/D	Coastal waters from central California to Vancouver Island and the Queen Charlotte Islands
Bowhead whale	<i>Balaena mysticetus</i>	E/D	Arctic Ocean and adjacent seas
Humpback whale	<i>Megaptera novaeangliae</i>	E/D	Oceanic; all oceans
Blue whale	<i>Balaenoptera musculus</i>	E/D	Oceanic; all oceans
Finback or fin whale	<i>Balaenoptera physalus</i>	E/D	Oceanic; all oceans
Sei whale	<i>Balaenoptera borealis</i>	E/D	Oceanic; all oceans
Western gray whale	<i>Eschrichtius robustus</i>	E/D	Western North Pacific Ocean and adjacent seas
Sperm whale	<i>Physeter macrocephalus</i>	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.

U.S. calving grounds. The two teams currently help coordinate efforts to reduce the risk of ship collisions. The Atlantic Large Whale Take Reduction Team, convened by the Service in 1996, provides recommendations on measures to reduce entanglements in fishing gear. Cooperative agreements between the Service and research organizations have been established to monitor and assess the right whale population and disentangle whales caught in fishing gear. The Service also has provided advice to other federal agencies (e.g., the Navy and the Coast Guard) on measures to minimize vessel collisions through formal consultations under section 7 of the Endangered Species Act. The Service also works closely with Canada's Department of Fisheries and Oceans, which recently listed right whales as endangered under a new Canadian Species At Risk Act, which is similar to the U.S. Endangered Species Act.

Population Status

Some studies suggest that the western North Atlantic population was increasing slowly in the 1980s shortly after directed research and management began but then began a slow decline in the early 1990s. The principal cause of the population's failure to recover is believed to be mortality from entanglement in commercial fishing gear and collisions with ships. The deaths of more than half of the 44 right whale carcasses found since 1990 have been attributed

to these causes (Fig. 7), including 19 due to ship strikes and five due to entanglements. For 11 of the other 44 deaths, necropsies were not possible and no cause of death could be determined because the carcasses were seen only briefly floating offshore. If the proportion of human-caused deaths for those 11 animals were the same as that for the animals that could be examined, then human-related causes would account for nearly two-thirds of all observed deaths (29 of 44 deaths), including 53 percent (23 deaths) due to ship strikes and 14 percent (6 deaths) due to entanglements.

Importantly, only a portion of the animals that die each year are observed. A recent scientific article on the western North Atlantic population (Kraus et al. 2005. *Science* 309) suggests that the average detection rate may be as low as 17 percent. Of those animals that died, some unknown portion probably succumbed to ship strikes or entanglements. Thus statistics based on observed dead whales do not give a complete picture of North Atlantic right whale mortality.

Right Whale Deaths and Injuries in 2005

As shown in Figure 7, four dead right whales were found in 2005, including at least two hit by ships and one entangled in fishing gear. The first of these carcasses was found floating nearly 129 km (80 mi)

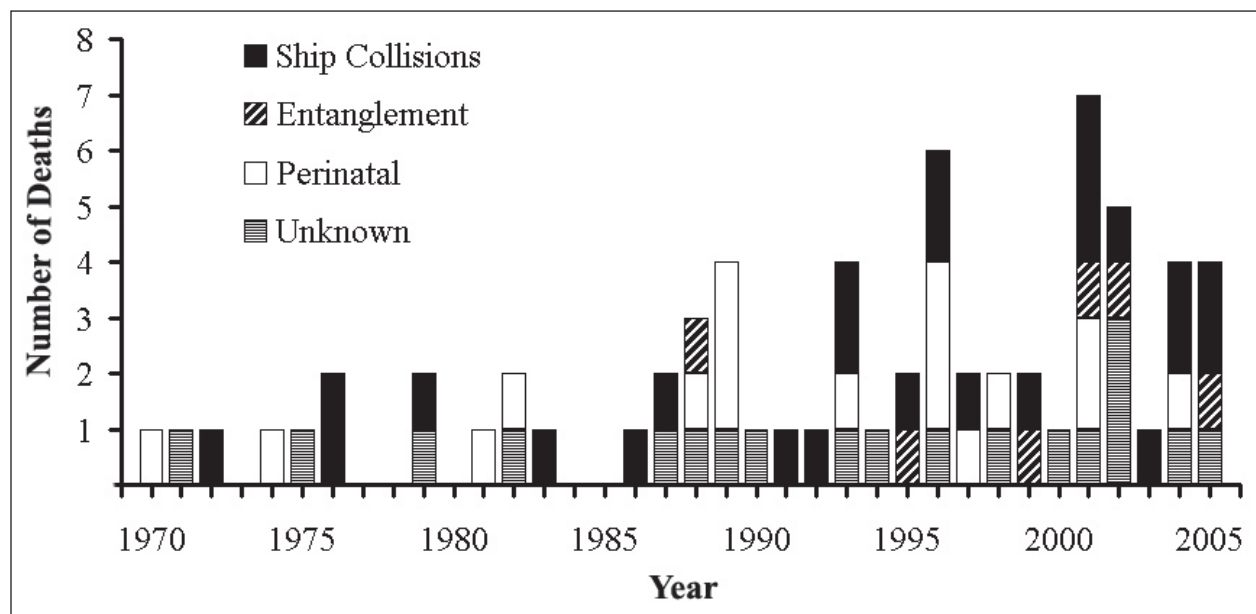


Figure 7. Known mortality of North Atlantic right whales, 1970–2005. Figure based on data from various sources and compiled by the Marine Mammal Commission.

east of Nantucket, Massachusetts, by a Coast Guard aerial reconnaissance team on 10 January. Weather conditions prevented retrieval of the carcass for necropsy and its cause of death was listed as unknown. A biopsy sample collected at sea before the animal disappeared identified the whale as an adult female (whale #1160) that had sustained serious propeller wounds from a ship collision in 2001.

The second carcass, sighted on 12 January by a right whale survey team, also was an adult female (whale #2143). Found floating 24 km (15 mi) off Cumberland Island, Georgia, the whale was towed ashore for a necropsy. The animal had sustained serious propeller wounds as a calf in 1991 and at death was carrying a full-term fetus. The old wounds had apparently reopened under the strain of pregnancy and become infected, likely causing the animal's death. The third carcass, another adult female (whale #2301), was first reported stranded on Ship Shoal Island, Virginia, by a Coast Guard helicopter pilot on 3 March. Although the whale was badly decomposed, rope caught in its baleen and deeply embedded in one of its flippers indicated that death was caused from entanglement. The fourth carcass, a subadult female (whale #2617), stranded on Monomoy Island south of Cape Cod, Massachusetts, on 29 April. Fractured vertebrae and severe bruising on its right flank indicated that a ship had killed it.

In addition to the four documented deaths, a vessel collision and two new entanglements involving live whales were reported in 2005. The vessel collision, which occurred on 10 March, involved an adult female (whale # 2425) and a 43-ft. private fishing vessel off Cumberland Island, Georgia. The vessel operator immediately, and commendably, reported the collision to the Coast Guard and remained on site until an aerial survey team and research vessel arrived. A full account of the accident was provided to the Coast Guard and the Service. At the time of the collision, the vessel apparently was traveling at 19 to 20 knots and was stopped by the collision. About 30 seconds after the whale was struck, it surfaced and began thrashing the surface with an injured fluke. Its left tail fluke, nearly severed midway between the notch and the tip, was left dangling straight down when the fluke was lifted out of the water to dive (Fig. 8). The wound bled profusely and a deep gash was seen on the peduncle, with smaller gashes on the fluke. The whale was resighted moving north several days later. On 5 September it was seen again on Stellwagen Bank off Massachusetts in very poor condition with gray skin and numerous yellow-orange blotches sug-



Figure 8. North Atlantic right whale with a severed left fluke cut by the propeller of a 43-ft. private fishing vessel off Cumberland Island, Georgia, 10 March 2005. Photograph courtesy of M. Zani, New England Aquarium.

gesting a heavy infestation of cyamids (small crustaceans called whale lice that usually occur only on roughened skin patches or callosities on a right whale's head). As of the end of 2005 it had been neither resighted nor found dead.

The two new entanglements observed in 2005 included an adult male (whale #1167), first seen entangled on 8 June 88 km (55 mi) east of Cape Cod, and an unidentified juvenile seen on 3 December 16 miles east of St. Simons Island, Georgia. The whale off Cape Cod was trailing about 61 m (200 ft) of green line and was too far offshore for a team to mount a disentanglement attempt that afternoon. Subsequent searches by vessel and aircraft were unsuccessful. The animal was resighted in Roseway Basin on 6 September and appeared to be in poor health. The whale off Georgia had line wrapped across its back and possibly around both flippers. It was trailing about 122 m (400 ft) of line with three small buoys attached. A disentanglement team was able to reach the whale the day it was sighted, attach a satellite-tracking device, and remove approximately 61 m (200 ft) of trailing line and the three buoys. Two days later off St. Augustine, Florida, more of the trailing line was removed. A third disentanglement attempt was made on 12 December off North Carolina. A small remaining portion of trailing line, as well as derelict gear picked up subsequent to the previous distentanglement attempt was removed, but the team was unable to remove the tight, constricting loop of line across the animal's back. During the attempt, the telemetry buoy parted from the whale, making further tracking impossible. At last sighting, the whale appeared to be in generally good condition although there were some early signs of deterioration.

At the end of 2005, 25 right whales had been observed entangled in fishing gear since Janu-

ary 2000 (Table 5). A disentanglement team removed some or all of the entangling gear from 11 whales, but it was not possible to remove any gear from the other 14 animals. At the time of the last reported sightings, 8 of the 25 whales appeared to have been in good condition, 5 were in poor condition, and 3 were known or assumed to have died. Excluding the animals known or thought to have died, 12 of the remaining 22 whales were believed to have been free of entangling gear when last sighted, and 10 were still carrying at least some gear. An additional whale with severe entanglement injuries but carrying no gear was photographed off Florida in 2003. That animal has not been resighted.

Revision of the Right Whale Recovery Plan

A recovery plan for right whales in both the North Atlantic and North Pacific Oceans was initially adopted by the National Marine Fisheries Service in 1991. To incorporate new information and reassess recovery priorities, a draft revised plan specific to North Atlantic right whales was completed by the Service in 2001 and comments were requested. However, because the draft plan did not identify objective and measurable recovery criteria as required by the 1994 amendments to the Endangered Species Act, adoption of the plan was deferred pending the development of those criteria.

On 9 June 2004 the Service published a *Federal Register* notice requesting comments on another revision. The revised draft identified four criteria for reclassifying the species from endangered to threatened under the Endangered Species Act: (1) the population structure indicates a demographically normal population that will continue to increase; (2) the population has increased for a period of 20 years at an average rate of 2 percent or more per year; (3) the five listing criteria set forth in the Endangered Species Act have been met; and (4) the estimated probability of extinction is no more than 1 percent within 100 years.

By letter of 12 November 2004 the Commission commented to the Service, noting that measures

Table 5. Observed right whale entanglements, 2000–2005

	No Gear Removed	Some Gear Removed	All or Most Gear Removed	Total
Last Seen in Good Condition	5	2	1	8
Last Seen in Poor Condition	3	1	1	5
Known or Assumed Dead	1	1	1	3
Not Resighted/ Uncertain Conditions	5	3	1	9
Total	14	7	4	25

adopted to date to reduce ship collisions and entanglements had been ineffective and that stronger measures were clearly needed. The draft revision, however, implied that what was most needed were steps to monitor the effectiveness of existing measures and to take further action only if necessary and possible. In this regard, the Commission noted that major initiatives started by the Service since the 2001 draft were not reflected in the new draft. The Commission therefore recommended that the draft plan be revised to underscore the urgent need for developing and implementing substantially improved measures as quickly as possible.

With respect to the new recovery criteria, the Commission concurred with two of the proposed criteria (i.e., meeting listing criteria under the Endangered Species Act and requiring a 1 percent or lower probability of extinction within 100 years). However, it noted that the criterion for requiring that the population structure be indicative of a demographically normal population that will continue to grow was vague and confusing. It also noted that the criterion for a 2 percent growth rate over 20 years could be satisfied by a population of about 450 whales if the current population numbered only 300 whales. The Commission expressed concern that such a population size was still too small to allow downlisting. The Commission therefore recommended that the Service reexamine and revise those two criteria.

On 5 May 2005 the Service adopted a revised recovery plan for North Atlantic right whales. The revised plan noted that there had been no apparent signs of the species' recovery over the past 15 years and that action was urgently needed to reduce the significant threats posed by ship collisions and entanglement in fishing gear. It set forth five objectives and nearly 150 specific tasks (see "Right Whale Recovery Plan Objectives" on next page). To address concerns about identified recovery cri-

Right Whale Recovery Plan Objectives

Objective 1. Significantly reduce sources of human-caused death, injury, and disturbance

- Develop and implement a ship strike reduction strategy
- Conduct risk-assessment analyses of various ship routing or speed options to assess the best set of vessel traffic management options
- Continue to implement mandatory ship reporting systems along the U.S. East Coast
- Develop and implement strategies to modify fishing operations and gear to reduce entanglements
- When possible, practicable, and safe, disentangle whales caught in fishing gear
- Continue and expand efforts to inform mariners of right whale vulnerability to ship strikes and entanglement in fishing gear and related regulatory requirements

Objective 2. Develop demographically based recovery criteria

Objective 3. Identify, characterize, protect, and monitor important habitats

- Monitor right whale habitat-use patterns to assess shifts that might reflect habit disturbance or degradation
- Monitor human activities to assess potential right whale habitat degradation
- Collect and analyze data as necessary to assess the need to modify critical habitat boundaries

Objective 4. Monitor the status, trends, and distribution of the western North Atlantic right whale population

- At least once every three years evaluate data on the status of western North Atlantic right whales
- Monitor right whale occurrence and habitat-use patterns in high-use areas
- Maintain a photo-identification database
- Continue and improve a program to necropsy right whale carcasses
- Where feasible, effective, and minimally intrusive, conduct radio and satellite tagging studies to increase knowledge of right whale habitat use, distribution, and behavior
- Conduct genetic studies to assess population structure, effective population size, genetic diversity, and possible impacts on health and reproductive success
- Conduct studies to assess right whale health at the individual and population levels

Objective 5. Coordinate federal, state, local, international, and private efforts to implement the recovery plan

- Enforce right whale protection laws
- Evaluate the effectiveness of the Northeast and Southeast Implementation Teams
- Promote bilateral cooperative efforts with Canada
- Periodically review and update the North Atlantic Right Whale Recovery Plan

teria, the plan noted that over the next two years the Service expects to reevaluate extinction risks that could be used as a threshold for downlisting or delisting large whale species. As interim criteria, the plan provided revised downlisting criteria that identified the demographic parameters indicative of a healthy population. In addition, the criterion for population growth was revised to require an average 2 percent annual growth rate over 35 years, rather than 20.

Development of a Ship Strike Reduction Strategy

To date, the National Marine Fisheries Service has relied largely on voluntary efforts by vessel operators to be alert for and avoid hitting right whales. To implement this strategy, it developed extensive outreach materials and established two mandatory ship reporting zones—one off Florida and Georgia and the other off Massachusetts (Fig. 9)—requiring

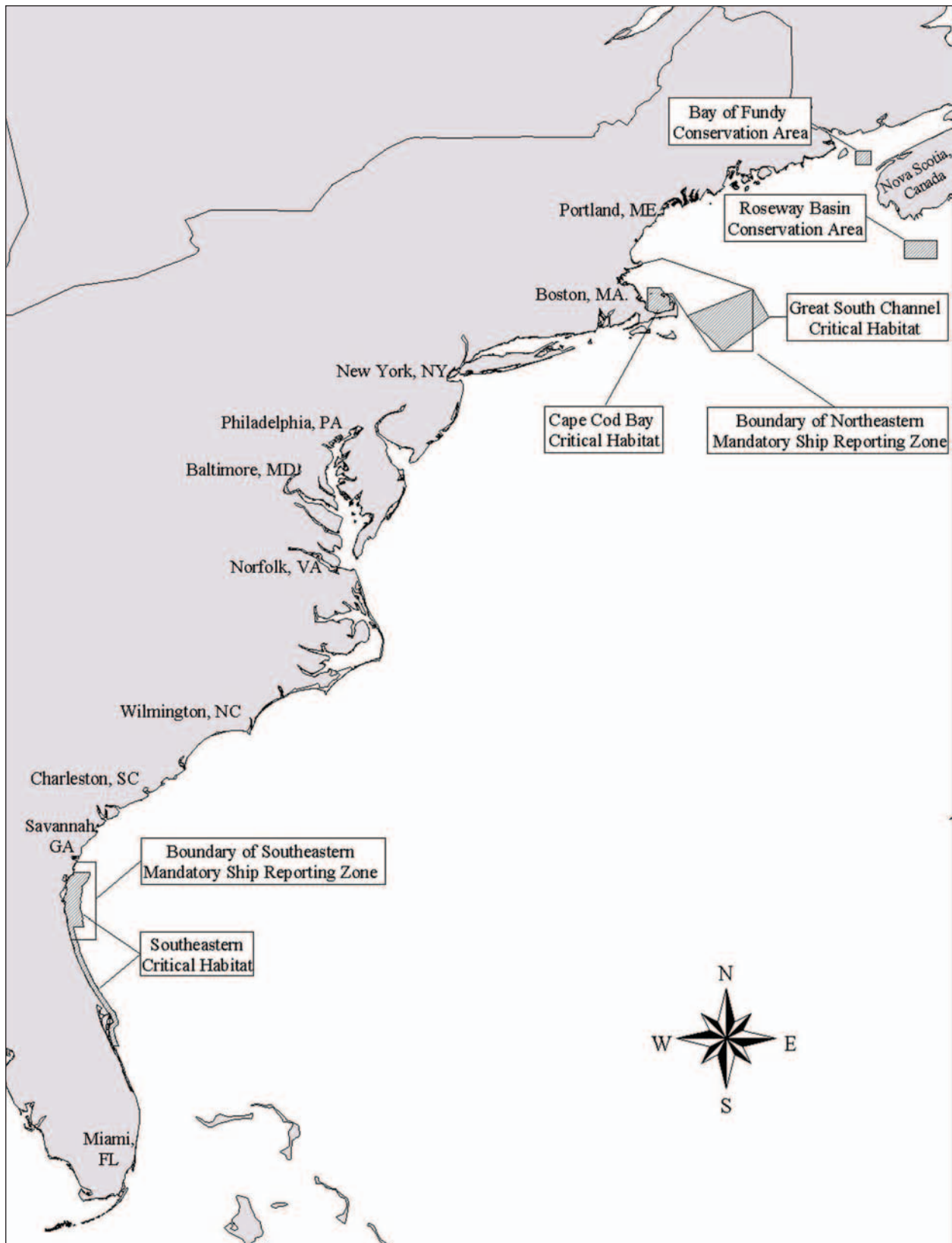


Figure 9. Designated critical habitats and mandatory ship reporting zones for North Atlantic right whales. Figure courtesy of Leslie Ward and Alex Smith, Florida Fish and Wildlife Research Institute.

that, upon entering those zones, all ships of more than 300 gross tons report to an onshore station for information on right whale protection measures. Concerned that additional measures would be needed to address the problem, the Marine Mammal Commission wrote to the Service on 23 November 1997, recommending that it develop agreements with shipping companies operating in ports along the U.S. East Coast to enlist their cooperation in implementing measures to reduce the risks of collisions with right whales. In part, it recommended that the Service examine measures to adjust vessel speeds, routes, and operating procedures for ships when transiting high-use right whale habitats. In response to this recommendation, a study was initiated in 1999, funded by the International Fund for Animal Welfare, the National Marine Fisheries Service, and the Marine Mammal Commission.

The study was carried out under the auspices of the Service's Northeast Implementation Team and involved a series of meetings with vessel operators and officials at major East Coast ports to solicit views on possible speed, routing, and other measures. A final report recommending specific measures was provided to the Service late in 2001. During the same period, the Commission supported an assessment of available information on collisions between whales and ships. Based on findings and recommendations of these studies and the fact that vessel-related right whale mortality was continuing, the Service reexamined possible management measures and began developing a comprehensive ship-strike reduction strategy for right whales. As part of its effort, the Service initiated studies of the economic impacts of various speed and routing restrictions, a survey to gather additional whale collision records, investigations of factors related to collisions between whales and ships, and technological means of detecting whales from ships. Based on those studies, the Service developed the framework for a new approach to reduce vessel collision risks and, on 3 October 2003, convened a federal inter-agency working group to discuss initial views on its developing strategy. To obtain additional input, the Service published an advance notice of proposed rulemaking in the 3 June 2004 *Federal Register*, requesting public and agency comments.

Key parts of the Service's new ship-strike reduction strategy include measures to (1) limit vessel speeds within 46 to 55.5 km (25 to 30 nmi) of 10 major East Coast ports at times when right whales are likely to be present, (2) establish a dynamic area management system requiring ships to limit their speed when near concentrations of right whales,

and (3) designate vessel traffic corridors for ships transiting the southeastern U.S. calving grounds and feeding areas off Massachusetts. Other components of the strategy include expanding public outreach efforts, reexamining section 7 consultation requirements with other federal agencies that operate vessels, and establishing a cooperative agreement with Canada on right whale protection.

As noted in its 2004 annual report, the Commission expressed strong support for the proposed strategy. By letter of 5 August 2004 the Commission suggested that, based on available information on ship speeds at which whales have been killed or seriously injured (Fig. 10), vessel speeds should be limited to 12 knots or slower in areas where right whales occur. The Commission also recommended that (1) speed restrictions for the southeastern calving grounds apply throughout the right whale critical habitat and mandatory ship reporting system areas; (2) dynamic area management zones be triggered by the same criteria initially proposed by the Service for commercial fishery-related dynamic area management zones (i.e., a single sighting of three or more right whales within 75 nmi²), and (3) vessel operators be required to report any collisions with a whale to help gather additional data on factors associated with collisions.

During 2005 the Service reviewed comments on possible ship-strike reduction measures and took steps to further evaluate and develop proposed measures. Among other things, the Service initiated or continued support for studies to analyze economic impacts of the proposed measures, vessel routes that would minimize collision risks off key ports, and factors affecting interactions between ships and whales. The Service also began to develop a draft environmental impact statement for its proposed strategy and continued consultations with other involved federal agencies.

At the end of 2005 the Service expected to further develop or begin implementing parts of its ship-strike reduction strategy in 2006 but anticipated that several key parts would not be implemented until 2007. Among the steps it expected to take in 2006 are circulating a draft environmental impact statement on its proposed strategy and publishing proposed rules to limit the speed of vessels entering U.S. East Coast ports during times that right whales are likely to be present, identifying vessel traffic lanes that pose the least risk to right whales, and preparing a proposal to the International Maritime Organization for establishing an "Area To Be Avoided" by large vessels in the Great South Channel right whale feeding area off Massachusetts.

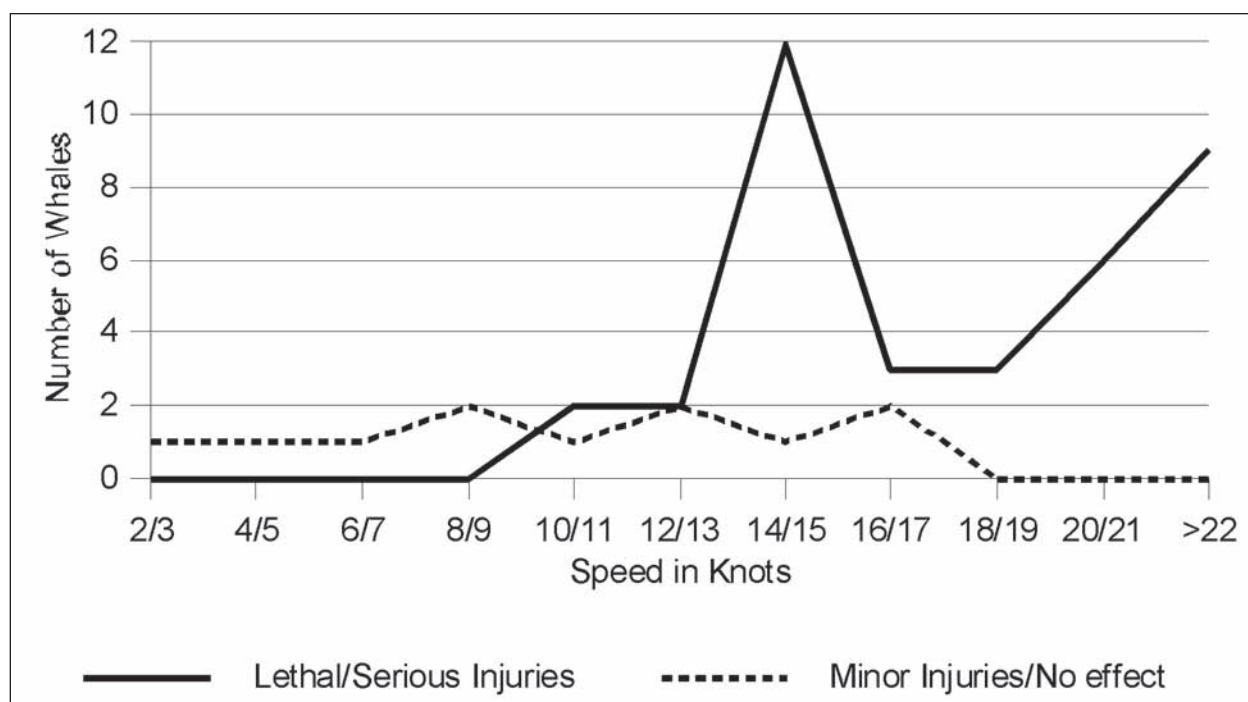


Figure 10. The number and severity of injuries to whales caused by ships traveling at known speeds at the time of collisions. “Lethal/Serious Injuries” = observations of a dead whale or evidence of bleeding wounds following a collision. “Minor Injuries/No effect” = collision reports with no mention of blood or with whales seen swimming away with no bleeding wounds apparent. Data courtesy of Laist et. al. 2001 and the National Marine Fisheries Service.

Vessel Speed Restrictions—In an eight-week period from mid-November 2004 to mid-January 2005, four dead right whales were found, including one that was killed by a ship and two others that had wounds from previous ship collisions that may have contributed to their deaths. All three animals hit by ships were adult females, two of them carrying full-term fetuses. Another adult female with a full-term fetus was killed by a ship earlier in 2004.

These deaths clearly compromise the species’ prospects for recovery. Believing that immediate action was needed, the Commission wrote to the Service on 24 January 2005 recommending that emergency regulations be adopted within a month to limit vessel speeds consistent with measures already under consideration by the Service for areas along the coastal spring migration route between the right whale calving grounds off Florida and Georgia and their feeding grounds off New England and southeastern Canada. Specifically, it recommended that the Service limit vessel speeds to 12 knots within 46 km (25 nmi) of major East Coast ports during the periods when right whales were expected to pass those ports. The Commission also recommended that the Service implement a dy-

namic area management system that would allow it to impose similar speed restrictions for a period of 24 hours on vessels operating within 18.5 km (10 nmi) of any reliable right whale sighting.

Following the 10 March collision mentioned earlier between a right whale and a private fishing vessel off southern Georgia, environmental groups submitted additional requests to the Service, including a formal petition for emergency rulemaking. On 18 March six U.S. Senators wrote to President Bush calling on the Administration to increase its efforts to reduce ship strikes. In July 2005, 16 right whale biologists published a paper in the journal *Science* entitled “North Atlantic right whales in crisis,” urging that emergency measures be adopted to reduce vessel-related, as well as fishing-related, right whale mortality.

On 1 July 2005 the Service responded to the Commission’s 24 January letter, stating that the issuance of emergency regulations required time comparable to that of a normal rulemaking process and, given that it was already taking steps to develop a ship-strike reduction strategy, the Service had decided not to pursue emergency rulemaking. It also noted that it had begun to issue more explicit

advisory notices along with its right whale sighting reports, recommending that vessels reduce speeds to 12 knots or less near those locations whenever consistent with human safety and national security. The Service also noted that it had written to the Coast Guard on 9 May 2005 asking that Coast Guard broadcasts include a similar advisory in its notices to mariners and in messages to ships responding to the mandatory ship reporting systems. On 12 June the Coast Guard rejected the Service's request. The Coast Guard advised that recommending a specific speed limit would be contrary to internationally accepted language on speed advisories, which do not specify specific speeds, and that including such a recommendation in its broadcasts could be viewed as a Coast Guard endorsement of such speed restrictions.

In response to the petition from environmental groups for emergency rules, the Service published a similar reply on 29 September 2005 in the *Federal Register*. In that notice, the Service advised that emergency rulemaking to limit vessel speeds was not warranted at this time in light of ongoing efforts to develop a comprehensive ship-strike reduction strategy and that it was taking steps to develop additional non-regulatory measures to reduce ship-strike risks. Late in 2005 several environmental groups filed a notice of intent to sue the Coast Guard and the National Marine Fisheries Service for failing to use their authority fully and meet their obligations under the Endangered Species Act to protect right whales.

Entanglement in Fishing Gear

Sections 117 and 118 of the Marine Mammal Protection Act establish a process for managing the incidental take of marine mammals in commercial fisheries. They require the National Marine Fisheries Service to prepare stock assessment reports for each marine mammal stock in U.S. waters and to calculate a potential biological removal (PBR) level that is the maximum amount of human-caused mortality that could be allowed annually and still provide a high level of assurance that the stock can increase to or remain within its optimum sustainable population level. When incidental take levels exceed PBR, the Service is required to convene a take reduction team, with a membership drawn from stakeholders, to develop a take reduction plan. That plan must reduce incidental takes to or below PBR within six months of plan implementation. Because of their highly endangered status, PBR for North Atlantic right whales has been set at zero.

In 1996 the Service convened the Atlantic Large Whale Take Reduction Team to address the incidental take of several large whales along the East Coast, including right whales. The team included representatives from East Coast gillnet and trap fisheries, environmental groups, research groups, state agencies, and federal agencies, including the Marine Mammal Commission. The team's charge was to reach consensus on measures to recommend to the Service for inclusion in a take reduction plan for mitigating the incidental take of whales in East Coast trap and gillnet fisheries—particularly the lobster trap fishery and gillnet fisheries for groundfish, sharks, and other coastal fish. The team focused almost exclusively on North Atlantic right whales because of their highly endangered status.

The team has been unable to reach consensus on all recommended measures, and the Service has therefore had to develop mitigation measures based on differing views within the team. The Service adopted the initial Atlantic Large Whale Take Reduction Plan in 1997. Because there was no apparent reduction in the number of observed entanglements or entanglement-related deaths following the plan's adoption, the Service has periodically reconvened the team, expanded its scope to include additional trap and gillnet fisheries, and made frequent changes to the plan's provisions and requirements. At least some changes have been made every year since 1999, and major revisions were made in 2000 and 2002. Because entanglements and entanglement-related deaths continued during this period, the Service began a lengthy process to develop another major plan revision in 2003. The Service now expects to adopt plan revisions in 2006.

Throughout the process of developing and modifying the take reduction plan, the Service has relied principally on three major risk reduction approaches: (1) disentangling whales; (2) encouraging the use, on a fishery-wide basis, of gear modifications thought to make the gear less likely to entangle whales; and (3) requiring more stringent gear modification in certain times and areas where whales are most likely to occur.

Disentangling whales is generally not the preferred response, nor is it even possible in many cases. Therefore, gear modifications and time/area closures are necessary. The gear modifications currently encouraged or required include weak links with various breaking strengths that are intended to separate gear parts and allow whales to break free of gear after becoming entangled; knot-free lines intended to reduce the likelihood of snarling in

baleen; limits on the number of buoylines used to mark a string of gear and on the number of traps per buoy line; and sinking or neutrally buoyant lines instead of floating lines. As new provisions and more fisheries have been added to the plan over the years, efforts to address local concerns have resulted in an extraordinarily complex set of requirements and exceptions that vary by fishery (and often by region within a fishery), gear type, time and area, and the way gear is fished.

In addition to these required measures, extensive research has been undertaken on other possible modifications. Among the many modifications under examination are stiff line, glowing line, weak line, line that might weaken or dissolve when it comes into contact with whale skin or blubber, pop-up buoys that would allow floats and buoy lines to be kept on the bottom until deployed gear is ready to be hauled, time-tension line cutters that would cut line when under the constant pull of an entangled whale, and buoy shapes less likely to cause line to wrap around flippers. Although studies of these and other options continue, technical, practical, or cost limitations have precluded application to date.

The Commission has repeatedly commented to the Service that its take reduction measures rely too heavily on gear modifications of uncertain effectiveness and that almost no meaningful effort has been focused on seasonal closures of important right whale habitat to hazardous gear types. Further, the Commission has consistently recommended that proposed rules be modified to prohibit deployment of gillnets and traps in designated right whale critical habitats seasonally. Similar recommendations were made by the Commission's representative at meetings of the take reduction team. The Service has consistently rejected these recommendations.

On 30 June 2003 the Service published a *Federal Register* notice announcing plans to prepare an environmental impact statement on revising the Atlantic Large Whale Take Reduction Plan and requesting comments on options that should be considered. In response, the Commission wrote to the Service on 29 July 2003, noting its many previous recommendations for closing critical habitats to trap and gillnet fishing when whales are known to concentrate in those areas and providing copies of pertinent letters.

On 25 February 2005 the Service published a *Federal Register* notice announcing the availability of the draft environmental impact statement and requesting comments. The document considered six complex options involving additional gear modifications. The principal focus of the new options was

on requirements for use of sinking and/or neutrally buoyant ground lines in trap and gillnet fisheries and for expanded use of weak links on lines connecting buoys to submerged gear. The document failed to include any options for seasonal closures of right whale critical habitats to trap or gillnet fishing and indicated that additional measures to reduce the risks of whale entanglements in vertical lines would be addressed sometime in the future.

On 12 May 2005 the Commission wrote to the Service, noting its particular disappointment that the Service had disregarded the need to evaluate the option of time/area closures as recommended by the Commission. In doing so, the Commission noted, the Service had failed to meet regulatory requirements governing the preparation of environmental impact statements. These include the need for agencies to sharply define the issues by rigorously exploring and objectively evaluating all reasonable alternatives and explaining why any alternatives not selected were rejected.

The Commission also noted that the most significant feature of the new plan was the requirement for expanded use of sinking or neutrally buoyant ground lines in trap fisheries. Ground lines in trap fisheries are used to link multiple traps. Many fisheries currently use floating line for this purpose, and loops in lines between traps can float up to several tens of feet above the bottom and entangle passing whales. Sinking or neutrally buoyant lines that would lie on the sea bottom would reduce the amount of line in the water column and thereby reduce entanglement risks. The Commission has supported efforts to require the use of sinking or neutrally buoyant ground line but noted that none of the proposed options would require its full use until 2008. Thus, the Commission noted, it would be difficult, if not impossible, to assess effectiveness of the measure until 2012.

As an incentive for fishermen to convert to using sinking or neutrally buoyant line before 2008, the proposed alternatives would allow them to fish with such lines in areas otherwise closed because of large aggregations of right whales. However, recent analyses of lines removed from entangled whales indicate that perhaps half or more of all entanglements occur in vertical buoy lines for which reliable means of avoiding entanglement do not yet exist. By discounting entanglement risks with buoy lines and encouraging fishermen to switch to sinking lines so that they can fish in areas with large concentrations of right whales, the Commission noted, the proposed alternatives could actually increase entanglement risks. The Commission

therefore strongly opposed using permission to fish in high-use right whale habitat as an incentive for fishermen to switch to sinking or neutrally buoyant ground lines. Instead, it recommended that such permission not be included in any alternatives unless it was accompanied by an additional measure explicitly excluding use of vertical buoy lines (e.g., using a pop-up buoy system that eliminates vertical lines when the gear is not being hauled or set).

To address deficiencies in the draft statement, the Commission recommended that the Service prepare a supplemental draft environmental impact statement that, among other things, would provide a thorough discussion of available information on the frequency of whale entanglements in vertical lines, including those equipped with weak links, and the extent to which weak links will reduce the number of right whale entanglements. The Commission also recommended that the supplemental statement identify and analyze an option to (1) seasonally close all right whale critical habitats to trap and gillnet fishing until such time as gear modifications are developed that would ensure that right whale entanglement risks in vertical lines would be substantially reduced, and (2) require all trap fisheries along the U.S. East Coast to use sinking or neutrally buoyant ground lines within one year of adopting the new plan.

At the end of 2005 the Service was reviewing comments on its draft environmental impact statement and developing a final statement and accompanying rule.

Critical Habitat for North Atlantic Right Whales

In 1994, based on sighting data collected since the 1980s, the National Marine Fisheries Service designated three areas as critical habitat for North Atlantic right whales under provisions of the Endangered Species Act. The three areas were the calving grounds off Florida and Georgia, and the two feeding areas in Cape Cod Bay and the Great South Channel off Massachusetts (see Fig. 9). Subsequent survey data have revealed that right whales also use certain areas adjacent to the designated critical habitats. In light of this new information, the Ocean Conservancy petitioned the Service on 9 July 2002 to expand the boundaries of all three critical habitats. By letter of 28 August 2002 the

Commission expressed its support for the proposed action and recommended that the Service analyze all available sighting data and proceed without delay to designate new boundaries that better reflect the extent of the population's habitat needs.

On 28 August, the Service announced in the *Federal Register* its conclusion that the petitioned action was not warranted because the petition did not provide adequate detail on the environmental features of the proposed new areas that were essential to the conservation of right whales. On 5 December 2003 the Commission wrote to the Service, noting that it was difficult to understand the basis for such a conclusion, given that the proposal was based on the Service's own survey data and that the proposed areas were simply extensions of those already designated. The Commission therefore again recommended that the Service analyze all available sighting data and modify the critical habitat boundaries as quickly as possible. The Service's 30 December 2003 response advised that because the petition did not list the special management areas or essential habitat features, it would not proceed with the requested action.

Change in Nomenclature

On 10 April 2003 the Service published a final rule to change the name for the northern right whale (*Eubalaena glacialis*) as it appeared on the Endangered Species Act's list of endangered and threatened species. Previously right whales in the North Atlantic and North Pacific Oceans had been considered as two populations of the same species, the northern right whale. Based on new information, however, accepted scientific nomenclature now recognizes two distinct species—the North Atlantic right whale (*E. glacialis*) and the North Pacific right whale (*E. japonica*). The Service's April 2003 rule, therefore, sought to modify the Endangered Species Act list so as to make it consistent with currently accepted scientific nomenclature by designating northern right whales as two separate species, both endangered under the Endangered Species Act.

On 11 January 2005, however, the Service rescinded the name change because it had failed to follow required procedures. To correct the procedural errors, the Service advised that it would conduct a status review of the northern right whale to determine if it should be listed as two separate species under the Endangered Species Act and that, in the pro-

cess of doing so, it would reexamine critical habitat boundaries. As of the end of 2005 no further steps had been announced regarding either the status review or the reanalysis of critical habitat boundaries.

Marine Mammal Commission Review of the Cost-Effectiveness of the North Atlantic Right Whale Recovery Program

As noted in Chapter XI, in 2004 Congress directed the Marine Mammal Commission to assess the population viability of the most endangered marine mammals and make recommendations on the cost-effectiveness of their protection programs. As part of its response to this directive, the Commission is planning to review the cost-effectiveness of the North Atlantic right whale recovery program. The major objectives include the following:

- review information on the status of North Atlantic right whales and the factors affecting their recovery;
- identify the major research and management actions currently being undertaken by the Service and cooperating agencies and groups to implement the right whale recovery plan;
- review information and analyses defining the biological effectiveness of current, proposed, and alternative management actions;
- evaluate the extent to which major research tasks are providing information vital for carrying out or improving management measures;
- identify staff and funding levels over the past three years for major right whale research and management actions;
- evaluate the cost-effectiveness of direct expenditures allocated to major research and management actions undertaken as part of the right whale recovery program; and
- identify actions that should be taken to improve the cost-effectiveness of right whale recovery efforts.

At the end of 2005 the Commission, in consultation with the National Marine Fisheries Service, planned to convene a panel of scientists and management experts to hold this review in 2006. The panel will include representatives of the Commission's Committee of Scientific Advisors as

well as an outside expert. A report of the review is expected to be available by the end of 2006.

Southern Resident Killer Whale (*Orcinus orca*)

As described more fully in the section on the AT1 stock of killer whales in Alaska (Chapter IV), three distinct "ecotypes" of killer whales inhabit the North Pacific—resident, transient, and offshore. The National Marine Fisheries Service recognizes three biological stocks of resident killer whales in the North Pacific. The southern resident stock is observed primarily in Washington and southern British Columbia in summer months and also off Oregon and California in winter. The northern resident stock is observed primarily in central and northern British Columbia, and the Alaska resident stock is observed from southeastern Alaska to the Aleutian Islands and the 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, or 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 four generations. Pods comprise groups of related matrilines, which—with occasional exceptions—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).

Population Trends

Historical abundance of southern resident killer whales is not known. Estimates range from as low as 140 to more than 200 individuals. Since 1960, however, the southern resident stock has never exceeded 100 individuals (Fig. 11). 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

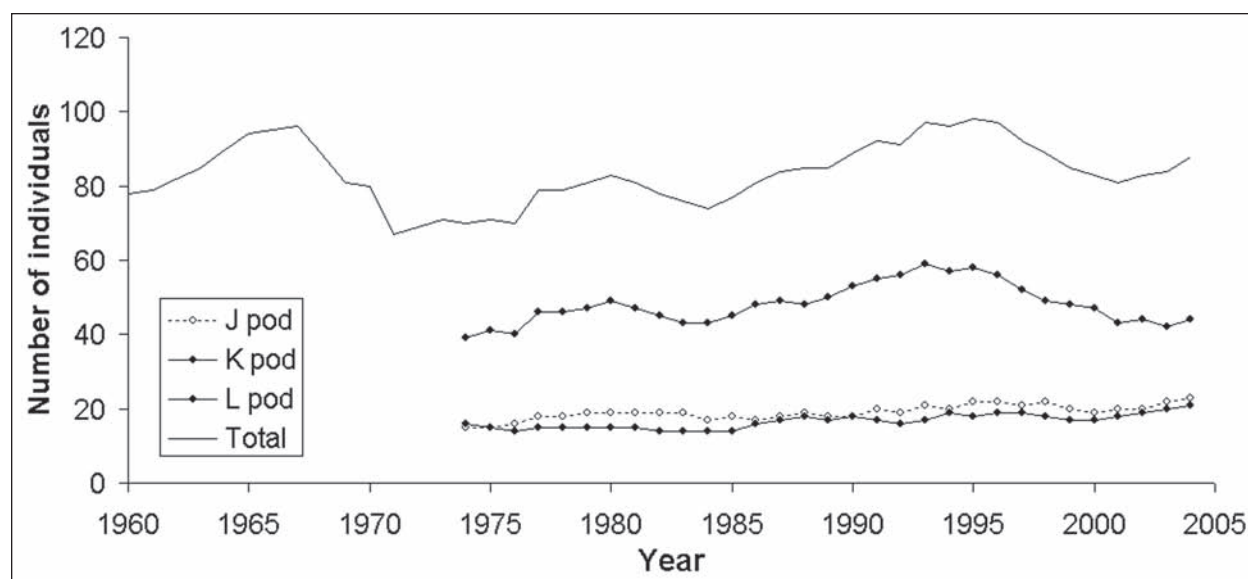


Figure 11. Southern resident killer whale abundance, 1960–2005. Data courtesy of the National Marine Fisheries Service.

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 and then increased back to 88 animals in 2004. These trends in abundance for southern residents seem to be driven primarily by changes in the abundance of animals in L pod, which is the largest of the three southern resident pods. The most recent increase, however, has been driven primarily by an increase in J and K pods. These pod-specific trends may be particularly important if, as evidence suggests, males rarely mate with females from their own pod. 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 factors have been identified as potentially contributing to the failure of southern resident killer whales to recover to their historic abundance: high contaminant loads, disturbance by whale-watching boats and other vessel activity, and declines in available prey, particularly salmon. 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 ethers (PBDEs, “new” pollutants found in flame-retardant materials). Transient killer whales feed on marine mammals, which places them higher on the food chain than resident killer whales and thus more likely to have high levels of some contaminants. Although southern resident killer whales feed on fish, they have contaminant levels approaching those of transients and much higher than those of other resident populations in the North Pacific. Such high contaminant levels may compromise immune system function, and the levels of PCBs observed in southern resident killer whales exceed thresholds thought to cause immune system disorders in seals. High contaminant levels also may compromise reproduction. Although direct causal relations between contaminants and changes in immune and reproductive system function are difficult to prove in wild animals, existing evidence suggests the possibility of such links in Atlantic and Mediterranean cetaceans that have experienced viral epidemics, as well as in lactating female polar bears that exhibited a correlation between reproductive hormone concentrations and contaminant levels.

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 exposure with whale-watching vessels, both commercial and private, may disrupt foraging, rest-

ing, or other behavior and cause killer whales to change their habitat-use patterns. Noise associated with whale-watching or other vessels may not only disturb the animals but also may increase ambient noise levels to the extent that it interferes with or masks killer whale sounds used for foraging, communication, or other purposes. 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 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. The whales depend heavily on salmon and perhaps on specific salmon runs. The majority of salmon runs throughout the Pacific Northwest are much smaller than they were historically when southern resident killer whales were thought to number more than 200 individuals. This suggests that carrying capacity for resident killer whales has declined. In recent decades, overall salmon abundance in the Puget Sound region has been roughly stable if hatchery-produced salmon are included. The extent to which population trends of southern resident killer whales (see Fig. 11) are linked to changes in salmon abundance warrants further investigation.

In addition to these factors that likely impede the recovery of southern resident killer whales, their small population size makes them especially vulnerable to catastrophes as could occur from exposure to disease or contaminants from an oil spill.

Endangered Species Act Status

In response to the decline in southern resident killer whales between 1995 and 2001 (see Fig. 11), the Center for Biological Diversity petitioned the National Marine Fisheries Service in May 2001 to list the southern resident stock as threatened or endangered under the Endangered Species Act. The Service convened a biological review team, which conducted a status review and determined that listing was not warranted because southern resident killer whales did not constitute a species. The definition of “species” under the Endangered Species Act identifies species, subspecies, and “distinct population segments” as units that may warrant listing. The Service defines a distinct population segment on the basis of three elements: (1) discreteness of the population segment in relation to the remainder of the species to which it belongs, (2) the significance of the population segment to the species to which it belongs, and (3) the popu-

lation segment’s conservation status in relation to the Endangered Species Act’s standards for listing. For the 2002 status review, southern resident killer whales were evaluated in the context of one global species of killer whales and were not considered to have met the significance criterion. Under the Marine Mammal Protection Act, however, southern resident killer whales were considered a population stock, and the Service designated them as depleted under the Act in 2003.

In December 2002 the Center for Biological Diversity and other plaintiffs challenged the Service’s “not warranted” finding under the Endangered Species Act. One year later, in December 2003, the court set aside the not-warranted finding and remanded the matter back to the National Marine Fisheries Service. The Service convened another biological review team and conducted another status review, incorporating substantial new information regarding the taxonomic structure of killer whales. In particular, the Service, with support from the Marine Mammal Commission, held a Workshop on Shortcomings of Cetacean Taxonomy in Relation to Needs of Conservation and Management in 2004, which specifically addressed killer whales as a case study. The majority of participants in the killer whale working group at the workshop felt that resident and transient killer whales in the eastern North Pacific probably merited species or subspecies status. The biological review team agreed that resident killer whales merited subspecies status. In that context, the team concluded that southern resident killer whales represented a distinct population segment of the as-yet unnamed North Pacific resident subspecies.

The biological review team conducted a population viability analysis for southern resident killer whales, which allowed for (1) variation in survival rates based on observed rates in the past 30 years, (2) variation in carrying capacity, and (3) potential catastrophes. Optimistic scenarios resulted in 0.1 to 3 percent likelihood of extinction in 100 years and 2 to 42 percent likelihood in 300 years. Pessimistic scenarios resulted in 6 to 19 percent likelihood of extinction in 100 years and 68 to 94 percent likelihood in 300 years. Based on those results and a review of the threats facing southern resident killer whales, the National Marine Fisheries Service proposed listing the distinct population segment as threatened in December 2004. The Marine Mammal Commission commented on the proposed listing, supporting it but also suggesting that the population’s small size, projected risk of extinction, and exposure to significant threats warranted a listing

as endangered. After considering the Commission's comments and those of the public, the Service published a final rule on 18 November 2005 listing the southern resident killer whale population as endangered under the Endangered Species Act. The final rule is effective as of 16 February 2006.

Hawaiian Monk Seal (*Monachus schauinslandi*)

The Hawaiian monk seal is the most endangered seal in U.S. waters and one of the most endangered pinnipeds in the world. The species is one of only two seal species that live in tropical waters, the other being the Mediterranean monk seal (*M. monachus*), which numbers a few hundred individuals. A third tropical species, the Caribbean monk seal (*M. tropicalis*), is now considered to be extinct. About 90 percent of Hawaiian monk seals live on and around the remote Northwestern Hawaiian Islands (NWHI) (Fig. 12), a chain of small islands, atolls, reefs, and lagoons that sit atop a 1931-km (1,200-mi) long chain of undersea mountains. Almost all pups are born at six relatively discrete breeding colonies located at French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, the Midway Islands (also referred to as Midway Atoll), and Kure Atoll.

Since the late 1950s when Hawaiian monk seals were first studied, beach counts at the six major pupping colonies have declined by more than 60 percent (Fig. 13). The total population is currently estimated to number fewer than 1,300 animals and is declining at a rate of about 4 percent per year. If there is a bright spot in this discouraging trend, it is the species' recent reoccupation of the main Hawaiian Islands (Fig. 14). Over the past 15 years, the number of sightings and births in the main Hawaiian Islands has increased slowly and possibly spread from Niihau and Kauai in the west to the island of Hawaii at the southeastern end of the archipelago. Prior to the 1990s virtually no births were recorded in the main Hawaiian Islands. Since 2003, however, 10 and 12 per year have been documented.

Although limited, archeological evidence indicates that monk seals were killed for food by early Hawaiians prior to European contact in the 1700s. Such hunting and the associated disturbance likely extirpated monk seals from the main Hawaiian Islands, effectively limiting their distribution to the NWHI. After the arrival of Europeans in the early 1800s, periodic episodes of seal hunting in the

NWHI further depleted their numbers. More recent threats include both human-related and natural factors that have varied at the different breeding colonies over time. Among the human-related factors are disturbance and displacement of hauled-out seals by people and animals, entanglement in marine debris (principally derelict trawl nets that drift into the area from around the North Pacific Ocean), depletion of prey resources by commercial fishing, interactions with recreational and commercial fishing gear, and oil spills. Natural factors include shark predation; naturally occurring biotoxins; disease; aggressive behavior by some adult male seals towards pups, juveniles, and adult females; the effects of oceanographic changes on prey resources; and the loss of pupping beaches to erosion. In general, the small isolated nature of the NWHI makes their local ecosystems exceedingly vulnerable to both natural and human impacts.

The National Marine Fisheries Service is the lead federal agency responsible for the recovery of Hawaiian monk seals. The U.S. Fish and Wildlife Service, the State of Hawaii, and the National Ocean Service also have major responsibilities by virtue of their management responsibilities for monk seal habitat. All of the NWHI except Kure Atoll are managed by the U.S. Fish and Wildlife Service as part of the Hawaiian Islands National Wildlife Refuge and the Midway Atoll National Wildlife Refuge. Kure Atoll is owned by the State of Hawaii and managed by the Hawaii Department of Land and Natural Resources as a state reserve. The Department, through its Division of Aquatic Resources, also assists with monk seal management actions in the main Hawaiian Islands. In 2005 the Department designated all state waters in the NWHI as a state marine refuge. With the exception of the U.S. Fish and Wildlife Service and state refuges just described, all waters out to 50 nautical miles from the atolls and submerged banks are managed by the National Ocean Service as the NWHI Coral Reef Ecosystem Reserve.

Other important partners in monk seal recovery include the U.S. Navy, which previously owned and maintained a naval air station on the Midway Islands; the U.S. Coast Guard, which has lead responsibility for enforcing many relevant laws; the Western Pacific Fishery Management Council, which is responsible for developing fishery management plans and making recommendations to the Department of Commerce regarding fisheries management; and the Marine Mammal Commission, which periodically reviews recovery efforts and helps support various research and management activities.

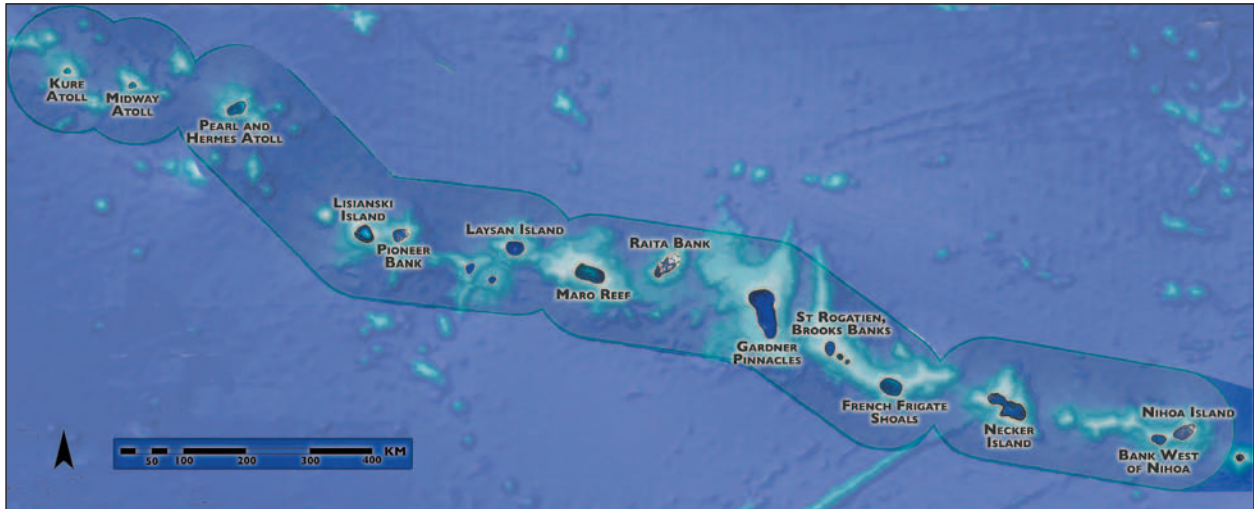


Figure 12. The Northwestern Hawaiian Islands. Original image courtesy of Aurelie Shapiro et al., NOAA’s National Ocean Service.

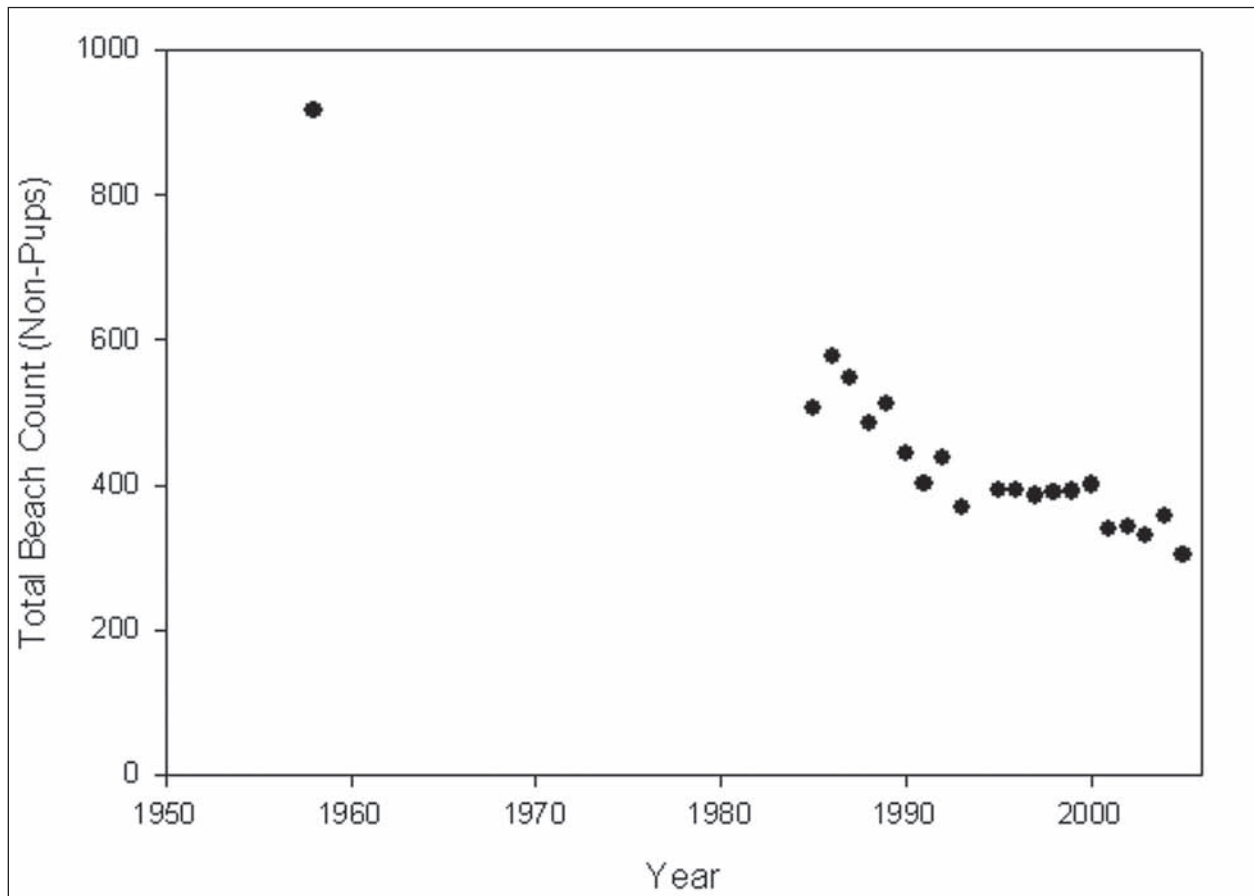


Figure 13. Combined total of mean beach counts of Hawaiian monk seals (excluding pups) at all six major pupping colonies in the Northwestern Hawaiian Islands, 1958–2005. Unpublished data courtesy of the National Marine Fisheries Service’s Pacific Islands Fisheries Science Center.

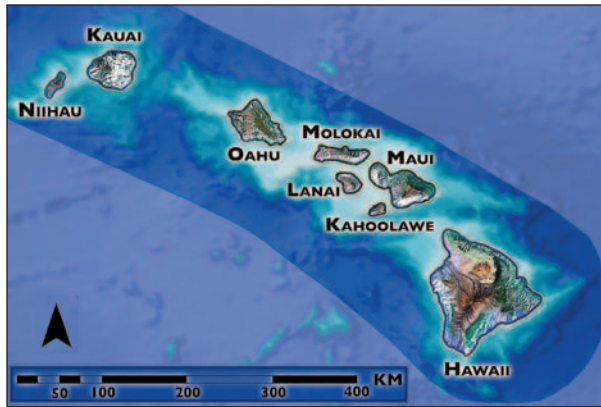


Figure 14. The main Hawaiian Islands. Original image courtesy of Aurelie Shapiro et al., NOAA's National Ocean Service.

Marine Mammal Commission Review of the Hawaiian Monk Seal Recovery Program

As discussed in its 2004 annual report, the Marine Mammal Commission reviewed the Hawaiian monk seal recovery program and other marine mammal issues in Hawaii at its annual meeting in October 2004. Based on its review, the Commission wrote to several agencies on 25 January 2005 identifying monk seal recovery needs, as well as other conservation priorities. Those letters went to the Under Secretary for Oceans and Atmosphere of the Department of Commerce (the head of the National Oceanic and Atmospheric Administration), the Administrator of the National Marine Fisheries Service, the Regional Administrator of the Service's Pacific Islands Regional Office and the Director of its Pacific Islands Fisheries Science Center, the Assistant Administrator for Oceans and Coasts of the National Ocean Service (the head of the National Marine Sanctuary Program), the Director of the U.S. Fish and Wildlife Service, the Secretary of the Department of Transportation, and the Chairman of the Hawaii Department of Land and Natural Resources.

At the time of the Commission's meeting, the National Marine Fisheries Service had recently elevated its Hawaii-based research and management offices to full regional status. In doing so, it established the Pacific Islands Fisheries Science Center and the Pacific Islands Regional Office responsible for fisheries and protected species issues in waters off Hawaii and U.S. territories in the western Pacific. The Commission was impressed by the Service's initial efforts to identify regional marine

mammal research and management priorities and to increase staff and funding commensurate with their new regional roles and responsibilities. With regard to Hawaiian monk seals, the Commission concluded that ongoing research and management efforts were generally addressing critical issues in the NWHI but that more resources were needed to address emerging issues in the main Hawaiian Islands. Representatives of the Service's new regional office and science center recognized this need and were taking appropriate steps to address it.

Based on its review of the monk seal recovery program, the Commission's 25 January 2005 letter to the NOAA recommended that the Pacific Islands Regional Office and the Pacific Islands Fisheries Science Center be provided increased funding to carry out the full range of research and management activities necessary to conserve marine mammals, including Hawaiian monk seals, in the region. In the agency's 21 April 2005 reply, the NOAA Administrator noted that additional funding was routinely included in its budget request for the western Pacific area but that securing additional resources was uncertain because of competition with other priorities within the Department of Commerce and NOAA. More specific recommendations concerning priority needs are discussed in the next section.

Monk Seals in the Main Hawaiian Islands

The rare occurrence of Hawaiian monk seals in the main Hawaiian Islands before the 1990s (except for a few seals known to occur regularly on Niihau and occasional sightings on other islands) meant that virtually all recovery work was focused on the NWHI. As monk seal sightings and births in the main Hawaiian Islands increased through the 1990s, so too did the need to assess and monitor the population's status and to mitigate increasingly frequent interactions between people, seals, and other animals. Among the interactions of particular concern were disturbance of seals by beachgoers and dogs, the hooking of seals attracted to bait on recreational fishing lines, and the potential for transmission of diseases between domesticated animals and seals.

To monitor the occurrence of monk seals in the main Hawaiian Islands, the Pacific Islands Fisheries Science Center (formerly the Service's Honolulu Laboratory) has been compiling sighting reports and tagging seals on an opportunistic basis. In 2001 the Service conducted an aerial survey of the main Hawaiian Islands shoreline and counted

52 seals, which suggests that the total number of animals in the area was perhaps 100 animals or more. Because of funding limitations, a dedicated research program to regularly monitor seal abundance in the main Hawaiian Islands has not been implemented.

As the number of seals in the main Hawaiian Islands has increased, the Service's Pacific Islands Regional Office has managed seal/human interactions by marking temporary seal protection zones around seals hauling out on recreational beaches (Fig. 15), responding to reports of seal harassment, and treating hooked or entangled seals. As with the science center, staff and funding limitations have left the regional office ill prepared to address the increasing monk seal management needs in the main Hawaiian Islands. Their efforts, however, have been greatly enhanced by volunteers (such as the Kauai Monk Seal Watch Program, the Oahu Monk Seal Response Program, and the Hawaii Wildlife Fund), staff of the Hawaii Department of Land and Natural Resources, and other local officials and individuals.

During 2002–2004 the Commission took a number of actions to help address monk seal issues in the main Hawaiian Islands. Among other things, it convened a workshop to identify ways of improving responses to seal haul-out events, provided several months of support for a response coordinator on Kauai, and provided funding to help develop volunteer networks on islands other than Kauai. During its October 2004 annual meeting, the Commission reviewed progress that had been made. Among other things, the State's Division of Aquatic Resources, with funding assistance from the Service, had hired a temporary monk seal response coordinator for Kauai and initiated steps



Figure 15. Temporary seal protection zone and Hawaiian monk seal on a popular recreational beach on Kauai. Photograph courtesy of Hawaii Division of Aquatic Resources.

to develop and formalize a cooperative agreement with the Service pursuant to section 6 of the Endangered Species Act. The Service had hired two additional staff members to work on issues pertaining to monk seals and other protected species in the main Hawaiian Islands, had successfully rescued several distressed seals, and had relocated a seal behaving aggressively toward swimmers. Both the Service and the Division of Aquatic Resources had continued to work closely with volunteers and local officials involved in responding to monk seals that had hauled out on beaches.

The Commission's 25 January 2005 letters to the Service and the State commended both agencies for the significant progress on developing cooperative efforts to address monk seal needs in the main Hawaiian Islands. In its letter to the Hawaii Department of Land and Natural Resources, the Commission recommended that it continue to work with the Service to hire a full-time monk seal response coordinator for Kauai, continue work on the section 6 cooperative agreement with the Service, and seek a grant under that authority to provide permanent support for the position.

The Commission's letter to the Pacific Islands Regional Office recommended that it (1) continue to work with the State on the issues noted in its letter to the Service, (2) develop standardized protocols and establish networks to respond to and document monk seal haul-outs on each of the main Hawaiian Islands, and (3) develop a tiered system for guiding and authorizing different levels of response by volunteers and others. In its letter to the Pacific Islands Fisheries Science Center, the Commission recommended that funding for studies of monk seals in the main Hawaiian Islands be increased to develop a research and monitoring program similar in scope to that undertaken in the NWHI. Major research objectives would include identification of monk seal foraging areas, movements, and site-fidelity patterns, along with collection of prey samples. The Commission also wrote to the National Ocean Service's National Marine Sanctuary Program on 25 January 2005 recommending that it expand the scope of the Hawaiian Islands Humpback Whale National Marine Sanctuary to include other components of the marine ecosystem around the main Hawaiian Islands, including Hawaiian monk seals. The Commission noted that monk seals could receive important benefits from sanctuary stewardship, including support for volunteer efforts to respond to monk seal haul-out events and the development of much-needed public outreach and education materials.

The Service's regional office and science center both responded to the Commission's recommendations on 14 March 2005. The regional office advised that it had provided funding to the State to hire a permanent monk seal response coordinator for Kauai and that steps were being taken to develop standardized procedures for responding to monk seal haul-outs as part of a broader stranding response program being developed for the main Hawaiian Islands. The regional office also hired a marine mammal response coordinator to expand response efforts throughout the main Hawaiian Islands. The Service's science center advised that it intended to seek additional funding for research in the main Hawaiian Islands and was developing a comprehensive research plan that would draw in part on the results of the October 2002 workshop sponsored by the Commission, the Service, and the State.

The Commission subsequently learned that in 2005 the science center had hired a full-time staff member and an additional temporary staff member to collect and analyze data on monk seals in the main Hawaiian Islands. Also, steps were taken to develop a main Hawaiian Islands monk seal research plan to gather the same types of data as collected at colonies in the NWHI (i.e., abundance, distribution, terrestrial habitat-use patterns, age and sex structure, survival rates, pup production, reproductive rates, age at maturity, body growth, body condition, causes of mortality, and population genetics). The Commission also learned that the State of Hawaii had hired a permanent monk seal coordinator for Kauai and that it expected to submit a draft section 6 agreement to the Service in 2006.

During 2005 the Marine Mammal Commission continued to assist on matters related to monk seals in the main Hawaiian Islands. To help assess abundance, the Commission provided funding to the Pacific Islands Fisheries Science Center for a survey of monk seals at the island of Niihau. Because of problems in chartering aircraft, the survey was not conducted, and the funds were reprogrammed to support related monk seal research in the main Hawaiian Islands. The Commission also funded a workshop in November 2005 to evaluate whether a vaccine should be developed that could be used to protect Hawaiian monk seals against phocine distemper virus, which has caused large-scale die-offs of seals in other parts of the world. At the end of 2005, the report of the workshop had not been completed; however, a preliminary draft recommended a cooperative effort between marine aquariums and

government agencies to investigate the safety and effectiveness of such a vaccine through trials on captive harbor seals and northern elephant seals.

With regard to other monk seal health issues, four monk seal deaths occurring in 2005 in the main Hawaiian Islands were attributed to common terrestrial pathogens. *Leptospira* bacteria were identified in two of the cases, but the cause of death was undetermined. The other two animals died of protozoal infections, one of which was confirmed as toxoplasmosis.

Monk Seals in the Northwestern Hawaiian Islands

During the Commission's October 2004 annual meeting, representatives of the National Marine Fisheries Service reviewed efforts to monitor the status of monk seal colonies and management activities in the NWHI. Those efforts have provided the core of the monk seal recovery program since the early 1980s and rely on seasonal field camps at the major breeding colonies with periodic visits to other islands and atolls used by monk seals. Because of the logistics involved in working in such remote locations, costs are high, and in 2004 the Pacific Islands Fisheries Science Center received \$2.25 million for monk seal recovery work. Approximately half of the funds were used for personnel and logistics costs and half for operational expenses. The Commission concluded that the program was well organized and addressing critical needs, and it recommended in its 25 January 2005 letter to the science center that it continue to fund ongoing research and recovery work in the NWHI at existing levels.

In 2005 the science center continued to monitor monk seals at all six major breeding colonies. During the year, it introduced a new approach for recording data in the field and initiated several new analyses, including the use of mark/recapture methods to estimate the total number of seals. This new analysis supplemented mean beach counts used in the past as the principal index of population trends. Overall, monk seal abundance in the NWHI continued to decline in 2005. As shown in Figure 13, mean beach counts declined to the lowest level recorded to date. Based on mark/recapture analyses, the minimum number of seals in the NWHI was estimated to be 1,073 animals. The number of recorded monk seal births declined from 207 in 2004 to 163 in 2005.

Studies of monk seal foraging ecology continued as a major research focus in 2005. Results of satellite tagging and underwater camera studies conducted in the early 2000s revealed differences in at-sea foraging patterns for different age classes, sexes, and breeding colonies. Work also continued on analyzing fatty acids from seal tissue samples to assess the relative amount of lobster and other prey species in the diet. Results of that work, begun in 1999, are expected to be available in 2006. In March 2005 the science center held a workshop on monk seal foraging research to assess recent progress and identify future research needs. Results of that workshop are being used to develop a five-year research plan that will focus on assessing foraging success of juvenile monk seals.

To improve juvenile survival rates, the science center conducted a pilot “second chance” program to rehabilitate juvenile monk seals in poor condition. The approach involves capturing and temporarily feeding underweight juveniles held in pens at their birth atolls. Initially the project was planned for Midway Atoll but was moved to French Frigate Shoals in 2004 due to costs imposed by the U.S. Fish and Wildlife Service at Midway. However, during 2004 no suitable candidates were observed. Although the program was not conducted in 2005, it may be resumed in the future.

Refuges and Reserves in the Northwestern Hawaiian Islands

Most of the NWHI are very small and only a few comprise more than 100 acres of emergent land. The largest, Laysan Island, barely exceeds 1,000 acres. Although all of the islands in the chain have sustained various forms of human impact since their discovery in the early 1800s, this remote chain of islands and reefs constitutes one of world’s least disturbed and most intact coral reef ecosystems. In addition to providing pupping and haul-out habitat for most of the remaining Hawaiian monk seals, the island chain supports many other endangered species and some of the world’s largest seabird colonies. In recognition of the region’s exceptional wildlife resources, all the islands except Midway and Kure Atolls have been protected and managed since 1909 by the U.S. Fish and Wildlife Service as part of the Hawaiian Islands National Wildlife Refuge. Over the past decade, substantial strides have been made to expand protection of both the islands and the associated marine resources that make up

the NWHI ecosystem, many of which are described in previous annual reports. Among other things, the Midway Islands were transferred from the Navy to the U.S. Fish and Wildlife Service in 1996 for use as a national wildlife refuge; in 2000 the President designated federal waters around the NWHI as a coral reef ecosystem reserve; and in 2005 the Governor of Hawaii designated all state waters in the NWHI as a state marine refuge.

To coordinate management of protected areas in the NWHI, the National Marine Sanctuary Program, the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and the Hawaii Department of Land and Natural Resources completed a draft interagency memorandum of agreement in 2002. However, agency disagreements over jurisdictional boundaries stalled action on approval of the agreement and at the time of the Commission’s 2004 annual meeting the future of the interagency agreement was unclear. Recognizing the importance of the agreement in furthering regional ecosystem management, the Commission on 25 January 2005 wrote to NOAA, the National Marine Fisheries Service, the National Ocean Service, the U.S. Fish and Wildlife Service, and the Hawaii Department of Land and Natural Resources recommending that the agencies act expeditiously to complete their review of the draft agreement, resolve any remaining concerns, and finalize the agreement. Each of the agencies responded by expressing a continuing commitment to work toward completing the agreement. During 2005 efforts were made to resolve remaining points; however, as of the end of the year the agreement had not been finalized. Nonetheless, the agencies were cooperating routinely and were working toward some form of common management.

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve — The NWHI Coral Reef Ecosystem Reserve was established by Executive Orders in December 2000 and January 2001 to ensure the long-term conservation of the region’s coral reef ecosystem and related marine resources in their natural condition. In part, the orders directed that all commercial fishing activity within the reserve’s boundaries be capped at levels that existed in the year prior to the reserve designation. The orders also directed that a reserve advisory council, including a representative of the Marine Mammal Commission, be established to provide advice on reserve research and management issues. Responsibility for managing the reserve was delegated to the National Marine Sanctuary Program

in NOAA's National Ocean Service. Activities conducted by the Sanctuary Program relative to the Coral Reef Ecosystem Reserve during 2001–2004 are described in the Commission's annual reports for those years.

The Executive Orders require that the Sanctuary Program Office consider converting the reserve into a national marine sanctuary under provisions of the National Marine Sanctuaries Act. The sanctuary designation process began in 2002 and continued through 2005. Efforts in 2005 focused on development of a draft environmental impact statement and accompanying draft sanctuary management plan. The Sanctuary Program Office expects to release those documents for public comment in 2006.

The most controversial elements of the sanctuary designation process have been the types and amounts of fishing that might be allowed within the proposed sanctuary. Several commercial fisheries operated in the NWHI before the reserve was designated, including a trap fishery for lobsters (closed since 2000), a hook and line fishery for bottomfish, and a pelagic troll fishery for tuna, mahimahi, and billfish. Within each fishery, only a few vessels, about 5 to 10, fished seasonally each year, subject to fishery management plans developed by the Western Pacific Fishery Management Council and approved by the National Marine Fisheries Service. The Hawaii-based pelagic longline fishery also operated in the NWHI but expanded rapidly in the late 1980s due to an influx of vessels from other areas. Since 1992 it has been excluded from within 50 nautical miles of the islands to prevent interactions with Hawaiian monk seals. The Council also has drafted fishery plans to authorize harvests of precious coral and reef-associated species in portions of the NWHI, but the plans were disapproved by the National Marine Fisheries Service. In addition, small catches of various species have been taken by recreational fishing, fishing by Native Hawaiians for subsistence and cultural purposes, and sustenance fishing by transiting vessels (i.e., fish caught and consumed by a crew while at sea).

The Marine Mammal Commission has been particularly concerned about the impact of lobster fishing on monk seals, especially at French Frigate Shoals. Lobsters are a known prey item for monk seals and, early in the 1990s, weaned pups and juveniles began to exhibit signs of starvation and poor survival, suggesting stress associated with limited prey availability. With lobster stocks severely depleted and the structure of their populations significantly altered from pre-exploitation conditions, the Service closed the lobster fishery in 1999, citing

concern about the adequacy of information with which to assess the status of lobster stocks. Since designation of the reserve, no action has been taken to reopen the NWHI lobster fishery.

Under section 304(a)(5) of the National Marine Sanctuaries Act, regional fishery management councils are afforded an opportunity to draft fishing regulations for any proposed sanctuary. Those regulations must be consistent with the policies of the Sanctuaries Act and the goals and objectives for the proposed sanctuary. In 2004 a number of fishery-related actions were taken by the National Marine Sanctuary Program staff and the Reserve Advisory Council; those actions are described in the Commission's 2004 annual report.

Fishing in the proposed sanctuary was discussed at the Commission's October 2004 annual meeting, and a representative of the Western Pacific Fishery Management Council said it was considering alternative measures that would allow commercial fishing currently prohibited in the reserve. In its 25 January 2005 letters to NOAA and the National Marine Sanctuary Program, the Commission expressed concern that the Council was evaluating options that were inconsistent with Executive Orders designating the reserve. It therefore recommended that any proposed regulations to convert the reserve into a national marine sanctuary be consistent with the Executive Orders.

Early in 2005 the Council requested comments on alternative fishery-related regulations and posted an analysis of six possible approaches on its Web site. The identified alternatives did not follow the guidance provided to them by the Sanctuary Program Office and did not consider the alternative identified as being most consistent with the proposed sanctuary's goals and objectives. Three of the Council's alternatives allowed various levels of fishing for lobsters and corals and suggested that, if no sanctuary was designated, the provisions of existing fishery management plans would somehow have a role in governing fishing within the reserve, notwithstanding provisions in the Executive Orders.

By letter of 17 February 2005 the Commission provided comments to the Council, recommending that it analyze each of the alternatives set forth in the sanctuary program's guidance document and explain why it believes that its alternatives would be more appropriate. The Commission also recommended that fishery-related regulations for the proposed sanctuary prohibit commercial fishing for lobsters, bottomfish, corals, live fish for the aquarium trade, sponges, algae, and all other species not

otherwise authorized to be harvested; allow limited trolling for pelagic species at catch levels that occurred prior sanctuary designation; allow Native Hawaiian subsistence fishing subject to catch-reporting requirements; and allow recreational fishing subject to catch limits, reporting, time-area restrictions, and other provisions consistent with identified goals and objectives.

On 17 March 2005 the Council approved a set of proposed regulations to be forwarded to the Sanctuary Program Office. Its proposed rules called for a continuation of bottomfish and pelagic species fishing subject to certain limits and a moratorium on all other commercial, recreational, subsistence, and sustenance fishing until such time as a science-based fishery ecosystem management plan could be developed by the Council in consultation with the Sanctuary Program Office and other concerned parties.

On 25 October 2005 NOAA released a document summarizing its findings that the Council's recommended approach did not satisfy the policies and purposes of the Sanctuaries Act or the goals and objectives for the proposed sanctuary. Among other things, it noted that the Council's proposal failed to address sanctuary goals calling for a permanent ban on commercial harvests of precious corals, lobsters, and reef-associated species. It also noted that the Council's recommendation for permitting bottomfish fishing was based on economic factors, rather than ecosystem management-based factors. As a result, NOAA advised that it would develop proposed fishing regulations for inclusion in the draft environmental impact statement for the proposed sanctuary.

On 16 May 2005 Congressman Ed Case of Hawaii introduced a bill in Congress that would replace the sanctuary designation process by designating all lands and waters within 92 km (50 nmi) of NWHI as a single management entity called the Northwestern Hawaiian Islands Marine Reserve. Under the bill, primary management authority for the new area would be assigned to a new office within the Sanctuary Program Office called the Office of National Marine Sanctuaries and Reserves. The purpose of the new area would be to provide the highest level of permanent protection to the region's total ecosystem. As of the end of 2005 the bill had not been taken up by committee.

Northwestern Hawaiian Islands Marine Refuge — In 2001 the Hawaii Division of Aquatic Resources in the Hawaii Department of Land and Natural Resources proposed designating all state

waters in the NWHI as a fishery management area to help protect the region's living marine resources from impacts of fishing and other activities. At that time, the Commission commented in support of the proposal but recommended that the proposal be modified to require a precautionary management approach and to clarify the conservation goals. Based on comments from the Commission and others expressing similar views, the Division withdrew its proposal and in 2004 circulated a new proposal to designate the area as a state marine refuge. The stated purpose of the action was to ensure the long-term conservation of the area's unique coral reef ecosystem and related marine resources based on a precautionary management approach. Under the new proposal, most of the state waters were to be set aside as no-take areas to protect them from the effects of commercial and recreational fishing.

On 5 August 2004 the Commission wrote to the Hawaii Department of Land and Natural Resources in support of the new proposal, noting that it squarely addressed the Commission's comments on the original proposal. Regarding the proposal's new provisions, the Commission recommended some changes in the boundaries of new no-take areas and suggested new language to help clarify provisions that might inadvertently be interpreted as allowing some commercial fishing in the no-take areas.

Early in 2005 the Department of Land and Natural Resources developed a revised proposal based on comments it had received on the original version from the Commission and others. The Hawaii Board of Land and Natural Resources, which oversees the Department, took up the new proposal on 13 February 2005. At that time, the Commission expressed its strong support for the proposed measure and commended the staff for its work. The Commission also recommended that the Board add language similar to that which had been recommended previously to clarify that the taking of marine life from any part of the refuge could be allowed for approved management purposes, such as removing marine debris with attached coral, removing male monk seals whose aggressive behavior was believed to be a threat to a colony's recovery, or cleaning oiled seabirds.

On 29 September 2005 the Governor of Hawaii signed into law regulations designating all state waters in the NWHI as a marine refuge. In part, the regulations established a ban on commercial and recreational fishing within refuge boundaries and allowed fishing only by Native Hawaiians for subsistence and cultural purposes. In announcing the

new refuge, the Governor called upon federal officials to adopt similar restrictions in regulations for the NWHI sanctuary proposal. State officials also advised that they planned to seek designation of the area as a World Heritage Site by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). In response to the State's action, the Commission wrote to the Governor on 28 October 2005 commending her for the leadership and foresight she exhibited in taking such a strong conservation measure. The Commission also wrote to the Director of the Hawaii Department of Land and Natural Resources to extend its appreciation for all that he and his staff had done to further creation of the refuge. At the end of 2005 the State was developing regulations for management of the refuge.

Midway Atoll National Wildlife Refuge —

Between World War II and the early 1990s, the U.S. Navy operated a naval air station on the Midway Islands. At its peak in the 1950s and 1960s, the station and its associated infrastructure supported more than 3,000 people. In 1993 the station was closed and, after extensive clean-up effort, the Navy transferred ownership to the U.S. Fish and Wildlife Service in 1996 for inclusion in the National Wildlife Refuge System. Once the transfer was made, the U.S. Fish and Wildlife Service was required to maintain the island's operational runway as an emergency landing field for transpacific air traffic. Funding to maintain the runway facilities, however, was not provided and, to defray these costs, the Service contracted with a concessionaire to provide public access to the refuge with revenues to be used to maintain the airfield's facilities. The arrangement, however, proved unprofitable for the concessionaire and the agreement was terminated, leaving responsibility for maintaining the airfield to the Service.

In the absence of a dedicated funding source, the U.S. Fish and Wildlife Service began charging visitors to Midway—including National Marine Fisheries Service monk seal researchers—fees to help cover airfield maintenance costs. Because of those fees, monk seal research and management activities at Midway have had to be curtailed. A "second chance" project was among the activities affected. The project was designed to rehabilitate juvenile seals in poor condition and not expected to survive. Although such monk seal research and management work would further the purposes for which the refuge was established, the U.S. Fish and Wildlife Service has continued to charge these fees

to support maintenance of the island's infrastructure, staffing, and other functions.

During the Commission's October 2004 annual meeting, representatives of the two Services reviewed matters related to monk seal work on the Midway Islands and the associated fees. Based on the discussions, the Commission wrote to the Department of Transportation on 25 January 2005. The Department's Federal Aviation Administration, as the lead agency responsible for air safety, has required that the Service maintain the airfield on Midway at a level equivalent to that required for commercial airports. Believing that the Federal Aviation Administration, rather than the U.S. Fish and Wildlife Service, should be responsible for costs associated with the maintenance of facilities whose primary purpose is air transportation safety, the Commission recommended that the Department provide funds to the U.S. Fish and Wildlife Service sufficient to pay for the costs required to improve and operate a commercial-level airfield and associated infrastructure on the Midway Islands.

The Commission also wrote to the U.S. Fish and Wildlife Service on 25 January 2005 recommending that it reduce the user fees being charged to the National Marine Fisheries Service for monk seal recovery work on the Midway Islands. The Service's 28 March 2005 reply advised that, although the FY 2005 appropriations bill included \$6 million for the Federal Aviation Administration and other parties to upgrade airfield facilities on Midway, associated costs for maintaining aging infrastructure in such a remote and harsh environment far exceeded those provided. The Service therefore advised that, to help cover funding shortfalls for the airfield, it was necessary to charge additional fees. It also noted that it would work to keep fees charged to the National Marine Fisheries Service as low as possible but suggested that the National Marine Fisheries Service should seek additional funding to conduct scientific investigations on Midway in light of the current situation. The Commission subsequently learned that the Federal Aviation Administration has provided funding to upgrade facilities at Midway and that it has initiated steps to contract for the maintenance and operation of the airfield, thereby relieving the Service of major responsibilities in this regard.

Northwestern Hawaiian Islands National Wildlife Refuge — At its 2004 annual meeting, the Commission addressed two management issues in the Northwestern Hawaiian Islands National Wild-

life Refuge, which is managed by the U.S. Fish and Wildlife Service: clean-up of contaminants and the loss of pupping beaches due to erosion. Both issues are a concern at French Frigate Shoals, an atoll located about halfway between the main Hawaiian Islands and Midway Atoll. French Frigate Shoals is approximately 32.2 km (20 mi) wide and has a crescent-shaped lagoon sprinkled with about a dozen small sand islands, most of which are little more than exposed sandbars (Fig. 16). The largest island, Tern Island, was expanded by the Navy in World War II to an area of nearly 40 acres to support a runway for refueling planes enroute to Midway. It has served as a permanently occupied field station for the refuge since the late 1970s.

The contaminant clean-up issue involves the removal of pollutants from an old dump site on Tern Island. In the 1960s and 1970s the U.S. Coast Guard operated a loran station there, and during that period station personnel buried old electrical equipment and other solid wastes on the island. The location of the dump site was later forgotten, but in 2000 erosion exposed the site when a breach opened in the seawall. Sampling revealed that the site was contaminated with high levels of PCBs, and the

Coast Guard responded quickly with a clean-up effort. The contamination, however, was more widespread than anticipated, and although more soil was removed than planned, the effort failed to clean up the entire site to Environmental Protection Agency standards. The Service has requested that the Coast Guard fund additional clean-up work, but the Coast Guard has declined to do so on grounds that further remediation would not significantly improve wildlife protection. As noted in past annual reports, the Commission and the Environmental Protection Agency also have recommended that the Coast Guard conduct additional clean-up work at the site and have received similar responses.

During the Commission's October 2004 annual meeting, representatives of the U.S. Fish and Wildlife Service advised that it was aware of no further action being planned by the Coast Guard to complete the clean-up operation. Accordingly, on 25 January 2005 the Commission wrote to the Coast Guard recommending that it secure the necessary funds to clean up the remaining contaminated soils and materials on Tern Island to levels agreed to when the clean-up effort was initiated. On 7 March 2005 the Coast Guard replied to the Commission, maintaining that its clean-up effort had surpassed both ecological risk reduction and regulatory requirements but stating that it would continue consultations with the Environmental Protection Agency to assure that all issues surrounding the remediation effort are brought to closure.

The second issue discussed at the Commission's annual meeting was the loss of monk seal pupping beaches to erosion, which is likely to occur as a result of rising sea levels. Whaleskate Island is one of the more important pupping beaches on French Frigate Shoals and has all but disappeared over the past several years. Some other islands used by seals at French Frigate Shoals also are shrinking in size. Concerned about the loss of pupping habitat, the Service is exploring options to mitigate the effects of erosion at important pupping sites.

The Commission's 25 January 2005 letters to the Service's Pacific Islands Regional Office and the Pacific Islands Fisheries Science Center, the U.S. Fish and Wildlife Service, and the Hawaii Department of Land and Natural Resources recommended that the agencies cooperate on efforts to identify possible ways to protect, and if possible, restore and enhance NWHI habitats used by monk seals. On 14 March the Pacific Islands Fisheries Science Center and the Pacific Islands Regional Office responded, noting that they shared the Commission's



Figure 16. French Frigate Shoals, an approximately 32.2-km (20-mi) wide crescent-shaped coral atoll, contains numerous small sandy islets that provide refuge to Hawaiian monk seals. Original image courtesy of Christine Taylor of NOAA's National Marine Sanctuary Program (<http://www.hawaiianatolls.org/maps/graphicmaps.php>).

concern and that the science center was seeking funds and pursuing collaborative efforts with other agencies to assess the feasibility of habitat restoration at French Frigate Shoals. The U.S. Fish and Wildlife Service's 28 March reply also expressed concern about erosion but noted that, based on its experience in rebuilding the seawall on Tern Island, such efforts could be very expensive and may not be cost-effective.

Shark Predation on Hawaiian Monk Seals

In the late 1990s the National Marine Fisheries Service detected a sharp increase in the number of monk seal pups killed by sharks at French Frigate Shoals. Prior to the mid-1990s such incidents were infrequent, but between 1997 and 1999 they became the predominant cause of mortality for pre-weaned pups, with nearly 50 percent of all pups born thought to have been killed by sharks at the atoll's two principal breeding islands (Trig and Whaleskate Islands). Based on shark tagging by science center researchers, it was believed that the predation was caused by a few individual Galapagos sharks that had recently learned this predatory behavior. The Service therefore proposed to identify and kill individual sharks known to patrol pupping beaches at Trig Island. Because the atoll is part of the Hawaiian Islands National Wildlife Refuge, a permit for the activity was sought from the U.S. Fish and Wildlife Service. Although concerned about the effects of removing top-level predators from the lagoon ecosystem, the U.S. Fish and Wildlife Service issued a permit allowing a limited take over five years, after which the agencies would review the program's effectiveness and impact.

Between 2000 and 2004 monk seal field teams killed 10 sharks. During that period, the number of pup deaths attributed to sharks decreased by about half from peak years in the late 1990s. However, the occurrence of shark predation at other islands in the atoll increased during that period. At the Commission's October 2004 meeting, representatives of the National Marine Fisheries Service advised that they planned to seek a permit from the U.S. Fish and Wildlife Service to expand the scope of the shark removal effort to include other monk seal breeding islands at the atoll.

In its 25 January 2005 letter to the Service's Pacific Islands Fisheries Science Center, the Commission noted that it was encouraged by the reduction in shark-related deaths coincident with

removal of a limited number of sharks but that it appreciated concerns about removing large predatory sharks from the atoll ecosystem. The Commission therefore recommended that the science center collaborate with refuge staff to identify ways of better assessing the abundance, behavior, and movements of Galapagos sharks in the NWHI, particularly at French Frigate Shoals. In its 14 March reply, the science center stated that it was reviewing recent reef survey data to determine the relative composition of shark species at French Frigate Shoals and other sites within the atoll and examining new options for tagging sharks, given their increased wariness of humans since shark removal activities began.

In its 25 January 2005 letter to the U.S. Fish and Wildlife Service, the Commission also noted that the removal of important ecosystem components, such as sharks, needed to be done judiciously. Given the importance of actions to improve monk seal survival rates, however, the Commission encouraged the Service to continue working with the science center to design a research project that would involve continuation and possible expansion of shark removal efforts with careful follow-up monitoring and assessment of possible impacts on the shark population. The Service's 28 March reply noted that it planned to continue working with the science center on the issue and that it supported adapting research goals based on previous results to better understand predator/prey relationships within the refuge.

In 2005 two sharks were removed at French Frigate Shoals. Of the 52 pups born at the atoll in 2005 (nearly half of which were born on Trig Island), 10 pups (about 20 percent) died of known or inferred shark predation, and 4 other unexplained disappearances may have been related to shark predation. Of the 10 known or inferred losses, 2 were observed, 2 involved pups with severe shark bites that later disappeared, and 6 were inferred as losses to sharks based on the absence of other apparent causes. As a result of the designation of the state marine refuge, continuation of the shark removal efforts in 2006 will require that the science center also obtain a permit from the Hawaii Department of Land and Natural Resources.

Hawaiian Monk Seal Recovery Plan

In 2001 the National Marine Fisheries Service reconstituted the Hawaiian Monk Seal Recovery Team, in part to update the original Hawaiian Monk Seal Recovery Plan adopted in 1983. In 2005 the team completed and submitted a revised draft plan

to the Service. Although the Service had hoped to circulate the draft for public comment in 2005, some information in the plan required updating. At the end of 2005 the Service, in consultation with the team, was still in the process of incorporating those changes. The revised plan is expected to be released for review and comment the summer of 2006.

Florida Manatee (*Trichechus manatus latirostris*)

The Florida manatee is a subspecies of the West Indian manatee and occurs only in rivers and coastal waters of the southeastern United States. West Indian manatees, including the Florida subspecies, are listed as endangered under the Endangered Species Act as well as under Florida state law. Because of a limited tolerance for cold temperatures, most Florida manatees overwinter near warm-water discharges from springs or power plant outfalls located in the southern two-thirds of the Florida Peninsula. Site fidelity to individual refuges or groups of refuges is a major factor effectively dividing Florida manatees into at least four relatively discrete regional subpopulations (Fig. 17). These occur in the upper St. Johns River, along the Atlantic coast, in southwestern Florida, and in northwestern Florida. Dedicated manatee research efforts began in the late 1970s. Generally increasing maximum winter counts at warm-water refuges indicate that Florida manatees have increased since then. The extent of this increase, however, is uncertain.

The U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission share lead responsibility for carrying out most manatee recovery work, but this work is also shared by a great number of cooperating participants. The Florida Manatee Recovery Team, which was convened by the U.S. Fish and Wildlife Service under provisions of the Endangered Species Act, includes about 140 members from 60 agencies and groups. Their activities are guided by a recovery plan that was

last updated in 2001 and are coordinated through periodic meetings of 11 recovery team task forces and working groups (see Table 6).

Population Status

In the mid-1980s Florida manatees were thought to number at least 1,200 animals based largely on maximum, although not simultaneous, counts at winter aggregation sites. More recently, the best current estimate is at least 3,300 animals based on a single statewide count at warm-water refuges and adjacent areas in January 2001. Past and recent estimates, however, are not directly comparable because recent survey efforts have been more extensive and thorough. Even recent statewide winter counts are not directly comparable between years because of the difficulty in counting and estimating the number of manatees away from known warm-water sites at any given time. Thus, year-to-year differences in maximum winter counts, such as those between 2001 and 2004 (i.e., 3,300, 1,758, 3,016, and 2,505 manatees, respectively), are not a useful measure of abundance trends. For example, the decrease of more than 1,500 animals between the 2001 maximum count and the 2002 count is in-



Figure 17. Florida manatee regional populations: Northwest, Southwest, Upper St. Johns River, and Atlantic. Figure courtesy of the U.S. Fish and Wildlife Service's Florida Manatee Recovery Plan.

Table 6. Florida Manatee Recovery Team Task Forces and Working Groups

Task Force/Working Group	Principal Activities/Areas of Interest
Steering Committee	Monitor and coordinate recovery work and make recommendations on behalf of the team to the U.S. Fish and Wildlife Service and involved parties
Manatee Regulatory Working Group	Review and make recommendations on watercraft facility permits and manatee protection plans
Manatee Protection Working Group	Review regulations and signage provisions for boat speed zones and other protection areas; review measures to minimize sources of manatee harassment
Interagency Task Force for Water Control Structures	Oversee installation of manatee protection devices on floodgates, locks, and drainage structures likely to entrap manatees
Rescue, Rehabilitation, and Release Program	Coordinate the rescue, rehabilitation, and release of injured or distressed manatees
Manatee Entanglement Working Group	Identify activities to reduce the entanglement of manatees in marine debris and fishing gear
Manatee Population Status Working Group	Develop recovery criteria and assess the biological status of the population
Manatee Habitat Working Group	Develop habitat-related recovery criteria and recommend actions to identify, monitor, and evaluate habitat needs
Warm-Water Task Force	Promote actions to establish and protect long-term regional networks of warm-water refuges
Comprehensive Everglades Restoration Program Inter-agency Manatee Task Force	Recommend actions to protect manatees as part of the Comprehensive Everglades Restoration Program (CERP)
Manatee Education Working Group	Review and promote the development of public outreach programs and materials

consistent with mortality records for 2001, and the increase of more than 1,300 animals in counts for 2002 and 2003 is beyond the reproductive potential of a manatee population numbering fewer than 2,000 animals. Nevertheless, recent winter counts do identify a minimum population size at the time of a count, and in 2005 the maximum winter count was 3,143 manatees, with 1,594 on Florida's east coast and 1,549 on the west coast.

In 2005, 398 manatee carcasses were documented, which approached the record of 416 animals in 1996 (Table 7). As in 1996, the 2005 total included an unusually large number of deaths caused by natural biotoxins associated with red-tide events along Florida's west coast. In 1996, 149 animals were known or suspected to have died of this cause during a two-month red-tide event in southwestern Florida. In 2005 at least 89 deaths were thought to have been caused by exposure to red tides. Unlike

1996, those deaths occurred over a longer stretch of coast (from the southwestern to the central part of Florida's west coast) and over a longer period of time (from spring through fall).

Watercraft-Related Manatee Deaths

The largest source of human-related manatee mortality, and perhaps the most significant factor currently impeding population recovery, is collisions with boats. Watercraft-related deaths typically have accounted for one-fourth to one-third of all annual manatee deaths. In 2005, 80 deaths were attributed to this cause. Excluding the unusually high number of red tide-related deaths, watercraft collisions accounted for 26 percent (80 of 309) of all deaths.

Vessel operators, particularly when traveling at high speeds, cannot reliably detect and avoid manatees. To reduce watercraft-related manatee

Table 7. Known manatee mortality in the southeastern United States (excluding Puerto Rico) reported through the manatee salvage and necropsy program, 1978–2005

Year	Vessel-Related Deaths No. (%)	Floodgate and Lock Deaths No. (%)	Other Human-Related Deaths ¹ No. (%)	Perinatal Deaths No. (%)	Other Deaths ² No. (%)	Total Deaths in the Southeastern United States
1978	21 (25)	9 (11)	1 (1)	10 (12)	43 (51)	84
1979	24 (31)	8 (10)	9 (12)	9 (12)	28 (36)	78
1980	16 (25)	8 (12)	2 (3)	13 (20)	26 (40)	65
1981	24 (21)	2 (2)	4 (3)	13 (11)	74 (63)	117
1982	20 (17)	3 (3)	2 (2)	14 (12)	78 (67) ³	117
1983	15 (19)	7 (9)	5 (6)	18 (22)	36 (44)	81
1984	34 (26)	3 (2)	1 (1)	26 (20)	66 (51)	130
1985	35 (28)	3 (2)	3 (2)	23 (19)	59 (48)	123
1986	33 (26)	3 (2)	1 (1)	27 (22)	61 (49)	125
1987	39 (33)	5 (4)	4 (3)	30 (26)	39 (33)	117
1988	43 (32)	7 (5)	4 (3)	30 (22)	50 (37)	134
1989	51 (29)	3 (2)	5 (3)	39 (22)	78 (44)	176
1990	49 (23)	3 (1)	4 (2)	45 (21)	113 (53)	214
1991	53 (30)	9 (5)	6 (3)	53 (30)	54 (30)	175
1992	38 (23)	5 (3)	6 (4)	48 (29)	70 (42)	167
1993	35 (24)	5 (3)	7 (5)	39 (27)	61 (41)	147
1994	51 (26)	16 (8)	5 (3)	46 (24)	76 (39)	194
1995	43 (21)	8 (4)	5 (2)	56 (28)	91 (45)	203
1996	60 (14)	10 (2)	1 (0)	61 (15)	284 (68) ⁴	416
1997	55 (22)	8 (3)	9 (4)	61 (25)	113 (46)	246
1998	67 (28)	9 (4)	7 (3)	52 (21)	108 (44)	243
1999	84 (30)	15 (5)	8 (3)	52 (19)	116 (42)	275
2000	79 (28)	7 (3)	9 (3)	58 (21)	126 (45)	279
2001	82 (24)	1 (0)	7 (2)	63 (19)	183 (45)	336
2002	98 (31)	5 (2)	9 (3)	53 (17)	150 (48)	315
2003	75 (20)	3 (1)	7 (2)	72 (19)	226 (59) ⁵	383
2004	69 (24)	3 (1)	4 (1)	72 (26)	132 (47)	282
2005 ⁶	80 (20)	5 (1)	9 (2)	89 (22)	215 (54) ⁷	398

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

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

³ Includes 39 deaths attributed to a spring red-tide event in southwestern Florida.

⁴ Includes 149 deaths attributed to spring and fall red-tide events in southwestern Florida.

⁵ Includes 98 deaths attributed to a spring red-tide event in southwestern Florida.

⁶ Data for 2005 are preliminary.

⁷ Includes 79 deaths attributed to red-tide events.

Data courtesy of the Florida Fish and Wildlife Conservation Commission.

deaths, resource managers therefore rely principally on boat speed zones established in areas where manatees and watercraft-related manatee deaths occur most often. Although operating at slow speeds increases the chance that vessel operators can detect and avoid animals and can reduce the force of a collision if one occurs, the principal value of slow vessel speed likely is the added time provided for manatees to detect and avoid oncoming boats.

Efforts to establish boat speed zones began in earnest in 1989 when the Florida Governor and Cabinet directed state and county agencies to develop boat speed zones in 13 key counties. Although in many instances the development of such zones has been, and continues to be, contentious, initial speed zone networks were completed for all 13 counties by the early 2000s. Those networks include several types of zones: channel-exempt (i.e., zones with slow or idle speed outside marked channels and speeds up to 40.2 to 48.3 km/hr (25 to 30 mph within channels); channel-inclusive (i.e., zones with slow or idle speed both outside and in marked channels); and shoreline speed zones (i.e., zones with reduced speed within specified distances from shore). The application of zone types and speeds for any given area is based on site-specific analyses of manatee habitat, vessel traffic patterns, geographic conditions, and public comment. In recent years, rule-making efforts have focused on establishing new zones outside the original 13 counties and on revising existing rules in response to court challenges and new developments or information. Efforts to reduce further the number of such deaths are addressed in county-specific manatee protection plans, which address boat facility siting, boater education initiatives, law enforcement, and other strategies.

As shown in Table 7, watercraft-related manatee deaths have continued to increase since the late 1980s despite adoption of boat speed zones. This increase could be explained by at least four hypotheses: (1) boat speed zones are not an effective mitigation approach and provide little protection; (2) compliance rates with established zones have been too low to reduce collision risks; (3) the speed restrictions implemented have been too limited to protect manatees (e.g., speeds are still too fast, or slow and idle speed restrictions are not covering the right areas or enough area); and (4) these measures have been partially effective, but growing numbers of boats and/or manatees have increased the number of collisions faster than new speed zones have reduced them.

To date, efforts to evaluate these hypotheses have focused primarily on periodic studies of boater compliance, which indicate that compliance rates vary greatly by area and by vessel type and size. This information has been used to help direct enforcement efforts. In 2005 the Marine Mammal Commission and the U.S. Fish and Wildlife Service, with help from the Florida Fish and Wildlife Research Institute, examined mortality trends under different sets of speed regulations in two connected waterways (Sykes Creek and the Florida Barge Canal) near Cape Canaveral, Florida. These narrow waterways are heavily developed with marinas and canals and have consistently ranked among the highest in the state for the number of manatee deaths attributed to watercraft.

In June 1990 the State adopted a year-round channel-exempt speed zone (i.e., slow speed outside the main channel and a 40.2-km/hr (25-mph) limit inside the marked channel) in part of Sykes Creek. In October 1994 the zone was expanded to cover the entire creek as well as the barge canal, with intermittent slow-speed areas in parts of the canal's main channel. However, manatee carcasses continued to be recovered in both waterways, and early in 2002 the U.S. Fish and Wildlife Service designated both Sykes Creek and the barge canal as manatee refuges under the Marine Mammal Protection Act and the Endangered Species Act. Accompanying the designations were rules requiring slow speed in all areas, including the marked channels.

Analysis of carcass recovery rates under the three sets of rules revealed an abrupt decline in watercraft-related manatee deaths once the uniform slow-speed rules were enforced. In the three and a half years before enforcement of the new manatee refuge rules began in mid-2002, nine carcasses attributed to vessel collisions had been recovered in the two waterways, an average of 2.6 deaths per year. In the same period after enforcement began (i.e., through the end of 2005) only one vessel-related death was documented, an average of 0.3 deaths per year. It is interesting that injuries to the one animal found after mid-2002 showed evidence of partial healing, and it may have been hit elsewhere before moving into the refuge. Although more time is needed to evaluate the effectiveness of the new rules, the information given here provides some of the first evidence that boat speed limits can be effective if well designed and enforced. It also suggests that channel-exempt speed zones may not be appropriate for reducing collision risks in

narrow waterways. Results of this analysis will be published in 2006.

Management of Warm-Water Refuges

As already noted, most Florida manatees survive cold winter periods by aggregating at warm-water discharges from natural springs or power plant outfalls (Fig. 18). The future loss of many of these discharges, principally from power plant closures, may represent the greatest long-term threat to manatees. Most of these plants are in the central one-third of the Florida peninsula where winter water temperatures appear to be too cold for manatees to survive. All of these plants are oil- or natural gas-fired facilities that were built before the early 1970s, and some have reached or are approaching the end of their planned operational lives. Since the early 1970s, new power plants have not been allowed to discharge heated effluent that could substantially raise the temperature of receiving waters. Thus, as older, inefficient plants are closed, they cannot be replaced by new plants that create outfalls suitable for sustaining manatees in winter.

In 2003 the Marine Mammal Commission initiated a review to evaluate the implications of impending power plant closures for manatee survival. The review assessed the extent to which manatees depend on warm-water refuges and considered management actions that might be needed as plants close. Results of the review were published in two related papers in 2005 and were shared with the Florida Manatee Recovery Team's Warm-Water Task Force. The task force considered results of the review in drafting a plan to manage warm-water refuges under the Florida Manatee Recovery Plan. In part, the review found that:

- Statewide, nearly two-thirds of all Florida manatees now rely on outfalls from 10 power plants during the coldest winter periods.
- Along Florida's east coast, nearly 85 percent of all manatees use outfalls from five plants.
- Ambient winter water temperatures in southernmost Florida occasionally drop to levels too cold to support manatees and, to survive these periods, manatees rely on a few passive thermal basins (i.e., deep holes, usually in dredged canals, where water temperatures cool more slowly).
- The best natural winter habitat for manatees appears to be at warm-water springs in central and north-central Florida along both the east and west coasts, where discharges remain a constant 22° C (72° F).
- Only about 12 percent of all Florida manatees currently rely on warm-water springs in winter, and populations using those springs are the only ones that are increasing steadily in size.
- A number of natural warm-water springs likely used by manatees in the past are not currently used by manatees because of their inaccessibility due to obstructions (dams, locks, siltation, etc.) and

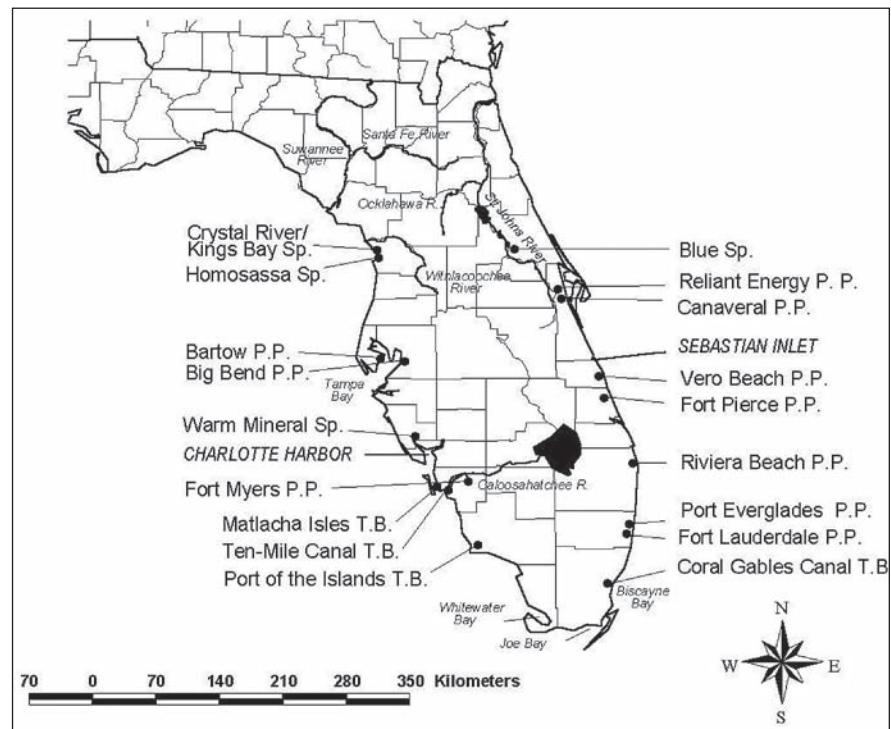


Figure 18. Natural and artificial warm-water refuges (P.P., power plant; Sp., spring; T.B., thermal basin) with at least one winter count of 50 or more Florida manatees. Figure courtesy of Leslie Ward, Florida Fish and Wildlife Research Institute.

disturbance caused by recreational activities (boating, swimming, tubing, etc.).

- Because of site fidelity, animals accustomed to using particular power plant outfalls may be unable to find alternative warm-water refuges and may die of cold stress after a plant closes.

The assumption that manatees will simply move south to warmer parts of the state as power plants close may be incorrect. Tracking studies suggest that most manatees using power plants have not been sighted at passive thermal basins in southernmost Florida or warm-water springs. In addition, the absence of major warm-water refuges in southernmost Florida makes much of that area marginal winter habitat for manatees. The review therefore concluded that many manatees might not move south if plants close and, even if they did, the waters in southernmost Florida may not be able to support a large influx of displaced animals. Maximum winter counts of animals at seven of the 10 major power plants can exceed 200 animals and at two can exceed 500 animals. Thus, plant closures could result in the exposure of large numbers of animals to lethal cold stress.

Precisely when the power plants in question will be closed is unclear. Such decisions will be made by individual utility companies based on proprietary economic forecasts and factors that are hard to predict, such as future costs and availability of alternative energy sources, competition with rival utilities, and trends in energy demand. Given the proprietary nature of such decisions, advance notice of closures may be short. However, because older plants are less efficient and operate on fuel oil or natural gas whose prices are rising dramatically, it is possible that some plants could be closed over the next 5 to 10 years. Even if plants are not fully closed, escalating fuel and maintenance costs may force utilities to run some plants intermittently, which also could expose animals to lethal levels of cold stress.

Development of a Warm-Water Refuge Plan — To prevent significant losses of animals as power plants close, the Commission's review concluded that a plan is urgently needed to identify a suitable long-term network of warm-water refuges and to have in place management options that could be used to prevent manatee deaths resulting from plant closures. In the next 60 years, it is likely that most if not all the power plants used by manatees will be gone. Manatees then will need to rely almost entirely, if not entirely, on a network of other types of refuges. Ideally, the plan will include ref-

uges, such as warm-water springs and passive thermal basins, that do not depend on manmade heat sources. With only about 12 percent of the current manatee population using natural springs and perhaps a comparable proportion using thermal basins, a long-term warm-water refuge management plan will need to increase the proportion of animals using such sites. Both the Commission's review and the Warm-Water Task Force's draft plan identify a number of options.

As already noted, some major warm-water springs in the northern half of Florida that likely were used by manatees in the past now support few if any manatees. In several cases, this appears to be due to obstructions, such as dams, locks, or silted-in spring runs, that prevent or restrict manatee access. Removing obstructions to enhance manatee access to at least some additional springs therefore appears essential for creating a new warm-water refuge network capable of supporting manatees throughout the winter. In addition, steps are needed to secure the long-term reliability of warm-water discharges from natural springs that currently are important for manatees, as well as those that may become increasingly important in the future. Spring discharge rates naturally fluctuate to a certain extent depending on interannual rainfall patterns. Aquifers feeding major springs can be depleted by excessive water withdrawal from wells in surrounding areas for residential, agricultural, and industrial uses. Reduced flow rates can affect both the size of warm-water areas available to manatees as well as the water quality, and actions to assure the quantity and quality of spring flows are therefore essential for the long-term survival of Florida manatees.

The Commission and the Warm-Water Task Force also recommend exploring the development of new passive thermal basins in southern parts of the state that might be modified to support manatees through the winter. At the suggestion of the Florida Power & Light Company, the Warm-Water Task Force made plans in 2005 to examine a remote canal on the company's property in southeastern Florida to determine the feasibility of creating a new warm-water refuge for manatees.

The Commission's review and the Warm-Water Task Force identified several potential actions to prevent the loss of large numbers of animals now relying on power plant outfalls. These include (1) capturing and rehabilitating distressed animals that remain near eliminated outfalls as plants close and releasing them at other refuges, (2) limiting manatee access to outfall areas before plants close in hopes that they will move to other refuges on

their own (e.g., by fencing off outfalls and allowing manatee access only during the coldest periods), and (3) testing the feasibility of constructing solar-heated refuges at or near existing plant outfalls that could support manatees on a temporary basis (e.g., for 15 to 20 years) pending the growth of manatee populations using warm-water springs and passive thermal basins elsewhere in the state.

The first two options pose potential risks of losing large numbers of manatees. Capturing manatees in open water is difficult and, even if most of the affected animals could be caught, rehabilitating what could be many tens or even hundreds of animals would overwhelm available rescue and treatment capabilities. Attempts to prevent manatee access to outfalls also could result in large numbers of deaths if site-fidelity patterns and unfamiliarity with other refuge locations prevent animals from finding alternative warm-water sites during extreme cold weather. However, the third option (creating temporary solar-heated refuges), if technically feasible at an acceptable cost, could pose a minimal risk to manatees and help bridge the temporal gap between the current situation in which most manatees depend on power plant outfalls and a future time when most manatees rely on non-industry-dependent refuges.

Assessing the Feasibility of Solar-Heated Warm-Water Refuges — To assess the use of solar heating technology to create a warm-water refuge for manatees, Florida Power & Light Company supported a modeling study in 2000 to calculate heat requirements and the capability of existing solar panel technology to meet those needs. The study concluded that available technology was adequate, but that further modeling studies should be done using more precise ambient air and water temperatures to estimate solar heating requirements. To follow up on this recommendation, the Marine Mammal Commission, in consultation with the Warm-Water Task Force, contracted with the Florida Solar Energy Center in 2003 for a modeling study to estimate the heat requirements and costs for a solar water-heating system suitable for heating a winter manatee refuge. The study considered refuges at three hypothetical locations in different parts of the manatee's current winter range along Florida's east coast.

The study was completed in 2005 and concluded, among other things, that commercially available solar collectors and a small gas-fired backup water heater using a closed water-circulation system could maintain an enclosed area in the

northern part of the manatee's current winter range at 22° C (72° F) throughout the winter. It also estimated that the cost of the solar heating system at the northern end of the species' range (not including costs for building the enclosure, the heat exchanger in the enclosed basin, or land for the solar panels), which would be most expensive, would range from about \$130,000 for a small refuge (15 by 15 m [50 by 50 ft]) to \$750,000 for a large refuge (46 by 46 m [150 by 150 ft]).

Based on results of the study, the Warm-Water Task Force, which includes representatives of Florida power companies, agreed that further steps should be taken to better estimate costs associated with developing a small test facility to demonstrate the technical feasibility of the approach and to determine if manatees would learn to use it. In 2005 Reliant Energy offered to consider hosting such a demonstration project at its power plant near Cape Canaveral and to assist in developing a conceptual plan that could be used to assess such a facility's total costs and permit requirements. In response, the Marine Mammal Commission again contracted with the Florida Solar Energy Center to work with Reliant Energy to develop a conceptual test facility design and calculate the solar heating requirements at that location. The Center subsequently convened a meeting of engineers and manatee biologists to develop technical specifications for a refuge basin (e.g., location, size, depth, number and size of openings for manatee access, water temperature, etc.). Results of the effort are expected to be available in 2006.

Management of Natural Springs — In 2005 efforts were undertaken to improve and protect manatee habitat at several warm-water springs considered vital to the survival and growth of the northwestern Florida manatee subpopulation. Homosassa Springs is an artesian spring that discharges water at a constant 22° C (72° F) and is currently used by up to 100 manatees during cold winter periods. Access to the spring's upper reaches and warm-water discharge, however, is blocked by a fence. In addition, sediment has accumulated in the spring run creating shallow depths where manatees can easily be disturbed and displaced from the warmest areas. Property around the spring was developed as a wildlife attraction in the 1940s, and in 1980 manatees were introduced into the fenced-off upper portions of the spring run as a public attraction. In 1990 the Florida Department of Environmental Protection purchased the property and has continued to operate it as a state wildlife park. In 2000 the Commission wrote to the Department urging that

the fence be removed to allow full access by wild manatees; however, the park's captive manatees have been a major attraction and no action has been taken to remove the fence.

In 1997 captive manatees at the park began to develop a previously unknown papillomavirus that causes skin lesions and rough patches similar to warts. The virus was subsequently found on a few of the region's wild manatees that may have contracted it from skin sloughed by the captive animals and passing through the spring run's fence. Lesions on the wild animals have tended to heal over time, whereas those on the captive animals have not. Some scientists believe that exposure to water that remains a constant 22° C (72° F) may be a factor promoting expression of the virus. The captive manatees also tend to be overweight compared with the majority of animals at other facilities. One hypothesis is that the extra weight may allow the manatees to survive at 22° C (72° F) but that this temperature is not optimal for year-round and long-term maintenance. Some scientists believe that the captive animals are immune-compromised as a result of living in less-than-optimal conditions.

To address effects of siltation along the spring run, the State and the Army Corps of Engineers began developing plans in the early 2000s to remove accumulated sediment and thereby create deeper resting areas for manatees using the warm-water discharge. These plans were being completed as of the end of 2005 and, with funding from the Florida Department of Environmental Protection and the U.S. Army Corps of Engineers, dredging to deepen the spring run was expected to begin in mid-2006.

In 2004 the U.S. Fish and Wildlife Service also took steps to review the advisability of removing manatees from the upper spring run. In response to those efforts, the Marine Mammal Commission wrote to the Service on 14 January 2005 recommending that the Service work with managers of the Homosassa Springs Wildlife State Park to arrange for moving the park's captive manatees from the spring run to other captive maintenance facilities or to a separate isolation pool recently constructed for manatees at the park. It also recommended that the two agencies develop plans to remove the fence blocking wild manatees from the spring's headwaters. The Commission's recommended actions would (1) prevent transmission of the papillomavirus from captive to wild manatees, (2) help ensure the health of the captive animals now held in the upper spring run, and (3) maximize the value of Homosassa Springs for wild animals.

During 2005 officials from the Service and Park entered into discussions with regard to the continued maintenance of manatees, and 3 of the 9 animals maintained at the park were moved to other facilities. By the end of 2005, however, a final decision had not been made on whether to remove the remaining manatees and open the entire spring run to wild animals.

Also in 2005, staff of the Florida Fish and Wildlife Conservation Commission and the State's Suwannee River Water Management District worked together to establish minimum flows for Manatee and Fanning Springs, two warm-water springs north of Homosassa Springs along the Suwannee River. These springs currently support low numbers of animals but could potentially support larger numbers in the future. Maximum winter counts of manatees at Manatee and Fanning Springs currently stand at only 20 and 7, respectively, but they appear to be increasing slowly. In 2005 the District proposed minimum spring flow levels for both springs at 90 percent of historical discharge levels. These levels will be used to guide permits for aquifer water withdrawals in the spring recharge areas. Steps also were taken to begin developing a minimum flow level for Weeki Wachee Spring, south of Homosassa Springs, where maximum winter counts of manatees also have been increasing slowly. The St. Johns River Water Management District, responsible for establishing a minimum flow for Blue Spring in Volusia County, announced in November 2005 that it would recommend a Blue Spring minimum flow to its board in 2006. After several years of studies, historical reviews, and modeling efforts, the District proposed to set a minimum flow below the current average flow and to then incrementally increase the minimum flow each year, eventually returning to the current average flow. The District contends that alternative water supplies will reduce dependence on the aquifer and allow for natural flows to be returned.

The long-term goal for the manatee research and management program is to develop a permanent network of warm-water springs and passive thermal basins capable of supporting a recovered manatee population. This will require an examination of warm-water refuges whose use by manatees may now be restricted due to physical obstructions or other constraints but that might become important in the future. In 2005, the Marine Mammal Commission contracted for a study to examine all of Florida's major warm-water springs with regard to their potential suitability as winter habitat for

manatees and any constraints or impediments to manatee access (see also Chapter XII).

Assessments of the Status of Florida Manatees

During 2005 the Manatee Population Status Working Group, which includes a representative of the Marine Mammal Commission, completed a biological assessment of the status of Florida manatees. Based on available data collected over the past 10 years, the working group examined the status and trends for each of the four regional subpopulations. For each of the four regions, the working group found that watercraft-related deaths were the largest current cause of human-related adult mortality.

With regard to both the northwest and upper St. Johns River manatee subpopulations, which included 11.4 and 3.4 percent, respectively, of all animals counted in the January 2001 statewide survey, the working group concluded that numbers were growing, that reproductive rates were high, and that mortality was low. With regard to the Atlantic coast subpopulation, which accounted for 43.9 percent of all manatees in the 2001 survey, the group concluded that it was unclear whether the number was increasing, stable, or declining. It noted, however, that abundance was apparently increasing in the early 1990s. Watercraft-related mortality was a higher proportion of total mortality for this subpopulation than for either the northwest or the upper St. Johns River subpopulation, and its total mortality also was higher. For the southwest subpopulation, which included 41.3 percent of the 2001 statewide count, the working group concluded that survival rates were low and abundance was declining. Watercraft-related deaths and red tides are the highest-ranked causes of adult mortality for this subpopulation, and it was noted that this subpopulation cannot sustain this level of human-related and natural mortality.

Also during 2005 two independent reviews were initiated to assess the legal status of Florida manatees: one under state law and the other under federal law. As noted in past annual reports, the Florida Fish and Wildlife Conservation Commission received a petition in 2003 asking that the status of Florida manatees under state law be reevaluated in light of new information on their abundance and trends. In response, a review was initiated in 2004 but was later postponed pending actions to reevaluate the State's overall listing process. In 2005 the Florida Commission adopted new criteria and

procedures for listing species in need of additional protection under state law and directed that a new review of Florida manatees be undertaken following that process. The purpose of the review is to determine whether Florida manatees should remain listed as endangered on the state list or be down-listed or delisted.

The new listing criteria adopted by the State are based on quantitative standards used by the IUCN—The World Conservation Union to rank species on its Red List of species at risk. Under the new state criteria, however, “endangered” is equated with the IUCN category for “critically endangered” and “threatened” is equated with species classified as “endangered” under the IUCN system. At the end of 2005 a review panel convened by the Florida Commission was conducting a preliminary analysis of findings for further review and comment. Given the new state criteria, results of that review appear likely to recommend that Florida manatees be reclassified under state law from “endangered” to “threatened.”

Also in 2005 the U.S. Fish and Wildlife Service initiated a federal five-year status review for Florida manatees under provisions of the Endangered Species Act. Species classification criteria under the Endangered Species Act differ substantially from those of the State of Florida and rely largely on more qualitative factors, including (1) present or threatened destruction, modification, or curtailment of a species' habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) inadequate regulatory mechanisms; and (5) other natural or anthropogenic factors affecting a species' continued existence. Like the state review, however, the federal review will consider whether Florida manatees should remain listed as endangered, be reclassified as threatened, or be removed entirely from the federal list.

A *Federal Register* notice announcing the Service's review was published on 14 March 2005 and requested any new information on the status of Florida manatees since the initial listing in 1967. In response, the Marine Mammal Commission wrote to the Service on 27 June 2005 providing results of the previously mentioned reviews regarding the effectiveness of boat speed zones and the importance of warm-water access to Florida manatees. The Commission also noted that any decision to alter the level of protection afforded manatees should consider the threats and uncertainties associated with the continued existence of major warm-wa-

ter refuges now used by manatees. The review is expected to be completed in 2006. Other threats facing manatees include increasing vessel traffic and the potential for increasing numbers of vessel-related manatee deaths, increasing entanglements in fishing gear, red tides, and degradation of essential manatee habitats, such as natural warm-water springs, secluded waterways used for mating and resting, and grass beds important for manatee foraging—particularly those near warm-water refuges.

California Sea Otter (*Enhydra lutris nereis*)

Sea otters once ranged along the North Pacific rim from northern Japan to Baja California, Mexico. Over-exploitation by the fur trade in the eighteenth and nineteenth centuries brought sea otters to the brink of extinction. When commercial harvesting was banned in 1911, only a small remnant colony survived in California along the coast between Monterey and Big Sur. Taxonomists identified this population as the southern sea otter, *Enhydra lutris nereis*, distinguishing it from other remnant populations in Russia and Alaska. In 1977 the U.S. Fish and Wildlife Service listed the southern sea otter as threatened under the Endangered Species Act. The Service approved a recovery plan for the southern sea otter in 1982. The plan called for reestablishment of southern sea otters in one or more locations within the subspecies' historic range but away from its limited distribution at that time. The purpose was to minimize the possibility that a single catastrophe, such as an oil spill, could eliminate all or a significant portion of the population.

The Endangered Species Act authorizes translocation of a listed species to establish experimental populations, but in 1982 the Marine Mammal Protection Act did not include similar translocation provisions. This inconsistency was resolved in the case of the southern sea otter when Congress passed Public Law 99-625. The law authorized a translocation subject to provisions that would minimize conflicts between translocated sea otters and shellfish fisheries. Those provisions included the establishment of a management zone from which sea otters would be excluded.

In 1987 the Service published a final environmental impact statement that identified San Nicolas Island, one of the Channel Islands off southern California, as the preferred translocation site. The

impact statement also proposed a management zone south of Point Conception in Santa Barbara County from which sea otters would be excluded. Between 1987 and 1990 the Service captured and released 140 sea otters at San Nicolas Island. Many left the island and returned to central California; some died, and the fate of the others is not known. In 2004, 32 adult sea otters remained at San Nicolas Island. In 2005, 31 adult sea otters were counted at San Nicolas Island.

The Service stopped moving sea otters to San Nicolas Island in 1990 but continued to remove the few animals found within the designated management zone until 1993. In 1998 approximately 100 southern sea otters moved from central California into the northern end of the management zone. At the same time, rangewide counts of the southern sea otter population indicated a decline of approximately 10 percent since 1995. In response, the Southern Sea Otter Recovery Team recommended that the Service not move sea otters from the management zone back to the parent range because doing so would expose the animals to risks associated with capture and handling and would be disruptive to the social structure of the parent population.

In 2000 the Service issued a biological opinion evaluating the translocation program. The opinion concluded that complying with the containment requirements of the translocation program regulations would likely jeopardize the continued existence of the species for two reasons. First, the reversal of the southern sea otter's population decline was essential to the survival and recovery of the species, and continued removal of animals from the management zone could cause the direct deaths of individuals and disrupt social behavior in the parent range, thereby exacerbating the observed decline. Second, expansion of the southern sea otter's distribution was essential to the survival and recovery of the species, and continuation of the containment program would artificially restrict the range to the area north of Point Conception, thereby increasing the vulnerability of the species to oil spills, disease, and stochastic events. Recent annual population surveys indicate that the population has been increasing, with the 2003 and 2004 counts (2,505 and 2,825, respectively) the highest on record. In 2005 the count dropped slightly to 2,735.

In August 2005 the Service released a draft supplemental environmental impact statement that analyzed the impacts of alternatives to the current program. The environmental impact statement included an evaluation of the translocation program based on information obtained over the 18 years

since the program's inception. The issues and concerns addressed in the impact statement generally fell within four categories: (1) economic effects on fisheries and tourism; (2) effects on the nearshore marine ecosystem; (3) effects on the southern sea otter population; and (4) effects on other agency activities. The Service's proposed action is to terminate the translocation program but not to remove any sea otters residing within the translocation or management zones at the time the decision to terminate is made, as would be required under existing regulations. The Service held two public hearings in California in November 2005 and is currently reviewing public comments on the draft supplemental environmental impact statement.

At the end of 2005 the Commission was preparing to submit comments to the Service supporting its proposed action. However, the Commission also was preparing comments describing its concern about the potential effects of immigrating sea otters in southern California on abalone species in that area. White and black abalones have been depleted by overharvesting and are likely to be highly vulnerable to predation by otters. The Commission was planning to recommend that the U.S. Fish and Wildlife Service and the National Marine Fisheries Service consult to identify recovery measures for the sea otter that would not compromise recovery of these abalone species.

Marine Mammal Species of Special Concern 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 in other areas of the world face major conservation challenges. Some are in danger of extinction in the immediate future, and others are being extirpated in parts of their range or consist of multiple discrete populations that are being serially extirpated. Although the Marine Mammal Commission has not been directly involved in oversight or management of many such non-U.S. species and populations, this report includes the following descriptions to highlight those species at greatest risk

of extinction and the challenging issues that must be addressed to conserve them.

In 2005 several independent efforts were conducted to identify international conservation priorities for marine mammals. The United Nations Environment Programme sponsored a review of small cetaceans to identify the most important threats facing each species. The review concluded that bycatch of cetaceans in fishing gear threatens the most species. The World Wildlife Fund sponsored an evaluation of bycatch issues facing small cetaceans and efforts to address them. The Commission provided funds to translate the resulting report and thereby make it available to foreign audiences.

Western Gray Whales off Sakhalin Island, Russia

The western North Pacific population of gray whales (*Eschrichtius robustus*) is listed as critically endangered by IUCN–The World Conservation Union. The population currently numbers about 120 whales, of which 20 to 25 are reproductively mature females. Their historical abundance is poorly known but was probably at least 1,500. They were reduced by commercial whaling and thought to be extinct by the mid-1900s. A few whales were resighted in the early 1970s, and observations increased in the 1980s off the northeastern coast of Sakhalin Island in the Sea of Okhotsk (Fig. 19). The whales are now observed in these coastal waters each year from about June to November. The nearshore conditions off northeastern Sakhalin Island appear to favor gray whale prey (e.g., amphipods, isopods), and the two main feeding areas for the whale population are located in this region. Their distribution during the remainder of the year is largely unknown although a few stranding records and sighting observations indicate that they migrate southward along the east coast of Asia to the waters off southern China or perhaps farther south. Since the mid-1990s extensive research has been conducted on the population on its Sakhalin feeding grounds. That research has provided important information on the population's abundance, size/sex composition, reproductive and survival rates, condition, and foraging behavior.

The coastal waters around Sakhalin Island, particularly its northeastern coast, overlies large oil and gas reserves. The Russian Federation has divided the Sakhalin shelf into nine project areas for the purposes of controlling the commercial development of those reserves (Fig. 20). Development is occurring in three project areas and being planned in several

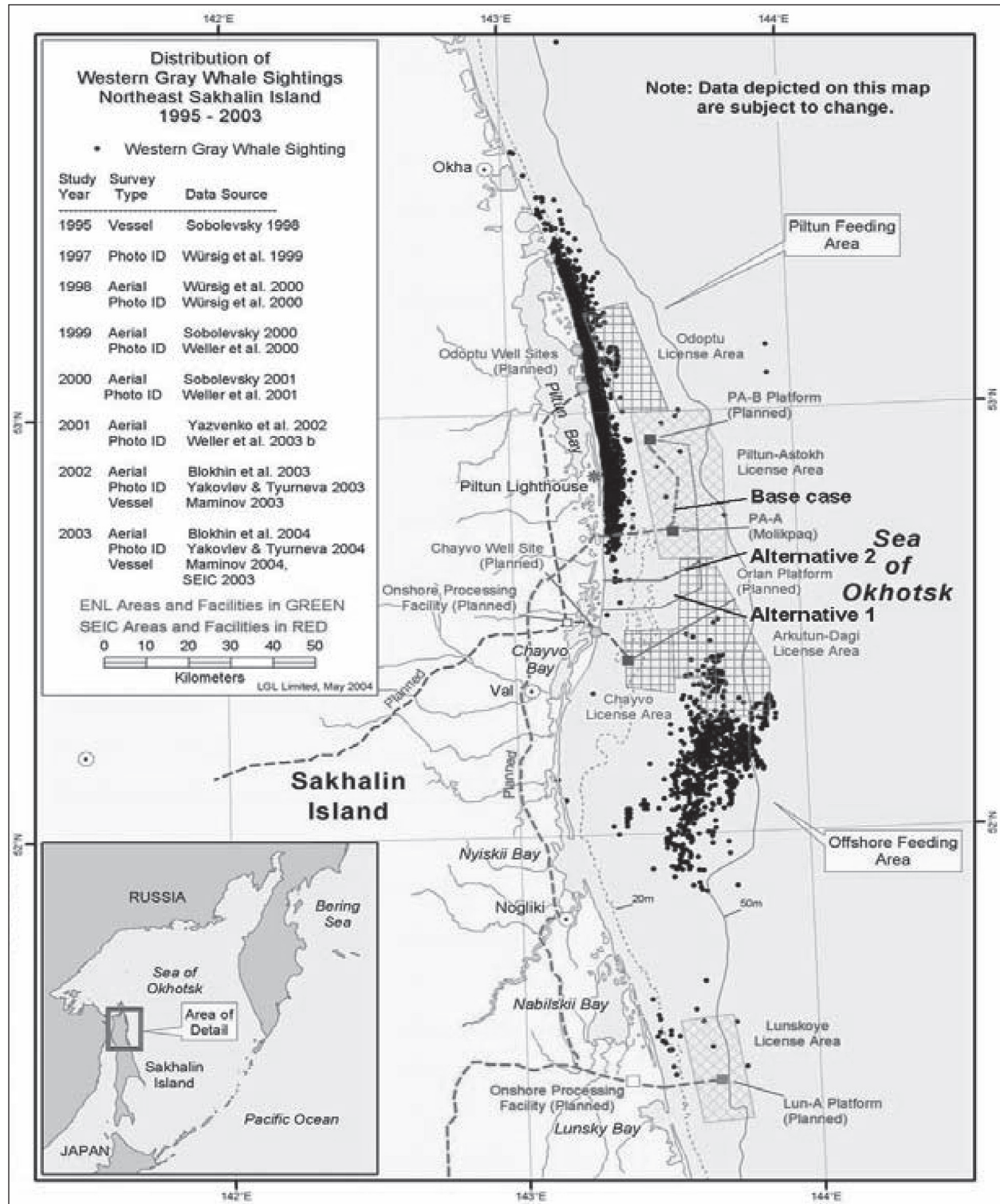


Figure 19. Distribution of sightings of western gray whales off the northeastern coast of Sakhalin Island. Figure courtesy of the Independent Scientific Review Panel on the Impacts of Sakhalin II Phase 2 on Western North Pacific Gray Whales and Related Biodiversity. IUCN, Gland, Switzerland, and Cambridge, United Kingdom, 2005.

others. Sakhalin II is the most advanced project and began commercial production in 1999. Sakhalin II is being developed and managed by the Sakhalin Energy Investment Company, Ltd. (SEIC) under a production-sharing agreement with the Russian Federation and the Sakhalin regional government. SEIC is a partnership of Shell, Mitsui, and Mitsubishi.

Sakhalin II has two phases. Phase 1 consists of an offshore drilling and production platform (PA-A), a subsea pipeline from the platform to a

single-anchor leg mooring, and a large tanker anchored to the mooring and used as a floating storage and off-loading facility. Oil is transferred from this facility to tankers for distribution around the world. Phase 1 has been in production since 1999 but only operates during the period when nearby waters are sufficiently ice free, from approximately June to November.

Phase 2 of Sakhalin II is currently under development. This phase involves the construction of two additional offshore platforms (PA-B, Lun-A); removal of the subsea pipeline from the PA-A platform, the single-anchor leg mooring, and the floating storage and off-loading tanker; construction of pipelines from the three platforms to shore; an onshore pipeline to the southern end of Sakhalin Island; and construction of a liquid natural gas plant and export terminal at Prigorodnoye on Aniva Bay (see Fig. 19). Phase 2 will involve year-round production of oil and gas.

Phase 1 and 2 facilities and activities are close to the foraging areas of the western gray whale population and pose a number of risks, both during construction and operation. An oil spill could directly affect the whales or affect them indirectly by damaging or destroying the benthic communities in their feeding grounds. Construction introduces noise into the nearshore marine environment, requires considerable vessel activity with the accompanying risk of ship strikes, and may cause physical disturbance to important feeding areas or the ecological mechanisms that support them. Piltun Lagoon, on the northeastern shore of the island, appears to play an important role in creating the nearshore feeding area used by mothers and calves, and disturbance or contamination of the lagoon could have particularly serious effects. Removal of the Phase 1 tanker-based transportation system near the gray whale feeding grounds will likely reduce risks to the whales. The oil and gas transportation system associated with Phase 2 will be based farther to the south, away from the feeding grounds. The tankers loaded from the new facility at Prigorodnoye will, however, still pose some risk because the

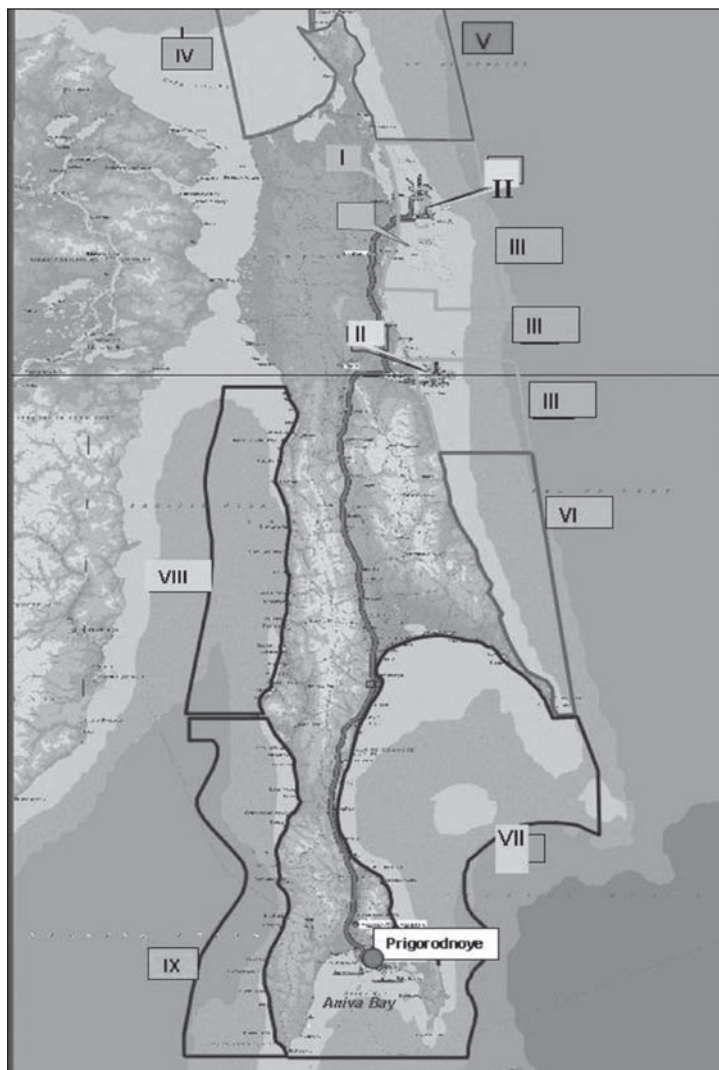


Figure 20. Map of the Sakhalin region showing the nine project areas. Figure courtesy of the Independent Scientific Review Panel on the Impacts of Sakhalin II Phase 2 on Western North Pacific Gray Whales and Related Biodiversity. IUCN, Gland, Switzerland, and Cambridge, United Kingdom, 2005.

traffic lanes used by many of the tankers will cross the whales' migratory route.

The risks associated with Sakhalin II construction and operations are not the only threats to the western gray whale population. Additional risks are, or will be, posed by other oil and gas development in the region (Sakhalin I and V are currently in the early stage of development and other projects are being planned), as well as regional activities unrelated to oil and gas production and various other threats to the population throughout its range (e.g., directed killing, bycatch in fisheries, ship strikes, noise, contaminants, disease, predation). In 2005 three gray whales died from entanglement in fishing gear off the coast of Japan. Ultimately, the persistence and recovery of the western gray whale will depend on whether it can survive the cumulative effects of all the risk factors.

The underlying question with regard to Sakhalin II Phase 2 is whether all the different facets of development and operation are being and will be conducted in a manner that allows oil and gas production without jeopardizing the survival and recovery of the western gray whale population. SEIC has committed extensive resources to address this question. It was raised again by international banks, including the U.S. Export-Import Bank, that were asked for loans to bring Phase 2 into production. The potential lenders contacted a number of organizations, including the Marine Mammal Commission, to discuss the possibility of a review of Sakhalin II Phase 2 construction and operations to provide the information needed to assess the level of risk to western gray whales and their habitat. After several months of discussion among the lenders, SEIC, conservation organizations, and marine mammal biologists, SEIC asked IUCN to organize and conduct such a review. The IUCN agreed, appointed the chairman of its Cetacean Specialist Group as the chairman for the review, and, with the chairman, appointed an independent scientific review panel to conduct the review. The panel and its terms of reference are described on the IUCN Web site (<http://www.iucn.org/themes/business/isrp/index.htm>). The panel met on four separate occasions between September 2004 and January 2005 and issued its report to the IUCN on 16 February 2005.

The report focused on four main threats to western gray whales, including construction and operational noise, oil spills, vessel/whale interactions and collisions, and degradation of the gray whale feeding grounds. The report included modeling results that indicated that even relatively small changes in reproduction and, particularly, survival could

have significant effects on recovery if those effects persist over time. The report also emphasized that recovery of the western gray whale population is contingent on minimizing cumulative effects of various risk factors. Because individually minor risks may have cumulatively significant effects, a robust monitoring program is needed to detect important changes in the population even if those changes cannot be explained. Finally, the report called for the creation of a comprehensive, rangewide strategy for conservation of western gray whales.

IUCN sponsored a follow-up workshop on 11–12 May 2005 in Gland, Switzerland, to provide an opportunity for various stakeholders, including the potential lenders, to consider the review panel's report and SEIC's responses to it. The most important outcome of this workshop was an agreement that a long-term scientific advisory panel was needed to provide continued oversight of SEIC activities that may affect gray whales and make recommendations that would help the company avoid unnecessary risks.

After the Gland workshop, the potential lenders felt that further appraisal of Sakhalin II activities was needed and they requested an additional meeting to resolve remaining issues. The potential lenders, in concert with AEA Technology, a consulting firm employed by the lending institutions to assist in the assessment of Sakhalin II Phase 2's potential environmental effects, convened a meeting in Vancouver, British Columbia, on 17–19 September 2005. At this meeting, discussions between SEIC and a group of independent scientists (the majority of whom had served on the initial independent scientific review panel) led to further resolution of some issues and, perhaps most important, provisional agreement about the terms of reference for a long-term advisory panel. SEIC agreed to sponsor the panel and in September 2005 sent a letter to the IUCN requesting that it serve as the convener for the Western Gray Whale Advisory Panel. The IUCN agreed to assume the role of convener and at the end of 2005 was in the process of establishing a contract with SEIC for that purpose, refining the terms of reference for the advisory panel, identifying panel candidates, and making preparations to convene the first meeting early in 2006.

Yangtze River Dolphin (Baiji)

The Yangtze River dolphin or baiji (*Lipotes vexillifer*) is almost certainly the world's most endangered marine mammal. It could conceivably go extinct in the next decade. Chinese scientists observed 4 to 17

animals each year during annual surveys in 1997–1999. Survey results were not corrected for animals under the surface or out of the survey area; thus, the actual abundance of baijis is unknown. However, it may be only tens of individuals. The baiji has already disappeared from large sections of the Yangtze River and associated lakes and waterways. To date, limited efforts to maintain baijis in captivity have failed. Factors leading to the baiji's decline, and perhaps its extinction in the near future, include habitat degradation, fragmentation, and loss due to waterway management (e.g., damming and diversion for agriculture, hydroelectric power generation, flood control, and other purposes); direct and indirect fisheries interactions (e.g., illegal electrical fishing, entanglement and hooking, competition for prey); vessel strikes; and contaminants.

A workshop on the conservation of baijis and Yangtze finless porpoises (*Neophocaena phocaenoides*) was held in Wuhan, China, in 2004. Participants discussed the current status of the species and the potential for creating a self-sustaining

population of baijis in the “semi-natural” Shishou Reserve (a 21-km [13 mi] oxbow adjacent to the Yangtze River) or the Wuhan dolphinarium. The Shishou Reserve (see Fig. 21) is already used for maintenance of finless porpoises. Workshop participants visited both sites. Although they disagreed about which site was more suitable for baijis, they agreed that aggressive conservation measures, such as capturing and translocating baijis to a protected area, were necessary to prevent imminent extinction. Workshop participants therefore recommended that China's Ministry of Agriculture and Institute of Hydrobiology collaborate with other relevant governmental agencies, international experts, and non-governmental conservation organizations (local, national, and international) to create an international baiji conservation committee. This committee would monitor efforts to save the baiji, provide expertise and advice to the Chinese government, and coordinate the use of international support for baiji conservation. Workshop participants also discussed preparations for a baiji and finless

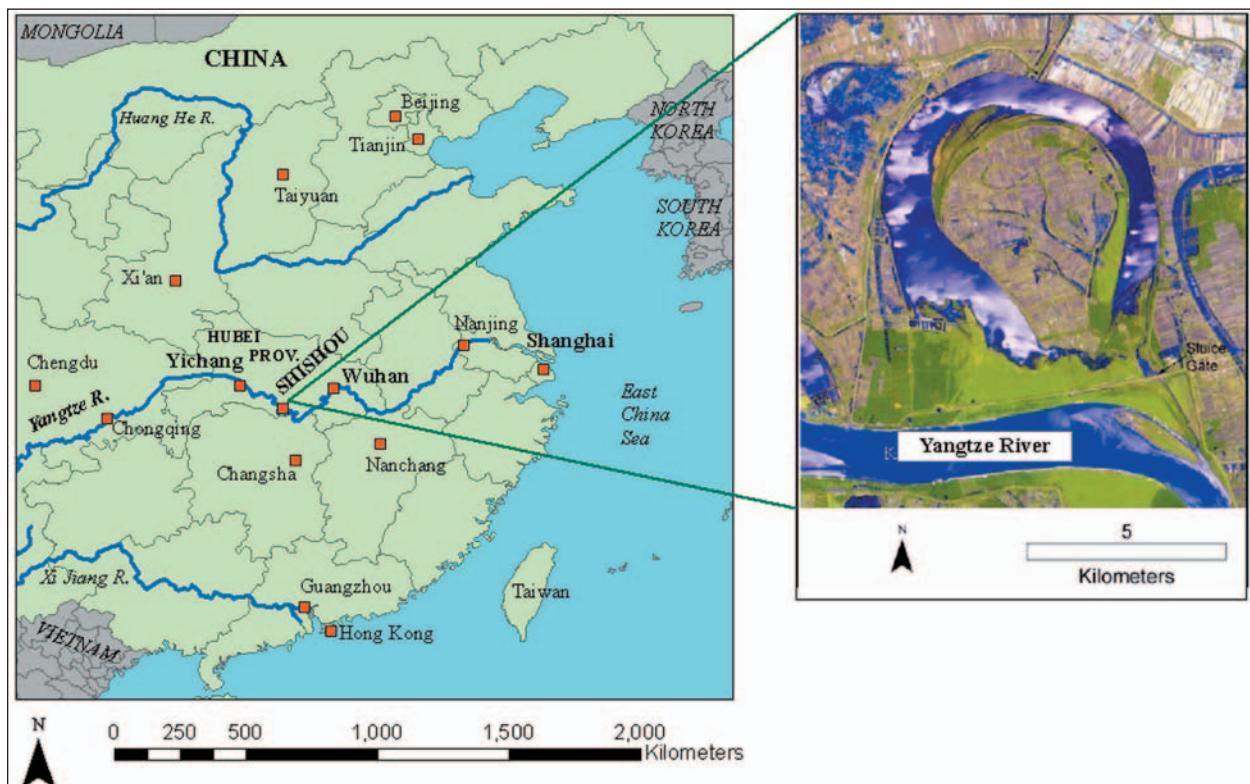


Figure 21. The Yangtze River, shown on the left, is home to the critically endangered Yangtze River dolphin (baiji) and the endangered Yangtze River finless porpoise population. At right is an aerial view of the semi-natural Shishou Reserve (the 21-km (13 mi) long, 1 to 2-km (0.6 to 1.2 mi) wide Tian-e-Zhou Oxbow located near Shishou City in Hubei Province. Aerial photograph courtesy of Report of the Workshop on Conservation of the Baiji and Yangtze Finless Porpoise, Wuhan, Hubei, China, 28 November–3 December 2004.

porpoise survey of the Yangtze River from Yichang to Shanghai. The survey was initially planned for 2005 but has been rescheduled for fall 2006.

Finless Porpoise

The finless porpoise (*Neophocaena phocaenoides*) has generally been recognized as one species with three forms (subspecies) but may actually consist of two species, each with its own subspecies. These porpoises are distributed in shallow coastal waters and estuaries from Japan to the Arabian Gulf and south to East Timor. One form occurs in the Yangtze River and associated lakes. The finless porpoise is listed by IUCN as “data deficient,” and the Yangtze River population is listed as endangered. The species’ overall abundance is unknown, but evidence suggests that it is severely reduced and may have been extirpated in parts of its range. The primary threat appears to be fisheries bycatch, particularly in gillnets. Other potential factors include mortality from electrical fishing in the Yangtze River and reductions in prey from overfishing, as well as habitat degradation, waterway management, and high levels of contaminants.

In the early 1990s a small number of finless porpoises was captured in the Yangtze River and relocated to the Shishou Reserve (see Fig. 21). They seem to be surviving and reproducing well, despite problems with water quality and fishing in the reserve. In addition, a captive-bred finless porpoise calf was born in July 2005 in the Wuhan dolphinarium, which hosts three adult porpoises (two females and one male). As noted earlier in the discussion of baiji, a 2004 workshop was held in Wuhan, China, to discuss the current status of both species and necessary modifications to improve the quality of the Shishou Reserve as a habitat for both. The baiji survey planned for 2006 will also be used to assess finless porpoise abundance and distribution in the Yangtze River from Yichang to Shanghai.

Ganges and Indus River Dolphins

The taxonomic status of the Ganges and Indus River dolphins is not clear. Currently scientists consider them subspecies (*Platanista gangetica gangetica* and *P. gangetica minor*, respectively), but they also have been, and may again be, considered separate species (*P. gangetica* and *P. minor*) after further review. They occur separately in the Indus River (Indus River dolphin) and the Ganges-Brahmaputra-Meghna and Karnaphuli-Sangu River systems (Ganges River dolphin). Both are consid-

ered to be endangered by the IUCN. Data collected in 2001 indicate a population of approximately 965 Indus River dolphins. No population estimate is available for the Ganges River dolphin, but surveys of portions of the subspecies’ range suggest a minimum abundance of 1,200 to 1,800 animals.

The Indus River dolphin has been extirpated from about 80 percent of its historical habitat, and the Ganges River dolphin has been nearly extirpated in Nepal. Threats to these species include fisheries interactions (e.g., entanglement in fishing gear, 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., for meat and oil to use as bait for fisheries or medicinal purposes). Waterway management (barrages, damming, and diversion for agriculture and other purposes) is of particular concern because it fragments habitat, degrades downstream habitat, and reduces flows in both the Indus and Ganges Rivers. In the Ganges, waterway management will become a much greater threat if India proceeds with the Rivers Interlink Water Transfer Project, a project designed to link the major rivers of India to control water distribution and flow. The Commission has provided funding to support an investigation into the potential effects of declining freshwater flows on Ganges River and Irrawaddy dolphins in the Sundarbans Delta as a result of this major waterway management project. That investigation is now complete, and a final report is expected early in 2006.

Irrawaddy Dolphin

Irrawaddy dolphins (*Orcaella brevirostris*) are distributed sparsely in tropical and subtropical estuaries and the waterways of mangrove forests in the Indo-Pacific region. In addition, freshwater populations occur in the Mahakam, Ayeyarwady (formerly Irrawaddy), and Mekong River systems and Songkhla and Chilika Lakes. Irrawaddy dolphins were recently split into two species. The newly described snubfin dolphin (*O. heinsoni*) occurs in the coastal waters of northern Australia and southern Papua New Guinea. Five isolated subpopulations of Irrawaddy dolphins are considered to be critically endangered by the IUCN, with populations of fewer than 100 animals each. These subpopulations are located in the Ayeyarwady River of Myanmar (59 animals); Mahakam River of Indonesia (33–50 animals); Malampaya Sound of the Philippines (77 animals); Mekong River of Laos, Cambodia,

and Vietnam (69 animals); and Songkhla Lake of Thailand (fewer than 50 animals). Threats to these dolphins are similar to those facing Ganges and Indus 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, although illegal electrical fishing is also a concern in the Ayeyarwady River.

Several local, national, and international conservation efforts are under way to provide some protection for Irrawaddy dolphins. A Workshop to Develop a Conservation Action Plan for Freshwater Populations of Irrawaddy Dolphins was held 21–26 March 2005, in Phnom Penh, Cambodia. After the workshop, 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 in which gillnetting and other activities that could potentially harm dolphins are prohibited. The Myanmar government also declared a protected area for Irrawaddy dolphins and a cast-net fishery in which humans and dolphins fish cooperatively in a 74-km (46 mi) river segment of the Ayeyarwady River above the city of Mandalay. The cooperative fishery is unique and involves cast-net fishermen summoning dolphins by acoustical means and the dolphins then herding fish schools toward the fishermen’s canoes. The dolphins benefit from the activity by preying on fish whose movements are confused by the sinking cast-net and those that are momentarily stuck on the muddy bottom after the net is pulled up. As mentioned above, the Marine Mammal Commission has provided funding to support an investigation into the potential effects of declining freshwater flows on Ganges River and Irrawaddy dolphins in the Sundarbans Delta as a result of India’s proposed Rivers Interlink Water Transfer Project.

Vaquita

The vaquita (*Phocoena sinus*) is the world’s smallest porpoise and currently is found only in the northern reaches of the Gulf of California. The species is listed as critically endangered by the IUCN and as endangered under Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Official Mexican Standards list of threatened and endangered species, and the U.S. Endangered Species Act. Data collected in 1997 suggested a population size of 567 (95 per-

cent confidence interval 177–1,073) vaquitas. The current number of vaquitas is unknown, but the International Committee for the Recovery of the Vaquita (Comité Internacional para la Recuperación de la Vaquita, CIRVA) estimated that the population likely had declined to between 250 and 450 vaquitas by 2005. The primary threat facing vaquitas is bycatch, primarily in gillnet fisheries. Based on observer data and interviews with fishermen, an estimated 39 vaquita were killed in gillnet fisheries (i.e., shrimp, charro, shark, sierra) near El Golfo de Santa Clara between January 1993 and April 1994.

Recovery efforts are led by scientists from the Mexican National Marine Mammal Program, National Institute of Ecology, in Ensenada, Mexico, working collaboratively with CIRVA. CIRVA was formed by the Mexican government in 1996 and met in 1997, 1999, and 2004. CIRVA focused initially on scientific research to assess abundance, distribution, and potential threats. Since 1999 CIRVA has recommended phasing out all gillnet and trawl fisheries in the Upper Gulf of California and Colorado River Delta Biosphere Reserve in the northern Sea of Cortez and extending the reserve to ensure that it encompasses all known vaquita habitat. In 2005, based on those recommendations, the Mexican Departments of Environment and Fisheries and the state governments of Sonora and Sinaloa banned gillnets and trawling within a portion of core vaquita habitat (Fig. 22). The governments also agreed to compensate fishermen, a measure that was suggested by CIRVA to offset the socioeconomic costs of altering fishing practices.

Since 2001 the Marine Mammal Commission has provided support for research on the distribution and abundance of vaquitas, as well as for the third CIRVA meeting. In 2005 the Commission and others sponsored two meetings on vaquita at the Society for Marine Mammalogy biennial conference 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. Much of the recovery effort for the vaquita is focused on the development of socioeconomic measures to compensate for the loss of fishing opportunities as prohibitions are imposed on gillnet fishing in the northern Gulf of California.

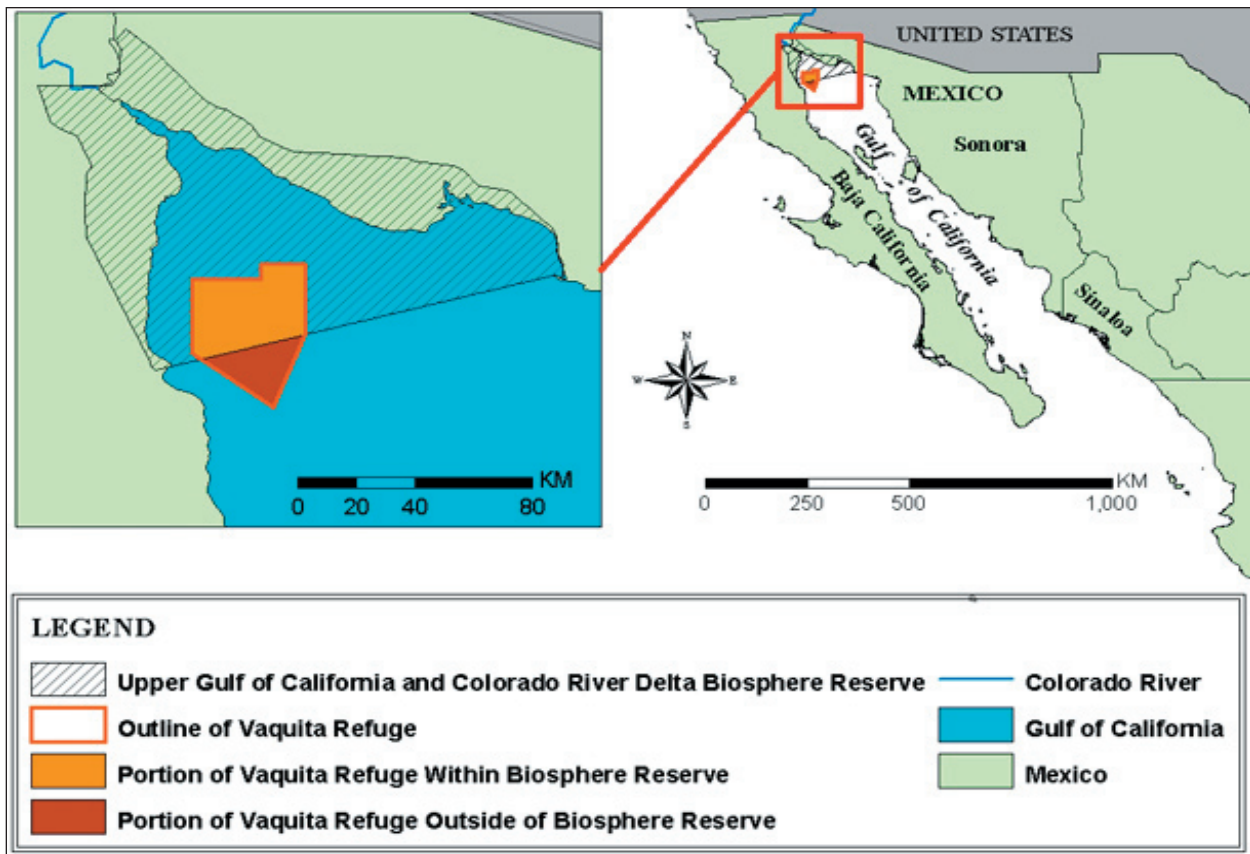


Figure 22. The vaquita refuge area was extended in 2005 to protect vaquita from gillnet and trawling activity beyond the southern boundary of the Upper Gulf of California and Colorado River Delta Biosphere Reserve. The Refuge area does not match CIRVA’s proposal, but it does cover the area in which approximately 80 percent of vaquita sightings occur. Data courtesy of Lorenzo Rojas-Bracho, Programa Nacional de Investigación y Conservación de Mamíferos Marinos, Instituto Nacional de Ecología.

Hector’s Dolphin

Hector’s dolphins (*Cephalorhynchus hectori*) occur only in nearshore waters of New Zealand. Two subspecies are recognized based on genetics and morphology: Maui’s dolphin (*C. hectori maui*) on the North Island’s west coast and the South Island Hector’s dolphin (*C. hectori hectori*) around the South Island. The South Island Hector’s dolphin is the more abundant, numbering more than 7,000. The most recent estimate for Maui’s dolphins is only 111 animals, and the subspecies is considered critically endangered by IUCN. The primary threat to both subspecies is fisheries bycatch, particularly in coastal set gillnets. The nearshore distribution of Hector’s dolphins results in large overlap with both commercial and recreational coastal set net fisheries. Recent population models suggest that Maui’s dolphins are likely to be driven to extinction if fishing effort is not reduced. In addition to fishery bycatch, other threats facing Hector’s dolphins include

pollution, disease, aquaculture, coastal and offshore development, and marine tourism. New Zealand’s Department of Conservation is currently developing a threat management plan to address concerns regarding both subspecies of Hector’s dolphins.

Bowhead Whale

All stocks of bowhead whales (*Balaena mysticetus*) were severely depleted by commercial whaling. The Bering–Chukchi–Beaufort Seas stock has recovered to a considerable extent, with a current population of approximately 10,500 whales. The Svalbard–Barents Sea (Spitzbergen) stock is classified as critically endangered by IUCN and probably has fewer than 100 whales and fewer than 50 reproductively mature animals. The Okhotsk Sea stock may consist of only 100 to 200 whales and is classified as endangered. Bowhead whales in the eastern Canadian Arctic are currently managed as

two stocks, the Davis Strait–Baffin Bay stock and the Hudson Bay–Foxe Basin stock. Recent tagging work indicates that the ranges of the two presumed stocks overlap considerably in both summer and winter seasons, suggesting that the whales may belong to a single stock. Some recent genetic analysis also provides support for the single-stock hypothesis. Current abundance surveys suggest a population size of about 5,000 bowhead whales for the two combined stocks. This estimate is much larger than previous estimates of 400 to 500 whales for the Davis Strait–Baffin Bay stock and fewer than 300 for the Hudson Bay–Foxe Basin stock. The previous estimates were imprecise and based on limited surveys, so the apparent increase in abundance is likely due, at least in part, to improved survey data. However, the apparent increase also is consistent with more frequent sightings of bowhead whales by local people and could reflect a true population growth. The current estimate was still undergoing official review in Canada at the end of 2005.

Bowhead whales are migratory and associate closely with arctic sea ice. Threats to bowhead stocks include fisheries interactions (i.e., entanglement in fishing gear), changes to habitat due to global warming, disturbance due to human-generated noise, ship strikes, hunting, and contaminants from pollution.

Mediterranean Monk Seal

The Mediterranean monk seal (*Monachus monachus*) has been referred to as Europe's most endangered marine mammal. It is listed as critically endangered by IUCN and endangered under the U.S. Endangered Species Act. The Mediterranean monk seal is one of three species recognized in the genus *Monachus*: the Caribbean monk seal (*M. tropicalis*) is considered extinct, and the Hawaiian monk seal (*M. schauinslandi*), with a population of about 1,250 seals, is listed as endangered under the U.S. Endangered Species Act.

The Mediterranean monk seal has been extirpated through most of its range, and the population is now highly fragmented. Recent estimates suggest a total population of perhaps 500 to 550 Mediterranean monk seals, with approximately 300 to 350 in the eastern Mediterranean, 15 to 20 in the western Mediterranean, and 180 in the Atlantic. New survey data from Turkey resulted in an increase of 50 seals over previous estimates (for the eastern Mediterranean), but this likely reflects better survey data rather than an actual increase in the seal population. Before 1997 the largest single colony was at Côte des Phoques in Western Sahara on Africa's north-

western coast. A mass mortality at that site in 1997, attributed possibly to morbillivirus or saxitoxin, reduced the colony by one-half to two-thirds.

Significant threats to the species include habitat degradation and loss, fisheries interactions (entanglement in fisheries gear and, particularly, shooting by fishermen who perceive the monk seal to be a competitor), disease (e.g., morbillivirus), harmful algal blooms, and disturbance. Research and management of these threats is confounded by a lack of international cooperation and coordination.

Saimaa Seal

The Saimaa seal (*Phoca hispida saimensis*) is a subspecies of ringed seal found only in Lake Saimaa in southeastern Finland. Like other ringed seals, Saimaa seals maintain breathing holes through the ice in winter and carve out lairs in snowdrifts overlying these holes. Snowdrifts, however, form only along the shore of Lake Saimaa and islands within the lake. As a result, seal lairs, including those used for birthing and nursing pups, are all located near shore and are susceptible to the effects of shoreline development. The current abundance is estimated at 280 seals, including only 73 to 76 mature females. The subspecies is listed by IUCN as endangered, and the European Union has designated Saimaa seals as needing strict protection. Hunting of seals was allowed prior to 1955 and was considered the primary threat to their conservation. In the 1960s and 1970s the effects of contaminants, mainly mercury, were viewed as the likely cause of low pup survival. More recently, entanglement in recreational fishing gear (gillnets) has become a significant source of mortality. In addition, development around the lake, associated disturbance, and water management practices are thought to be degrading habitat, altering ice conditions, and threatening birthing lairs. In particular, abnormal variations in water levels can cause the ice near shore to break, disrupting and possibly collapsing seal lairs. If this occurs during the pupping season, pups may be exposed and their chance of survival reduced until new snowdrifts form and the lairs can be recreated. Pup mortality is usually about 10 percent, but up to 44 percent of pups have died in some years as a result of widespread lair disruption. Various protective measures have been implemented to control fishing seasons and locations, establish protected areas, manage water levels more conservatively, and raise awareness of conservation needs. The population has grown 2.8 percent per year during the period 1990–2005 although some subpopu-

lations have declined, particularly in northern parts of Lake Saimaa, suggesting range constriction. The maintenance of protection measures appears to be vital for the continued recovery of Saimaa seals.

West African Manatee

The West African manatee (*Trichechus senegalensis*) is distributed in coastal marine water, estuaries, and rivers from Senegal to Angola, occurring in saltwater, brackish water, and freshwater areas. These herbivorous animals consume floating, overhanging, and emergent vegetation rather than submerged vegetation. Their abundance is unknown, but the species is thought to be declining throughout much of its range and probably has been extirpated in some countries. Factors causing decline or threatening the species' future include hunting and trapping, entanglement in fishing gear, habitat degradation and loss (e.g., mangrove and forest clearing with resulting siltation and filling of estuaries and lagoons), and waterway management (e.g., dams and flood-control structures). The species is legally protected in many range countries but enforcement generally has not been effective. West African manatees currently are listed as vulnerable by IUCN but soon may be listed as endangered, following an IUCN Sirenian Specialist Group workshop in August 2005, sponsored in part by the Marine Mammal Commission. Workshop participants considered the status of all sirenian species and subspecies. Participants concluded that the status of West African manatees was precarious although very few scientific data are available to justify an endangered designation for the species.

Okinawan Dugong

The dugong (*Dugong dugon*) is the only extant member of the family Dugongidae. It is distributed from East Africa to Vanuatu in shallow coastal waters between 26° north and 26° south latitudes. On a global basis, it is listed by IUCN as vulnerable. Although dugongs are still found in many parts of their historical range, they have been extirpated in much of that range and now generally occur in fragmented, declining populations. Their nearshore habitat and dependence on sea grass beds for food make dugongs particularly vulnerable to human-related mortality and habitat degradation.

A small dugong population still occurs along the northeastern coast of Okinawa. The size of this population is unknown, but fewer than a dozen

animals have been sighted in recent surveys. The Okinawan dugong population has been listed by the government of Japan as a "Natural Monument," and it is considered an important component of the culture and history of native Okinawans.

The governments of Japan and the United States have been considering possible sites on Okinawa for a new U.S. Marine Corps air station to replace the existing base at Futenma. The primary site under consideration prior to 2005 was an offshore airstrip near an existing U.S. Marine base (Camp Schwab). The airstrip was to be built on top of coral reefs and seagrass beds within the habitat used by dugongs. Construction of the base posed threats to dugongs due to disturbance, loss of sea grass beds, pollution, noise, and watercraft activities. IUCN recommended in 2000, and again in 2004, that Japan review the potential environmental effects of construction of the base, including pre-construction activities such as underwater drilling and seismic surveys, before initiating those activities. Japan initiated an environmental assessment for the original base plan although the review apparently was never completed.

In September 2003 a coalition of conservation groups filed a lawsuit against the U.S. Department of Defense (*Okinawa Dugong v. Rumsfeld*). The suit requested that the Department comply with the National Historical Preservation Act (NHPA) by conducting a complete public assessment of the effects of the project on Okinawan dugongs. While the case was proceeding, a pre-construction drilling survey was initiated in April 2004. Local protests against the base construction substantially hindered the drilling survey, stalling the project until September 2004 and disrupting the progress of the survey since then. In March 2005 the defendant's motion to dismiss was denied, and the court ruled that base construction constituted a federal action and that the dugong was a cultural property of Japan entitled to protection under NHPA.

In October 2005 Japan and the U.S. Department of Defense decided to relocate the planned base closer to shore. The new plan calls for an airstrip to be built on "reclaimed land" surrounding the peninsula that currently hosts Camp Schwab. This plan would still require filling shallow nearshore waters, involving risks to nearby coral reefs and sea grass beds. The extent to which the new plan reduces the potential for impacts on Okinawan dugongs is not clear. It also is not clear whether an environmental assessment of the new plan has been initiated by either Japan or the U.S. Department of

Defense. The lawsuit against the U.S. Department of Defense (*Okinawa Dugong v. Rumsfeld*) was still in litigation at the end of 2005.

Marine Otter

The marine otter (*Lontra felina*) is distributed along the western coast of South America from northern Peru (6° south latitude) to southern Chile (57° south latitude). It is cryptic and occurs in rocky coastal areas with heavy surf or rough shoreline conditions. Its historical distribution included the

southern coast of Argentina. Although its range is still fairly extensive, it is rare and has been extirpated from much of the area within that range and now occurs in fragmented, isolated populations. Its current abundance is undetermined. Due to severe hunting in recent decades, the marine otter is listed as endangered by IUCN. The major threats currently facing marine otters are habitat loss caused by urbanization, water pollution, poaching for fur, fisheries interactions (mortality caused by fishing with explosives or entanglement in fishing gear), and occasional shooting by fishermen.

Chapter VI

MARINE MAMMAL HEALTH AND STRANDING RESPONSE

The National Marine Fisheries Service established the Marine Mammal Health and Stranding Response Program in the late 1980s in response to growing concern about stranded marine mammals. Amendments to the Marine Mammal Protection Act adopted in 1992 formalized the program and designated the National Marine Fisheries Service as the lead agency to coordinate related activities. The program's 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 (UMEs).

On 4–6 April 2005 the Marine Mammal Health and Stranding Response Program hosted the National Marine Mammal Stranding Network Conference. The meeting brought together members of stranding response networks from around the United States for a review of the goals and policies of the national stranding response program. Experts in marine mammal health, stranding response, and necropsy and sample collection gave presentations, and several panels and workshops provided training on such topics as the management of response efforts (particularly to large, complex mass-stranding events), responding to oil spills, responding to media requests, conducting necropsies, and collecting and archiving samples. In addition, several talks and a workshop focused on the potential effects of anthropogenic noise on marine mammals and the samples or necropsy protocols that might be useful for diagnosing cases where anthropogenic noise may have contributed to or caused the stranding. Marine Mammal Commission staff participated in the conference.

Release Criteria for Rehabilitated Animals

Section 109(h) of the Marine Mammal Protection Act provides the statutory basis for the stranding response programs of the National Marine Fisheries Service and the U.S. Fish and Wildlife Service. That provision authorizes federal, state, and local government officials and those designated by the Services to take marine mammals when necessary for (1) the protection or welfare of the mammal, (2) the protection of the public health and welfare, or (3) the nonlethal removal of nuisance animals. It further specifies that, “[i]n any case in which it is feasible to return to its natural habitat a marine mammal taken ... under [this provision], steps to achieve that result shall be taken.” Because it may not always be clear when such animals are releas-

able, Congress included a provision in the 1992 Marine Mammal Health and Stranding Response Act directing the Secretary of Commerce to “develop and implement objective criteria to determine at what point a marine mammal undergoing rehabilitation is returnable to the wild.” Those criteria were to be completed by 4 November 1994.

As discussed in previous annual reports, the National Marine Fisheries Service developed draft release criteria in 1997 in conjunction with the U.S. Fish and Wildlife Service and in consultation with marine mammal biologists, behaviorists, and veterinarians. The draft criteria were published for review and comment in 1998 but, although revised to address comments received from the public and two expert advisory panels, they were never finalized. The lack of objective criteria for the release of animals has led to confusion and controversy regarding the release of certain marine mammals, with the primary concerns being the possible com-

munication of diseases; competition for resources; genetic stock mixing between rehabilitated animals and the wild populations to which they were returned; and the ability of captive animals, specifically captive-born and long-term captives, to adapt to conditions in the wild. The completion of such criteria therefore seems critical both to marine mammals that may be candidates for release and to efforts to maintain the overall health of marine mammal populations in the wild.

At the end of 2004 the National Marine Fisheries Service had revised the draft release criteria again and provided them to the U.S. Fish and Wildlife Service for review. The U.S. Fish and Wildlife Service transmitted official comments on the draft release criteria to the National Marine Fisheries Service on 11 April 2005. In a letter to the National Marine Fisheries Service on 25 January 2005, the Marine Mammal Commission reiterated its earlier recommendation that the Services issue final regulations or guidelines on releasing rehabilitated marine mammals. In its 18 April 2005 response, the National Marine Fisheries Service indicated that it expected to complete a final product by the end of 2005. However, no further action was taken in 2005 regarding the release criteria. The Commission anticipates that the National Marine Fisheries Service and the U.S. Fish and Wildlife Service will work together to complete a mutually agreeable draft and then either publish the draft criteria in the *Federal Register* for additional public comment or initiate environmental review of the criteria under the National Environmental Policy Act and the Endangered Species Act.

Unusual Mortality Events

Unusual mortality events (UMEs) involving marine mammals appear to have increased in frequency and scale over the past several decades. The apparent increase may be due to actual increases in mortality, more extensive observation, better reporting, or some combination of these. Such events have been documented in the United States and around the world for a wide range of species and may involve from a few to thousands of animals. UMEs can have a devastating impact on marine mammal populations, particularly those that are already threatened or endangered.

Mortality events are triggered by a variety of factors, both natural and human-related. These can be difficult to distinguish because human activities

may indirectly affect the occurrence of otherwise natural factors, causing mortality events. For example, the frequency, severity, and location of toxic algal blooms may be changing as a consequence of global warming and marine pollution.

Some mortality events are caused by disease. Morbilliviruses (which cause distemper in dogs, measles in humans, and rinderpest in hoofed mammals) are thought to be responsible for several recent events involving Mediterranean monk seals, harbor seals, bottlenose dolphins, and striped dolphins. Severe outbreaks may have occurred because cetaceans and pinnipeds have only recently been exposed to these viruses and thus have not acquired immunity to them. Alternatively, more virulent forms of the viruses may be evolving or scientists may have become more adept at diagnosing the causes of disease outbreaks.

High levels of environmental contaminants also may contribute to mortality events. Contaminant levels are especially high in top-level predators such as killer whales and polar bears. Levels of polychlorinated biphenyls in killer whales exceed levels found to have adverse effects in harbor seals and have been correlated with changes in reproductive hormone levels in polar bears. Human-related events and activities, such as oil spills and operation of powerful sonars, also may cause mortality events.

It is important to recognize that mortality events may be caused by multiple as well as single factors. Animals that are in poor condition due to unsuccessful foraging, for example, may be more vulnerable to disease or exposure to harmful algal blooms. Similarly, animals exposed to high levels of contaminants may experience reduced immune system function, which may predispose them to disease and reduce their chances of survival.

Working Group on Marine Mammal Unusual Mortality Events

The Marine Mammal Health and Stranding Response Act of 1992 directed the Secretary of Commerce to carry out the following:

- 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.

The National Marine Fisheries Service, in consultation with the Marine Mammal Commission and the U.S. Fish and Wildlife Service, established the Working Group on Marine Mammal Unusual Mortality Events composed of marine mammal experts from around the country. The Service consults the working group whenever increases in stranding rates or other factors suggest that a UME may be occurring.

The working group held its first meeting in April 1993 and has met annually since then. The most recent meeting took place 16–18 August 2005 in St. Petersburg, Florida. The group reviewed mortality events in 2004 and 2005, including harbor seals in Maine, bottlenose dolphins in Florida, small cetaceans in the mid-Atlantic region, harbor porpoises in North Carolina, manatees in Florida, and large whales and Risso's dolphins in New England.

The working group also developed recommendations for improving the UME program. It recommended that the Department of the Interior support both the Prescott Grant Program and the UME contingency fund, particularly with regard to Florida manatees, which have been involved in three UMEs in the past four years. The group also recommended that the National Marine Fisheries Service support the development of national laboratory capabilities for diagnosis of wildlife diseases, improve the coverage and training of stranding programs throughout the United States, and work toward revising legislation to allow UME funds to be used for carcass disposal (which can represent a substantial cost to local governments or stranding networks).

Unusual Mortality Events in 2005

At least four separate incidents involving unusually high levels of mortality of marine mammals occurred during 2005. The events and the species affected are described here.

Pilot whales in North Carolina — On 15–16 January 2005, 33 stranded pilot whales (*Globi-*

cephala macrorhynchus) were found near Oregon Inlet on the Outer Banks of North Carolina. On the same day, two dwarf sperm whales (*Kogia sima*; near Hatteras, North Carolina) and a live minke whale calf (*Balaenoptera acutorostrata*; near Duck, North Carolina) were found stranded along the coast of the Outer Banks. On 19 January a decomposed dwarf sperm whale calf was found just south of the Outer Banks (South Core Banks), and it may have been involved in the same stranding event. U.S. naval maneuvers coincided with the strandings although details regarding the precise timing, location, and use of particular sound sources were not publicly available at the end of 2005. Necropsies with at least some sample collection were conducted on 27 pilot whales, 3 dwarf sperm whales, and the minke whale. Blood samples and ocular fluid were collected from two additional pilot whales before they washed out to sea. Computed tomography (CT) scans were conducted on the heads of two pilot whales and two dwarf sperm whales. The analyses of the resulting data are ongoing, and the only findings discussed at the UME working group's meeting suggested that the stranded animals were not suffering from infectious disease. At the end of 2005 the working group was considering whether the stranding event represented a new UME or was part of the 2004 UME involving small cetaceans along the Atlantic coast. A final report on this stranding event should be available in 2006.

Harbor porpoises in North Carolina — Thirty-eight harbor porpoises (*Phocoena phocoena*) stranded in North Carolina between 1 January and 28 March 2005, and a UME was declared. Most were young-of-the-year, and many were emaciated, suggesting that those animals had difficulty finding food. Histopathological investigations of six stranded porpoises showed no evidence of systemic disease or common symptoms among the animals, other than emaciation. After the UME was declared, only one more harbor porpoise stranded in North Carolina for the remainder of the year. A final report on this UME should be available in 2006.

Multispecies mortality associated with Florida red tide — In March 2005, at least 33 manatee carcasses were found along the western coast of Florida. Most of the carcasses tested positive for brevetoxin, a naturally occurring neurotoxin produced by the dinoflagellate *Karenia brevis*. Blooms of *K. brevis* commonly are referred to as Florida red

tide. A substantial red tide bloom was present along the southwestern coast of Florida early in 2005, and it persisted throughout the entire year, although its geographic extent changed over time. A UME was declared on 22 March, the third red tide-induced UME for manatees in the past four years. Of 396 manatee carcasses found in Florida in 2005, the cause of death for 81 was attributed to brevetoxicosis. From July to October, 54 bottlenose dolphin carcasses were found along Florida's west coast, as were three carcasses of unidentified delphinids and one stranded live bottlenose dolphin neonate. The cause of many or all of the dolphin strandings and deaths likely was brevetoxicosis although the results of analyses of dolphin tissues and stomach contents were pending at the end of 2005. A second UME was declared for bottlenose dolphins on 10 November 2005, and that UME was combined with the manatee UME as a multispecies mortality event. Sea turtles, seabirds, and fishes also exhibited local die-offs caused by the red tide bloom throughout the year. At the end of 2005 the red tide bloom still persisted in low concentrations offshore, and analyses of manatee, dolphin, sea turtle, seabird, and fish mortality events were ongoing. A combined multispecies mortality event report will be developed at the conclusion of the event.

Large whales in New England — Fifteen large whales stranded or were found dead at sea in New England in July 2005. On 16 August the working group declared a large whale UME for northeastern U.S. waters. By 7 November a total of 34 large whales had been found dead at sea or onshore, including 10 minke whales, 7 humpback whales, 4 fin whales, 1 sperm whale, and 12 whales that could not be assigned to a particular species. Samples were collected from nine whales; the other whales were too far offshore to sample. A substantial algal bloom occurred in New England in the summer, and two minke whales tested positive for saxitoxin in their stomach contents. Saxitoxin is a natural neurotoxin produced by some dinoflagellates (e.g., *Alexandrium catenella*, *A. tamarense-excavatum*, and *Pyrodinium bahamense*). However, at the end of 2005 the cause of the UME had not been definitely determined, and the UME was considered to be ongoing.

Progress on Previous Unusual Mortality Events

Several UMEs that were ongoing at the end of 2004 were further considered by the working group during 2005. They are discussed here.

Bottlenose dolphins in Florida, 2004 — From 10 March to 13 April 2004, 107 bottlenose dolphins (*Tursiops truncatus*) stranded dead along the Florida panhandle, and hundreds of dead fish and marine invertebrates also were found in the area. The working group formally declared the die-off to be a UME on 15 March 2004. The event apparently was caused by brevetoxins. As already noted, blooms of *K. brevis*, known as the Florida red tide, have become common since the 1990s. The relatively high frequency of UMEs prompted the National Marine Fisheries Service to assess the health of bottlenose dolphins in the region to determine if they were more susceptible to red-tide events than dolphins from other areas. Twelve dolphins were captured during April 2005 for the study. Eleven of the animals were weighed and measured, and biological samples were collected for health analyses; the last animal did not react well to handling and was released quickly. All of the animals were marked for future identification. Most animals were equipped with radio transmitters to allow their movements to be tracked, and one animal was equipped with a satellite-linked transmitter, which provided locations remotely. At the end of 2005 analyses of health and movement data were ongoing, and the UME had not yet been declared formally closed.

Harbor seals in Maine, 2003–2004 — The number of harbor seal (*Phoca vitulina*) strandings along the coast of Maine increased rapidly between 2001 and 2004. The average number of seal strandings from 1996 to 2000 was 78 (54 live, 24 dead). In 2003, 260 strandings were reported (94 live, 166 dead), and 524 (178 live, 346 dead) were reported in 2004. As a result of the increased strandings and an increase in the proportion of adult seals found dead, a UME was declared for Maine harbor seals in 2003 and continued into 2004. This UME originally was linked to a UME of minke whales in the

same region, but no evidence was found to support such a link. At the end of 2004 the number of stranding reports was again similar to those of the previous five years, suggesting that the UME for Maine harbor seals may have ended. The working group reviewed recent information at its annual meeting in 2005 and declared the event to be over.

Small cetaceans along the Atlantic Coast, 2004 — Thirty-one small cetaceans stranded along the coast from Maryland to Georgia between 3 July and 2 December 2004. Stranded animals included eight species of small cetaceans that usually are found far offshore and generally are not expected to strand along the coast. The working group declared the strandings to be a UME on 20 August 2004. A retrospective analysis showed that strandings were unusually high from July through September 2004 from North Carolina through Georgia. Pathology results suggested two distinct proximate causes. The majority of delphinids showed inflammation in their central nervous system, which was likely caused by a virus. The majority of *Kogia* specimens (dwarf and pygmy sperm whales), on the other hand, had cardiac lesions. Scientists were unable to determine whether these two distinct pathologies reflected two separate mortality events that happened to coincide or resulted from a common ultimate cause, which may have reduced the animals' immune function. A final report on this UME is expected in 2006.

Small cetaceans off Virginia, 2004 — From May to July 2004, 66 small cetaceans were found stranded along the coast of Virginia, mostly along the outer (eastern) coast of Virginia's barrier islands. Most of the stranded animals were bottlenose dolphins, but harbor porpoises, common dolphins, Atlantic white-sided dolphins, Risso's dolphins, and pilot whales also were found. Additional animals stranded later but at rates similar to those of previous years. The working group declared the strandings to be a UME on 20 July 2004. Human interactions were implicated in 16 of the strandings (1 common dolphin and 15 bottlenose dolphins), with fishery interactions being the most common. Two bottlenose dolphins were found with cinder blocks tied to their flukes, one on Cedar Island

(19 June 2004) and the other in the Chincoteague National Wildlife Refuge (12 July 2004), and a third was found with a frayed line tied to its flukes (Wallops Island, 20 July 2004). National Marine Fisheries Service enforcement officers were notified of the incidents involving cinder blocks, but the Commission is unaware of the results, if any, of the investigation into those cases. A final report on this UME should be available in 2006.

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 marine mammal stranding network participants to carry out critical activities including recovery or treatment of stranded marine mammals, collection of data from living and dead stranded marine mammals, and operational costs directly related to those activities. Each award has a maximum of \$100,000 and may be granted for a project 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 because 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 2005, the National Marine Fisheries Service awarded grants totaling approximately \$3.7 million to 40 projects out of 95 submitted proposals. Technical and merit review panels evaluated the proposals and selected award winners. A member of the Commission staff participated on the merit review panel. In June 2005 the National Marine Fisheries Service solicited proposals for grants to be awarded in fiscal year 2006 and received 78 proposals.

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 lines, in traps, or in nets; damage or destroy fishing gear; or potentially 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.

In 2005 the Marine Mammal Commission commented on proposed amendments to National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act, discussed marine mammal/fisheries interactions in Alaska at the Commission's annual meeting (see Chapter II), participated on the Pelagic Longline Take Reduction Team convened by the National Marine Fisheries Service to address incidental mortality of marine mammals in Atlantic longline fisheries, and monitored developments in the eastern tropical Pacific tuna fishery. The following sections summarize those activities and recommendations resulting from them.

Proposed Amendments to National Standard 1

The Magnuson-Stevens Fishery Conservation and Management Act establishes 10 national standards and requires that fishery management plans and regulations be consistent with them. The first standard is that "conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry." In the 22 June 2005 *Federal Register*, the National Marine Fisheries Service proposed a set of changes relevant to National Standard 1 to facilitate compliance with the Act. The Marine Mammal Commission commented on those proposed changes on 21 October 2005. Key proposed changes and Commission comments were as follows.

Core stocks and stock assemblages

Stocks taken during fishing operations include those that are targeted and those that are caught incidentally.

Stock surveys and other research are required to assess the status of those stocks and the extent to which catches, whether intentional or incidental, affect stock status. In 2003 the Service reported that fish, shellfish, and crustaceans from just over 900 stocks are taken in federally managed fisheries, and the status of 541 of those stocks was unknown. Many of these are taken incidentally because they co-occur with targeted stocks. Current funding is not sufficient to support status assessment for all stocks, and the majority of assessment efforts are aimed at targeted stocks. To address this situation, the Service recommended that fishery management councils "group stocks for each FMP [fishery management plan], to the extent possible, into stock assemblages in order to improve status determinations for stocks that currently have an unknown status." The Service defined a stock assemblage as "a group of fish stocks that are geographically related, are caught by the same gear, and have sufficiently similar life history so that they can be managed together based on an aggregate F_{lim} , B_{lim} , and OY, or on stock-specific F_{lims} , B_{lims} , and OYs for indicator stocks." F_{lim} and B_{lim} are designations for the

limiting mortality rate imposed by a fishery and the biomass of the fished stock when that rate has been imposed, respectively. OY means the optimum yield from a stock.

In its 21 October 2005 letter to the Service, the Marine Mammal Commission questioned whether grouping of stocks into assemblages does, in fact, increase the level of protection for each stock. All stocks grouped into an assemblage may not be equally vulnerable to fishing operations. In the absence of stock assessment information, it may be difficult or impossible to determine the extent to which stocks are geographically related or have similar life histories. In addition, although stocks may be caught by the same fishing gear, they may not be equally vulnerable to that gear. Stocks with lower than average reproductive capacity, smaller population size, or greater vulnerability to fishing gear may be placed at greater risk if grouped with stocks with greater reproductive capacity, larger population size, or less vulnerability.

The use of indicator species also does not ensure that stocks in an assemblage are adequately protected unless it can be demonstrated that management measures based on the indicator species are sufficient to protect the most vulnerable stocks. Here again, the use of one stock as an indicator of another must be validated before considered reliable. Otherwise, grouping may become more a matter of convenience rather than a suitable basis for protecting fish stocks and the ecosystem.

Finally, the Commission questioned whether grouping stocks actually improves status determinations. In the absence of needed information, this approach could have the opposite effect by overlooking the vulnerability of certain stocks because they have been placed in a stock assemblage. For that reason, the Commission recommended that the Service “review its rationale for grouping stocks in assemblages, modify the final guidance to assure that protection of potentially vulnerable stocks will be achieved under the proposed approach, and seek means of collecting information needed to assess the status of affected stocks so that they are not put at risk by grouping.”

Fishing Mortality Thresholds

The Service’s proposed changes to National Standard 1 included a requirement that “in any new or amended fishery management plan, target mortality rate (F_{target}) for stocks being rebuilt must be less than the limiting mortality rate (F_{lim}), beginning in the first year and thereafter.” The Commission

concurred with the precautionary intent of this rule but questioned whether the first year started when a stock was designated as “overfished” or “depleted” or if it started when the stock rebuilding plan was completed. A rebuilding plan may take several years to complete; thus, the Commission suggested that the timeline should start with the designation of the stock as depleted. When overfishing on a depleted stock continues, the stock becomes more depleted, requires a longer recovery period, and is less likely to fulfill its ecological role. These ecological consequences are accompanied by economic ones inasmuch as any future fisheries targeting that stock are compromised. To avoid such situations, particularly when they result from failure to develop and implement a rebuilding plan in a timely manner, the Commission further recommended that the Service establish a time at which all fishing on an overfished stock should cease until a rebuilding plan is completed and initiated.

The Service also proposed to manage stocks solely on F_{lim} when data are inadequate to estimate rebuilding targets in terms of B_{MSY} (the biomass estimated to produce the maximum sustainable yield) or a proxy. The Commission disagreed with this proposal based, in part, on other arguments put forth by the Service that “stocks can become depleted for reasons other than, or in addition to, overfishing, such as environmental changes, pollution, and habitat destruction.” Under such conditions, basing a determination of stock status solely on fishing mortality rate could put the stock at unknown but potentially significant risk. For that reason, the Commission recommended that the Service require affirmative evidence of a stock’s status, particularly before removing the protections associated with a designation of overfished or depleted.

Stock Size Thresholds

The Service proposed that the threshold for determining when a rebuilding plan is necessary be set at one-half of B_{MSY} , or one-half the biomass that produces the maximum sustained yield. The Commission concurred with the Service that using this biomass level is conceptually straightforward but also noted that its use is confounded by several important assumptions. The first assumption is that fishing to achieve the theoretical maximum sustained yield is, in fact, sustainable and consistent with the maintenance of healthy marine ecosystems (see Chapter II). The second assumption is that fisheries biologists can provide empirically derived and reliable estimates of B_{MSY} , which generally is not the case.

For example, in the North Pacific, where fisheries management is often considered to be exemplary, B_{MSY} is unknown for almost all targeted stocks. Although fisheries scientists use “proxies” for B_{MSY} , it is not clear that the underlying relationship between stock and recruitment, including variability in that relationship, is adequately reflected in those proxies. The third assumption is that fishing based on maximum sustainable yield takes into account all the other factors that may affect stock status but are not accounted for in its presumed stock recruitment relationship (e.g., pollutant effects, loss of habitat).

The Service suggested that B_{lim} for stocks with high natural fluctuations in biomass can be safely set near the lower end of the resulting range (e.g., the lower 95 percent confidence interval). Here, too, the Commission disagreed. Such an approach could hold a stock at a low level when its persistence may depend on periodic replenishment from peaks of recruitment and reproductive biomass. All other things being equal, stocks with high natural fluctuations in biomass may be more vulnerable than less variable stocks. In addition, from an ecological perspective, the value of some prey species for marine mammals may depend on periods or pulses of high abundance or biomass.

The Service also suggested that specification of B_{lim} would not be required in all cases, including those for which existing data are grossly inadequate or insufficient for providing a defensible estimate of B_{lim} or a proxy thereof. Estimation of B_{lim} will be difficult in a number of cases, particularly where poorly known stocks are taken in fisheries targeting other species. The Commission questioned whether fishing for a stock when its B_{lim} cannot be reliably estimated is consistent with responsible fishery management practices and recommended that, before such fishing is allowed, the Service provide explicit guidelines that ensure conservation of the stock, including a description of how stock status would be monitored.

Rebuilding Times

The current strategy for establishing rebuilding times for overfished stocks is based on minimum and maximum rebuilding times (T_{min} and T_{max} , respectively), which are determined as follows. T_{min} is defined as “the number of years it takes to achieve a 50-percent probability that biomass will equal or exceed B_{MSY} at least once, when $F = 0 \dots$ ” Further, “ T_{max} may not exceed 10 years if T_{min} is less than 10 years, and T_{max} may not exceed T_{min} plus one generation time, if T_{min} is greater than or equal to

10 years.” This results in a discontinuity: if a stock has a T_{min} of nine years, then T_{max} may not exceed 10 years; if its T_{min} is 10 years, then T_{max} jumps to 10 years plus one generation time. To avoid this discontinuity the Service proposed that T_{max} be determined as follows: if T_{min} plus one generation time exceeds 10 years, then $T_{max} = T_{min}$ plus one generation time; if T_{min} plus one generation time is less than or equal to 10 years, then $T_{max} = 10$ years.

The Commission concurred with the Service that explicit rebuilding times are needed and that the current approach results in an illogical discontinuity. The Commission believes that, for the purpose of maintaining ecosystem health as well as fishery productivity, the best strategy is to facilitate stock recovery as quickly as possible. The length of time needed to recover an overfished stock to B_{MSY} depends on the extent to which the stock is overfished, its inherent reproductive capacity, natural and anthropogenic environmental factors that may affect recovery, and the amount of fishing that is allowed to occur. Once a stock is overfished, fishery managers only have control over the amount of fishing allowed. The use of 10 years to determine rebuilding times is not based on biology but rather on a political tolerance for delay in recovery. The Commission suggested that the use of T_{min} , or some derivative of T_{min} , would provide a better biological basis for determining rebuilding times. If estimated correctly, T_{min} should take into account all pertinent stock biology, including recruitment processes and their variability, other natural and anthropogenic factors that may affect stock recovery, as well as the degree of depletion. Setting T_{max} equal to T_{min} times some recovery or safety factor (e.g., 1.5) provides a simple, understandable expression of tolerance for fishing of overfished stocks that is derived from, and expressed in terms of, the fastest possible recovery (i.e., recovery in the absence of fishing).

Revision of Unsuccessful Rebuilding Plans

The Service identified two strategies when a stock is rebuilding more slowly than initially projected: the first is to reduce the target fishing mortality rates and the second is to lengthen the rebuilding horizon. The Commission recommended that the preferred approach is to reduce target fishing mortality rates because unanticipated delay in rebuilding indicates that the stock’s capacity to recover and its tolerance for additional fishing have been overestimated. Lengthening rebuilding times should be used only

as a last resort because it provides an incentive to continue overfishing.

Optimum Yield Control Rules

Finally, the Service proposed strengthening the current requirement to develop target optimum yield control rules by requiring such rules for each core stock and stock assemblage unless the available data are inadequate to do so. Optimum yield control rules must be less than maximum sustainable yield control rules for all levels of stock abundance because they should incorporate social, economic, and ecological factors. In general, the Commission agrees with the requirement that optimum yield control rules must be less than maximum sustainable yield control rules. The growing emphasis on ecosystem-based fishery management serves as a reminder of the importance of these other considerations. Further, determining the ecological tolerance of marine ecosystems to fisheries removal is one of the major challenges facing managers seeking to identify truly sustainable levels of fishing that are consistent with healthy ecosystems. The Commission noted that it was aware of ongoing efforts by the Service to take these considerations into account in fisheries management and encouraged them to continue to do so. This issue was one of the major elements of the discussion on management of groundfish fisheries in Alaska waters, as described in Chapter II. At the end of 2005 the Service informed the Commission that it was delaying further action on these proposed changes until Congress takes action on pending amendments to the Act.

Marine Mammal/Fisheries Interactions in Alaska

The Marine Mammal Commission held its 2005 annual meeting in Alaska. The meeting focused on major issues affecting marine mammals in the Gulf of Alaska and the Bering, Chukchi, and Beaufort Seas, including the effects of commercial fishing. The discussions regarding direct and indirect effects of fishing are summarized in Chapter II. Two additional matters covered under the topic of fishery effects were the difficulty of determining when marine mammals are seriously injured by fishery interactions and the problem of determining the stock of origin for certain marine mammals killed in fisheries interactions.

Serious Injury

The National Marine Fisheries Service has defined “serious injury” as an injury that is likely to lead to mortality. In 1997 the Service held a workshop to develop more specific guidelines for various groups of marine mammals (e.g., pinnipeds, large cetaceans, small cetaceans). Unfortunately, the guidelines have proven difficult to implement because the necessary data are not always available. The Commission understands that the Service is planning to convene a workshop in 2006 to address this issue. In view of the uncertainty regarding the seriousness of many injuries, the Commission wrote to the Service on 8 March 2005 to recommend that guidelines should be precautionary, both to protect marine mammals and to provide incentives for collecting more comprehensive data.

Stock of Origin

When marine mammals are killed in fishing operations, the stock of origin often is difficult to determine if multiple stocks of the same species occur in the same area. This problem is exacerbated when animals from the different stocks are difficult to distinguish visually and when genetic samples from the dead marine mammals or the possible stocks of origin are not available. Currently the approach used to assign those animals to specific stocks is inconsistent among regions. Proposed changes to the stock assessment guidelines suggest that the mortalities be partitioned according to the relative abundance of the stocks present. In its letter of 8 March 2005, the Commission suggested that such approach could disadvantage smaller, more vulnerable stocks. The Commission recommended that the Service follow the approach used in the Alaska region to assign the unidentified mortalities to all potential stocks of origin. Although this may result in some double counting, it ensures adequate protection for the most vulnerable stocks and provides incentives to improve collection of stock information.

Atlantic Pelagic Longline Take Reduction Team

Under the Marine Mammal Protection Act, the National Marine Fisheries Service is to convene take reduction teams to address situations where the incidental taking of marine mammals in fisheries exceeds certain specified levels. Each team develops

a plan to reduce the number of incidental takes to below a stock's potential biological removal (PBR) level within six months of a plan's implementation and to insignificant levels approaching a zero mortality rate within five years. PBR is defined in 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." The Service has defined the zero mortality rate goal (ZMRG) as an incidental take rate lower than 10 percent of PBR.

In 2005 the Service established a take reduction team to reduce the number of incidental marine mammal takes in the Atlantic pelagic longline fishery. The team was convened as part of a settlement agreement in a lawsuit brought against the Service in 2002 by the Center for Biological Diversity and Turtle Island Restoration Network. The agreement called for the formation of two take reduction teams to address long-finned and short-finned pilot whale (*Globicephala melas* and *G. macrorhynchus*, respectively) and common dolphin (*Delphinus delphis*) takes in the longline fishery and the Atlantic squid/mackerel/butterfish trawl fishery. To meet this requirement, the Service must convene a second team by 30 September 2006.

The Atlantic pelagic longline take reduction team is composed of longline fishermen and industry representatives; marine mammal and fisheries biologists, and representatives from environmental conservation organizations; the Mid-Atlantic Fishery Management Council, the Service, and the Commission. The team originally was convened to address pilot whale and common dolphin takes in accordance with the settlement agreement, but no common dolphin takes have been observed in the longline fishery in the past five years. As a result, the team decided to focus on the two species of pilot whales. Because these two species are virtually indistinguishable in the field, the Service currently manages them as one species complex (i.e., both abundance estimates and incidental take rates are derived for the two species together [Table 8]). Risso's dolphins (*Grampus griseus*) and pygmy sperm whales (*Kogia breviceps*) also are taken in the

pelagic longline fishery (Table 8). Over the past five years, the average estimated take rates for pilot whales (both species together) and for Risso's dolphins are less than PBR but above ZMRG. The pygmy sperm whale incidental take rate exceeds the PBR calculated for pygmy sperm whales and dwarf sperm whales (*Kogia sima*) combined, but that rate is estimated on the basis of only one observed take in the past five years. At the end of 2005 the team was considering whether to include Risso's dolphins and pygmy sperm whales within the scope of the take reduction plan.

In 2005 the team met on 29–30 June and 27–29 September for informational briefings on the fishery, incidental take rates, and the biology of pilot whales and Risso's dolphins. Two meetings are planned for 2006, and the team intends to submit its recommended take reduction plan to the Service following those meetings.

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 km² (5 million mi²), 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 be-

Table 8. Estimated abundance and annual incidental take for marine mammals affected by the Atlantic pelagic longline fishery

Species	Estimated abundance	Estimated takes (all fisheries total)	Estimated PBR
Pilot whales (both species)	31,139	132 (210)	239
Risso's dolphins	20,479	48 (51)	124
Pygmy sperm whales ¹	395	6 (6)	2

¹ Estimated abundance and PBR are for pygmy sperm whales and dwarf sperm whales combined. Data courtesy of National Marine Fisheries Service stock assessment reports for 2005.

came 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. 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 less than 2,000 dolphins per year. Nevertheless, at least two dolphin stocks that have been heavily impacted 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 observed reduction in mortality, and the stocks remain severely depleted. 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.

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, and perhaps more important, U.S. legislation establishes standards as to what tuna may be labeled as being “dolphin-safe,” a label that makes the product 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. By the mid-1980s that number had dropped to fewer than 50. In 2005 only four U.S. purse seine vessels obtained permits to fish for tuna in the eastern tropical Pacific, and none of those vessels intentionally set on schools of dolphins. In fact, no U.S. vessel has intentionally set on dolphins since 1994. Nevertheless, 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. For example, 24 dolphins were accidentally captured and killed by U.S. vessels in 1998. The most recent mortalities attributed to the U.S. fleet involved five rough-toothed dolphins (*Steno bredanensis*) in 2002.

Foreign capacity in the fishery grew concurrently with the decline in the U.S. fleet in the eastern tropical Pacific. 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 cubic meters in well volume—roughly 400 short tons/363 metric tons or more in capacity) in the foreign fleet. Data provided in the most recent quarterly report published by the Inter-American Tropical Tuna Commission (July–September 2005) indicate that there are now about 156 large purse seine vessels participating in the fishery. The largest fleets belong to Ecuador (42 vessels), Mexico (41), Venezuela (25), Panama (18), and Colombia (11).

The growth in overall fleet capacity during the 1990s prompted the Inter-American Tropical Tuna Commission—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 Inter-American Tropical Tuna Commission program, the capacity of the international fleet eligible to use purse seines 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 9,887 short tons/8,969 metric tons per year, the equivalent of about 25 vessels with a capacity of 400 short tons/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 make a single fishing trip of not more than 90 days in the eastern tropical Pacific without counting against the fleet capacity limit.

Not only has overall fleet capacity increased in recent years, but there has also been an increasing trend in the number of sets being made on schools of dolphins. Data on the number of sets on dolphins made during the past 25 years are presented in

Figure 23. The Inter-American Tropical Tuna Commission reported that 13,839 sets on dolphins were made in 2003, the highest number in any year since the fishery began. The number of sets on dolphins declined to 11,783 in 2004, but preliminary data for 2005 indicate that the number of dolphin sets again exceeded 12,000. Despite the increase in the number of dolphin sets being made in recent years, reported dolphin mortality has not changed appreciably during this period. As reflected in Table 9, the reported number of dolphins killed in the course of fishing for tuna in the eastern tropical Pacific Ocean remains well below the aggregate dolphin mortality limit of 5,000 per year. Although subject to revision, the Inter-American Tropical Tuna Commission preliminarily estimated that fewer than 1,200 dolphins were killed incidental to purse seine fishing operations in the eastern tropical Pacific in 2005, the lowest number since the fishery began. Although this level of mortality is believed not to be biologically significant to the affected dolphin stocks, as discussed in greater detail later in this section, there is concern that stress and its related impact associated with the chase and capture of dolphins in the course of catching tuna may adversely affect the ability of depleted dolphin stocks to recover. As such, recent increases in the number of dolphin sets being made remain a cause for concern.

Another issue that has garnered increasing attention in recent years is the number of small ves-

sels capable of making sets on schools of dolphins but not covered by dolphin protection programs. Historically, the regulatory agencies and Congress believed that only vessels of greater than 400 short tons/363 metric tons carrying capacity could successfully make sets on dolphins. This is reflected both in domestic legislation and in international agreements. For example, in regulations implementing the dolphin-safe labeling requirements of the Marine Mammal Protection Act, the National Marine Fisheries Service has used the 400-short-ton/363-metric-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 they can be labeled as dolphin-safe. There is a growing body of evidence that some vessels of less than this size have been setting on dolphins. According to the Inter-American Tropical Tuna Commission, 300 sets on dolphins have been made by vessels smaller than 400 short tons/363 metric tons since 1987. In response, parties to the Agreement on the International Dolphin Conservation Program adopted a resolution in October 2002 specifying that any vessel of 400 short tons/363 metric 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 (Pub. L. 108-447) funded the National Marine Fish-

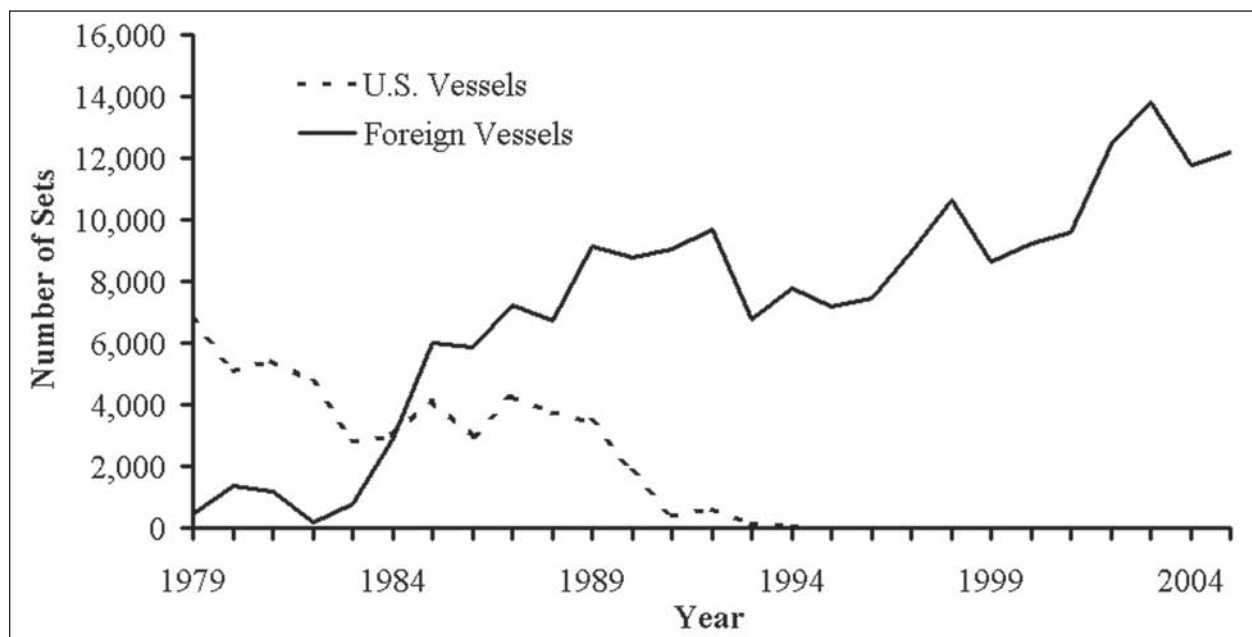


Figure 23. Number of U.S. and foreign vessel sets on dolphins, 1979–2005. Data courtesy of the National Marine Fisheries Service and the Inter-American Tropical Tuna Commission.

Table 9. Estimated incidental kill¹ of dolphins in the tuna purse seine fishery in the eastern tropical Pacific Ocean, 1972–2005

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

eries Service’s activities related to dolphin encirclement 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/363 metric 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 Inter-American Tropical Tuna Commission 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. The Service is working with the Tuna Commission toward the development of such a system. In September 2005 the Service entered into a contract with the Tuna Commission to place observers on some Class 4 and 5 vessels (those

with a well volume of between 213 and 425 cubic m [277 to 552 cubic yd]) and to monitor landings from these vessels to look at the frequency with which yellowfin tuna of different sizes are caught using different fishing methods.

The International Dolphin Conservation Program

Representatives of the United States and 11 other nations signed the Declaration of Panama on 4 October 1995. By doing so, those nations declared their intention, contingent on the enactment of changes in U.S. law, to formalize an earlier agreement (the La Jolla Agreement), under which significant reduction in dolphin mortality had occurred, as a binding international agreement and to incorporate additional dolphin protection measures. The envisioned changes to U.S. law included allowing access to the U.S. market for all tuna, whether caught by setting on dolphins or not, provided that the fish were caught in compliance with the agreement. The

Declaration of Panama also called on the United States to redefine the term “dolphin-safe” to include any tuna caught in the eastern tropical Pacific by a purse seine vessel in a set in which no dolphin mortality was observed, rather than applying that term only to tuna caught on trips during which no sets on dolphins were made. Among other things, the new international agreement was to establish annual stock-specific quotas on dolphin mortality based on minimum population estimates and to limit overall mortality to no more than 5,000 animals a year. The international agreement envisioned by the parties to the Declaration of Panama, the Agreement on the International Dolphin Conservation Program, was concluded in May 1998 and entered into force on 15 February 1999.

Under this agreement, each vessel of greater than 400 short tons/363 metric tons carrying capacity is required to carry an observer on each fishing trip made in the eastern tropical Pacific Ocean. At least 50 percent of the observers placed on a nation’s vessels are to be from the Inter-American Tropical Tuna Commission observer program, with the remainder coming from a parallel national program, should the nation decide to establish one. Among other things, the observers are to report the number of dolphins killed and seriously injured in purse seine sets. The Service expects that the results of this ongoing research will help identify the characteristics of vessels capable of catching tuna by setting on dolphins.

The International Dolphin Conservation Program Act

Efforts to amend U.S. law as called for by the Declaration of Panama culminated in enactment of the International Dolphin Conservation Program Act on 15 August 1997. The new law made several changes to the U.S. tuna-dolphin program. Among other things, changes to section 304 of the Marine Mammal Protection Act directed the Secretary of Commerce, in consultation with the Marine Mammal Commission and the Inter-American Tropical Tuna Commission, to conduct a study of the effects of chase and encirclement on dolphins and dolphin stocks taken in the course of purse seine fishing for yellowfin tuna in the eastern tropical Pacific. The study was to consist of abundance surveys and stress studies designed to determine whether chase and encirclement are having a “significant adverse impact on any depleted dolphin stock in the eastern tropical Pacific Ocean.” Specifically, the amend-

ments required the National Marine Fisheries Service to survey the abundance of depleted dolphin stocks during 1998, 1999, and 2000. The stress studies were to include (1) a review of relevant stress-related research and a three-year series of necropsy samples from dolphins killed in dolphin sets, (2) a one-year review of relevant historical demographic and biological data related to dolphins and dolphin stocks, and (3) an experiment involving the repeated chasing and capturing of dolphins by means of intentional encirclement. The amendments directed the Service to make a final finding on the effects of chase and encirclement by 31 December 2002. If the Service determined that there is no significant adverse effect, the definition of dolphin-safe tuna would be changed to include all tuna harvested in sets in which no dolphin mortality or serious injury was observed.

The National Marine Fisheries Service issued the final finding required under the International Dolphin Conservation Program Act on 31 December 2002. The Service found that “[b]ased on the information reviewed, ... the intentional deployment on or encirclement of dolphin[s] with purse seine nets is not having a significant adverse effect on any depleted dolphin stock in the [eastern tropical Pacific].” The Service published that finding in the *Federal Register* on 15 January 2003, providing additional details on the information reviewed, the process followed, and the criteria used to make that decision. The finding and supporting documentation are found on the Service’s Web site (<http://swr.nmfs.noaa.gov/tmm.htm>).

Litigation

Within hours of the release of the final finding, environmental organizations filed suit in the U.S. District Court for the Northern District of California challenging the finding, claiming that it was not supported by the research findings and other information and, therefore, that it was arbitrary and not in accordance with the applicable law. As discussed in previous annual reports, the court issued a preliminary injunction in the case, *Earth Island Institute v. Evans*, on 10 April 2003, enjoining the Service from taking any action under the International Dolphin Conservation Program Act to allow any product to be labeled as dolphin-safe that was harvested using purse seine nets intentionally set on dolphins in the eastern tropical Pacific.

The court issued its ruling on the full merits of the case on 9 August 2004, finding that the Service had failed to diligently pursue the necropsy study

and the chase and capture experiment mandated by the International Dolphin Conservation Program Act. The court believed that so little had been accomplished on those projects that the results were rendered meaningless. In this regard, at the time the final finding was made less than 10 percent of the minimum number of necropsy samples needed to provide meaningful results had been obtained. The court ruled that excusing the agency from obtaining a sufficient sample size to achieve scientifically meaningful results would be “tantamount to excusing [it] from the Congressional mandate” with which it was charged. The court remained unswayed by the Service’s arguments that the logistical and bureaucratic challenges of working with other nations to secure samples justified the slow progress, concluding that the record demonstrated a lack of due diligence on the agency’s part. As for the chase and encirclement experiment, the court also concluded that the sample sizes obtained were too small to address important questions related to the finding or to allow for population-level inferences. In the court’s opinion, the record of agency action demonstrated “a pattern of delay and inattention that contributed to limited results.”

Under the International Dolphin Conservation Program Act, the final finding was to be based on the “best available scientific evidence.” The Service had established a process that focused on four general issues for assessing that information with respect to the apparent failure of depleted dolphin stocks in the eastern tropical Pacific to recover as expected: (1) changes to the ecosystem that may have affected the ability of these stocks to recover, (2) current direct mortality levels, (3) effects of stress or other indirect factors associated with the tuna fishery, and (4) the growth rates of the stocks. In making the final finding that the fishery is not having a significant adverse effect on the dolphin stocks, the Service had characterized the evidence as “mostly inconclusive.” The court, however, took a decidedly different view, concluding that “the Defendant’s effort to portray the record as providing even-handed support for either finding does not withstand scrutiny. Rather, while the record is hampered by limited data ... a fair reading of the science that is available—and one that does not improperly ignore evidence simply because it is not conclusive—indicates that virtually all of the best available scientific evidence points toward a fishery having a significant adverse impact.”

The court also examined the decision-making process used by the Service in reaching the final finding, which should have been based solely

on the best available scientific data. The court believed that the decisionmakers had been influenced by other policy concerns and that the record as a whole provided ample evidence that the agency had disregarded the best available science in favor of political and diplomatic considerations.

Based on its analysis, the court declared the final finding to be arbitrary, capricious, an abuse of discretion, and contrary to applicable law under the Administrative Procedure Act. Accordingly, the court directed that the term dolphin-safe will 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 (now *Earth Island Institute v. Gutierrez*). Representatives of the Mexican and Venezuelan tuna industries also filed an appeal of that ruling although they had been denied the right to intervene in the matter by the district court. The Mexican tuna industry also appealed the district court’s ruling that denied its participation in the case, a matter which it was seeking to have resolved before the appeal on the merits of the case proceeded. The Ninth Circuit Court of Appeals issued a ruling on the participation of Mexican and Venezuelan fishermen in the case on 26 May 2005, denying them status as parties. The appellate panel believed that the United States was adequately representing the foreign fishing groups’ interests in the case. Nevertheless, these trade groups, as well as the Inter-American Tropical Tuna Commission, have filed amicus briefs in the case. The court also ruled on a motion seeking to have the case moved to the U.S. Court of International Trade, where an earlier challenge of National Marine Fisheries Service regulations implementing the International Dolphin Conservation Program Act had been heard (*Defenders of Wildlife v. Hogarth*). It denied that motion, noting that this was a case involving how tuna are labeled rather than one involving embargoes against importing tuna. As of the end of 2005, briefing of the case by the parties was ongoing. Oral argument before the court is expected in 2006.

Regulations

The National Marine Fisheries Service published a proposed rule concerning the International Dolphin Conservation Program on 29 October 2004 to implement various resolutions adopted by the parties to the international program. Among other

things, the proposed regulations would have (1) established a register of U.S. vessels with a history of fishing in the eastern tropical Pacific and limited participation in the purse seine fishery to those vessels, (2) capped the capacity of U.S. purse seine vessels participating in the eastern tropical Pacific to 9,887 short tons/8,969 metric tons per year, (3) revised the requirements for maintaining and submitting records tracking tuna in commerce, (4) required owners of registered vessels to pay annual assessments, (5) prohibited commerce involving tuna or tuna products that do not meet the labeling requirements of the Dolphin Protection Consumer Information Act, and (6) prohibited interference with enforcement and inspection activities under applicable U.S. laws.

The Service published final regulations on 12 April 2005. The final regulations were substantively unchanged from the proposed rule but included several technical modifications in response to public comments.

Affirmative Findings and Embargoes

The regulations implementing the International Dolphin Conservation Program Act set forth procedures and criteria for making affirmative findings for tuna-harvesting nations. Only countries with such a finding are permitted to import yellowfin tuna and yellowfin tuna products harvested in the eastern tropical Pacific into the United States. During 2004 affirmative findings were made for Mexico, Ecuador, and El Salvador, giving them access to the U.S. market through 31 March 2005.

Once an affirmative finding is made, it may be renewed up to four times. However, every five years

each exporting country must submit a new application describing its tuna-dolphin program and compliance with the International Dolphin Conservation Program. Both Mexico and Ecuador submitted new applications to obtain affirmative findings for 2005 and subsequent years. The Service published a notice of a new affirmative finding for Ecuador on 13 May 2005. A notice of a new affirmative finding for Mexico was published on 17 June 2005. In addition, Spain, which had previously been subject to a tuna embargo, submitted sufficient information to obtain an affirmative finding. Notice of that finding was published by the Service on 9 June 2005. All of these findings will remain valid through 31 March 2010, subject to annual reviews by the Service.

The other country that has qualified for an affirmative finding in recent years is El Salvador. Although El Salvador does not need to submit a new application until 2008, the affirmative finding remains subject to annual review and renewal. The Service published notice of the annual finding for El Salvador on 13 May 2005. 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 that themselves cannot import tuna directly into the United States. Such embargoes prevent nations from gaining access to the U.S. market for their tuna by shipping through a secondary nation. Currently, no intermediary nation embargoes are in place.

Chapter VIII

INTERNATIONAL ASPECTS OF MARINE MAMMALS

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 the international arrangement for protecting and conserving marine mammals.

During 2005 the Commission was closely involved in a number of international efforts to protect and conserve marine mammals. The Commission Chairman and a member of the Committee of Scientific Advisors on Marine Mammals participated in an effort to develop a Caribbean marine mammal action plan. The Commission's Scientific Program Director and three members of the Committee of Scientific Advisors continued their participation in a scientific review of the potential impacts of offshore oil and gas development on the critically endangered western North Pacific population of gray whales. That issue is discussed in Chapter V of this report. In addition, the Commission paid close attention to developments in the eastern tropical Pacific tuna fishery and its possible impact on dolphin stocks in that area. Additional details on that issue are provided in Chapter VII. During the year, the Commission continued to advise the U.S. delegation to the International Whaling Commission and supported efforts to secure U.S. Senate ratification of the U.S.–Russia polar bear agreement. These activities are discussed in the following sections.

International Whaling Commission

The International Whaling Commission (IWC) was established under the International Convention for the Regulation of Whaling of 1946. At the end of 2005, 66 nations were members of the IWC. 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.

In 1982 the IWC established a moratorium on commercial whaling to promote the recovery of a number of whale stocks that had been depleted. Only Norway—which had lodged an objection to the moratorium and is therefore not bound by it—continues to conduct commercial whaling, *per se* (see the discussion of Japan's "research" whaling later in this section). During 2005 Norway autho-

rized the take of more than 600 minke whales from the northeastern Atlantic Ocean.

Revised Management Scheme

For more than a decade, the IWC has attempted to develop and adopt a Revised Management Scheme (RMS) to guide whale conservation and manage commercial whaling. The RMS would establish mechanisms by which catch limits are determined and practices are in place to ensure that those limits are not exceeded. At its 2004 meeting, the IWC adopted a resolution calling for intersessional work, both to complete the draft text of the RMS and to develop technical details so that the RMS could be ready for consideration and possible adoption at the 2005 IWC meeting.

The IWC's 57th annual meeting was held 20–24 June 2005 in Ulsan, Republic of Korea. At that meeting, the IWC took no action to reverse the moratorium on commercial whaling. Furthermore,

the IWC members continued to have divergent views on the elements to be included in the RMS, and the chairman determined that the RMS text was not ready for consideration in the plenary session. Japan proposed to amend the whaling convention's Schedule (which establishes whaling quotas) under an RMS that would lift the moratorium and allow commercial whaling to resume in coastal areas, but the proposal did not receive the needed three-quarters majority. Rather, the parties adopted a resolution to hold an intersessional meeting to work on the outstanding issues of the RMS before the 2006 IWC meeting.

“Scientific” Whaling

The International Convention for the Regulation of Whaling allows for scientific research whaling to be conducted outside the management scope of the IWC. Under this arrangement, Japan reported that its whalers took 440 minke whales during 2004–2005, the final year of its 16-year Antarctic research program (JARPA I). Although the IWC Scientific Committee had not yet reviewed the results of the program, Japan announced that it would begin another multiyear research whaling program in Antarctic waters (to be known as JARPA II) in 2006. The United States joined Australia and other nations in sponsoring a resolution criticizing Japan's unilateral decision to continue and expand its research whaling program. The resolution passed, but Japan remains committed to its research whaling program and intends to take 850 Antarctic minke whales, 50 humpback whales, and 50 fin whales during 2005–2006.

The Scientific Committee's 2005 preliminary estimate of minke whale abundance in the Antarctic is 362,000 minke whales, compared with an estimated 760,000 in 1990. Three hypotheses have been proposed to explain this apparent decline: (1) an actual change in minke whale abundance; (2) changes in the proportion of the total population within the survey area at the time of the survey; and (3) changes in the survey process that compromise the comparability of estimates across years. The IWC identified completion of a revised estimate for Antarctic minke whales as a high priority and noted that it expects the Scientific Committee to agree on estimates at the 2006 meeting.

Japan also continues to conduct research whaling in the North Pacific Ocean in a program known as JARPN II. Take levels in 2005 remained the same as in the past two years—220 minke whales, 50 Bryde's whales, 100 sei whales, and 10 sperm

whales. As in previous years, there was considerable disagreement within the IWC Scientific Committee over most aspects of this program, including the objectives of the study, the methods being used, the proposed sample sizes, the likelihood of success, the effects on whale stocks, and the amount and quality of data that could be obtained using non-lethal alternatives.

In 2003 Iceland announced it would begin a research whaling program involving minke, fin, and sei whales. Under this program, Iceland took 36 minke whales in 2003, 25 in 2004, and 39 in 2005. To date, Iceland has not taken fin or sei whales under its program.

The moratorium on commercial whaling does not apply to aboriginal subsistence whaling, which is managed under separate provisions. Currently, the IWC authorizes subsistence whaling from the following stocks: (1) the Bering/Chukchi/Beaufort Seas stock of bowhead whales, (2) the eastern North Pacific stock of gray whales, (3) minke and fin whales stocks off West Greenland, and (4) North Atlantic humpback whales off St. Vincent and the Grenadines. At its 2005 meeting, the IWC Scientific Committee's Subcommittee on Aboriginal Subsistence Whaling reviewed the catch limits for each of the affected stocks and recommended that no changes be made to the multiyear block quotas adopted by the IWC in 2002. However, the Scientific Committee informed the IWC that it was concerned about the unreliable abundance estimates for fin and minke whales off Greenland and noted that it would be difficult to develop a strike limit algorithm for authorizing future hunts from these stocks. In response, Greenland voluntarily agreed to reduce its take from 19 to 10 fin whales per year in 2006 and 2007. In addition, Denmark committed to assist Greenland in conducting new abundance surveys.

At the 2004 IWC meeting, a question was raised regarding an important assumption in the algorithm being developed to establish strike limits for bowhead whales. The assumption is that there is only a single stock of bowhead whales migrating past Barrow, Alaska, and available to subsistence hunters in Alaska and on Russia's Chukotka Peninsula. Preliminary information presented at the 2004 meeting suggested that this might not be the case. In response, the United States held a workshop in Seattle, Washington, on 23–24 February 2005 to examine the stock structure of Bering/Chukchi/Beaufort Seas bowhead whales and to evaluate and establish priorities for the ongoing research program investigating stock structure. Representatives from

Japan, Norway, Canada, and Russia participated in the review. The workshop participants considered various stock structure hypotheses and reexamined the so-called “Oslo Bump,” a significantly greater genetic difference between pairs of whales sampled approximately one week apart near Barrow during the fall migration versus those sampled at other times. At its 2005 meeting, the IWC Scientific Committee generally approved of the research being conducted to resolve these issues but recommended that every effort should be made to obtain samples for genetic analyses from whales taken by hunters in Russia. The committee stressed that the focus of the program should be to provide advice of direct relevance to testing the strike limit algorithm. However, pending completion of the stock structure studies, the Scientific Committee did not believe that changes were needed to the existing catch limits, which apply through 2007.

The IWC’s Conservation Committee, established in 2004, met again in 2005. Although there continues to be disagreement within the IWC over the Committee’s establishment and its terms of reference, the IWC agreed to two of the Committee’s recommendations: (1) developing a research program to address the issue of inedible “stinky” gray whales caught by aboriginal subsistence hunters on Russia’s Chukotka Peninsula, and (2) pursuing the issue of whales being killed or seriously injured by ship strikes.

Argentina, Brazil, and South Africa presented a Schedule amendment for IWC consideration that would establish a South Atlantic sanctuary. As in previous years when similar proposals were made, several countries that favor the resumption of commercial whaling opposed the proposal, and it failed to win the required majority. Japan and a number of other pro-commercial whaling countries also proposed a Schedule amendment to abolish the existing Southern Ocean Sanctuary. The United States and like-minded countries opposed that proposal, and it was not adopted.

During its plenary session, the IWC reviewed the Scientific Committee’s report on environmental matters, including the relationship between sea ice and cetaceans, habitat degradation, the State of the Cetacean Environment Report (SOCER), Arctic issues, and anthropogenic noise. The Scientific Committee also examined a number of issues related to whale-watching activities, including possible impacts of whale-watching on whales and the development of whale-watching guidelines, and provided recommendations to the IWC. Among other things, the Scientific Committee recommended that

it review opportunistic sources of data on cetaceans, including data collected from whale-watching operations, and their potential value to the work of the IWC.

United States–Russia Polar Bear Agreement

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 (Fig. 24). Several other stocks occur throughout the Arctic in Canada, Greenland, Norway, and Russia. Polar bears can traverse great distances, often crossing national boundaries and entering international waters. As such, efforts to conserve polar bears often require international cooperation. Recognizing this, and because of concern over the increase in the number of polar bears 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 habitat components 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.

In the early 1990s the Marine Mammal Commission and others raised concerns that existing U.S. laws may not be sufficient for the United States to implement fully all provisions of the Agreement on the Conservation of Polar Bears, particularly with respect to habitat protection. Also, it was clear that not all of the hunting restrictions contained in the agreement had been reflected in the Marine Mammal Protection Act or other U.S. laws. For example, the provisions of the Marine Mammal Protection Act allowing Alaska Natives to take marine mammals for subsistence and the creation and sale of handicrafts do not restrict the taking of polar bear cubs or female bears with cubs or hunting in polar bear denning areas, as does a resolution adopted by the parties to the agreement.

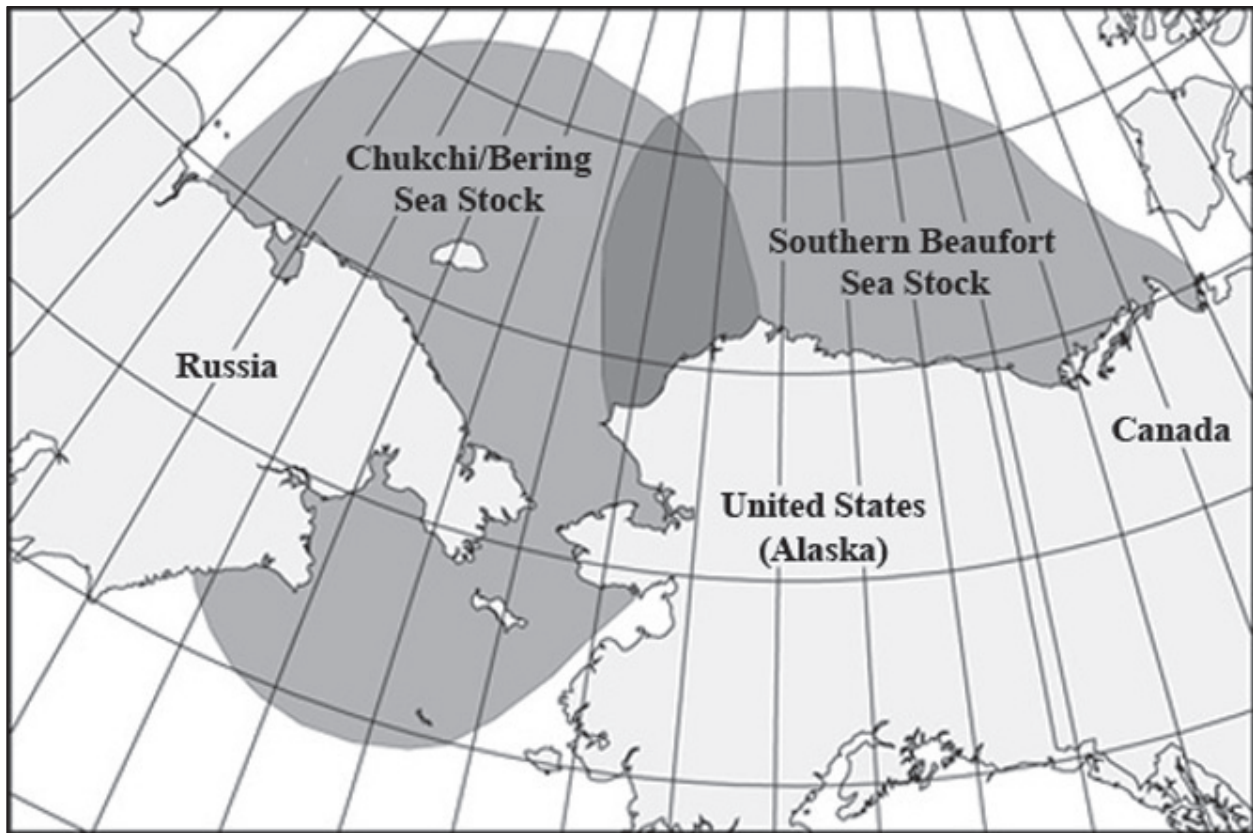


Figure 24. Distribution of Alaska stocks of polar bears. Figure courtesy of the U.S. Fish and Wildlife Service.

To address these perceived deficiencies, the U.S. 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. Those 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. Further impetus for a bilateral polar bear treaty between the United States and Russia came from an amendment enacted to the Marine Mammal Protection Act in 1994. Section 113(d) of the Act, added at that time, 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.

Efforts to pursue greater cooperation between the United States and Russia with respect to the Chukchi/Bering Seas polar bear stock culminated in October 2000 with the signing of the Agreement between the Government of the United States of America and the Government of the Russian Fed-

eration on the Conservation and Management of the Alaska/Chukotka Polar Bear Population. That 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 its 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.

Before the agreement can take effect, it must be ratified by the parties, which Russia has already done. In the United States, a key step in the ratification process is securing the advice and consent of the Senate. The Senate unanimously passed a resolution providing its advice and consent on 31 July 2003, subject to one condition. That condition requires 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 modify the boundaries of the area covered by the agreement.

In addition, the United States has recognized that legislation to implement certain provisions of the agreement domestically will be needed. The Department of the Interior, in consultation with the Marine Mammal Commission and the State Department, has developed draft implementing legislation, which was transmitted to Congress in 2004.

The Senate Commerce Committee convened a hearing on 14 November 2005 to consider legislation to implement the U.S.–Russia polar bear agreement. The two witnesses before the Committee,

the Deputy Director of the U.S. Fish and Wildlife Service and the Executive Director of the Alaska Nanuuq Commission, both expressed strong support for the agreement and called on Congress to pass implementing legislation promptly.

The following day, 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. That bill would create a new title under the Marine Mammal Protection Act specifically to address Alaska/Chukotka polar bears and implementation of the bilateral agreement. Among other things, that bill would establish 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. Under the Act, the Secretary of the Interior would be directed to promulgate regulations to implement the provisions of the Act and the agreement. The Secretary would be specifically directed to consult with the Secretary of State, the Marine Mammal Commission, and the Alaska Nanuuq Commission on all matters involving implementation of the agreement.

The Commerce Committee held a markup of S. 2013 on 17 November 2005. The Committee unanimously approved the bill, sending it forward to the full Senate for its consideration. Further action on the bill was pending at the end of 2005.

Chapter IX

REAUTHORIZATION OF THE MARINE MAMMAL PROTECTION ACT AND THE ENDANGERED SPECIES ACT

In the early 1970s, Congress enacted two landmark pieces of legislation aimed at protecting and conserving wildlife. These were the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973, the two statutes most directly involved in the conservation of marine mammals. Both measures are subject to periodic reauthorization and, in both cases, the most recent authorization of appropriations expired several years ago.

This does not mean, however, that the provisions of the Acts cease to apply or that their mandates go unfunded. Rather, unless repealed, or allowed to lapse through a sunset clause, the statutes remain in force. Congress has continued to appropriate funding to implement these two statutes, despite an expired authorization of appropriations. Efforts during 2005 related to reauthorization of the two Acts are discussed in this chapter.

Marine Mammal Protection Act

The Marine Mammal Protection Act was enacted in 1972. Major amendments were enacted in 1984, 1988, and 1994—the last three times the Act was reauthorized—and in 1997 when significant changes were made to the Act’s tuna-dolphin provisions. The most recent authorization in 1994 extended appropriation authority for carrying out the provisions of the Act through fiscal year 1999.

Congress began the process to reauthorize the Marine Mammal Protection Act in 1999. The Subcommittee on Fisheries and Oceans of the House Resources Committee held hearings on reauthorization issues in June 1999, 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.

The Administration Bill

The Marine Mammal Commission and the other federal agencies with responsibilities under the Act entered into interagency discussions beginning in 1999 to identify issues that they believed merited attention during the reauthorization of the Marine Mammal Protection 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, and 2003. With a new Congress convening in 2005, the Administration needed to resubmit a reauthorization bill for consideration. The acting General Counsel of the Department of Commerce transmitted the Administration’s recommended bill to Congress on 18 June 2005. That bill was substantively identical to the 2003 Administration bill and would authorize appropriations through fiscal year 2010 for the Marine Mammal Commission, the Department of Commerce, and the Department of the Interior to carry out their responsibilities under the Act. The provisions of the Administration bill are summarized in the Commission’s previous

annual report and are not repeated here. The text of the bill, along with a section-by-section analysis of its provisions, can be found at the National Marine Fisheries Service's Web site (<http://www.nmfs.noaa.gov/pr/laws/mmpa/reauth.htm>).

Congressional Action in 2005

Several bills to reauthorize the Marine Mammal Protection Act were introduced during the 2003–2004 sessions of Congress. On 5 May 2005 Congressman Wayne Gilchrest, Chairman of the Subcommittee on Fisheries and Oceans of the House Resources Committee, introduced H.R. 2130. The measure draws heavily from H.R. 5104, a bill that Mr. Gilchrest introduced in 2004, and from previous bills and the proposals put forth by the Administration. Like H.R. 5104, H.R. 2130 does not include amendments to extend the general authorizations for funding to implement the Act but includes specific authorizations for the Prescott Grant Program, the Marine Mammal Unusual Mortality Event Fund, carrying out and funding research on the nonlethal removal and control of nuisance pinnipeds, developing improved fishing methods and gear, and conducting and funding research related to the protection and conservation of marine mammals and the ecosystems on which they depend. The primary difference between H.R. 5104 and H.R. 2130 is that H.R. 2130 drops the proposal to authorize harvest management agreements between the federal resource agencies and Alaska Native organizations that would allow the parties to establish enforceable harvest limits before a stock is designated as depleted. Such an amendment is a central part of the Administration's reauthorization proposal and, although not included in the introduced bill, Mr. Gilchrest has indicated his intent to add such a provision before final action is taken on the bill. Other differences between the two bills are that H.R. 2130 would change the notification requirements for transferring captive marine mammals between facilities where there is no change in ownership and would increase the authorized funding level for the Prescott Grant Program from \$5 million to \$7 million annually and add an emergency assistance process to that program.

Included in H.R. 2130 are proposed amendments to do the following:

- amend the Act's import provision [section 101(a)(6)] to clarify that exports of marine mammal products, as well as imports, are authorized if they are part of cultural exchanges by Alaska Natives and Native inhabitants of Russia, Canada, and Greenland, or if they are for noncommercial pur-

poses by a U.S. citizen in conjunction with travel abroad or by a non-citizen who legally possesses the product;

- expand the incidental take regime for commercial fisheries (section 118) to include recreational fisheries that meet the criteria for listing as a category I or II fishery;
- increase the time for preparing and reviewing take reduction plans under section 118(f) of the Act and eliminate the need to convene a take reduction team for fisheries that are having no more than a negligible impact on a strategic marine mammal stock;
- retain the zero mortality rate goal of the incidental take regime for commercial fisheries but eliminate the requirement that it be achieved within seven years of enactment of the 1994 Marine Mammal Protection Act amendments;
- require that stock assessment reports and take reduction plans reflect the conservation benefits derived from state and regional fishery management actions;
- require increased representation of National Marine Fisheries Service employees at take reduction team meetings;
- require the Service to consult with a take reduction team before publishing any take reduction plan that differs from that recommended by the team;
- direct the Secretary of Commerce to conduct research on measures for the nonlethal removal and control of nuisance pinnipeds;
- eliminate the requirement that the Marine Mammal Commission be staffed by no fewer than 11 employees and the provision restricting the amount the Commission can spend on experts or consultants;
- extend the exemption for scrimshaw products and materials under the Endangered Species Act for an additional 11 years;
- specifically prohibit the release of a captive marine mammal without prior approval;
- revise the Act's permit provisions to specify that the Secretary may not require, through a co-munity statement or otherwise, that a marine mammal exported from the United States to a foreign facility remain subject to U.S. jurisdiction;
- exclude marine mammals exported to foreign facilities from the inventory of marine mammals maintained in captivity and specify that the inventory be updated annually;
- direct the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to conduct a review of and report on the costs and benefits

of maintaining the inventory of marine mammals maintained in captivity;

- increase the maximum penalties for violations of the Act; and
- reinstate the requirement for the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to report to Congress annually on their activities under the Act and create an annual reporting requirement for federal agencies that conduct or fund marine mammal research.

A markup of H.R. 2130 was held by the House Resources Committee on 18 May 2005. The Committee unanimously ordered that the bill be favorably reported to the House of Representatives without amendment. Further discussion of the bill can be found in House Report 109-180, published on 21 July 2005. No further action was taken on the bill during the 2005 session of Congress.

Although the House Resources Committee favorably reported H.R. 2130 and recommended that it be passed, Representative Richard Pombo, chairman, introduced a separate reauthorization bill on 18 October 2005. That bill, H.R. 4075, tracked most of the provisions of H.R. 2130 but included a few technical changes. For example, the reporting requirement for federal agencies that conduct or fund research on marine mammals would be included as a general reporting requirement under section 103 of the Act, rather than being placed in section 110, which pertains specifically to research grants.

No action was taken by the Senate to reauthorize the Marine Mammal Protection Act during 2005.

Endangered Species Act

The Endangered Species Act was last reauthorized in 1988 for a five-year period. Since the authorization expired in fiscal year 1992, bills have been introduced in each session of Congress to reauthorize and/or amend the Act. During the 2005 session of Congress, no fewer than six bills were introduced to amend the Act in one way or another. Most of the bills targeted specific issues, such as the process for designating critical habitat, increasing the role of states in species recovery, relocating species that would be affected by flood control projects, and compensating those who engage in species recovery efforts. The only comprehensive reauthorization bill submitted during 2005 was H.R. 3824, the Threatened and Endangered Species Recovery

Act of 2005, introduced by Congressman Richard Pombo on 19 September 2005.

H.R. 3824, if enacted, would make significant changes to the Endangered Species Act. Some of these changes would be generally applicable to all species under the Act. For example, the bill would amend the process for listing species under the Act by requiring the preparation of an analysis of the relative impacts and benefits of a listing. Also, the responsible agencies would be directed to use the authority to list distinct population segments of vertebrates under the Act “only sparingly,” an admonition from the 1979 Congressional record that was incorporated in the U.S. Fish and Wildlife Service and National Marine Fisheries Service joint policy on distinct population segments. Other broadly applicable provisions would eliminate the existing statutory requirements pertaining to the designation and protection of critical habitat, set schedules for preparing recovery plans for newly listed species and establish a process for completing recovery plans for other listed species, modify the process for completing consultations under section 7 of the Act, and eliminate the Endangered Species Committee process by which federal actions are allowed to proceed even when they would jeopardize the continued existence of listed species.

Two provisions of the bill have particular bearing on marine mammal programs. First, section 21 of H.R. 3824 would transfer all of the Secretary of Commerce’s responsibilities and authorities under the Act to the Secretary of the Interior. Such an amendment would shift agency jurisdiction over the endangered species programs related to nine species of large whales, four species of small cetaceans, and six species of pinnipeds. It is not clear whether a similar shift in agency responsibilities is anticipated under the Marine Mammal Protection Act or whether the agencies would have split jurisdiction for the same species under the two Acts.

The second provision applicable to marine mammals is section 25, which addresses the taking of manatees incidental to the construction of boat docks. This provision was not included in the originally introduced version of the bill or the version approved by the House Resources Committee. Rather, it was included in a substitute bill considered for the first time before the full House of Representatives. As discussed in previous annual reports, the U.S. Fish and Wildlife Service determined in 2003 that it could not issue an incidental take authorization for the construction of docks and the resulting vessel operations because it could not make the required finding that such taking would

have a negligible impact on manatees. H.R. 3824 would specify that “[c]onsultation under section 7 of the Endangered Species Act ... is equivalent to a section 101 incidental take authorization ... under the Marine Mammal Protection Act ... for receiving dock building permits.” That is, under this provision, a separate incidental taking authorization

under the Marine Mammal Protection Act would no longer be needed, provided that a no-jeopardy finding under section 7 were made.

The House of Representatives passed H.R. 3824 on 29 September 2005 by a vote of 229 in favor and 193 opposed. The bill has been referred to the Senate for its consideration.

Other Marine Mammal-Related Bills Introduced in 2005

A number of other bills to amend the Marine Mammal Protection Act, or otherwise related to marine mammal programs, were introduced during 2005.

S. 362, introduced by Senator Daniel Inouye on 10 February 2005, would establish a program within the National Oceanic and Atmospheric Administration and the U.S. Coast Guard to determine the sources of and take steps to reduce or prevent marine debris. Among other things, the bill would create an interagency committee on marine debris that would coordinate the federal marine debris program. The Marine Mammal Commission would be a member of that committee. S. 362 was passed by the Senate on 1 July 2005. Congressman Frank Pallone introduced a nearly identical measure, H.R. 3692, in the House of Representatives on 7 September 2005.

H.R. 2323 was introduced by Congressman Sam Farr on 12 May 2005. It would establish recovery and research programs for the California sea otter population. The bill would establish a southern sea otter implementation team and authorize \$5 million a year for sea otter research and recovery efforts.

H.R. 2376, introduced by Congressman Ed Case on 16 May 2005, would establish the Northwestern Hawaiian Islands National Marine Refuge. Among other things, the bill would create an advisory council to provide recommendations to the Secretary of Commerce on management of the area. A representative of the Marine Mammal Commission would be a non-voting member of the advisory council.

S. 1224, introduced by Senator Barbara Boxer on 9 June 2005, would make broad changes to national ocean policies and management practices. Title IV of that bill relates to marine mammals and would (1) require the Marine Mammal Commission to report to Congress on emerging threats to marine mammals, (2) establish a national ocean noise pollution research fund, (3) coordinate recovery efforts set forth in conservation plans and take reduction plans under the Marine Mammal Protection Act, (4) direct further research to develop fishing gear to reduce bycatch of marine mammals and authorize a fishing gear buyback program, (5) expand the fisheries incidental take program under the Marine Mammal Protection Act to include non-commercial fisheries, (6) authorize appropriations of \$25 million per year to collect data to improve the stock assessment reports prepared pursuant to section 117 of the Marine Mammal Protection Act, and (7) authorize appropriations of \$25 million per year to increase observer coverage under section 118 of the Act.

H.R. 2939 was introduced by Congressman Curt Weldon on 16 June 2005. Like S. 1224, it would affect national ocean policy broadly. Regarding marine mammals, the bill would eliminate the split jurisdiction over marine mammals under the Marine Mammal Protection Act by transferring management authority for walrus, polar bears, sea otters, marine otters, manatees, and dugongs to the National Oceanic and Atmospheric Administration.

H.R. 3839, introduced by Congressman Don Young on 20 September 2005, would repeal section 118(b) of the Marine Mammal Protection Act to eliminate the requirement that the commercial fisheries reduce the incidental mortality and serious injury of marine mammals to insignificant levels approaching a zero rate.

S. 2013 was introduced by Senator Ted Stevens on 15 November 2005 to implement the provisions 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. Further discussion of the agreement and the legislation is included in Chapter VIII.

Chapter X

PERMITS AND AUTHORIZATIONS TO TAKE MARINE MAMMALS

With certain exceptions, 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.” One such exception provides for the issuance of permits by either the National Marine Fisheries Service or the U.S. 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. Under the Act, the Marine Mammal Commission is to review all permit applications except those for the importation of polar bear trophies.

Under another exception, the National Marine Fisheries Service and the U.S. Fish and Wildlife Service may grant authorizations 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 incidental to several such activities are summarized later in this chapter.

This chapter discusses the Commission’s review of permit applications and authorization requests that it received in 2005. This chapter also provides information on the importation of polar bear trophies, the request by the Makah Tribe for a waiver under the Marine Mammal Protection Act, and the public’s interactions with marine mammals in the wild.

Permit Application Review

Permits for scientific research, public display, species enhancement, and photography all involve the same four-step review process: (1) either the National Marine Fisheries Service or the U.S. Fish and Wildlife Service receives and initially reviews applications from individuals or organizations; (2) the Service 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, reviews and transmits its recommendation to the Service; and (4) the Service takes final action after consideration of comments and recommendations from the Commission, other expert reviewers, and the public. If captive

maintenance of animals is involved, the Service seeks the views of the Department of Agriculture’s Animal and Plant Health Inspection Service on the adequacy of facilities, animal husbandry and care programs, and transportation arrangements. When proposed activities include marine mammal species under both agencies’ jurisdiction, the Services have developed guidelines to streamline the permitting process through a joint application and the issuance of a single permit.

Once a permit is issued, the responsible agency can amend it, provided 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 permit amendments except those con-

sidered to be of a minor nature (i.e., those that do not include a request to take additional numbers or species of animals, expand the type of taking authorized, increase the risk of adverse impact, or change or expand the location of the research). Under the National Marine Fisheries Service's permit regulations, an extension of the duration of the research up to 12 months for activities that were included in the original scope of the permit is considered to be a minor amendment.

During 2005 the Commission reviewed 24 permit applications submitted to the National Marine Fisheries Service, 6 permit applications submitted to the U.S. Fish and Wildlife Service, and 1 permit application involving both Services. Of the applications received from the National Marine Fisheries Service, 21 were for scientific research, 1 was for commercial/educational photography, and 2 were for public display. Of the applications received from the U.S. Fish and Wildlife Service, 5 were for scientific research and 1 was for enhancement purposes. In addition, the Commission reviewed 12 permit amendment requests submitted to the Services (10 to the National Marine Fisheries Service and 2 to the U.S. Fish and Wildlife Service). In general, the Services adopted the Commission's recommendations concerning these permit actions.

One permit-related issue that has been of continued concern involves requests from researchers to attach tags to large whales. Tagging may be the best, and frequently the only, means for collecting certain natural history information on large cetaceans. Since the 1970s technological advances in electronic tags and related instruments have revolutionized data collection on marine mammals. Among other things, these instruments provide information on tagged individuals (e.g., location, movement patterns, diving patterns), their physiological state (e.g., heart rate, blood gases), their environment (e.g., temperature, ambient light), and their ecology (e.g., habitat use, prey consumption). More recently, application of video technology to marine mammals has provided not only numerical data, but also visual images of the animals in their environment. Given the great expanse of the world's oceans and the fact that these animals spend a considerable portion of their time underwater, technological aids such as tags are essential for understanding marine mammals and their ecology.

At the same time, tagging may involve some risk to the animals. Attachment of an instrument to a large whale, using either suction cups or an invasive technique, requires maneuvering a small boat close to the whale. Such close proximity poses

some level of risk to both the whale (e.g., collision with the boat or propeller) and the tagging crew (e.g., capsizing). Tags that require invasive attachment also cause a wound that may be compounded by secondary consequences. Follow-up of early tagging studies revealed that some animals experienced swelling or other evidence of infection, inflammation, or necrosis although it was unclear whether those symptoms were caused by the tag itself or intrusion of sea water and/or external pathogens (e.g., bacteria) into the wound. In addition, both the approach and actual tagging may cause stress or elicit adverse behavioral responses from the animals. The two responses considered most serious are disruption of a mother-calf bond and a shift in habitat-use patterns.

Such potential consequences raise two general concerns, the first being related to animal welfare and the second being scientific. Animal welfare concerns raise questions as to whether tagging large whales poses potentially significant risks to individual animals. Scientific concerns raise questions about the utility and reliability of the data if tagging alters those things the scientist may be attempting to measure (e.g., behavior, distribution, survival) and those changes are not accounted for in the study results. Similar questions have been raised with regard to other scientific methods (e.g., branding for identification of individual animals).

To address these issues, the Marine Mammal Commission and the National Marine Fisheries Service's Office of Protected Resources jointly sponsored a workshop on 10 December 2005 in conjunction with the 16th Biennial Meeting of the Society for Marine Mammalogy in San Diego, California. The purpose of the one-day workshop was to review recent innovations in tagging technology, examine tagging protocols to determine if and how they might be improved, review existing evidence regarding the potential adverse effects of tagging on large cetaceans, and consider research strategies to address existing gaps in the understanding of potential tagging effects. Leading scientists who conduct tagging studies or who have expressed concerns about the effects of such studies summarized the latest information on tagging effects, including both physical and physiological injury and adverse behavioral responses. The presentations were followed by expert panel discussions with the workshop attendees on those topics.

Taken together, the presentations suggested that new technology has extended the time that tags remain attached to the animals while minimizing secondary consequences, such as infection. Deter-

mining the relative merits of new techniques for attachment has been a challenge because individual whales are difficult to observe for periods long enough to assess potential impacts. Nonetheless, two forms of evidence indicate that tag attachment methods have improved significantly and that tags can be attached safely. First, the attachment duration for tags has increased from a matter of hours or days to weeks and months. In addition, the transmitted information suggests that instrumented animals are not altering their behavior in a manner that would indicate serious injury or mortality. Second, tagged animals are being sighted in apparent good health weeks and months after tagging. More studies are needed to assess other potential adverse effects of tagging, but these observations are reassuring.

Evidence of short-term behavioral reactions and localized infections in response to tagging, however, continues to suggest the need for careful design of tags and tagging experiments to minimize potential adverse effects, particularly on highly endangered species for which the fitness of each individual animal is particularly important. For example, the use of antibiotics to address infections from invasive tags was discussed at the meeting. Participants disagreed as to the advisability of using single applications of antibiotics; whether single applications are effective over the duration of tag attachment; whether they may pose a risk to the affected animal if, in effect, they select for more virulent pathogens; and if an antibiotic is to be used, which is best under these circumstances. These and related questions require further study.

At the end of 2005 the Marine Mammal Commission was preparing a report of the workshop. The report is expected to summarize the existing scientific literature regarding tagging effects on large whales and recommend future studies and data collection to further advance understanding of potential negative effects and the ability to avoid them.

General Authorizations

The 1994 amendments to the Marine Mammal Protection Act provided for a streamlined “general authorization” for research that involves taking only by Level B harassment (i.e., any act of pursuit, torment, or annoyance that has the potential to disturb but not injure a marine mammal or marine mammal stock). Between 6 and 16 researchers a year have obtained letters confirming that their activities may appropriately be conducted under this authoriza-

tion. During 2005, 12 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.

General authorizations do not apply to activities that may take endangered or threatened marine mammals. In its testimony before the House Resources Committee’s Subcommittee on Fisheries Conservation, Wildlife, and Oceans in June 1999, the Commission recommended that the general authorization be expanded to apply to all marine mammals. However, such a proposal has not been included in the draft legislation submitted to Congress by the Secretary of Commerce and the Secretary of the Interior to reauthorize the Marine Mammal Protection Act (see Chapter IX) because it was thought that an amendment to the Endangered Species Act would be a more appropriate vehicle for implementing such a change.

Small-Take Authorizations

As noted earlier, 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 use 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 nondepleted 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 securing a small-take authorization when the taking will be by harassment only.

Authorizations under section 101(a)(5)(A) require that regulations be promulgated setting forth permissible methods of taking and requirements for monitoring and reporting, as well as a finding that the incidental taking will have negligible effects on the size and productivity of the affected species or stocks. Authorizations for incidental harassment under section 101(a)(5)(D) do 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 of up to five years and authorizations under section 101(a)(5)(D) for up to one year. Both types of authorizations may be renewed. Requests for small-take authorizations under sections 101(a)(5)(A) and 101(a)(5)(D) that the Commission provided comments on during 2005 are described here.

Authorizations under Section 101(a)(5)(A)

BP Exploration — On 25 July 2005 the National Marine Fisheries Service published a *Federal Register* notice concerning a request from BP Exploration for renewal of an authorization to take small numbers of bowhead, gray, and beluga whales and ringed, spotted, and bearded seals incidental to oil production operations at the Northstar facility in Alaska and federal waters in the Beaufort Sea. The Service noted that it was proposing to issue new regulations to govern incidental taking and invited pertinent comments, information, and suggestions.

The Commission provided comments to the Service on 29 August 2005. The Commission reiterated the points made in its 30 December 2004 letter commenting on the Service's earlier notice that it was considering initiating such a rulemaking. The Commission recognized that available studies suggest that the effects of the construction and operation of the Northstar production facilities and related activities on marine mammals are "subtle and equivocal, and small in the context of natural variation of the marine ecosystem." Nonetheless, the Commission recommended that a rigorous monitoring program sufficient to detect any non-negligible effects be pursued to ensure that the activities are not individually or cumulatively having any population-level effects on marine mammals and are not adversely affecting the availability of marine mammals for subsistence uses by Alaska Natives. The Commission recommended that the Service consult with the applicant, the Minerals Management Service, and other industry and government entities, as appropriate, to develop a collaborative, long-term arctic monitoring program. The Commission also expressed concern about the likely effects of climate change on sea ice in the

Arctic, which, in conjunction with activities such as the Northstar project, could have significant effects on the distribution of ringed seals and polar bears and on the availability of these species for subsistence uses by Alaska Natives. The Commission recommended that the potential effects of climate change be factored into long-term monitoring and mitigation programs.

In addition, the Commission noted that the North Slope Borough Science Advisory Committee has made recommendations for improving monitoring programs and data analyses. For example, at the Service's 2005 peer review meeting concerning these efforts, participants agreed that (1) monitoring would continue as outlined in BP's application and would include acoustic monitoring each September to detect bowhead whale calls, with an expanded effort every four years, and (2) BP would launch a long-term environmental monitoring program. The Commission further noted that discussions are ongoing among BP, the Alaska Eskimo Whaling Commission, and the North Slope Borough regarding a new conflict-avoidance agreement that will address concerns relating to the subsistence harvest of marine mammals in the region surrounding Northstar. A proposed rule to authorize the requested taking is expected to be published in 2006.

Alaska Aerospace Development Corporation — The National Marine Fisheries Service published a *Federal Register* notice on 29 October 2004 proposing to promulgate regulations to authorize the Alaska Aerospace Development Corporation to take by incidental harassment small numbers of Steller sea lions during rocket launches and associated activities from the Kodiak Launch Complex on Kodiak Island, Alaska.

The Commission reviewed the notice and the applicant's petition for regulations and provided comments to the Service on 30 December 2004. The Commission recommended issuance of the proposed authorizations, provided that the mitigation, monitoring, and reporting requirements described in the Service's proposed rule were adopted. The Commission noted that the taking of several marine mammal species other than Steller sea lions was possible and recommended that the authorization, if granted, include other species that could be harassed to reduce the possibility that the applicant may engage in impermissible taking. The Commission recommended that the applicant contact the U.S. Fish and Wildlife Service to determine if authorization for the incidental taking of small numbers of sea otters also was needed. The Commission also

recommended that, if authorization for additional species was to be provided, the proposed monitoring program be expanded accordingly. Publication of a final rule was pending at the end of 2005.

Minerals Management Service — On 24 August 2005 the National Marine Fisheries Service published a *Federal Register* notice inviting comments on whether to propose regulations under section 101(a)(5)(A) of the Marine Mammal Protection Act to authorize the take of small numbers of marine mammals incidental to the removal of oil and gas drilling and production structures in the Gulf of Mexico. The Service noted that such regulations would authorize oil and gas operators holding letters of authorization to take marine mammals during explosive removal activities for a five-year period. The Service indicated that the Minerals Management Service had initiated consultation under section 7 of the Endangered Species Act on these activities and that the consultation would be concluded prior to the issuance of the incidental take regulations. The Minerals Management Service completed a programmatic environmental assessment of the proposed rig-removal activities in February 2005. The National Marine Fisheries Service is reviewing that document and will either adopt it or prepare its own National Environmental Policy Act document before making a determination on the issuance of regulations and letters of authorization for these activities.

The Marine Mammal Commission reviewed the *Federal Register* notice and the applicant's petition for regulations and provided comments to the Service on 23 September 2005. The Commission recommended that the Service initiate the proposed rulemaking if it believes that the planned monitoring programs will be adequate to verify how and over what distances marine mammals may be affected, that only small numbers of marine mammals will be taken, and that the cumulative impacts on the affected species and stocks will be negligible. Publication of the proposed regulations was pending at the end of 2005.

Authorizations under Section 101(a)(5)(D)

U.S. Army Corps of Engineers-Jacksonville District — The U.S. Army Corps of Engineers-Jacksonville District applied to the National Marine Fisheries Service for incidental harassment authorizations to take by harassment small numbers of ma-

rine mammals during blasting and dredging projects in various geographic areas. Three requests were submitted in 2004 and one in 2005. On 15 January 2004 the Service published a *Federal Register* notice regarding a request from the Corps to take by harassment small numbers of bottlenose dolphins incidental to dredging and blasting activities relating to deepening the inner portion of Brunswick Harbor in Glynn County, Georgia. On 21 January 2004 the Service published a notice regarding a request from the Corps to renew its incidental harassment authorization to take small numbers of bottlenose dolphins incidental to underwater dredging and blasting activities related to deepening the Dodge-Lummas Island Turning Basin in Miami, Florida. On 25 May 2004 the Service published a notice regarding a request from the Corps to take small numbers of bottlenose dolphins by harassment incidental to activities related to expanding and deepening the Alafia River Navigation Channel in Tampa Harbor, Florida. And on 18 August 2005 the Service published a notice regarding a request from the Corps to take small numbers of bottlenose dolphins by harassment incidental to activities related to expanding and deepening the Port Sutton Navigation Channel in Tampa Harbor, Florida.

For all of these requests, the Service preliminarily determined that the proposed activities should result, at most, in short-term, temporary modification of bottlenose dolphin behavior (including temporarily vacating the area near the blasting operations) and would have no more than a negligible impact on the affected marine mammal stocks. The Service therefore believed that the proposed action would have a negligible impact on the subject animals.

The Commission reviewed the four applications and provided comments to the Service on 10 March 2004, 22 March 2004, 14 June 2004, and 21 September 2005, respectively. The Commission agreed with the Service's preliminary determinations but recommended that, prior to any blasting, the Service review and approve the applicant's specific blasting plans, considering among other things the maximum weight of the explosives that would be used for each explosive event. The Commission further recommended that the mitigation and monitoring activities be carried out as proposed and that observer effort be sufficient to detect any marine mammals that may be within the danger or safety zones calculated for each explosion. Given the formulae for estimating the sound pressure levels to which animals would be exposed, the Commission thought that the applicant should be required

to collect empirical data during its operations to assess the accuracy of the models. The Commission concurred with the assumption that the type of blasting proposed is unlikely to cause significant, long-term problems or changes in habitat use by marine mammals unless the animals are close to the source of a blast or unless exposure to blasting is frequent. The Commission noted, however, that it would be useful if the Service or the applicant conducted pre- and post-blast surveys and monitored and mapped the distribution of high-intensity sound resulting from the shallow-water blasts. The Commission noted that authorization should be sought from the U.S. Fish and Wildlife Service if the potential existed for manatees to be taken incidental to the proposed activities. Finally, the Commission reiterated its belief, as stated in correspondence to the Service on other authorizations, that an across-the-board definition of temporary threshold shift (TTS) as constituting no more than Level B harassment inappropriately dismisses possible injury and biologically significant behavioral effects (e.g., an increased risk of natural predation or ship strikes) that can result from repeated TTS harassment and from the cumulative effects of long-term exposure. The Commission therefore reiterated its recommendation that TTS be considered as having the potential to injure marine mammals (i.e., Level A harassment).

On 19 April 2005 the Service issued an incidental harassment authorization to the Corps of Engineers to take bottlenose dolphins by harassment incidental to deepening the Dodge-Lumms Island Turning Basin in Miami, Florida. In response to the Commission's recommendations, the Service noted that (1) until additional information becomes available about the effects of small-charge detonations on marine mammals, it considers the safety zone models provided by the applicant to be conservative and based on the best scientific information currently available; (2) the proposed level of monitoring is sufficient to ensure that no bottlenose dolphins will be injured or killed; (3) the conduct of population surveys before initiating the proposed activities is not warranted because the project is unlikely to result in more than brief reactions by the animals; and (4) the applicant will be required to provide a blasting plan to the Service before initiating blasting. The Service continued to disagree with the Commission's recommendation that the Service consider temporary threshold shift as having the potential to injure marine mammals (i.e., Level A harassment). Authorizations for the

Brunswick Harbor, Alafia River, and Port Sutton Navigation Channel projects had not been issued at the end of 2005.

Eglin Air Force Base — On 7 June 2005 the National Marine Fisheries Service published a *Federal Register* notice proposing to issue a one-year authorization for the take of small numbers of marine mammals by harassment incidental to training operations at the Naval Explosive Ordnance Disposal School in the northern Gulf of Mexico. The Service also invited comments on the possible issuance of regulations to govern the incidental taking of marine mammals for a period of up to five years. The Service preliminarily determined that the proposed action would have a negligible impact on the affected species or stocks, that no take by serious injury and/or death is anticipated, and that the potential for temporary or permanent hearing impairment is low and would be avoided through the incorporation of the proposed monitoring and mitigation measures.

The Commission provided comments to the Service on 8 July 2005. The Commission generally concurred with the Service's preliminary determinations. The Commission noted, however, that monitoring, even under the best conditions, involves a greater than 80 percent likelihood that small cetaceans will not be observed when they are in the vicinity of the test site. The Commission therefore recommended that the Service further explain its rationale for determining that taking will be by harassment only. The Commission also recommended that, if the Service determines that the potential for lethal injuries is sufficiently remote to warrant the issuance of an incidental harassment authorization under section 101(a)(5)(D) of the Act, it require that operations be suspended immediately if a dead or seriously injured animal is found in the vicinity of the test site, pending authorization to proceed or issuance of regulations authorizing such takes under section 101(a)(5)(A) of the Act. The Commission also reiterated its concern that the Service's across-the-board definition of TTS as constituting no more than Level B harassment inappropriately dismisses possible injury and biologically significant behavioral effects on the affected animals. The Commission continued to believe that the Service should provide a better justification for using (1) slight lung hemorrhage and a 50 percent probability of eardrum rupture as dual criteria for determining what injuries are "non-lethal," (2) 176 dB (6 dB below the TTS threshold) as the threshold

for “non-injurious behavioral response,” and (3) a criterion of 23 psi for determining the exposure level at which TTS occurs. In addition, the Commission noted that the applicant’s proposed activities appear to fit within the definition of a “military readiness activity” and, therefore, the request should be reviewed in light of the new definition of the term harassment applicable to such activities (see Public Law 108-136).

The Service issued the incidental harassment authorization on 23 August 2005. In response to the Commission’s comments and recommendations, the Service noted that the monitoring effort for the proposed activity is similar to that used in the past for Navy ship-shock trials, the differences being that the zone of influence for the training operations is significantly smaller and the water is shallower, both of which make it more likely that marine mammals will be detected. The Service expressed confidence that no marine mammals would be killed as a result of the proposed training operations because, based on density estimates, the number of marine mammals that potentially could be exposed to energy levels sufficient to cause Level A harassment or death during the planned 30 detonations per year is only 0.4 animal annually. The Service nevertheless included a requirement in the incidental harassment authorization that operations be suspended immediately if a dead or seriously injured animal is found in the vicinity of the test site, pending authorization to proceed or issuance of regulations authorizing such takes under section 101(a)(5)(A) of the Act. The Service reiterated its view that second-level impacts due to TTS cannot be predicted and are, therefore, speculative. The Service also noted that it had previously provided an updated explanation and justification for using the dual injury criteria. Regarding the applicability of the National Defense Authorization Act’s definition of harassment to the proposed action, the Service noted that, although it believes that the monitoring to be implemented by Eglin Air Force Base would ensure that Level A harassment or mortality is highly unlikely, an authorization under section 101(a)(5) of the Act is warranted because some animals could be injured (estimate is 0.4 animal per year) if the mitigation and monitoring overlooks an animal. The Service also noted that, given the uncertainty associated with predicting animal presence and behavior in the field, it accords some deference to applicants requesting an authorization for an activity that might fall slightly below the National Defense Authorization Act definition of harassment. In this way, they

are covered for impacts that may rise to the level of take, and such an authorization also carries a responsibility to implement mitigation and monitoring measures to protect marine mammals.

California Department of Transportation (CALTRANS) — The California Department of Transportation applied to the Service for incidental harassment authorizations to take by harassment small numbers of marine mammals during bridge demolition/construction projects in two geographic areas. One request was submitted in 2004, the other in 2005.

Sandholdt Road Bridge — On 24 August 2004 the Service published a *Federal Register* notice regarding a request from CALTRANS to take small numbers of Pacific harbor seals and California sea lions incidental to the demolition of the Sandholdt Road Bridge, Moss Landing, California, and construction of a replacement bridge at that location. The Service preliminarily determined that the activities associated with the proposed project should result in no more than the temporary modification in behavior of small numbers of Pacific harbor seals and California sea lions, that no takes by injury or death are anticipated, and that those by disturbance should be at the lowest level practicable due to the proposed mitigation measures.

The Commission reviewed the *Federal Register* notice and the application and provided comments on 24 September 2004, concurring with the Service’s preliminary determination. The Service issued the incidental harassment authorization on 4 January 2005.

Richmond–San Rafael Bridge — On 5 April 2005 the Service published a *Federal Register* notice regarding a request from CALTRANS to take small numbers of marine mammals by harassment incidental to structural modification of the Richmond–San Rafael Bridge. The Service preliminarily determined that the proposed activities would not have a significant impact on harbor seal pupping, weaning, or molting at Castro Rocks and that the short-term impact of the construction would result, at most, in a temporary modification in behavior by harbor seals and, possibly, by some California sea lions. The Service noted that no take by injury or death is anticipated and that takes by disturbance would be at the lowest level practicable due to the applicant’s proposed mitigation measures.

The Commission reviewed the *Federal Register* notice and the application and provided comments to the Service on 5 May 2005. The Com-

mission concurred that the Service's preliminary determinations were reasonable and believed that the proposed mitigation measures are appropriate. The Commission therefore recommended that the incidental harassment authorization be issued as proposed. The Service issued the incidental harassment authorization on 6 September 2005.

Conoco Phillips Alaska, Inc. — The Service published a *Federal Register* notice on 8 February 2005 proposing to issue a one-year authorization for the take of small numbers of marine mammals by harassment incidental to conducting on-ice seismic operations during oil and gas exploration activities in the U.S. Beaufort Sea off Alaska. The Service preliminarily determined that the short-term impact of the proposed activities would result, at most, in a temporary modification in the behavior of ringed seals and possibly a few bearded seals.

The Commission reviewed the *Federal Register* notice and the application and provided comments to the Service on 14 March 2005. The Commission generally concurred with the Service's proposed determinations. However, the Commission expressed the view that, although the proposed activities by themselves are likely to be negligible, the cumulative impacts of these activities in combination with similar activities being carried out elsewhere in the Beaufort Sea and the predicted effects of climate change in the Beaufort Sea region may, at some point, have more than negligible impacts on marine mammal populations. The Commission therefore recommended that the monitoring programs for the proposed activities be expanded to include data collection that could be used to detect changes in density and abundance of potentially affected marine mammals, as well as reproductive rates, prey availability, foraging patterns, distribution, and contaminant levels where oil and gas exploration, development, and production occur. The Service issued the incidental harassment authorization on 29 March 2005. It did not adopt the Commission's recommendation concerning expansion of the proposed monitoring program.

Lamont-Doherty Earth Observatory — On 21 March 2005 the Service published a *Federal Register* notice proposing to issue a one-year authorization for the take of small numbers of marine mammals by harassment incidental to conducting oceanographic seismic surveys in the Aleutian Islands area. The Service preliminarily determined that (1) the short-term impact of the proposed activities would result, at most, in a temporary modi-

fication in the behavior of certain species of marine mammals, and (2) any behavioral modifications made by those species to avoid the noise associated with the activities would be expected to have a negligible impact on the affected species. The primary means of ensuring that marine mammals will not be adversely affected by the proposed activities would be the establishment of "safety zones" above certain sound exposure thresholds and the shutdown of activities if marine mammals are observed within those zones. Activities could not be initiated when the safety zones could not be monitored adequately (e.g., during nighttime operations).

The Commission reviewed the *Federal Register* notice and the application and provided comments to the Service on 29 April 2005. The Commission generally concurred with the Service's preliminary determinations. However, the Commission questioned whether the proposed monitoring effort would be sufficient to detect all marine mammals within the safety zones at the start-up of operations or would be effective at detecting those marine mammals that may enter the safety zones during operations. The Commission recommended that the Service (1) more explicitly define what constitutes daytime and nighttime operations for purposes of applying the proposed mitigation measures, and (2) seek clarification of whether opportunities will be available on some survey segments to search for animals that may have been injured or killed on recently completed parallel transects. In addition, the Commission recommended that, if the proposed monitoring and mitigation measures do not provide sufficient assurance that marine mammals will not be exposed to sound levels that may cause serious injuries or mortalities, authorization of these additional types of taking should be pursued under section 101(a)(5)(A) of the Act. The Commission also recommended that, if it had not already done so, the Service notify its Alaska Fisheries Science Center researchers working in the area about the planned seismic work.

The Service issued the incidental harassment authorization on 28 July 2005. In response to the Commission's recommendations, the Service noted that, inasmuch as a single, low-intensity airgun is being used for this survey, and the sound pressure levels that might cause injury or mortality would not extend beyond the vessel's footprint, serious injury or mortality of a marine mammal is unlikely. The Service also noted that, given the small size of the conservative shutdown zones, the speed of the vessel, the length of daylight at that time of year, and the marine mammal avoidance measures that

will be implemented by the vessel for animals on the vessel's track, it is very unlikely that any marine mammals would enter the safety zone undetected. The Service stated that, if a marine mammal does enter the area, operations would be shut down until the animal leaves the safety zone. The Service also stated that it had notified its scientists working in the Aleutian Islands area of the proposed survey.

Boeing Company — On March 2005 the Service published a *Federal Register* notice proposing to issue a one-year authorization for the take of small numbers of marine mammals by harassment incidental to launches of the Delta IV/Evolved Expendable Launch Vehicle (EELV) at South Vandenberg Air Force Base, California. The Service preliminarily determined that the effects of the proposed activities would be limited to short-term startle responses and localized behavioral changes by small numbers of Pacific harbor seals, California sea lions, and northern elephant seals and would have no more than a negligible impact on those marine mammal stocks.

The Commission reviewed the *Federal Register* notice and the application and provided comments to the Service on 25 April 2005. The Commission concurred with the Service's preliminary determinations and recommended that the request be approved, provided that all reasonable measures are taken to ensure the least practicable impact on the subject species and that the proposed mitigation and monitoring activities described in the Service's notice be implemented. The Service issued the incidental harassment authorization on 23 May 2005. The Service adopted the Commission's recommendations.

Bay Marina Management Corporation — On September 2005 the Service published a *Federal Register* notice proposing to issue a one-year authorization for the take of small numbers of marine mammals by harassment incidental to maintenance dredging in the area of the Pier 39 Marina in San Francisco, California. The Service preliminarily determined that the proposed dredging activities may result in short-term and localized changes in behavior of small numbers of California sea lions and Pacific harbor seals, including causing California sea lions to vacate the dock haul-out area. Nevertheless, the Service believed that the proposed action would have a negligible impact on the animals and that take by injury or death was unlikely. The Service expressed the view that take by harassment would be at the lowest level practicable due to the proposed mitigation and monitoring measures.

The Commission reviewed the *Federal Register* notice and the application and comments to the Service on 17 October 2005. The Commission recommended that the requested authorization be issued, provided that the mitigation and monitoring activities proposed in the application and the Service's notice are carried out as described. The Service issued the incidental harassment authorization on 14 November 2005.

Scripps Institution of Oceanography — On 17 October 2005 the Service published a *Federal Register* notice proposing to issue a one-year authorization for the take of small numbers of marine mammals by harassment incidental to conducting a marine seismic survey in the southwestern Pacific Ocean. The Service preliminarily determined that (1) the short-term impact of the proposed activities would result, at most, in a temporary modification in the behavior of certain species of cetaceans, and (2) any behavioral modifications made by these species to avoid the noise associated with the activities would be expected to have a negligible impact on the affected species and stocks. The primary means of ensuring that marine mammals will not be adversely affected by the proposed activities would be the establishment of "safety zones" above certain sound exposure thresholds and the shutdown of activities if marine mammals are observed within those zones.

The Commission reviewed the *Federal Register* notice and the application and provided comments to the Service on 18 December 2005. The Commission generally concurred with the Service's preliminary determinations, provided that the proposed mitigation and monitoring activities are adequate to detect marine mammals in the vicinity of the proposed operations and to ensure that marine mammals are not being taken in unanticipated ways or numbers. The Commission noted that several species of beaked whales occur in the proposed seismic survey area and that the uncertainties concerning the effects of sound on these species underscore the need for caution. The Commission sought information from the Service and/or the applicant concerning the probability that an injured or dead beaked whale, other small cetacean, or elephant seal would be sighted from a ship running transects through an area or retracing recently run transect lines. The Commission also recommended that the Service require that the applicant not initiate ramp-up of the airguns after dark and/or maintain a low-level output from the airguns to repel marine mammals if full-scale operations may begin after dark, and that

monitoring of safety zones be conducted for more than 15 minutes prior to airgun use to help ensure that animals, such as elephant seals, that can dive for longer than 15 minutes, are not within the safety radius. Final action on the incidental harassment authorization was pending at the end of 2005.

Polar Bear Trophy Imports

The 1994 amendments to the Marine Mammal Protection Act 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. (Previously, Canada had identified 14 management units but no longer considers the Queen Elizabeth Islands to be a discrete management unit.) Although the Service removed the M'Clintock Channel management unit from the list of approved populations in 2001, it continues to issue permits for this unit provided that the trophies were taken prior to 1 June 2000. In addition, in accordance with the 2003 Marine Mammal Protection Act amendment that extended the exception for grandfathered trophies, the Service allows the importation of polar bear trophies by permit for hunts that were legally conducted before 18 February 1997, regardless of the population from which the bear was taken. The Service continues to allow the importation of polar bear trophies taken after this date only from approved management units. Imports from the other management units are not allowed, pending receipt of additional information sufficient to make the findings required under the Marine Mammal Protection Act.

Early in 2005 the Commission became aware of proposals to substantially increase the allowable harvest of polar bears from certain management units within the Canadian territory of Nunavut. The increases would apply to three of the management units from which trophy imports are currently allowed. In addition, Nunavut was considering reopening hunting in the M'Clintock Channel management unit, from which trophy imports are

no longer allowed because the U.S. Fish and Wildlife Service revoked an earlier affirmative finding after determining that the population had severely declined as a result of overharvesting.

In response, the Commission wrote to the Service on 4 February 2005 noting that the proposed increases would be discussed at a meeting of the Canadian Polar Bear Technical Committee to be held on 7–9 February 2005 and which Service representatives would attend. The Commission believed that the meeting provided a good opportunity to elicit additional information on the scientific basis for the proposed increases that would be needed to determine whether the new harvest levels would be contrary to the affirmative findings currently in place. The Commission further suggested that the Service look more broadly at whether the proposed increases would be consistent with the purposes of the Agreement on the Conservation of Polar Bears.

The increased harvest limits proposed for some management units related directly to revised abundance estimates. In some cases, however, the increases in estimated population sizes were based entirely on traditional knowledge—in this case an increase in the frequency of polar bear sightings near Inuit communities and hunting camps. Although recognizing the value of traditional knowledge, the Commission questioned the conclusions being drawn in this instance. The Commission noted that the increasing number of polar bear sightings may not indicate population growth but could reflect changes in distribution resulting from bears being attracted by food at inhabited sites, changes in the availability of sea ice as a hunting platform, or decreased availability of prey associated with sea ice. The Commission believed that it would be inappropriate to increase hunting limits without additional information to corroborate the trends suggested by traditional knowledge.

The Service replied to the Commission by letter of 29 March 2005. The letter explained that the Service had requested additional information from the Canadian government and was awaiting the published results of the Polar Bear Technical Committee meeting. The Service expected to review the affirmative findings under which polar bear imports are currently allowed in light of this information.

The Service provided an update of the situation to the Commission at its annual meeting in October 2005. The discussions focused on the western Hudson Bay and Gulf of Boothia management units. Although traditional knowledge had suggested an increase in the western Hudson Bay stock, a recently completed survey estimated that

the population had declined by approximately 200 bears (from 1,200 to 1,000). As such, the Service is concerned about whether the management program for this stock continues to meet the import requirements of the Marine Mammal Protection Act. On the other hand, recent abundance estimates for the Gulf of Boothia stock indicate a population larger than previously thought, which has prompted the Service to begin considering whether it qualifies for an affirmative finding.

The Service also expressed concern over recent changes to Nunavut's polar bear management program. Previously, if a sport hunt were unsuccessful, that hunting opportunity could not be reassigned; it could only be used to offset bears that had been taken illegally, accidentally, or for self-defense. Now harvest limits that are not used in a given year may be used as hunting "credits" in subsequent years and may be exchanged between hunting communities. Nunavut has also adopted a two-phased management approach, using a science-based "conservative harvest rate" for the seven years following the completion of a population inventory and a "guided harvest rate" for the remainder of the management cycle. The guided harvest phase recognizes that abundance data are becoming dated and allows for harvest adjustments based on traditional knowledge.

At the end of 2005 the U.S. Fish and Wildlife Service was continuing to review information on the 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 2006 to revise the list of approved populations.

The Commission provides comments to the Service as to whether a polar bear management unit meets the criteria to qualify for trophy importation. The Commission 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, more than 766 import permits have been issued. Of those, 132 were issued in 1997, 60 in 1998, 142 in 1999, 76 in 2000, 71 in 2001, 48 in 2002, 68 in 2003, 108 in 2004, and 61 in 2005. Under regulations promulgated by the U.S. Fish and Wildlife Service, a \$1,000 fee is assessed for each polar bear permit issued. Revenues are to be used for the development and implementation of cooperative research and management programs for the conservation of polar bear populations in Alaska and Russia.

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. In 1997 the Makah tribe of Washington State sought and received a share of the 1998–2002 subsistence limit for eastern North Pacific gray whales. In 2002 the IWC extended that catch limit (640 whales, with no more than 140 whales to be taken in any one year) through 2007. Although the tribe has been allocated up to five gray whales per year since 1998, it has taken only one whale since its resumption of whaling. That whale was struck and landed in 1999.

Whaling by the Makah tribe was interrupted in 2000 by a ruling of the Ninth Circuit Court of Appeals, which found that the environmental assessment prepared by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service on the Makah whaling program was inadequate because 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 court of appeals 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 possible impacts of whaling on the population of approximately 200 gray whales that is seen in 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 section 101(a)(3)(A) and 103 of the Marine Mammal Protection Act. On 11 February 2005 the Makah tribe requested that the National Marine Fisheries Service promulgate regulations waiving the Act's moratorium on taking marine mammals. The re-

quested waiver 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. In addition, the proposal submitted by the tribe would 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. To avoid taking animals from the Pacific coast feeding aggregation, the tribe would 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 feeding aggregation. The tribe also would prohibit hunting in gray whale feeding grounds in the Strait of Juan de Fuca. Finally, the tribe would compare photographs of all landed whales with the National Marine Fisheries Service's photo-identification database for the feeding aggregation. The tribe would 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 (ABL). The ABL would be calculated each year 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 ABL 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 meets certain standards necessary to conserve both the North Pacific stock and the Pacific coast feeding aggregation of gray whales. 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 court of appeals' ruling, the tribe maintains that its treaty whaling rights have not been abrogated by the Marine Mammal Protection Act or other U.S. law.

At the end of 2005 the National Marine Fisheries Service was still evaluating the waiver request. The Service has determined that it needs to prepare an environmental impact statement in accordance with the National Environmental Policy Act on any such regulations. To that end, the Service held public scoping meetings in October 2005 in Washington State and in the Washington, D.C., area to

gather information on the waiver request and issues to be addressed in the impact statement.

On 19 October 2005 the Resources Committee of the House of Representatives favorably reported a resolution (H. Con. Res. 267) expressing Congress' disapproval of requiring the Makah tribe to obtain a waiver and/or permit under the Marine Mammal Protection Act before taking gray whales and its sense that the United States should uphold the treaty rights of the tribe. This resolution, if adopted by the full House of Representatives, would be nonbinding and, absent enactment of additional legislation, would not invalidate the ruling of the court of appeals.

Interactions with Marine Mammals in the Wild

Under the Marine Mammal Protection Act, all activities involving any type of "taking" of marine mammals—including harassment—are prohibited unless authorized under the Act's provisions. As discussed elsewhere in this chapter, permits and small-take authorizations can be issued to authorize taking for a variety of purposes, including but not limited to scientific research, public display, and photography. However, the Marine Mammal Protection Act only provides for members of the public to take marine mammals during viewing or recreational activities if they obtain a waiver of the Act's taking moratorium. Such waivers are rarely sought and difficult to obtain.

Public interactions with marine mammals in the wild have greatly increased over the past several years. Increasing evidence indicates that these activities may be adversely affecting the animals' welfare. Such interactions typically involve close approaches to observe, photograph, pose with, touch, swim with, or otherwise interact with the animals. Although interactions generally are not motivated by a desire to harm the animals, they can pose substantial risks to both the humans and the wild marine mammals involved. Risks to people include injury or death from being bitten, rammed, drowned, or otherwise attacked. Animals may be driven from preferred habitat; injured by people trying to touch or prod them; debilitated by inappropriate, contaminated, or spoiled food; or enticed to interact with humans and thus become pests. Because human interactions have the potential to disturb or injure wild marine mammals, in many

instances, they constitute harassment under the Marine Mammal Protection Act.

The National Marine Fisheries Service's regulations define the term "take" to include feeding marine mammals in the wild. As such, feeding marine mammals in the wild is clearly prohibited. The dividing line between actions that constitute a taking and those that do not is not always so clear in other contexts. This has prompted the Service to develop guidelines for responsibly viewing marine mammals in the wild and to initiate a nationwide public education and outreach campaign encouraging proper viewing of wildlife from a distance.

Commercial Swim-with-the-Dolphin Programs in Florida and Hawaii

Over the past decade, the Commission has written to the National Marine Fisheries Service several times recommending that the Service advise both the public and commercial operators offering tours that involve closely approaching marine mammals that interactions that have the potential to disrupt the animals' behavioral patterns constitute harassment under the Marine Mammal Protection Act. The Commission advised the Service that, based on the results of a Commission-sponsored literature review and a pilot study of human interactions with bottlenose dolphins off Panama City, Florida, such interactions are likely to result in at least Level B harassment of the animals and, in some cases, could result in the death or injury of people or marine mammals. On 30 January 2002 the Service published an advance notice of proposed rulemaking seeking public input as to whether and, if so, how best to regulate interactions between the public and wild marine mammals.

At its 2002 annual meeting, the Commission was briefed by National Marine Fisheries Service representatives about interaction problems involving the public and spinner dolphins in Hawaii. At that time, agency representatives advised the Commission that NOAA's Office of General Counsel for Enforcement and Litigation and the Service's Southwest Regional Office do not consider public harassment of marine mammals to be a priority issue and have chosen not to enforce, or to selectively enforce, the harassment provisions of the Marine Mammal Protection Act. Reasons given for assigning low priority to this issue included the effort and time required for prosecuting even simple cases (due to the likelihood of appeals, etc.), the large

number of violations occurring, and the belief that prosecuting tourists, who the agency believes commit most of the violations, "would not do any good anyway because they [the agency's Office of General Counsel for Enforcement and Litigation] are unlikely to be repeat offenders." Agency representatives indicated that prosecuting harassment cases is unlikely to be given high priority "until someone like Congress tells them to make it a priority." In the exchanges at the Commission's meeting, the Commission advised the Service that, unless priority is given to this issue, supported by dedicated and consistent enforcement efforts, the measures currently being taken by some parts of the agency to address interaction problems will continue to be ineffective. The Commission further advised the Service that it would be following up with the agency on this matter.

On 6 May 2003 the Commission wrote to the Under Secretary for Oceans and Atmosphere of the Department of Commerce expressing concern about the increasing frequency with which marine mammals are being subjected to taking by harassment through directed human/marine mammal interactions and NOAA's lack of response to these ongoing violations of the Act. The Commission's letter focused on harassment related to close approaches to various pinniped species along the California coast and on swim-with-the-dolphin activities in Hawaii but noted that similar activities are occurring in other regions, most notably dolphin swim programs in the southeastern United States. The Commission noted that commercial operators in Hawaii are routinely offering the public opportunities to interact with dolphins in ways and at distances that result in unauthorized takings and may be having adverse effects on the affected populations. The Commission further noted that, according to information provided by the National Marine Fisheries Service, wild dolphin swim programs along the west coast of the island of Hawaii are proliferating. The Commission expressed concern that the agency has taken little or no enforcement action to address the problem despite the frequency of encounters between swimmers and dolphins, the predictability of when and where they occur, and the long-term impacts being documented.

NOAA's response, sent 6 January 2004, stated that it spends significant resources in educational and outreach efforts, and, where appropriate, both the agency's Office for Law Enforcement and the Office of the General Counsel are prepared to investigate and prosecute unlawful harassment. The agency noted, however, that various factors influ-

ence the agency's abilities in this regard—including available personnel and budget resources, established priorities, the requirements of the Marine Mammal Protection Act, and the challenges those requirements pose to pursuing successful prosecutions—as well as the Administration's proposed changes to the Act, which include amending the definition of harassment to facilitate prosecution of harassment cases. The Service also stated that it is in the process of promulgating regulations that more specifically address human interactions with marine mammals in the wild.

At its 2004 annual meeting in Hawaii, the Commission again explored the issue of the public's interactions with spinner dolphins. The Commission, its Committee of Scientific Advisors, and invited guests also visited one of the areas north of Kailua-Kona frequented by spinner dolphins and targeted by tour operators to get a firsthand understanding of the types of interactions that are occurring.

During discussion of the harassment issue at the 2004 meeting, many people who had been present on the field visit said that they had observed activities that they considered intentional pursuit and harassment of dolphins. National Marine Fisheries Service representatives noted, however, that opinions differ as to what activities constitute harassment. Contrary to the Commission's previous understanding and the Service's earlier statements, Service representatives indicated that the Service has no formal national policy concerning harassment that provides explicit guidance to the public concerning what activities the Service considers to have the potential for disturbing marine mammals. Both the Director of the Service's Office for Law Enforcement and a representative of NOAA's Office of the General Counsel noted that they are significantly impeded in their ability to pursue enforcement actions by the ambiguity in the Marine Mammal Protection Act's definition of harassment. They also noted that proceeding with a rulemaking to clear up the uncertainties would be premature in light of proposed legislation to amend the Act's definition of that term.

In addition to considering stepped-up enforcement as a means of addressing the problems created by human/dolphin interactions in Hawaii, the Commission and participants at its meeting considered possible alternative solutions. Participants generally agreed that other alternatives may be preferable to relying almost exclusively on rigorous enforcement

of the Marine Mammal Protection Act's taking prohibition. One idea put forth was that the National Marine Fisheries Service convene a meeting of federal, state, and local government agencies, researchers, tour operators, and other stakeholders to develop a comprehensive approach to the problem that looks at when, where, and how such activities can be conducted without adversely affecting the dolphins.

On 25 January 2005 the Commission wrote to the Under Secretary for Oceans and Atmosphere of the Department of Commerce reiterating its belief that some of the ongoing activities involving spinner dolphins and boaters and swimmers in Hawaii unambiguously fall within the Marine Mammal Protection Act's definition of harassment. The Commission again recommended that greater enforcement attention be given to human/dolphin interactions in Hawaii and that the National Marine Fisheries Service pursue cases, at least for the most egregious instances of harassment. The Commission noted that, inasmuch as enforcement officials believe that they are impeded in their ability to pursue cases because of ambiguities in the definition of harassment, it is incumbent on NOAA to act to resolve those ambiguities. The Commission agreed that, if changes to the underlying statutory provisions of the Marine Mammal Protection Act are imminent, proceeding with a comprehensive rulemaking may be unwarranted. Nevertheless, the Commission urged NOAA/NMFS to consider actions that could be taken to clarify and mitigate the situation short of rulemaking. The Commission suggested various strategies in this regard, including publication of a policy statement that provides explicit guidance and public notice of what the agency considers pursuit or annoyance of marine mammals and that identifies those activities that have the potential to disturb marine mammals.

The Service responded by letter of 21 April 2005, providing a general overview of its efforts regarding conservation of marine mammals in Hawaii, including working toward a joint enforcement agreement with the State; completing a memorandum of agreement among NOAA, the U.S. Fish and Wildlife Service, and the State to coordinate management efforts in the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve; and staffing the Office of the General Counsel in the Pacific Islands Region. The Service noted that additional funding is needed for its Honolulu offices and that additional resources for the western Pacific Islands area were requested in the President's fiscal

year 2006 budget. The Service's response did not address the Commission's specific concerns and recommendations with respect to human/dolphin interactions in Hawaii.

On 12 December 2005 the National Marine Fisheries Service published an advance notice of proposed rulemaking indicating that it was considering promulgating regulations specific to the main Hawaiian Islands to protect spinner dolphins from human interactions. The notice summarized studies that have documented changes in dolphin behavior associated with increased human activities in near-shore areas around several of the Hawaiian Islands and expressed the agency's concern that the displacement of dolphins from primary resting areas could be having adverse impacts. The Service requested comments as to whether protective regulations are needed and, if so, how they should be structured. Among the options being considered by the Service were regulations that would establish a limit as to how close vessels or swimmers could approach dolphins, prohibit activities of particular concern (e.g., swimming with or touching a spinner dolphin in the wild), restrict certain vessel practices (e.g., herding dolphins or positioning a vessel in the path of approaching dolphins), or establish time or area closures in or around particularly important areas.

At the end of 2005 the Commission was preparing comments on the advance notice of proposed rulemaking. The Commission expected to recommend that the Service proceed promptly with a rulemaking to increase the protection afforded spinner dolphins in Hawaii. The Commission anticipated recommending that the Service use a combination of provisions to protect dolphins by closing the most important resting areas to all human activities during certain times and establishing limitations on activities in other areas used by spinner dolphins. Such limitations might include vessel speed limits, limits on the number of vessels in a given area, and a generally applicable minimum approach distance.

Independent of the regulations being considered by the Service, the State of Hawaii is considering steps to establish protected areas in state waters, including some areas used by spinner dolphins. Although the State is precluded by the Marine Mammal Protection Act from adopting regulations directly related to the taking of marine mammals, protection of spinner dolphins is a possible ancillary benefit of action by the State to restrict activities in marine areas for other purposes, such as the

promotion of public safety, the protection of other resources, or the protection of cultural heritage.

La Jolla Children's Pool

In 1930 Ellen Browning Scripps received permission from the City of San Diego, California, to construct a breakwater at La Jolla to create a bathing zone adjacent to a city park. Following completion of the project in 1931, Ms. Scripps gave this area, known as "Children's Pool," to the city. At about the same time, the State of California conveyed to San Diego rights to tidal and submerged lands at that site. The grant of trust from the State specified that the area was to be "devoted exclusively to [a] public park, bathing pool for children, parkway, highway, playground, and recreational purposes...." The area was used for those purposes for the next several decades.

As pinniped populations increased in abundance along the West Coast, harbor seals began to use the area adjacent to Children's Pool. This prompted San Diego to establish in 1993 a marine mammal reserve adjacent to that location, from which swimmers, divers, and tourists were excluded. As more harbor seals occupied the area, they began using the beach at Children's Pool as a haul-out site.

San Diego closed the area to swimmers in 1997 due to high fecal coliform counts in the waters of Children's Pool. At that time, the city was not sure that the seals were the source of the coliform bacteria. The city manager stated that, "[i]f the high contamination level both proves to be due to seals, and continues, it is the City's intent to find a solution which allows the peaceful co-existence of humans and seals at Children's Pool, to the extent the public health can be protected." The city manager further noted that, if the seals are posing a risk to public health, the Marine Mammal Protection Act allows the city to take noninjurious actions to reduce or eliminate seal usage of Children's Pool.

When tests confirmed that the seals were the source of the high coliform bacteria levels, San Diego determined that the best solution would be to remove about three-fourths of the sand that had accumulated on the beach since the breakwater was built and to return the site to its 1931 configuration. The city applied for a small-take authorization from the National Marine Fisheries Service in 1998 seeking authority to take harbor seals incidental to removal of the sand. Before an authorization was issued, the city withdrew its request after the City

Council voted to “not dredge, not shoo the seals, [but] instead put up a barrier to protect the humans from the seals and the seals from the humans....”

In 1999 the National Marine Fisheries Service wrote to the city taking issue with the policy of shared use of Children’s Pool by humans and seals. The Service advocated that the city decide whether the area would be used by humans or seals. The Service subsequently decided to manage Children’s Pool as a harbor seal haul-out and rookery after the first births of seal pups on the beach had been documented, and so advised the city. Despite that pronouncement, the city continued to study options that would allow for shared use or that would alter the beach in an effort to make it less attractive to seals.

The City Council once again considered the issue of Children’s Pool at its 14 September 2004 meeting. A representative of the National Marine Fisheries Service advised the council that harbor seals are a healthy, growing species and that the city had authority under section 109(h) of the Marine Mammal Protection Act to move the seals if they are presenting a public nuisance or are causing a public health hazard. At that meeting the Service took the position that management of the seals at Children’s Pool was a local issue for the city to resolve. As a result, the City Council voted to pursue a sand removal project and open the pool for year-round public use. The City Council also directed that rope barriers and posted signs be removed to restore public access to the area.

When the city took no further action to remove sand at the beach, a resident filed suit against the city, claiming that it had violated the 1931 trust under which the tidelands had been transferred to San Diego. The Superior Court of California ruled in the case (*O’Sullivan v. City of San Diego*) on 25 August 2005.

The court found that a local entity that is the recipient of trust property must use that property in compliance with the terms of the trust. Here, the trust required that the lands be used for a children’s pool. The court ruled that use of the beach as seal habitat, an animal sanctuary, or a seal-watching site that precludes its use as a bathing pool for children would be outside the scope of the trust and not a permitted use. As such, the court found that the city had breached its trust responsibilities and directed the city “to employ all reasonable means to restore the Pool to its 1941 condition by removing the sand build-up and further to reduce the level of water contamination in the Pool to levels certified by the County of San Diego as being safe for humans.”

The court recognized that other federal, state, or county laws would apply to such undertakings, but directed that its order be complied with fully within six months.

The ruling prompted the city to seek the advice of the National Marine Fisheries Service as to whether section 109(h) of the Marine Mammal Protection Act provides authority for the city to disturb seals that may be on the beach at the time of the proposed sand removal. The Regional Administrator of the Service’s Southwest Region responded by letter of 17 October 2005, suggesting that section 109(h) provides the necessary authority for the proposed taking of harbor seals at Children’s Pool Beach. That response prompted the Commission to send letters to both the Service and the city seeking to clarify the situation. In doing so, the Commission stated clearly that the question of whether the court-ordered displacement of seals and/or modification of habitat at Children’s Pool is appropriate is purely a question of state law and not something on which the Commission would comment. Rather, the Commission was providing advice to the Service and the city solely to ensure that any taking of marine mammals that may occur while complying with the court’s order will be conducted in full compliance with the provisions of the Marine Mammal Protection Act.

In a 3 November 2005 letter to the Service’s Regional Administrator, the Commission noted that upon close examination the Service’s reply to the city had not addressed the city’s central questions. Rather, the Service merely restated the applicable law when it responded that it “agrees that the MMPA allows the city to restore the beach for exclusive human use provided the city determines one or more of the ... provisions of section 109(h) apply and can document the decision.” The Service did not indicate, however, whether it believed that the proposed activities at Children’s Pool fit within the scope of that provision.

The Commission took the position that providing guidance on interpreting section 109(h) is properly within the purview of the Service and should not be deferred to local jurisdictions to make independent determinations as to whether certain activities fit within the scope of that taking authority. The Commission believed that this was especially true in the case of Children’s Pool, which involves several novel issues of statutory construction and which has the potential to set a precedent concerning how human/marine mammal interactions are dealt with elsewhere. The Commission therefore recommended that the Service and/or NOAA’s Of-

office of General Counsel provide a more rigorous analysis of the applicability of section 109(h) to each aspect of the proposed taking to determine if other types of taking authorization (e.g., an incidental taking authorization under section 101(a) (5) of the Act) might also be needed. To assist the Service in undertaking such a review, the Commission provided the Service with an analysis of the legislative history of section 109(h) that the Commission had prepared several years ago and identified some of the issues that need to be resolved in this case (e.g., will seals be taken intentionally or only incidental to sand removal, is use of the section 109(h) taking authority appropriate in other than emergency situations, is mere inconvenience or interference caused by conflicting marine mammal and human activities sufficient to constitute a nuisance, will sand removal or other potential sources of taking be conducted by city officials or outside contractors?).

The Commission's letter to the city manager's office raised many of the same points and included a copy of the more detailed letter sent to the Service. The Commission stressed that the Service, as the resource agency responsible for implementing the Marine Mammal Protection Act, rather than the city attorney of San Diego, should be interpreting the Act's provisions and making the necessary determinations. As such, the Commission encouraged the city to renew its consultations with the Service to resolve the issues raised in its letters.

The urgency with which these issues needed to be resolved to comply with the court-imposed deadline was eased when the city decided to appeal the superior court's ruling and a stay of the order was imposed. Nevertheless, the Commission believes that the Service needs to address the issues of how best to authorize the taking of marine mammals that may occur as a result of sand removal or other activities at Children's Pool. As of the end of 2005 the Commission had yet to receive a response to its letters to the Service or the city.

Deterrence Regulations and Workshop

The 1994 amendments to the Marine Mammal Protection Act authorize certain categories of individuals to take marine mammals to protect personal safety or property, provided that the deterrence measures taken do not result in the death or serious injury of a marine mammal. Specifically, section 101(a)(4) of the Act allows (1) the owner of fishing

gear or catch, or the owner's employee or agent, to deter a marine mammal from damaging the gear or catch; (2) the owner of other private property, or the owner's agent, bailee, or employee, to deter a marine mammal from damaging that property; (3) any person to deter a marine mammal from endangering personal safety; or (4) a government employee to deter a marine mammal from damaging public property.

The 1994 amendments directed the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to consult with appropriate experts and, after notice and opportunity for public comment, to publish in the *Federal Register* a list of guidelines that may be used in safely deterring marine mammals. The Services were to recommend separate specific measures that can be used to deter marine mammals listed as endangered or threatened under the Endangered Species Act. Actions to deter marine mammals consistent with those guidelines or recommended measures would not be a violation of the Act. The amendments also directed the Services to identify deterrence methods that have a significant adverse effect on marine mammals and authorized the agencies to prohibit such methods by regulation.

The National Marine Fisheries Service published proposed deterrence regulations in May 1995. The Service offered guidance on passive, preventive, and reactive measures that could be taken to deter marine mammals, setting forth four general principles regarding acceptable deterrence measures. In addition to a statutory directive that such measures not result in the death or serious injury of the animal, the Service proposed that such measures should not (1) result in the separation of a female marine mammal from its unweaned offspring, (2) break the skin of a marine mammal, (3) be directed at a marine mammal's head or eyes, or (4) be used to deter pinnipeds hauled out on unimproved private property. The Service also proposed to prohibit the use of any firearm or other device to propel an object that could injure a marine mammal, the use of any explosive device to deter cetaceans or the use of explosives more powerful than seal bombs to deter seals or sea lions, translocation of any marine mammal, or the use of tainted food or bait or any other substance intended for consumption by the marine mammal. Deterrence of marine mammals listed as endangered or threatened under the Endangered Species Act would not be authorized under the proposed regulations. Rather, measures to safely deter listed species would be subject to a separate rulemaking.

Although the Commission and several others commented on the proposed rule, the Service never published final regulations. This has left those seeking to deter marine mammals under the authority of section 101(a)(4) to follow the general guidance of the statutory provision and the proposed guidelines published by the Service in 1995. The U.S. Fish and Wildlife Service has not published any guidelines or proposed regulations concerning the deterrence of marine mammal species under its jurisdiction. However, this has not been a significant problem because, with the exception of polar bears that can endanger personal safety, marine mammals subject to U.S. Fish and Wildlife Service jurisdiction generally do not interact with humans or their property in ways that require or warrant deterrence.

Attention again focused on the need for deterrence guidelines in 2005. As pinniped populations have continued to grow, particularly along the West Coast of the United States, the numbers of animals hauling out on docks, marinas, and boats have increased, as has the incidence of interactions between marine mammals and people at these locations. This prompted the National Marine Fisheries Service to convene a workshop of agency representatives, state officials, and other interested parties on 8 December 2005 to share information on pinniped populations, review the types of interactions that are occurring, discuss non-lethal deterrence methods and their effectiveness, and develop options concerning potential deterrence measures for evaluation by federal and state officials. This workshop was followed by a meeting of federal and state officials on 9 December to consider the information presented at the workshop and to review what had prevented the rulemaking initiated in 1995 from being com-

pleted. A Commission representative participated in both the workshop and the follow-up meeting.

At the meeting of federal and state officials, it was generally agreed that the Service should reinstate the rulemaking to identify acceptable deterrence measures. Participants also generally agreed that such regulations would need to provide sufficient flexibility to allow for innovation on the part of those deterring marine mammals by specifying fairly broad categories of acceptable methods. More specific information on particular methods could be provided on the Service's Web site, which could be updated and revised more frequently. Toward this end, the Service indicated that it intended to provide interim advice to the public on acceptable deterrence measures via its Web site pending the publication of more formal guidelines.

The Commission representative at the meeting advised that there is a need for the Service to do more than just identify acceptable deterrence measures as it revisits the previous rulemaking. There is also a need to clarify who may employ deterrence measures and under what circumstances. For example, what types of property damage are covered by the statutory provision? Is temporary exclusion from one's property sufficient to trigger this provision? What if access to one's property is precluded by the presence of a marine mammal on the property of another (e.g., a boat owner mooring at a public dock)? Is a formal process needed to identify who is authorized to act as an agent on behalf of a property owner? The Commission expects that the Service will address these and related issues in a new proposed rule, which likely will be published in 2006.

Chapter XI

SPECIAL PROJECTS

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 following sections of this chapter provide an overview of four special projects that the Commission currently is undertaking.

Sound in the Oceans

The U.S. Congress, through the Omnibus Appropriations Act of 2003, directed the Commission to “fund an international conference or series of conferences 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.” The potential for human-generated (anthropogenic) sound to affect marine mammals has been discussed in many forums in recent years and, since 1994, has been the subject of four reports from the National Research Council of the National Academies of Sciences.

The Commission consulted with interested stakeholders on various approaches that it might take to respond to the Congressional directive. Based on those discussions, the Commission developed a process for a multi-stakeholder dialogue focused on addressing the potential impacts of anthropogenic sound on marine mammals and retained a team of facilitators to help construct and manage the dialogue process. In November 2003 the Commission established a 28-member Advisory Committee on Acoustic Impacts on Marine Mammals under the provisions of the Federal Advisory Committee Act of 1972. To balance stakeholder representation, members were chosen from (a) agencies, organizations, and individuals whose activities introduce sound into the marine environment (U.S. Navy and other government agencies, shipping and oil and gas industries, and academic research scientists); (b) non-governmental environmental and animal welfare organizations; (c) research scientists with

pertinent expertise; and (d) federal and state agencies with responsibilities concerning or affecting marine mammals.

The Advisory Committee’s charter directed it to:

- review and evaluate available information on the impacts of human-generated sound on marine mammals, marine mammal populations, and other components of the marine environment;
- identify areas of general scientific agreement and areas of uncertainty or disagreement related to such impacts;
- identify research needs and make recommendations concerning priorities for research to resolve critical uncertainties or disagreements; and
- recommend management actions and strategies to help avoid and mitigate possible adverse effects of anthropogenic sounds on marine mammals and other components of the marine environment.

Operating procedures adopted by the Advisory Committee included the primary charge to “... develop recommendations to the Commission for inclusion in a report to Congress from the Commission. The Commission asks the Committee to develop as much consensus on these recommendations as is achievable. On issues where the Committee does not or cannot reach consensus, this will be noted and the Commission may develop, if it so chooses, its own recommendations to Congress on those issues.”

Between February 2004 and September 2005 the Advisory Committee met in six plenary meetings. In addition, Committee members and additional experts participated in numerous subcommittee and working group meetings to develop materials for the

Advisory Committee's consideration. Consistent with the Federal Advisory Committee Act, summaries of all Advisory Committee meetings and copies of all presentations and working drafts brought to the full Committee for consideration are publicly available, with most documents available on the Commission's Web site at www.mmc.gov/sound.

In addition, the Commission collaborated with the United Kingdom's Joint Nature Conservation Committee to co-sponsor a conference on international efforts to assess and address the effects of sound on marine mammals. The Commission also sponsored a workshop aimed specifically at the vulnerability of beaked whales to anthropogenic sound, particularly mid-frequency sonar.

At the Advisory Committee's final meeting in September 2005, significant differences on a number of key issues remained unresolved. For instance, Committee members' views differed on (1) how serious the problems of increasing ambient noise or intense sounds are for marine mammal populations; (2) the effectiveness of monitoring techniques to detect marine mammals; (3) the effectiveness and utility of mitigation measures to reduce potential impacts on marine mammals; and (4) the degree of precaution to take when introducing sound into the ocean given the high level of uncertainty and potential for serious impacts. Acknowledging this, Committee members agreed unanimously to discontinue efforts on a single consensus report to the Commission. They agreed instead to develop a summary of the Advisory Committee process and develop non-consensus statements by individual Advisory Committee members or groups of members on the issues discussed by the Advisory Committee in response to its charter. These statements were to be attached to the summary to constitute the report of the Advisory Committee to the Commission.

The Commission agreed to prepare its report to Congress and attach the report of the Advisory Committee to the Commission when it distributes its report to Congress. At the end of 2005, Advisory Committee members were preparing their statements to submit to the Commission. The Commission expects to complete its report to Congress in the first half of 2006.

Significant Events Related to Acoustic Impacts on Marine Mammals in 2005

During the course of the Advisory Committee meetings, a number of events occurred that heightened the controversy surrounding the potential effects of anthropogenic sound on marine mammals. Those events are described briefly here.

North Carolina stranding event — On 15–16 January 2005, 33 short-finned pilot whales, two dwarf sperm whales, and 1 neonatal minke whale stranded and died along approximately 85 miles of coastline in North Carolina. Necropsies were performed on some animals. The National Marine Fisheries Service classified these strandings as an unusual mortality event and was still investigating it at the end of 2005. U.S. naval maneuvers coincided with the strandings although information on the precise time and place of the exercises was not available at the end of 2005. This event is discussed further in Chapter VI of this report.

U.S. legal proceedings — 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 Department of the Navy for alleged violations of the National Environmental Policy Act, the Endangered Species Act, and the Marine Mammal Protection Act associated with the Naval exercises that use mid-frequency sonar in testing and training exercises. Plaintiffs contend 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 listed endangered or threatened species as required by the ESA, and (3) seek or obtain marine mammal incidental harassment authorizations or small-take permits as required by the Marine Mammal Protection Act. At the end of 2005 discussions between plaintiffs and government attorneys were continuing.

U.S. Navy activities — The U.S. Navy released two draft environmental impact statements, the first on the Surveillance Towed Array Sensor System Low-Frequency Active sonar system and the second on the Undersea Warfare Training Range proposed off the East Coast of the United States. The Commission plans to submit comments on each of these documents in 2006.

In August 2005 the Navy unveiled a programmatic strategy for reducing potential impacts of sonar on marine mammals and sea turtles. The strategy calls for the Navy to (1) continue supporting marine mammal research, (2) share information about Naval activities implicated in marine mammal stranding events, and (3) employ protective measures to minimize exposure of marine mammals to mid-frequency sonar so long as the measures are consistent with mission training and operational constraints. The Navy's strategy of protective measures requires habitat controls that avoid designated marine sanctuaries and critical habitats. If exercises are essential in such areas, the Navy will use additional observers and technologies such as passive acoustic monitoring. Navy vessels are to avoid approaching any whale head on and to travel at the slowest safe speed consistent with mission, training, and operations in designated areas.

The Navy's strategy also includes training area controls, which require surface units to use trained lookouts prior to and during exercises. Submarines are to use acoustic detection devices to locate marine mammals. When a marine mammal is detected within 412 m (450 yd) of a vessel's sonar dome, the ship or submarine must limit active transmission levels to at least 6 dB below the equipment maximum until such time as the marine mammal is no longer within 412 m (450 yd). If a marine mammal is detected within 183 m (200 yd) of the sonar dome, all active transmission must cease and the vessel must maneuver to avoid collision.

To protect beaked whales, Naval units are to avoid training with active sonar where they will encounter conditions like those found in the Providence Channel in the Bahamas (i.e., strong surface ducts, steep bathymetry, and constricted channels or limited egress for marine mammals). They will

also refrain from using multiple sonar systems over extended periods. Also, a ship or submarine operator who has attempted to avoid close quarters with dolphins or porpoises by conducting an avoidance maneuver may conclude, if the maneuver is unsuccessful, that the animals are deliberately approaching the ship to ride its bow wave and take no further mitigation measures.

Ecological Impacts of Killer Whales in the North Pacific Ocean

A number of pinniped populations in the North Pacific Ocean and Bering Sea have declined significantly over the past three or four decades. As a result of the observed declines, the western population of Steller sea lions has been listed as endangered, the southwest Alaska population of northern sea otters has been listed as threatened, and the Pribilof Islands population of northern fur seals has been designated as depleted. These changes in legal status have significant management implications and have received considerable attention due to constraints, or the possibility of constraints, imposed on fishing and other human activities.

At least three factors have been identified as potentially important causes of the declines: oceanographic regime shifts, commercial fishing, and predation by killer whales. The role of each of these factors has been highly controversial. The killer whale hypothesis has been expanded to include the supposition that large-scale commercial whaling in the North Pacific Ocean and Bering Sea in the 1950s to 1970s substantially reduced the availability of prey (large whales) for killer whales, causing them to shift their foraging from large cetaceans to pinnipeds and sea otters.

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 mam-

mals.” To investigate the potential effects of killer whale predation on marine mammals, the Commission convened a workshop of killer whale experts in April 2005 to review available scientific information, identify crucial gaps in that information, and suggest research to fill those gaps. Key areas of discussion included such things as killer whale ecotype and stock structure; abundance and trends; broad- and fine-scale distribution and movement, foraging patterns and diet, nutritional needs and energetics; and pertinent information on potential prey. Workshop participants agreed that mammal-eating (so-called “transient”) killer whales have the potential to significantly affect local populations of their prey, but available information is insufficient to indicate whether killer whales were involved in the decline of pinniped populations or in delaying the recovery of those populations. Stronger evidence is available for killer whales playing a substantial role in the recent decline of sea otters, at least in portions of the Aleutian Islands.

Workshop attendees suggested that research was necessary to address several fundamental questions regarding transient killer whales and their prey before the role of killer whales in suppressing prey populations could be assessed:

- How many transient killer whales are in the North Pacific?
- What are their distribution and movement patterns?
- What marine mammals do they eat?
- How much do they eat? and
- How does transient killer whale predation affect prey populations?

Although information was available to address some of these questions for specific regions and seasons (i.e., during the summer), that information was not sufficient to fully answer any of the questions. Based on the findings of the first workshop, the Marine Mammal Commission drafted a comprehensive research plan intended to guide future integrated research and provide a basis for assessing the predator/prey dynamics of transient killer whales and their marine mammal prey. This plan will be included as part of the Commission’s report to Congress in 2006.

To encourage implementation of the research plan, the Marine Mammal Commission convened a second workshop in August 2005 at which killer whale experts from the first workshop joined representatives of agencies and organizations likely

to fund research of the type described in the plan. Workshop participants discussed the research plan and provided suggestions for an implementation strategy similar to that used for the international collaborative research program on humpback whales in the North Pacific Ocean. In December 2005 the Commission convened a small organizing committee of killer whale researchers to coordinate further research implementation and funding efforts. The success of the implementation effort will depend to some degree on support and funding from Congress, the National Marine Fisheries Service, and non-governmental conservation organizations for long-term ecological research on killer whales and their ecosystems. At the end of 2005 the Commission was outlining its report to Congress. The report will include an assessment aimed at addressing the question from Congress, the research plan to address existing gaps in available scientific information, and funding strategies and recommendations to support the needed research.

Assessment of the Status of Endangered Marine Mammals in U.S. Waters and the Cost-Effectiveness of Related Protection Programs

In its 2004 omnibus appropriations bill, Congress directed the Marine Mammal Commission to “... review the biological viability of the most endangered marine mammals and make recommendations regarding the cost effectiveness of current protection programs.” After consulting with Congressional staff on the scope of this directive, the Commission decided to focus its review on the 22 marine mammal species and populations in U.S. waters that are listed as endangered or threatened under the Endangered Species Act or depleted under the Marine Mammal Protection Act (Table 10). During 2004 the Commission contracted with SRA International to help organize workshops and background reports and convene a project organizing committee including several members of the Commission’s Committee of Scientific Advisors on Marine Mammals; independent experts in the fields of population viability modeling, resource management, and natural resource economics; and repre-

Table 10. Marine mammal species and populations in U.S. waters listed under the Endangered Species Act, the Marine Mammal Protection Act, and the IUCN Red List

Marine Mammal Species and Populations in U.S. Waters	ESA Listing	MMPA Listing	IUCN Listing
West Indian manatee (Florida and Puerto Rico populations)	Endangered ¹	Depleted ¹	Vulnerable
Southern sea otter	Threatened	Depleted	Endangered ²
Northern sea otter (Southwest Alaska population)	Threatened	Depleted	Endangered
Caribbean monk seal	Endangered	Depleted	Extinct
Hawaiian monk seal	Endangered	Depleted	Endangered
Guadalupe fur seal	Threatened	Depleted	Vulnerable
Northern fur seal (Pribilof Island population)	Not listed	Depleted	Vulnerable ²
Steller sea lion (eastern population)	Threatened	Depleted	Endangered ²
Steller sea lion (western population)	Endangered	Depleted	Endangered ²
Blue whale (three populations)	Endangered ²	Depleted ¹	Endangered ³
Bowhead whale (western Arctic population)	Endangered ²	Depleted ¹	Lower risk
Fin whale (four populations)	Endangered ²	Depleted ¹	Endangered ²
Humpback whale (four stocks)	Endangered ²	Depleted ¹	Vulnerable ²
Northern right whale (N. Atlantic and N. Pacific populations)	Endangered ²	Depleted ¹	Endangered
Sei whale (three populations)	Endangered ²	Depleted ¹	Endangered ²
Sperm whale (five populations)	Endangered ²	Depleted ¹	Vulnerable ²
Beluga whale (Cook Inlet population)	Not listed	Depleted	Vulnerable ¹
Bottlenose dolphin (mid-Atlantic coastal population)	Not listed	Depleted	Data deficient ²
Killer whale (southern resident population)	Endangered	Depleted	Lower risk ²
Killer whale (AT1 group)	Not listed	Depleted	Lower risk ²

¹ Parentheses indicate the name or number of populations in U.S. waters based on Marine Mammal Stock Assessment Reports prepared pursuant to the Marine Mammal Protection Act.

² Listing applies to all populations worldwide; individual populations have not been evaluated.

³ Listing applies to all populations worldwide, except North Pacific population listed as lower risk and North Atlantic population as vulnerable.

sentatives of the National Marine Fisheries Service and the U.S. Fish and Wildlife Service.

Based on recommendations by the organizing committee, the Commission developed a three-phase project approach. Phase I involves a review of all 22 listed marine mammal taxa in U.S. waters, including their viability, status under established classification systems, and recovery or conservation programs.

Phase II involves a case study of the cost-effectiveness of the North Atlantic right whale recovery programs. Phase III involves the development of a summary report with recommendations to Congress.

During 2005 efforts were directed toward completing Phase I. In this regard, two reports were drafted and a workshop was convened. One of the reports reviews all 22 marine mammal taxa with

regard to their status under the Endangered Species Act, the Marine Mammal Protection Act, and the IUCN–The World Conservation Union’s Red List of threatened species. The second report reviews current recovery and conservation programs for each of those taxa, including the history and major elements of those programs, the agencies involved, and program implementation costs. Both reports are expected to be completed during 2006.

The workshop convened as part of Phase I assessed the population viability of the listed marine mammal species and populations. The workshop was held on 13–15 August 2005 in Savannah, Georgia. Its specific purposes were to (1) review provisions and procedures for listing and promoting the recovery of endangered, threatened, and depleted marine mammals occurring in U.S. waters; (2) review efforts to develop and use population viability analyses (PVA) and other types of population models for assessing and managing listed marine mammals; (3) evaluate the extent to which PVA or other types of models might be used to list species under the Endangered Species Act; and (4) evaluate the utility of PVA and other models for developing population management actions and alternatives. The workshop began with presentations by managers working to list and recover marine mammals. These were followed by presentations from the authors of the two reports described earlier. The workshop then reviewed a number of models developed specifically for marine mammals and discussed their strengths and weaknesses for assessing population status and guiding management efforts.

In part, workshop participants concluded that almost all of the listed marine mammal species in U.S. waters were viable. They based their conclusion on experience with other severely depleted species and information on the status of the listed marine mammals. They noted two exceptions, however. The first is the Caribbean monk seal, which participants believed was already extinct (the last confirmed sighting was in 1952). The second is the AT1 group of killer whales, which now consists of just seven males and two females and is not known to have produced a viable calf in more than 20 years. Based on population abundance and factors that increase the probability of extinction for very small populations (e.g., inbreeding), the participants also considered the listed marine mammal populations at greatest risk of extinction to be the North Atlantic and North Pacific right whales, southern resident killer whales, Cook Inlet beluga whales, the Puerto Rican population of West Indian manatees, Hawaiian monk seals, and southern sea

otters. They also noted that several of these species appear to be misclassified under U.S. law and on the IUCN Red List (see Table 10).

Workshop participants agreed that PVA models offer great potential for improving listing decisions under the Endangered Species Act and discussed a framework for their use in this regard. They also considered the benefits of a similar framework for other decision-making processes (e.g., prioritizing actions in recovery plans, evaluating reasonable and prudent alternatives in section 7 consultations under the Endangered Species Act, and deciding whether impacts of human activities are negligible under the Marine Mammal Protection Act).

At the end of 2005 a draft workshop report was nearing completion. In addition, the Commission was planning a review of the North Atlantic right whale recovery program to examine its cost-effectiveness as part of Phase II. A final report to Congress based on the results of Phases I and II is expected to be completed by the end of 2006.

Future Directions in Marine Mammal Research

In August 2003 the Marine Mammal Commission invited many of the world’s leading marine mammal scientists to participate in a consultation on future directions for marine mammal research. The purposes of the consultation were to (1) identify and evaluate threats to marine mammals, (2) develop research recommendations to further our understanding of such threats and devise methods to address them, and (3) generate new, creative, and proactive approaches for resolving issues related to the conservation of marine mammals and their habitats.

Prior to the meeting, the consultation steering committee identified 10 issues or threats to marine mammals and their habitats and invited leading scientists to prepare background papers for each topic. The issues or threats identified are direct fisheries interactions, indirect fisheries interactions, disease, contaminants, harmful algal blooms, anthropogenic sound, habitat transformation, long-term environmental change, identification of conservation units, and human population growth and demography.

The authors prepared their papers for discussion at the meeting. In addition, two other topics—growing marine mammal populations and ship strikes—were identified and discussed by the participants.

Subsequently, these papers and discussions were summarized in two publications: “A Report to Congress: Future Directions in Marine Mammal Research” and a more detailed report of the same name that constitutes the full report of the consultation. Both reports are available on the Commission’s Web site (www.mmc.gov) or in printed form from the Commission.

Following the consultation, the invited authors were given the opportunity to modify and expand their papers based on the discussions at the meeting or new information. A compilation of the revised pa-

pers, along with introductory and concluding chapters, was published in book form in December 2005 by The Johns Hopkins University Press. *Marine Mammal Research—Conservation Beyond Crisis* provides an overview of known threats to marine mammal populations and their habitats, the existing scientific information about those threats, important information gaps, and research directions to address those gaps. Information for obtaining a copy of the book can be found on the Commission’s Web site.

Chapter XII

RESEARCH AND STUDIES PROGRAM

The Marine Mammal Protection Act requires that the Marine Mammal Commission maintain a continuing review of research programs conducted or proposed under authority of the Act, undertake studies as it deems necessary or desirable in connection with marine mammal conservation and protection, and take every step feasible to prevent duplication of research. To accomplish these tasks, the Commission convenes meetings and workshops to review, plan, and coordinate marine mammal research; awards grants for studies to identify and develop solutions to domestic and international problems affecting marine mammals and their habitats so as to facilitate and complement activities of other agencies; and recommends steps that should be taken to prevent unnecessary duplication and enhance the quality of research conducted or supported by the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, the Geological Survey, and other federal agencies. In fiscal year 2005 the National Marine Fisheries Service transferred \$1.2 million to the Commission to support work on special projects discussed in Chapter V and the research program described here.

Workshops and Planning Meetings

In 2005 Commissioners, members of the Committee of Scientific Advisors on Marine Mammals, and staff helped organize and participated in meetings and workshops to accomplish the following:

- direct the federal Advisory Committee on Acoustic Impacts on Marine Mammals (see Chapter XI);
- review the ecological role of killer whales in the North Pacific Ocean and implement an integrated killer whale research plan (see Chapter XI);
- evaluate the use of population viability analysis or other quantitative tools for listing endangered species and developing or evaluating recovery actions (see Chapter XI);
- evaluate the potential behavioral and physiological effects of tagging large whales (see Chapter X);
- evaluate co-management and related issues with the Alaska Beluga Whale Committee;
- develop emergency plans for conservation of the Yangtze River dolphin;
- review and improve assessments of marine mammal stocks;
- develop a research plan for cetaceans in the Pacific Islands region;

- guide management of the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, including fishery management, a regional science plan, and the possible transition to a national marine sanctuary through the Reserve Advisory Committee;
- chair the Sirenian Review undertaken by IUCN–The World Conservation Union;
- chair a workshop to discuss foraging ecology of Hawaiian monk seals and foraging research needs;
- participate in a meeting to review management and research needs for ice-associated seals in Alaska and to continue efforts to develop an ice seal co-management agreement;
- chair a meeting to discuss the development of a morbillivirus vaccine that could be used with wild Hawaiian monk seals;
- participate in the Caribbean Regional Seas Program (United Nations Environmental Programme) to develop an action plan for marine mammal research and conservation;
- participate in and support the Warm-Water Task Force for Florida Manatees;
- discuss international arctic policy, U.S. involvement, and the potential role of the Commission;
- assess and develop measures to avoid adverse effects of oil and gas development on the western

North Pacific population of gray whales off Sakhalin Island;

- develop means for improving the response to marine mammal strandings off the Atlantic coast;
- promote coordination of research on bottlenose dolphins along the mid- and south Atlantic coast;
- assess the potential impacts of climate change on arctic marine mammals and means to prevent, minimize, or mitigate those measures;
- promote recovery of Hawaiian monk seals; and
- contribute to the development of a Caribbean Marine Mammal Action Plan.

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

- Atlantic Pelagic Longline Take Reduction Team (see Chapter VII);
- Bottlenose Dolphin Take Reduction Team;
- Working Group on Marine Mammal Unusual Mortality Events (see Chapter VI);
- Joint Subcommittee on Ocean Science and Technology (JSOST);
- Florida Manatee Recovery Team;
- Ocean Observations (a JSOST interagency working group);
- Harmful Algal Bloom, Hypoxia, and Human Health Working Group (a JSOST interagency working group); and
- Interagency Marine Debris Coordinating Committee.

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, it convenes workshops and awards grants for research and studies to help identify and determine how best to minimize threats to marine mammals and their habitats. The research program awards grants based on proposals submitted in response to a general request for proposals, unsolicited proposals, and specific research topics identified by the Commission. Since it was established in 1972, the Commis-

sion 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.

In 2005 the Commission issued a call for preproposals for projects aimed at furthering the conservation and management goals of the Marine Mammal Protection Act. A subcommittee of Commissioners, members of the Committee of Scientific Advisors on Marine Mammals, and staff reviewed 153 preproposals received and solicited 24 full proposals. After final review, the Commission awarded seven grants totaling approximately \$252,000. In addition, the Commission awarded three other research grants totaling approximately \$40,000. Brief descriptions of these grants are provided here.

Stock Identification and Assessment

Mixed-stock analysis of harbor porpoises (*Phocoena phocoena*) along the U.S. mid-Atlantic coast using microsatellite DNA markers (College of Charleston, Charleston, South Carolina) — Current management programs treat harbor porpoises in waters off the U.S. mid-Atlantic coast as a winter extension of the Gulf of Maine/Bay of Fundy population, and bycatch in the mid-Atlantic is attributed solely to that population. However, migrant porpoises from regions in Canada or West Greenland also may be present in the mid-Atlantic during winter months. This project is using mixed-stock analysis and assignment tests with microsatellite data to evaluate harbor porpoise population structure along the U.S. mid-Atlantic coast. An accurate evaluation of stock structure will help determine whether the current take reduction plan is apportioning harbor porpoise bycatch that occurs in the mid-Atlantic to the correct stock or stocks of animals. The resulting stock structure also can be used to correct calculations of potential biological removal levels for mid-Atlantic harbor porpoises.

Summer distribution and abundance of bowhead whales (*Balaena mysticetus*) in the Shantar Archipelago, western Okhotsk Sea (North Pacific Wildlife Consulting, Anchorage, Alaska) — Five stocks of bowhead whales are currently recognized in the arctic and sub-arctic regions of the North Atlantic and North Pacific Oceans:

Spitsbergen, Davis Strait, Hudson Bay, Bering–Chukchi–Beaufort Seas, and Okhotsk Sea stocks. Commercial whaling substantially reduced all of these stocks, but only the Bering/Chukchi/Beaufort Seas stock has shown discernible recovery. The Okhotsk Sea stock likely had a smaller pre-exploitation abundance, was subjected to an additional period of illegal Soviet whaling, and has remained at a low abundance of about 150 to 500 whales. This project will survey a late-summer aggregation of bowhead whales in the Shantar Archipelago of the western Okhotsk Sea. Previous studies in one part of this region produced few genetic recaptures of individual whales and found that whales were often absent, indicating that the population is distributed over a broader area. A broader assessment of the population is needed and timely, given the likely expansion of Okhotsk Sea industrial activities (e.g., tidal hydroelectric power plant implementation, oil and gas development) in the Shantar Archipelago. This region is the only known summering location for bowhead whales in the Okhotsk Sea, and the resulting estimate will provide a reasonable minimum abundance estimate for the entire population.

Conservation and Recovery

Nutritional constraints on southern sea otters: An undetected conservation issue? (Smithsonian National Zoological Park, Washington, D.C.) — The slow growth of the threatened sea otter population in California is accompanied by a number of other facets—elevated adult female mortality, declining mass-to-length ratios, changes in prey utilization, high rates of infectious disease, and prevalence of cardiomyopathy—that are consistent with nutritional inadequacies in otter diets. The potential importance of nutrition to population health of sea otters has been largely overlooked. This oversight could hinder efforts to recover this species in California. Malnutrition is a plausible causal agent not only for impaired disease resistance but also for reduced body condition (especially in reproductive females) and increased pup and adult mortality. This project will investigate nutritional constraints on sea otters by combining studies of sea otter foraging behavior and diet with an examination of the caloric content and nutrient composition of sea otter prey species. The overall goal is to determine if southern sea otters are sub-

ject to nutritional constraints, either on individual, seasonal, or population levels. The results could help explain patterns of reproduction, morbidity, mortality, and population growth.

Ecology and Ecosystem Management

Marine mammals of the Holarctic (North Pacific Wildlife Consulting, Anchorage, Alaska) — In the second half of the twentieth century, conferences were held regularly in the Soviet Union on the research, use, and protection of marine mammals. Few foreign specialists participated in these conferences. In turn, Soviet specialists had limited opportunities to attend similar conferences abroad. In 1995 international marine mammal specialists gathered near Moscow for a conference sponsored by the International Fund for Animal Welfare. Subsequently, International Conferences on Marine Mammals of the Holarctic were held in September 2000, September 2002, and October 2004. Each involved more than 100 participants from Russia and other nations, including the United States. The Marine Mammal Commission supported publication of materials from the second conference in both Russian and English. In 2005 the Commission provided funds to support publication of the 167 abstracts submitted to the third conference, again in both Russian and English. The third conference focused not only on presenting results of recent marine mammal investigations but also on determining priorities for future research activity, developing national and international cooperative projects, and discussing the availability of funds for future research.

Agent-based models of predator-prey relationships between killer whales and other marine mammals (University of Alaska, Anchorage, Alaska) — The role of killer whales in the decline of various marine mammal populations in Alaska is controversial and potentially important. Springer et al. (2003) hypothesized that declines in harbor seal, Steller sea lion, northern fur seal, and sea otter populations in Alaska were driven by the overharvest of great whales in the 1950s–1970s, leading killer whales to switch from whales to less-desirable, smaller prey species. That hypothesis has been questioned by other marine mammal scientists who cite inconsistencies in the timing of

declines, lack of evidence for killer whale predation on large whales, and the absence of declines in other areas with identical patterns of commercial whaling. Whatever the role of commercial whaling, it is known that killer whales prey on threatened marine mammals in the North Pacific and that the magnitude of that predation is at least a plausible factor either in their decline or in their failure to recover. Thus far, simple, static models of killer whale consumption have been constructed to test the plausibility of killer whale impact on other species (e.g., number of whales times predation rate on Steller sea lions equals estimated impact). More detailed data on predation rates relative to availability of alternative prey are becoming available and can better reveal dynamic relationships. Such data will require more sophisticated models to understand how the impact of killer whale predation is distributed among available prey populations. The goal of this project is to explore the plausibility of the Springer et al. hypothesis using agent-based modeling and simulation techniques. The objectives are to (1) develop the agent-based model, and (2) create a computer simulation to both validate the model and study the conditions under which Springer et al.'s hypothesis may be valid. Rather than simple, static models, this dynamic model will incorporate current knowledge about the harvest distribution of large whales, the documented declines of other species, and recent information on prey selection by predatory killer whales.

Development of a zooplankton resource assessment program for the prediction and management of right whale aggregation and habitat use on Jeffreys Ledge, Massachusetts (Provincetown Center for Coastal Studies, Provincetown, Massachusetts) — This project will predict the distribution of right whales based on the quality and distribution of zooplankton resources, the species' principal prey. The assessment method will employ a variety of measures of the food resource from field collections. A comparison of the food resource in areas where whales are present with that in areas where whales are absent will allow assessment of important resource characteristics. This study will build the baseline for making such a comparison in the Jeffreys Ledge area, a region of emerging importance for late fall aggregations of whales and one where both ship strike and fisheries interactions are possible.

Investigation of killer whale impacts on a population of harbor seals in Hood Canal, Washington (Washington Department of Fish and Wildlife, Tacoma, Washington) — The presence of transient killer whales in Hood Canal, Washington, in 2005 provided a unique opportunity to examine the effects of killer whale predation on a population of harbor seals. In January 2003 and January 2005, harbor seals in Hood Canal were subjected to unprecedented, extended predation by transient-type killer whales. Groups of transient killer whales entered Hood Canal and remained there for 59 days in 2003 and more than 130 days in 2005. Prior to 2003 transient killer whales had not been observed in Hood Canal, and harbor seals were believed to have been naive to killer whale predation. During both the 2003 and 2005 events, staff of the Washington Department of Fish and Wildlife and others regularly observed killer whale predation on harbor seals throughout Hood Canal. That predation was expected to have significantly reduced seal abundance based on predictions using various energetic models and observed predation rates. Following the 2003 event, however, the expected loss of about 900 seals from an estimated initial population of 1,200 should have caused a significant population decline, but a decline was barely detectable during surveys of the Hood Canal seal population. Although a number of potential reasons for this discrepancy have been suggested, including a rebound in seal numbers due to immigration and/or population growth, one of the most plausible explanations is that the Hood Canal harbor seal population responded to killer whale foraging pressure by changing their behavior and spending an increased amount of time hauled out on shore, thereby artificially inflating the abundance of seals observed onshore during the surveys. When killer whales entered Hood Canal in 2005, an effort was mounted to study the haul-out patterns of the harbor seals to determine if those patterns changed in response to killer whale presence. The study deployed a total of 32 flipper-mounted radio tags to examine haul-out patterns for the Hood Canal harbor seal population. Data will be used to develop a correction factor for the proportion of seals in the water and thus missed during surveys. The investigators also will be able to compare 2005 Hood Canal harbor seal assessment results with past assessments to determine the population's trajectory.

Health (Contaminants, Disease, and Strandings)

Publication of *Marine Mammals Ashore: A Field Guide for Strandings*, 2nd edition (National Aquarium in Baltimore, Baltimore, Maryland)—

The handbook, *Marine Mammals Ashore: A Field Guide for Strandings* (Geraci and Lounsbury 1993) has been used as a training tool for the U.S. regional stranding networks and by established and developing marine mammal stranding networks in more than 30 countries. Knowledge about marine mammals has grown tremendously over the past decade, as has concern among scientists and the public for the health and long-term survival of marine mammal populations. Die-offs—whether natural or human-related—have increased in frequency. Coastal species in particular are threatened not only by direct human interactions such as vessel strikes and incidental take but also by the more insidious effects of anthropogenic compounds, noise and other disturbances, and exposure to pathogens of terrestrial origin. At the same time, stranding networks in the United States and other countries have increased in number, size, and expertise. The primary objective of this project is to produce an up-to-date edition of this widely used field guide, retaining the practical content and features of the original while adding information relevant to current needs of stranding network participants in the United States, Canada, and Mexico. Secondary objectives are to make this version more relevant to an international audience by adding information of broader interest and, through international distribution, to encourage standardized methods of data and sample collection and cooperative investigation of events that cross national boundaries.

Support for the dissection of a beaked whale, *Ziphius cavirostris* (Smithsonian National Zoological Park, Washington, D.C.) — Cuvier's beaked whales (also referred to as goose-beaked whales) belong to a relatively understudied family of whales, the Ziphiidae. Recently beaked whales have been involved in a series of unusual mortality events that likely have been caused by exposure to high-intensity sound. Other species of cetaceans do not seem to be affected as dramatically, suggesting that a difference in the behavior or anatomy of

the ziphiids makes them more susceptible. Little is known of the soft-tissue anatomy of these whales. In 2002 a subadult male Cuvier's beaked whale stranded alive on the Oregon coast but subsequently died. The intact head was examined using computed tomography (a CT scan), which detected previously unknown anatomical features. This project will describe the features observed in the CT scans and extract tissues from those structures for analysis. The analyses will focus on the potential exchange of gases between the various air sinuses, the internal nares, and the middle ear, as well as the role of lipids found in the fat bodies in sound propagation. Investigators also will use this specimen to assess cranial dimorphism between male and female adults.

Fatty acid signature analysis as a potential forensic tool for Florida manatees and other marine mammals (Mote Marine Laboratory, Sarasota, Florida) —

Fatty acid signature analysis has recently been used to assess foraging ecology of marine mammals and determine what the animals have been eating. The technique has rarely been used to assess other questions about marine mammals, including the effects of stress or disease. Studies of other marine species, however, suggest that changes in fatty acid constituents may be associated with environmental change, stage of development, or exposure to contaminants. In addition, chemical changes in perinodal adipose tissue, including changes in mammalian fatty acid constituents, may affect activity of lymph nodes. In humans, alterations in fatty acid profiles have been linked with various metabolic, disease, and stress disorders. Finally, fatty acid epoxides may serve as mediators and indicators of oxidative stress associated with a variety of factors including inflammation, diabetes, and neuroendocrine regulation. Thus, the potential for using changes in fatty acids as a clinical diagnostic marker (i.e., biomarker) of stress or disease in marine mammals seems high. The investigators will examine the fatty acid and lipid class profiles of the livers of manatees recovered for necropsy in Florida and determine the extent to which fatty acid profiles and grossly determined causes of death correlate. Their hypothesis is that cause of death may be correlated with (or possibly even diagnosed by) particular fatty acid signatures in hepatic tissues of manatees.

Appendix A

2005 MARINE MAMMAL COMMISSION RECOMMENDATIONS AND AGENCY RESPONSES

Marine Mammal Commission Recommendation	Agency Response
3 January to National Marine Fisheries Service	
<p>Regarding proposed rulemaking for the National Marine Fisheries Service's List of Fisheries for 2005, the Commission recommended that the Service:</p> <ul style="list-style-type: none">• better describe the basis for its rankings in the annual List of Fisheries, including the level of observer coverage in each fishery;• in response to the separation of the Alaska groundfish fishery into a set of newly delineated fisheries, analyze past incidental mortality and serious injury for each newly delineated fishery and ensure that all affected marine mammal stocks are included in the list for each fishery or that the absence of those stocks from the relevant lists is adequately explained;• reclassify the mid-Atlantic bottom trawl fishery as category I until it can reliably distinguish short- and long-finned pilot whales for the purposes of estimating abundance and mortality and serious injury levels; and• classify the Gulf of Mexico blue crab trap/pot fishery as category II and the Gulf of Mexico menhaden purse seine fishery as category I and increase observer effort to determine their level of interaction with bottlenose dolphins.	
7 January to U.S. Fish and Wildlife Service	
<p>Regarding permit application no. PRT-095276 (California Department of Fish and Game, Marine Wildlife Veterinary Care and Research Center), the Commission recommended approval with provisions. The application proposed using up to six captive, non-releasable southern sea otters for the purpose of conducting research on the thermoregulatory effects of washing sea otters.</p>	<p>The permit was issued on 4 February 2005. The Commission's recommended provisions were adopted.</p>

Marine Mammal Commission Recommendation	Agency Response
11 January to U.S. Fish and Wildlife Service	
<p>Regarding permit application no. PRT-791721 (The Sirenia Project, U.S. Geological Survey) requesting a five-year renewal of permit no. MA-791721, which expired on 31 December 2004, the Commission recommended approval with provisions. The applicant proposed the capture, handling, and tail notching of up to 200 free-ranging manatees annually, of which up to 100 may be tagged with passive integrated transponder tags, up to 60 may be radio-tagged (some of which also may be sampled for blood, milk, and urine), and up to 45 may be freeze-branded. The applicant also proposed to conduct “non-harmful, non-invasive” physiological studies on wild and captive manatees in the southeastern United States and Puerto Rico and to export and import tissue samples collected from live and dead manatees.</p>	<p>The permit had not been issued at the end of 2005.</p>
14 January to U.S. Fish and Wildlife Service	
<p>Regarding a request from the U.S. Fish and Wildlife Service to the Florida Department of Environmental Protection that captive manatees held in the headwaters of the spring run at the Homosassa Springs State Wildlife Park be moved to other facilities or isolated holding pools at the park, the Commission concurred with the Service’s request and also recommended that park managers remove the fence blocking access by wild manatees to the headwaters of Homosassa Springs.</p>	
24 January to National Marine Fisheries Service	
<p>Regarding a proposal by the National Marine Fisheries Service to implement emergency rules to reduce the number of right whale deaths in the North Atlantic caused by ship strikes, the Commission concurred with the Service and recommended that it immediately adopt emergency regulations under the Marine Mammal Protection Act and the Endangered Species Act and initiate consultations under section 7 of the Endangered Species Act to implement elements of the proposed strategy for mitigating whale strikes.</p>	<p>On 1 July 2005 the Service stated that it had considered, but is not pursuing, emergency rule-making because substantial time is required to implement emergency rulemaking compared with the normal rulemaking process and that it will proceed as quickly as possible with analysis and rulemaking to implement the comprehensive ship strike strategy.</p>

Marine Mammal Commission Recommendation	Agency Response
25 January to National Marine Fisheries Service's Pacific Islands Regional Office	
<p>Following its 2004 annual meeting in Hawaii, the Commission recommended that the Service's Pacific Islands Regional Office take steps to further the conservation of marine mammals and their ecosystems in the Pacific Islands region, as follows:</p> <ul style="list-style-type: none"> • conduct Marine Mammal Protection Act and Endangered Species Act reviews of all activities in Hawaii and elsewhere in the Pacific Islands Region that pose potential impacts to, and could involve the take of, marine mammals, including the potential effects of high-speed ferries on humpback whales, monk seals, and other listed marine mammals; • in cooperation with the Pacific Islands Fisheries Science Center, develop a plan for research on and management of Pacific Islands Region cetaceans that will provide information on stock structure, abundance, and fishery-related mortality levels as required to assess marine mammal/fishery interactions under the Marine Mammal Protection Act; provide support and resources for development and coordination of stranding responses for all marine mammals within the main Hawaiian Islands, as well as other islands in the region; • convene a take reduction team to reduce takes of false killer whales in the Pacific Islands region; • develop a network and standardized protocols for responding to and documenting monk seal haul-outs on each of the main Hawaiian Islands; • in cooperation with the Pacific Islands Fisheries Science Center, the U.S. Fish and Wildlife Service, and State of Hawaii agencies, address the growing problem of loss of suitable haul-out and pupping habitat for monk seals in the Northwestern Hawaiian Islands; • work with the State of Hawaii and the Commission to convene a workshop to address the increasing impacts of swim-with-the-wild-dolphin operations in Hawaii; and • work with the State of Hawaii to develop a program to certify qualifying dolphin-watch operators as responsible wildlife-viewing companies. 	<p>On 14 March 2005 the Pacific Islands Regional Office responded that it:</p> <ul style="list-style-type: none"> • has been in discussions with the Army Corps of Engineers about the need to consult on permits that the Corps issues for offshore mariculture and has discussed the issues of mariculture and high-speed ferry service with the Hawaiian Islands Humpback Whale National Marine Sanctuary staff to promote better understanding of the potential impacts on marine mammals, particularly humpback whales. Pacific Islands Regional Office also expressed concerns about mariculture development to State of Hawaii officials; • is supporting the Pacific Islands Fisheries Science Center in its development of a cetacean research program; • is hiring a marine mammal team leader and a full-time stranding coordinator and is planning a stranding/monk seal workshop to develop effective stranding response capability; • has no immediate plans to convene a take reduction team under section 118 of the MMPA but is making significant efforts within available resources to address false killer whale interaction with the Hawaii longline fishery and will participate on the marine mammal advisory committee of the Western Pacific Fishery Management Council; • appreciates the financial support of the Commission to address monk seal issues and is exploring opportunities to supplement that funding. The Pacific Islands Regional Office intends to program Commission funding and any additional funds based upon the outcomes of the stranding/monk seal workshop; • recognizes the critical importance of loss of monk seal habitat and is investigating the long-term effects of this problem. Pacific Islands Regional Office is seeking funding and collaboration with other offices and agencies to support a study to assess the feasibility of habitat restoration in the Northwestern Hawaiian Islands; • has created a six-month rotational assignment for an individual to focus on the swim-with-the-wild-dolphin issues in Hawaii, is considering a workshop on the issue, and is coordinating with the Pacific Islands Fisheries Science Center to review research on the effectiveness of management actions to address the problem; and • will consider the Commission's recommendation to work with the State of Hawaii to develop a program to certify dolphin-watch operators as "responsible" wildlife-viewing companies.

Marine Mammal Commission Recommendation	Agency Response
25 January to National Marine Fisheries Service's Pacific Islands Fisheries Science Center	
<p>Following its 2004 annual meeting in Hawaii, the Commission recommended that the Pacific Islands Fisheries Science Center or the Service:</p> <ul style="list-style-type: none"> • cooperate with the Pacific Islands Regional Office to develop a plan for research on and management of Pacific Islands Region cetaceans that will provide information on stock structure, abundance, and fishery-related mortality levels as required to assess marine mammal/fishery interactions under the Marine Mammal Protection Act; • provide support and resources for development and coordination of stranding responses for all marine mammals within the main Hawaiian Islands, as well as other islands in the region; • continue existing levels of funding and support for ongoing research and recovery work on monk seals in the Northwestern Hawaiian Islands and provide additional funding needed for studies of monk seals in the main Hawaiian Islands; • collaborate with the Hawaiian Islands National Wildlife Refuge to increase efforts to assess the abundance, behavior, and movements of Galapagos sharks in the Northwestern Hawaiian Islands, particularly at French Frigate Shoals; • cooperate with the Pacific Islands Regional Office, the U.S. Fish and Wildlife Service, and State of Hawaii agencies to address the growing problem of loss of suitable haul-out and pupping habitat for monk seals in the Northwestern Hawaiian Islands; and • conduct research on the effectiveness of management actions taken to mitigate problems caused by swim-with-the-wild-dolphin operations and to evaluate potential cumulative effects of human activities on spinner dolphins. 	<p>On 14 March 2005 the Pacific Islands Fisheries Science Center responded that it:</p> <ul style="list-style-type: none"> • supports the Commission's recommendation to develop a research plan for cetaceans in the Pacific Islands Region and has already taken steps toward developing such a plan; • will defer to and coordinate closely with the Pacific Islands Regional Office concerning stranding network issues; • will continue to seek additional funding to support research and recovery of Hawaiian monk seals and is developing a comprehensive research plan to be completed in 2005; • is working to develop research plans to obtain more precise estimates of Galapagos shark movement patterns and abundance at French Frigate Shoals; • is seeking funding or collaboration with other offices and agencies to help support a study to assess the feasibility of habitat restoration at French Frigate Shoals; • intends to review research on the effectiveness of management actions to mitigate the potential negative impacts of dolphin "swim-with" programs, evaluate studies that have addressed the cumulative effects of human activities on small cetaceans, and address the issue at an upcoming Pacific Islands Fisheries Science Center workshop on cetaceans scheduled for the summer of 2005.

Marine Mammal Commission Recommendation	Agency Response
<p>25 January to National Marine Fisheries Service</p> <p>After its 2004 annual meeting in Hawaii, the Commission recommended to the National Marine Fisheries Service Headquarters steps that should be taken to further conservation of marine mammals and their ecosystems in the Pacific Islands Region, as follows:</p> <ul style="list-style-type: none"> • the National Oceanic and Atmospheric Administration, and particularly the National Marine Fisheries Service, complete intergovernmental cooperative agreements and provide funding for (1) implementation and enforcement of the Marine Mammal Protection Act, (2) activities relating to implementation of section 6 of the Endangered Species Act, (3) management of the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, (4) management of swimmer and boater interactions with spinner dolphins, and (5) coordination of monk seal volunteer efforts on Kauai; • the National Marine Fisheries Service provide support and resources for development and coordination of stranding responses for all marine mammals within the main Hawaiian Islands, as well as other islands in the region; the Service issue final regulations or guidelines on stranding response, including criteria to assess circumstances for when stranded animals should be taken into rehabilitation facilities and criteria for when animals in rehabilitation facilities should be released; the Service continue existing levels of funding and support for ongoing research and recovery work on monk seals in the Northwestern Hawaiian Islands by the Pacific Islands Fisheries Science Center and provide additional funding needed for studies of monk seals in the main Hawaiian Islands; • the Service provide the State of Hawaii Division of Aquatic Resources with funding for a Kauai monk seal response coordinator; the Service develop a tiered system to direct and authorize volunteers and agency partners that assist with monk seal management needs in the main Hawaiian Islands; 	<p>On 18 April 2005 the Service responded that it:</p> <ul style="list-style-type: none"> • is expanding Pacific Islands Regional Office staff to work with local organizations for outreach and education related to human interactions with spinner dolphins and with the State of Hawaii and other agencies to manage the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve; • is completing its guidance related to stranded marine mammals and their rehabilitation and release; • is planning a workshop related to the ethics of stranding response; • recognizes the importance of research and recovery efforts for monk seals and will continue to seek additional funds through the federal budget process; • has hired a marine mammal team leader who, among other things, will address impacts of the swim-with-the-wild-dolphin programs in Hawaii; • continues to support the completion of the cooperative research program on humpback whales; however, since support for the program was not included in the President's budget request for FY 2006, the program may be terminated in the future; • views instances of harassment under the Marine Mammal Protection Act as the exceptions rather than the rule, considers that each case requires individual assessment under the statute and regulations, and will continue to allocate its available enforcement resources in accordance with priority determinations; • is encouraging the State to enter into a joint enforcement agreement. The Marine Mammal Protection Act currently does not provide funding for such agreements, but the Administration's bill for Marine Mammal Protection Act reauthorization in 2003 contains such a provision; and • will remain an active participant in the process for developing a sanctuary in the Northwestern Hawaiian Islands.

(continued on the following page)

Marine Mammal Commission Recommendation	Agency Response
<p>(continued from previous page)</p> <ul style="list-style-type: none"> • the National Oceanic and Atmospheric Administration and the Service strengthen enforcement of the Marine Mammal Protection Act as it pertains to human/dolphin interactions in Hawaii and that cases be brought at least for the most clear instances of harassment, provide additional guidance as to what constitutes harassment as it pertains to this issue, and consider actions that could be taken to clarify and mitigate the situation short of rulemaking; • the Service enter into and provide funding for joint enforcement agreements with the State of Hawaii to assist in implementing and enforcing the Marine Mammal Protection Act, including spinner dolphin management issues; • the Service work with the State of Hawaii and the Commission to convene a workshop to address the increasing impacts of swim-with-the-wild-dolphin operations in Hawaii; • as part of development of the proposal for a Northwestern Hawaii Islands national marine sanctuary, the National Oceanic and Atmospheric Administration and the National Marine Fisheries Service work with the Western Pacific Fishery Management Council to develop draft fishery management regulations that are consistent with the Executive Orders establishing the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve; and • provide full funding for completion of the SPLASH (Structure of Populations, Levels of Abundance and Status of Humpbacks) program. 	
25 January to Coast Guard	
<p>Following its 2004 annual meeting in Hawaii, the Commission recommended that the U.S. Coast Guard secure the necessary funding and clean up the contaminated soils and materials remaining at Tern Island in French Frigate Shoals to the standards agreed upon with the Environmental Protection Agency and the National Marine Fisheries Service.</p>	<p>On 7 March 2005 the Coast Guard responded that its clean-up effort has already surpassed both the ecological risk reduction and regulatory requirements and it plans to continue to work with the Environmental Protection Agency Region 9 to assure that all issues surrounding this remedial effort are brought to closure.</p>
25 January to Department of Transportation	
<p>Following its 2004 annual meeting in Hawaii, the Commission recommended that the Department of Transportation provide funds to the U.S. Fish and Wildlife Service sufficient to cover the costs of improving and operating the commercial-level airfield and associated infrastructure at the Midway Atoll National Wildlife Refuge.</p>	<p>No response was received. However, the Commission learned that \$6 million was provided to the Federal Aviation Administration and other parties in fiscal year 2005 to upgrade the airfield facilities at Midway. In addition, the Federal Aviation Administration initiated steps to contract for airfield maintenance and operations, an action that would relieve the Service of those obligations.</p>

Marine Mammal Commission Recommendation	Agency Response
<p>25 January to U.S. Fish and Wildlife Service</p> <p>Following its 2004 annual meeting in Hawaii, the Commission recommended to the U.S. Fish and Wildlife Service that additional steps be taken to further conservation of marine mammals and their ecosystems in the Pacific Islands Region as follows:</p> <ul style="list-style-type: none"> • the U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, and the State of Hawaii conclude a Memorandum of Agreement to coordinate management of the Northwestern Hawaiian Islands; • the U.S. Fish and Wildlife Service, the National Marine Fisheries Service’s Pacific Islands Regional Office and the Pacific Islands Fisheries Science Center, and State of Hawaii agencies cooperate to address the growing problem of loss of suitable haul-out and pupping habitat for monk seals in the Northwestern Hawaiian Islands; • the U.S. Fish and Wildlife Service’s Northwestern Hawaiian Islands National Wildlife Refuge collaborate with the Pacific Islands Fisheries Science Center to increase efforts to assess the abundance, behavior, and movements of Galapagos sharks in the Northwestern Hawaiian Islands, particularly at French Frigate Shoals; and • the U.S. Fish and Wildlife Service’s Midway Atoll National Wildlife Refuge take action to reduce user fees currently being charged to the Pacific Islands Fisheries Science Center for work related to Hawaiian monk seal recovery. 	<p>On 28 March 2005 the U.S. Fish and Wildlife Service responded that:</p> <ul style="list-style-type: none"> • it recognizes the need for coordinated management of the marine resources in the Northwestern Hawaiian Islands in concert with the State of Hawaii and the National Oceanic and Atmospheric Administration, and plans to work with the latter to develop an environmental impact statement to evaluate a range of management plans for the waters surrounding the Northwestern Hawaiian Islands; • mitigating the natural loss of suitable haul-out and pupping habitat for monk seals in the Northwestern Hawaiian Islands is very expensive, and therefore the Service supports efforts by the National Oceanic and Atmospheric Administration and State agencies to continue to identify existing beaches in the main Hawaiian Islands that provide suitable haul-out and pupping habitat for monk seals, which will mitigate the loss of habitat in the Northwestern Hawaiian Islands; • it intends to continue a four-year effort to collaborate with the National Marine Fisheries Service’s Pacific Islands Fisheries Science Center to conduct research that explores the complex predator/prey relationship between Galapagos sharks and pre-weaned Hawaiian monk seal pups at French Frigate Shoals; and • it appreciates the Commission’s efforts to seek alternative funding to operate Henderson Airfield at Midway Islands and states that although the Service is working to reduce costs, it cannot afford to cover costs incurred by other federal agencies at Midway. It encourages the National Marine Fisheries Service’s Pacific Islands Fisheries Science Center to seek additional funding to cover the total cost of conducting scientific investigations at Midway.

Marine Mammal Commission Recommendation	Agency Response
25 January to National Oceanic and Atmospheric Administration	
<p>Following its 2004 annual meeting in Hawaii, the Commission recommended to the National Ocean Service, National Oceanic and Atmospheric Administration, that steps be taken to further conservation of marine mammals and their ecosystems in the Pacific Islands Region, as follows:</p> <ul style="list-style-type: none"> • the National Oceanic and Atmospheric Administration, the U.S. Fish and Wildlife Service, and the State of Hawaii conclude a Memorandum of Agreement to coordinate management efforts in the Northwestern Hawaiian Islands; • the National Oceanic and Atmospheric Administration's National Ocean Service work with the Western Pacific Fishery Management Council to develop draft fishery management regulations that are consistent with the Executive Orders establishing the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve; • the National Ocean Service and the State of Hawaii expand the scope of the Hawaiian Islands Humpback Whale National Marine Sanctuary to include other important components of the ecosystem, including Hawaiian monk seals, other marine mammals, and sea turtles; • the Hawaiian Islands Humpback Whale National Marine Sanctuary, the Pacific Islands Regional Office, the Pacific Islands Fisheries Science Center, and the State of Hawaii develop a coordinated network for responding to strandings and entanglement of humpback whales and other marine mammals; • the National Ocean Service develop a process to determine what regulations are needed to ensure that future activities, such as recently proposed mariculture projects and high-speed ferry operations, do not adversely affect Hawaiian Islands Humpback Whale National Marine Sanctuary resources; and • full funding be provided for completion of the SPLASH (Structure of Populations, Levels of Abundance and Status of Humpbacks) program. 	<p>On 4 February 2005 Commission representatives met with the leadership of the National Ocean Service to discuss these recommendations and means to implement them. No written response is anticipated.</p>

Marine Mammal Commission Recommendation	Agency Response
25 January to the State of Hawaii	
<p>Following its 2004 annual meeting in Hawaii, the Commission recommended that the State of Hawaii and its Department of Land and Natural Resources further conservation of marine mammals and their ecosystems in the Pacific Islands Region, as follows:</p> <ul style="list-style-type: none"> • in cooperation with the National Oceanic and Atmospheric Administration and the U.S. Fish and Wildlife Service, conclude a Memorandum of Agreement to coordinate management efforts in the Northwestern Hawaiian Islands; • in cooperation with the National Ocean Service, expand the scope of the Hawaiian Islands Humpback Whale National Marine Sanctuary to include other important components of the ecosystem, including Hawaiian monk seals, other marine mammals, and sea turtles; • in cooperation with the National Marine Fisheries Service’s Pacific Islands Regional Office and Pacific Islands Fisheries Science Center, develop a network for responding to strandings and entanglement of humpback whales and other marine mammals; • work with the National Marine Fisheries Service to establish a position for a Kauai monk seal response coordinator; • work with the Pacific Islands Regional Office, the Pacific Islands Fisheries Science Center, and the U.S. Fish and Wildlife Service to address the growing problem of loss of suitable haul-out and pupping habitat for monk seals in the Northwestern Hawaiian Islands; • work with the National Marine Fisheries Service, the Pacific Islands Regional Office, and the Commission to convene a workshop to address the increasing impacts of swim-with-the-wild-dolphin operations in Hawaii; • work with the Pacific Islands Regional Office to develop a program to certify qualifying dolphin-watch operators as “responsible” wildlife-viewing companies; and • enter into a joint enforcement agreement with the National Marine Fisheries Service to enforce Marine Mammal Protection Act and Endangered Species Act statutes and regulations. 	<p>No written response was received, but the following actions were taken in response to the issues raised in the Commission’s letter:</p> <ul style="list-style-type: none"> • A final agreement regarding management of the Northwestern Hawaiian Islands was not completed in 2005, but progress was made to resolve remaining interagency issues and an agreement is expected to be signed in 2006; • During 2005 the Commission was not advised as to whether or what further steps were taken to consider adding Hawaiian monk seals to the list of sanctuary resources subject to sanctuary management efforts. Sanctuary staff, however, continued to monitor and assist with monk seal management needs in the main Hawaiian Islands as able; • In 2005 state officials continued to assist the National Marine Fisheries Service with marine mammal stranding response efforts. State officials also are expected to participate in a 2006 workshop being organized by the Service on ways to better coordinate responses to strandings, as well as monk seal haul-out events; • In early 2005 the Hawaii Division of Aquatic Resources hired a monk seal response coordinator for the island of Kauai with funding provided by the National Marine Fisheries Service. The coordinator began working closely with the Service and volunteers to organize responses to monk seal haul-out events on the island; • During 2005 the Commission received no information on what further steps, if any, had been taken by the Sanctuary Program or the National Marine Fisheries Service to evaluate options for mitigating the loss of pupping habitat to rising sea levels; • A workshop on impacts between spinner dolphins and swimmers has not been held; however, the Hawaii Division of Aquatic Resources is participating on a spinner dolphin interagency working group convened by the National Marine Fisheries Service and an advance notice of proposed rule making was published in 2005 requesting comments on measures to reduce harassment by swimmers and dolphin-watch tour operators; and • As of the end of 2005 the Commission was not aware of any steps taken to establish a joint enforcement agreement between the State of Hawaii and the National Marine Fisheries Service.

Marine Mammal Commission Recommendation	Agency Response
<p>25 January to Department of Commerce</p> <p>Following its 2004 annual meeting in Hawaii, the Commission recommended to the Department of Commerce that it take steps to further conservation of marine mammals and their ecosystems in the Pacific Islands Region, as follows:</p> <ul style="list-style-type: none"> • complete intergovernmental cooperative agreements and provide funding for (1) implementation and enforcement of the Marine Mammal Protection Act, (2) activities relating to implementation of section 6 of the Endangered Species Act, (3) management of the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, (4) management of swimmer and boater interactions with spinner dolphins, and (5) coordination of monk seal volunteer efforts on Kauai; • in cooperation with the U.S. Fish and Wildlife Service and the State of Hawaii, conclude a Memorandum of Agreement to coordinate management efforts in the Northwestern Hawaiian Islands; • the National Oceanic and Atmospheric Administration’s Office of General Counsel establish a regional office in Hawaii to provide legal support for the new Pacific Islands Region; • the National Oceanic and Atmospheric Administration and the National Marine Fisheries Service strengthen enforcement of the Marine Mammal Protection Act as it pertains to human/dolphin interactions in Hawaii, and that cases be brought at least for the most clear instances of harassment, that additional guidance be provided as to what constitutes harassment as it pertains to this issue, and that appropriate actions are taken to clarify and mitigate the situation short of rulemaking; • as part of development of the proposal for a Northwestern Hawaiian Islands National Marine Sanctuary, the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service work with the Western Pacific Fishery Management Council to develop draft fishery management regulations that are consistent with the Executive Orders establishing the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve; and • the National Marine Fisheries Service’s Pacific Islands Regional Office and the Pacific Islands Fisheries Science Center be provided increased funding to carry out the full range of research and management activities necessary to conserve marine mammals and sea turtles in the Pacific Islands Region. 	<p>On 17 February 2005 the Department of Commerce acknowledged receipt of the Commission’s letter and noted that a substantial response would follow. On 21 April 2005 the National Marine Fisheries Service responded that it:</p> <ul style="list-style-type: none"> • had initiated discussions with the State of Hawaii to enhance implementation of the Marine Mammal Protection Act and Endangered Species Act and is working toward a joint enforcement agreement with Hawaii; • is working with National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, and the State of Hawaii to coordinate management efforts in the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, including a Memorandum of Understanding among the agencies; • is planning a regional office for its General Counsel in Hawaii. The lead attorney position is currently vacant; • has a dedicated enforcement program around the country; • has been and will continue working with the Western Pacific Fishery Management Council and others in developing and evaluating alternatives for a management framework for the Northwestern Hawaiian Islands; and • will provide additional funding for the National Marine Fisheries Service in Honolulu as possible in view of other resource needs across the country.

Marine Mammal Commission Recommendation	Agency Response
4 February to U.S. Fish and Wildlife Service	
<p>Regarding importation of polar bear trophies from Canada, the Commission encouraged the Service to explore the basis for all of the revised population estimates and corresponding changes in harvest limits for polar bears from Canada.</p>	<p>On 29 March 2005 the Service responded that it is seeking to clarify information from Canada on the quota and management changes.</p>
16 February to National Marine Fisheries Service	
<p>Regarding the National Marine Fisheries Service's 2004 stock assessment reports for marine mammals in the U.S. Pacific region, the Commission recommended that the Service:</p> <ul style="list-style-type: none"> • continue and expand its efforts to assess mortality in domestic and international fisheries as needed to provide accurate and precise estimates of take and incorporate the results into stock assessment analyses and reports; • develop an effective strategy for assessing mortality levels in transboundary stocks of marine mammals, with priority given to those stocks that are known to interact significantly with domestic or international fisheries; • develop a strategy for research and management of cetaceans in the Pacific Islands Region; and • develop a reliable means of assessing potential interactions between monk seals and the bottomfish fishery, if that fishery continues within the monk seals' range in the Hawaiian Archipelago. 	<p>On 20 June 2005 the Service published in the <i>Federal Register</i> a notice of availability of final stock assessment reports including its responses to comments. The Service noted that it had convened a workshop on research needs for the conservation and management of cetaceans in the Pacific Islands Region (22–24 June 2005). The Service also noted that it had initiated an observer program in 2003 that should provide data on monk seal/bottomfish fishery interactions. Since 2003 the observer program has not documented any interactions between monk seals and the bottomfish fishery.</p>
17 February to U.S. Fish and Wildlife Service	
<p>Regarding the U.S. Fish and Wildlife Service's draft revised 2004 stock assessment reports for marine mammals in California–Oregon–Washington, the Commission noted that the existing reports for the California and Washington sea otter stocks have not been revised since 1995. The Commission recommended that the Service revise the stock assessment reports for these sea otter stocks as soon as possible.</p>	<p>On 24 March 2005 the Service responded that it intended to publish draft revised stock assessment reports for both the California and Washington sea otter stocks in 2005.</p>

Marine Mammal Commission Recommendation	Agency Response
17 February to Western Pacific Fishery Management Council	
<p>Regarding the Western Pacific Fishery Management Council’s request for comments on proposed fishery-related regulations for the Northwestern Hawaiian Islands, the Commission noted that the Council’s analyses of the range of fishing alternatives do not follow the advice of the National Marine Sanctuary Program. The Commission recommended that the Council analyze each of the alternatives identified in the National Marine Sanctuary Program guidance document and explain why it believes the alternatives it has identified are more appropriate to consider. With regard to the development of proposed regulations for the sanctuary, the Commission recommended that the Council:</p> <ul style="list-style-type: none"> • prohibit all commercial crustacean fishing; • prohibit bottomfish fishing; • prohibit all commercial coral fishing; • prohibit commercial longline fishing for pelagic species; • limit commercial trolling, pole and line, and handline fishing for pelagic species to levels that occurred in the year prior to reserve designation and require reporting of all catch to the sanctuary administrators; • allow recreational fishing, including spearfishing, subject to catch limits, reporting, time and area restrictions, and, as appropriate, catch-and-release or other provisions; • prohibit fishing for aquariums and live fish trade, algae, sponges, and other invertebrates; • allow sustenance fishing subject to catch limits, reporting requirements, time and area restrictions, and gear restrictions; • allow Native subsistence fishing subject to catch reporting requirements; and • prohibit all fisheries not otherwise authorized. 	<p>No response was received.</p>
18 February to U.S. Fish and Wildlife Service	
<p>Regarding permit application no. PRT-096527 (Smithsonian Marine Station at Fort Pierce), the Commission recommended approval of the requested permit. The permit authorized the applicant to acquire specimen material (i.e., blood samples and whisker clippings) from two Florida manatees maintained at Mote Marine Laboratory. Six blood samples and two whisker clippings per animal were requested.</p>	<p>The permit was issued on 3 May 2005.</p>

Marine Mammal Commission Recommendation	Agency Response
22 February to National Marine Fisheries Service	
<p>Regarding permit application no. 881-1758-00 (Alaska SeaLife Center), the Commission recommended that the Service approve the requested activities with conditions. The permit authorized research on stranded harbor seals during their rehabilitation in the Center's rehabilitation program.</p>	<p>The permit was issued on 10 May 2005. The majority of the Commission's recommendations were adopted.</p>
22 February to National Marine Fisheries Service	
<p>Regarding a request for authorization to take small numbers of California sea lions, Pacific harbor seals, and northern elephant seals by Level B harassment incidental to research activities to assess the trends in black abalone populations at San Nicolas Island, California, the Commission recommended that:</p> <ul style="list-style-type: none"> • any authorization issued to the applicant specify that, if a mortality or serious injury of a marine mammal occurs that appears to be related to the abalone research, research activities be suspended while the Service determines whether steps can be taken to avoid further injuries or mortalities or until such taking can be authorized by regulations promulgated under section 101(a)(5)(A) of the Marine Mammal Protection Act; and • prior to issuing the requested authorization, the Service be satisfied that the applicant's monitoring program is sufficient to detect the effects of the proposed research activities, including any mortality and/or serious injury that results from startle responses or stampedes. 	
23 February to Army Corps of Engineers	
<p>Regarding the Army Corps of Engineers' Draft Environmental Impact Statement, Draft Environmental Impact Report, and Development of Regional Impact Report for the Cape Wind Energy Project, the Commission recommended that:</p> <ul style="list-style-type: none"> • the final document include a more complete assessment of available whale and other marine mammal survey and sighting data for Nantucket Sound; • the final document provide a more complete assessment of the potential effects of the predicted noise levels associated with pile driving on the behavior of marine mammals in Nantucket Sound; and • the Corps ensure that the applicant complies fully with section 101(a)(5) of the Marine Mammal Protection Act. 	

Marine Mammal Commission Recommendation	Agency Response
2 March to National Marine Fisheries Service	
<p>Regarding permit application no. 1073-1777-00 (Kathy Carlstead, Ph.D.), the Commission recommended approval with conditions. The permit was requested to import into the United States approximately 24 blood samples, 150 fecal samples, and 150 saliva samples from three captive false killer whales being maintained in permanent captivity at Ocean Adventure in the Philippines.</p>	<p>The permit was issued on 16 June 2005. The Commission's recommendations were adopted.</p>
2 March to National Marine Fisheries Service	
<p>Regarding permit application nos. 1071-1770 (The Dolphin Institute), 1000-1617 (Whitlow W. L. Au, Ph.D.), and 731-1774 (Robin W. Baird, Ph.D.), the Commission recommended approval with conditions. The first application requested authorization to continue long-term studies of the individual life histories, social roles, migration, habitat use, distribution, and reproductive status of North Pacific humpback whales. The second application requested authorization to continue long-term research to investigate the biology and behavior of several species of cetaceans in U.S. and international waters in the Pacific, including Alaska, Washington, Oregon, California, Hawaii, and other U.S. territories. The third permit application requested authorization to take by harassment several marine mammal species during the conduct of two research projects.</p>	<p>The permits were issued on 9 June 2005. The Commission's recommendations were adopted.</p>
7 March to National Marine Fisheries Service	
<p>Regarding permit application no. 782-1719-00 (National Marine Mammal Laboratory), the Commission recommended approval of the requested permit with conditions. The permit was requested for authorization to (1) take by harassment various species of cetaceans for the purpose of estimating abundance, collecting behavioral data, recording vocalizations, and photography, (2) collect biopsy samples from various species of cetaceans, and (3) conduct tagging studies on selected cetacean species.</p>	<p>The permit was issued on 4 April 2005. The Commission's recommendations were adopted.</p>

Marine Mammal Commission Recommendation	Agency Response
8 March to National Marine Fisheries Service	
<p>Regarding the National Marine Fisheries Service’s proposed changes to its stock assessment guidelines, the Commission noted that the Service’s revised definition of stock appeared to be in keeping with the definition of stock in the Marine Mammal Protection Act and the Act’s goals. However, the Commission suggested that the Service develop criteria for applying the modified guidelines to determine when a population is demographically isolated to an extent that it is a discrete group that warrants recognition as a separate stock. The Commission also suggested that the Service carefully consider the relationship of the term “population stock” under the Marine Mammal Protection Act and the term “species” under the Endangered Species Act. The Commission recommended that:</p> <ul style="list-style-type: none"> • the Service continue its deliberations on how to address the inconsistency apparent in the setting of a potential biological removal level for a stock that is declining even in the absence of known human impacts; • default recovery factors be used until such time as the Service has reviewed situations in which the recovery factor might be raised for stocks of unknown status and has developed evidence-based criteria that ensure that such stocks are not further disadvantaged; • the Service reconsider its options for attributing deaths to stocks and develop alternatives that do not pose disproportionately larger risks to small, vulnerable stocks; • for stocks with high potential biological removal levels, mortality and serious injury should be reduced substantially below 10 percent of potential biological removal levels before the zero mortality rate goal is considered to be met; and • the Service take a more precautionary approach when designating status for stocks for which essential information is lacking. 	<p>On 20 June 2005, the Service responded that:</p> <ul style="list-style-type: none"> • it will consider reporting potential biological removal as “undetermined” on a case-by-case basis in situations where stocks are declining and would continue to decline even if human-caused mortality were eliminated, and it will explain the reasoning behind such decisions in the affected stock assessment reports; • it does not plan to change its guidelines with respect to recovery factors because the current guidelines provide reasonable assurances that recovery factors will only be increased from default values in limited situations; • it agrees that assigning mortality proportional to stock size may cause disproportionate risk for small stocks, and it modified the guidelines to require a discussion of the potential for bias in stock-specific mortality estimates in each report affected by such allocation of mortality; • the zero mortality rate goal refers explicitly to a “rate,” therefore a large number of mortalities might still represent a small mortality rate (approaching zero) if the population is large; and • it is necessary for Service scientists to exercise their judgment when determining the status of some stocks for which little information is available. The decisions made regarding stock status are reviewed by the regional Scientific Review Groups.

Marine Mammal Commission Recommendation	Agency Response
<p>14 March to National Marine Fisheries Service</p> <p>Regarding a request from Conoco Phillips Alaska, Inc. for authorization to take small numbers of marine mammals by harassment incidental to conducting on-ice seismic operations during oil and gas exploration activities in the Beaufort Sea off Alaska through 31 May 2005, the Commission recommended that the monitoring programs for the proposed activities be expanded to include data on changes in density and abundance of potentially affected marine mammals, reproductive rates, prey availability, foraging patterns, distribution, and contaminant levels where oil and gas exploration, development, and production occur.</p>	<p>The incidental harassment authorization was issued on 4 April 2005.</p>
<p>14 March to National Marine Fisheries Service</p> <p>Regarding permit application no. 1074-1779 (Mr. Marc Dantzker, Cornell Laboratory of Ornithology), the Commission recommended approval of the permit with conditions. The application requested authorization to take by Level B harassment several species of cetaceans and pinnipeds during filming activities for purposes of commercial/educational photography. None of the species for which taking authorization was being requested is listed as endangered or threatened under the Endangered Species Act.</p>	<p>The permit was issued on 4 May 2005. The Commission's recommendations were adopted.</p>
<p>14 March to National Marine Fisheries Service</p> <p>Regarding a request for amendment of permit no. 984-1587-04 (Dr. Terrie Williams, Long Marine Laboratory), the Commission recommended approval with conditions. The requested amendment authorized studies to investigate the formation of acoustically driven bubbles in critical tissues in bottlenose dolphins, a suspected factor in recent mass-stranding events; the continuation of the reproductive energetics research authorized under the permit for an additional year; and expansion of the project to include research on up to 30 male and 30 female juvenile California sea lions undergoing rehabilitation at The Marine Mammal Center.</p>	<p>The amendment was issued on 7 June 2005. The Commission's recommendations were adopted.</p>

Marine Mammal Commission Recommendation	Agency Response
14 March to National Marine Fisheries Service	
<p>Regarding permit application no. 881-1745-00 (Alaska SeaLife Center), the Commission recommended approval with conditions. The application requested authorization to continue research on three Steller sea lions maintained in captivity to investigate stress responses, endocrine and immune system function, and seasonal variations to normal biological parameters such as mass and body composition, and to conduct research and development of external tags and attachments for future deployment in the field.</p>	<p>The authorization had not been issued at the end of 2005.</p>
14 March to U.S. Fish and Wildlife Service	
<p>Regarding permit application no. PRT-097957 (San Francisco Zoological Garden), the Commission recommended approval with conditions. The application requested authorization to import biological samples taken from free-ranging polar bears in Norway during 2000–2002 by Norwegian researchers.</p>	<p>The permit was issued on 22 March 2005. The Commission’s recommendations were adopted.</p>

Marine Mammal Commission Recommendation	Agency Response
<p>18 March to National Marine Fisheries Service</p> <p>Regarding the National Marine Fisheries Service’s public scoping notice regarding its intent to prepare an environmental impact statement on new acoustic exposure criteria, the Commission:</p> <ul style="list-style-type: none"> • inquired as to whether the draft environmental impact statement should specify whether the criteria will be used as hard-and-fast rules for distinguishing between anthropogenic sounds that will or will not be considered a taking or, alternatively, whether they will be used flexibly with other management tools (e.g., Endangered Species Act consultations) to assist the Service in making determinations based on particular circumstances; • recommended the Service should explain the nature and extent of the assumptions and extrapolations used to develop the matrix framework; • recommended that the Service carefully explain how acoustic criteria developed from empirical data largely drawn from a few small to mid-sized odontocete and pinniped species can adequately protect all marine mammals; • recommended that the draft environmental impact statement discuss how the Service will assess and interpret behavioral modifications that marine mammals may exhibit as a result of short-term exposure to intense sound sources as well as long-term exposure to increased background or ambient noise levels, which may lead to chronic disturbance or masking; • recommended that the draft environmental impact statement should evaluate proposed exposure criteria based, in part, on whether or not they can be measured and assessed to provide the essential feedback; • recommended that the draft environmental impact statement address the potential long-term effects of repeated or continuous sound exposures on marine mammals and how those might be measured; and • recommended that the Service revise its proposed alternatives in the draft environmental impact statement to provide a suite of reasonable choices that clearly define the options to be reviewed. 	

Marine Mammal Commission Recommendation	Agency Response
21 March to National Marine Fisheries Service	
<p>Regarding permit application no. 945-1776 (Glacier Bay National Park and Preserve, Christine M. Gabriele), the Commission recommended approval with conditions. The application requested authorization to take by unintentional harassment up to 500 North Pacific humpback whales, 20 minke whales, and 15 killer whales during observation, photo-identification, passive acoustic monitoring, prey sampling, and collection of whale feces and sloughed skin. Samples of sloughed skin would be exported to New Zealand for genetic analysis.</p>	<p>The permit had not been issued at the end of 2005.</p>
22 March to National Marine Fisheries Service	
<p>Regarding the National Marine Fisheries Service’s proposed rule to list southern resident killer whales as a threatened species under the Endangered Species Act, the Commission supported the Service’s proposal but found the Service’s preliminary determination that southern resident killer whales are “threatened” rather than “endangered” to be internally inconsistent, as well as inconsistent with the available data and Endangered Species Act listing determinations for other species. The Commission noted that the proposed rule does not include a measure to designate critical habitat for southern resident killer whales, and recommended that the Service proceed with a critical habitat designation as quickly as possible because habitat degradation may be a primary cause for the current depletion of the population.</p>	<p>The final rule was published on 18 November 2005 and became effective on 16 February 2006.</p>

Marine Mammal Commission Recommendation	Agency Response
23 March to National Marine Fisheries Service	
<p>Regarding permit application no. 369-1757-00 (Bruce Mate, Ph.D.), the Commission recommended issuance of the permit with conditions. The applicant requested authorization to tag and/or biopsy-sample up to 200 humpback whales, 200 blue whales, 200 fin whales, 200 gray whales, 200 North Atlantic right whales, 200 southern right whales, 200 bowhead whales, 200 sperm whales, and 60 North Pacific right whales over five years (no more than 50 whales of each species would be tagged/sampled in a single calendar year, with the exception of North Pacific right whales of which no more than 12 animals would be tagged/sampled in a single year). Up to 100 killer whales would be tagged and biopsy-sampled on an opportunistic basis during tagging activities on other species (no more than 20 killer whales would be tagged in a single year). Up to 200 additional animals of each species would be incidentally harassed annually during tagging/biopsy activities. Research activities would be conducted throughout U.S. coastal waters, international waters (including the North/South Atlantic, North/South Pacific, and Arctic Oceans), Indian Ocean, and Mediterranean Sea. The applicant's current permit expired on 31 October 2004.</p>	<p>The permit was issued on 30 May 2005.</p>
31 March to National Marine Fisheries Service	
<p>Regarding permit application nos. 594-1759 (Georgia Department of Natural Resources) and 633-1763 (Center for Coastal Studies), the Commission recommended approval with conditions. The first application requested authorization to continue investigations of North Atlantic right whale habitat-use patterns within and adjacent to the southeastern U.S. calving area designated as critical habitat, and the second application requested authorization to continue research on right whale demographics, life history traits, and behavior.</p>	<p>The permits were issued on 21 April 2005.</p>

Marine Mammal Commission Recommendation	Agency Response
20 April to National Marine Fisheries Service	
<p>Regarding permit application no. 522-1785 (Randall Wells, Ph.D.), the Commission recommended approval with conditions. The application requested authorization to capture, examine (including diagnostic ultrasound, and deep body and surface temperature measurements), sample (tooth, blood, urine, feces, blowhole exudate, milk, and sperm), mark (freeze-brand, tail-notch), tag (plastic cattle ear tags or roto-tags), conduct acoustic studies on, and release up to 120 bottlenose dolphins over five years in the shallow coastal waters of west-central Florida. Up to six of the 120 animals would have stomach temperature measurements taken using telemeter pills, and up to 20 animals would be tagged with short-term, non-invasive telemetry packages attached via suction cups. In addition, up to 100 dolphins annually would be sampled via biopsy darting for genetic and contaminant analyses.</p>	<p>The permit was issued on 30 May 2005.</p>
20 April to National Marine Fisheries Service	
<p>Regarding permit application no. 633-1778 (Center for Coastal Studies), the Commission recommended approval with conditions. The proposed research is part of a longitudinal monitoring program and ongoing research into humpback whale population ecology and human impact assessment. Up to 1,600 humpback whales of all ages, sizes, sexes, and reproductive conditions would be approached for photo-identification annually. Up to 200 of that number would be biopsy sampled.</p>	<p>The permit was issued on 21 April 2005.</p>
25 April to National Marine Fisheries Service	
<p>Regarding a request for amendment of permit no. 774-1714-00 (Southwest Fisheries Science Center, National Marine Fisheries Service), the Commission recommended approval with conditions. The amendment request sought authorization to (1) increase the number of humpback whales to be taken by photo-identification and biopsy sampling from 1,000 and 500 animals, respectively, to 3,000 and 1,500 animals, respectively, over the duration of the permit, as part of National Oceanic and Atmospheric Administration's Structure of Populations, Level of Abundance and Status of Humpbacks (SPLASH) program; and (2) attach satellite tags to 30 false killer whales and 30 short-finned pilot whales in waters surrounding the Hawaiian Islands.</p>	<p>The amendment was issued on 16 September 2005.</p>

Marine Mammal Commission Recommendation	Agency Response
<p>25 April to National Marine Fisheries Service</p> <p>Regarding a request by the Boeing Company to renew a one-year incidental harassment authorization to take small numbers of pinnipeds incidental to activities related to the Delta IV/Evolved Expendable Launch Vehicle at South Vandenberg Air Force Base, California, the Commission recommended approval provided that all reasonable measures be taken to ensure the least practicable impact on the subject species and the required mitigation and monitoring activities be carried out as described in the Service’s 23 March 2005 <i>Federal Register</i> notice and the subject application. The requested authorization was to take small numbers of Pacific harbor seals, California sea lions, and northern elephant seals during transport vessel operations, cargo movement activities, harbor maintenance dredging, and kelp habitat mitigation operations at the harbor at South Vandenberg Air Force Base. The principal means of taking would be by disturbance resulting from the presence of, and noise generated by, heavy equipment and other construction noise and construction vessel traffic during dredging activities and the operation of the <i>Delta Mariner</i> vessel and associated docking and cargo movement activities.</p>	<p>The incidental harassment authorization was issued on 20 May 2005.</p>

Marine Mammal Commission Recommendation	Agency Response
29 April to National Marine Fisheries Service	
<p>Regarding a request from the Lamont-Doherty Earth Observatory for authorization to take by harassment small numbers of several species of cetaceans and pinnipeds incidental to seismic survey and scientific rock-dredging activities to be conducted around the Aleutian Islands from 14 June to 20 July 2005, the Commission recommended approval if the authorization was suitably conditioned. The purpose of the surveys would be to examine the east-to-west change in the convergence angle of the Pacific–North America plates. The Commission expressed continued concern about whether the proposed monitoring effort will be sufficient to determine that no marine mammals are within the safety zones at start-up or will be an effective means of detecting when marine mammals enter the safety zones during operations. The Commission’s recommended conditions included a requirement that critical habitat areas, “no-approach” zones, and other areas where there is commonly a high density of pinnipeds during June and July be avoided to the extent possible. The Commission also noted that if the proposed monitoring program and mitigation measures do not provide sufficient assurance that marine mammals will not be exposed to sound levels that may cause serious injuries or mortalities, authorization of these additional types of taking should be pursued under section 101(a)(5)(A) of the Marine Mammal Protection Act. Also, the Commission recommended that the Service more explicitly define what constitutes “daytime” and “nighttime” for purposes of the proposed mitigation measures, and additional information be provided as to how close track lines are likely to be and the estimated time that is likely to transpire between passes through nearby locations.</p>	<p>The incidental harassment authorization was issued on 4 August 2005.</p>

Marine Mammal Commission Recommendation	Agency Response
<p>5 May to National Marine Fisheries Service</p>	
<p>Regarding a request from the California Department of Transportation for authorization to take small numbers of marine mammals incidental to construction related to seismic retrofitting of the Richmond–San Rafael Bridge, the Commission recommended issuance of the incidental harassment authorization as proposed. An authorization was originally issued to the California Department of Transportation by the Service on 16 December 1997 and was renewed by the Service on 8 January 2000, 19 September 2001, 23 September 2002, and 19 November 2003. The authorization would allow taking by harassment of small numbers of Pacific harbor seals and California sea lions during the seismic retrofit of the foundation and towers on piers 52 through 57. The proposed activities have the potential to disturb harbor seals hauled out on Castro Rocks and, possibly, California sea lions in the area.</p>	<p>The incidental harassment authorization was issued on 13 September 2005.</p>
<p>11 May to U.S. Fish and Wildlife Service</p>	
<p>Regarding the potential impact on Florida manatees of pending retirement of several power plants in Florida, the Commission recommended that the U.S. Fish and Wildlife Service contribute funds to develop construction plans for a solar-powered manatee refuge in its upcoming budget projections and consult with the Florida Fish and Wildlife Conservation Commission to arrange a cooperative project for developing and testing such a facility.</p>	<p>The Service provided an informal response indicating that, although it would provide staffing and other support for the initiative, it was not able to contribute funding.</p>

Marine Mammal Commission Recommendation	Agency Response
<p>12 May to National Marine Fisheries Service</p> <p>Regarding the National Marine Fisheries Service’s Draft Environmental Impact Statement for Amending the Atlantic Large Whale Take Reduction Plan, the Commission expressed disappointment that the Service decided summarily to discard the comments provided by the Commission during the scoping process for the draft environmental impact statement. The Commission noted that the analysis of impacts in the impact statement is inadequate. The Commission recommended that:</p> <ul style="list-style-type: none"> • the Service prepare a supplement to the draft environmental impact statement that analyzes the establishment of time and area closures and clearly assesses how the proposed measures will reduce entanglements sufficiently to meet the standards of the Marine Mammal Protection Act and the Endangered Species Act; • the supplement provide a thorough discussion of available information on the frequency of whale entanglements in vertical lines that were equipped with weak links; • the Service identify and analyze an option to (1) seasonally close right whale critical habitats to all trap fisheries and gillnets with vertical buoy lines until gear modifications are developed that provide assurance that right whale entanglement risks in such lines would be substantially reduced, and (2) require all trap fisheries along the U.S. East Coast to use sinking or neutrally buoyant ground line within one year of adopting the new plan; and • the Service immediately analyze all available right whale sighting data to reassess appropriate critical habitat boundaries that encompass high-use feeding and calving habitat. <p>The Commission urged the Service to use the draft environmental impact statement to consider the full range of management options that will bring lethal and serious injury takes of all Atlantic large whales to levels that meet the statutory standards of the Marine Mammal Protection Act and Endangered Species Act.</p>	<p>On 5 July 2005 the Service responded that the Commission’s recommendation and comments will be carefully considered when deciding how to proceed in the final rule and final environmental impact statement. The agency’s response to specific comments will be available in the preamble to the final rule.</p>

Marine Mammal Commission Recommendation	Agency Response
<p>19 May to National Marine Fisheries Service</p> <p>Regarding permit application nos. 782-1768 (National Marine Mammal Laboratory), 782-1702 (National Marine Mammal Laboratory), 358-1769 (Alaska Department of Fish and Game), 715-1784 (North Pacific Universities, Marine Mammal Research Consortium), 1034-1773 (Marcus Horning), and requests for amendment of permit nos. 434-1669 (Oregon Department of Fish and Wildlife), 1010-1641 (Aleutians East Borough), 800-1664 (Randall Davis), 881-1668 (Alaska SeaLife Center), and the Environmental Assessment of the Effects of National Marine Fisheries Service Permitted Scientific Research Activities on Threatened and Endangered Steller Sea Lions, the Commission provided preliminary comments in response to the Service’s request for an expedited review. The applicants are seeking authorization to continue and/or initiate research on the ecology and biology of threatened and endangered Steller sea lions to better understand the causes of the decline of the western population.</p>	<p>The permits/amendments were issued on 31 May 2005. The Commission’s comments generally were not adopted.</p>
<p>23 May to National Marine Fisheries Service</p> <p>Regarding compliance with regulations intended to reduce the bycatch of harbor porpoises in the northeast sink gillnet fishery, the Commission requested a description of the Service’s current and future plans to improve the implementation of the harbor porpoise take reduction plan, including approaches to monitoring closed areas, ensuring compliance with the regulations regarding the use of pingers, and assessing whether deployed pingers are functional.</p>	<p>On 17 June 2005 the Service responded that:</p> <ul style="list-style-type: none"> • its Northeast Regional Office sent a small entity compliance guide to all gillnet fishermen from Maine to North Carolina. This prompted many inquiries from fishermen for further information; • its Northeast Regional office also initiated a cooperative agreement between National Oceanic and Atmospheric Administration enforcement, state enforcement, and the Coast Guard in both the northeast and mid-Atlantic regions; and • in addition to outreach and enforcement, the Service is examining the functionality of pingers at sea.

Marine Mammal Commission Recommendation	Agency Response
27 May to National Marine Fisheries Service	
<p>Regarding the Department of the Navy's request for authorization to transport four bottlenose dolphins to Sea Life Park, Hawaii, as part of a breeding loan agreement, the Commission noted that it had no objection to the intent behind the proposed transport of the dolphins. The Commission noted, however, that Sea Life Park is currently under investigation by the Animal and Plant Health Inspection Service regarding its husbandry and veterinary care practices, and it questioned whether moving the dolphins to that facility at this time is appropriate. The Commission recommended that the transport be delayed until the investigation is completed and any steps needed to resolve problems at the facility have been taken.</p>	
3 June to U.S. Fish and Wildlife Service	
<p>Regarding a request for amendment of permit no. MA-010249-0 (Hubbs–Sea World Research Institute), the Commission recommended approval of the request with conditions. The original permit authorized the harassment of up to 10 captive manatees during fishing gear experiments. The permittee requested that the permit be amended to authorize field trials to follow up on the laboratory experiments conducted between 1999 and 2001. An estimated maximum of 300 manatees would be exposed at least once to the test objects. The animals would be exposed during a maximum of 60 days of field trials conducted during winter–spring of 2006 through the winter of 2007.</p>	<p>The amendment had not been issued at the end of 2005.</p>
9 June to National Marine Fisheries Service	
<p>Regarding a request from FEX L.P., a subsidiary of Talisman Energy, Inc. for authorization to take small numbers of beluga whales, ringed seals, bearded seals, spotted seals, and bowhead whales during the towing of barges containing a drilling rig, consumables, fuel, and essential construction equipment and supplies, the Commission recommended that all reasonable measures 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 <i>Federal Register</i> notice and the subject application. The principal means of taking would be from the noise generated by the towing vessels during movement of the barge and the physical presence of the tugs and barges.</p>	<p>The incidental harassment authorization was issued on 15 August 2005. The Service concurred with the Commission's recommendations and stated that mitigation and monitoring measures will be carried out as described in the application.</p>

Marine Mammal Commission Recommendation	Agency Response
<p>10 June to National Marine Fisheries Service</p> <p>Regarding permit application nos. 782-1768 (National Marine Mammal Laboratory), 782-1702 (National Marine Mammal Laboratory), 358-1769 (Alaska Department of Fish and Game), 715-1784 (North Pacific Universities, Marine Mammal Research Consortium), 1034-1773 (Marcus Horning), and requests for amendment of permit nos. 434-1669 (Oregon Department of Fish and Wildlife), 1010-1641 (Aleutians East Borough), 800-1664 (Randall Davis), 881-1668 (Alaska SeaLife Center), and the Environmental Assessment on the Effects of National Marine Fisheries Service Permitted Scientific Research Activities on Threatened and Endangered Steller Sea Lions, the Commission noted that the Commission staff provided preliminary comments on the applications on 19 May 2005 in response to the Service’s request. The Commission noted that the subject applications often do not provide sufficient information on proposed research designs, and it therefore is not possible to determine the likelihood that the applicants will achieve their research objectives. The Commission also noted that it is unclear whether all of the proposed research is essential and whether the potential benefits outweigh the combined risks. The Commission noted that the Service issued the requested permits and amendments prior to receiving the Commission’s formal comments and requested that the Service provide an explanation as to why it did so.</p>	<p>Permit nos. 782-1768, 358-1769, and 715-1784 and amendments nos. 434-1669, 1010-1641, and 881-1668 were issued on 31 May 2005.</p>
<p>20 June to National Marine Fisheries Service</p> <p>Regarding a request from the University of Alaska Fairbanks to take small numbers of marine mammals incidental to conducting a seismic survey across the Arctic Ocean, the Commission expressed its concern about whether the proposed monitoring effort will be sufficient to determine that no marine mammals—especially species that may be difficult to detect—are within the safety zones at start-up or to detect when marine mammals enter the safety zones during operations, particularly for activities conducted in the dark. The Commission recommended that the Service more explicitly define what constitute “daytime” and “nighttime” for the purposes of the proposed mitigation measures.</p>	

Marine Mammal Commission Recommendation	Agency Response
20 June to National Marine Fisheries Service	
Regarding permit application no. 116-1786 (Mr. Brad Andrews, Sea World, Inc.), the Commission recommended approval of the request with conditions. The application was for continued long-term maintenance of eight non-releasable female Hawaiian monk seals for enhancement purposes.	The permit had not been issued at the end of 2005.
20 June to National Marine Fisheries Service	
Regarding permit application no. 978-1791 (Paul E. Nachtigall, Ph.D.), the Commission recommended that the permit be issued with conditions. The application requested authorization to obtain audiometric data on up to 15 individuals of 38 species of cetaceans stranded on the beach or held in rehabilitation facilities. Auditory brainstem response recordings would be obtained using non-invasive suction cup sensors. Up to six one-hour hearing sessions, separated by minimum two-hour rest periods, would be performed on an individual animal per day, over five days. The research would take place in Hawaii and along the U.S. coastline over five years.	The permit had not been issued at the end of 2005.
20 June to National Marine Fisheries Service	
Regarding permit application no. 715-1792 (Andrew Trites, Ph.D.), the Commission recommended approval with conditions. The application requested authorization to deploy three types of electronic tags (i.e., dead-reckoners, satellite platform terminal transmitters, and VHF radio transmitters) on up to 35 lactating adult female northern fur seals annually on St. Paul Island, Alaska, during the breeding season, over a three-year period. All three tags would be glued at separate locations on the seals (the VHF tag on the top of the head, the dead-reckoner tag between the shoulder blades, and the satellite transmitter near the dead-reckoner tag). The seals would be recaptured for instrument removal. Up to 25 mature males, 50 immature males, and 50 pups would be incidentally harassed during capture/recapture of the lactating female seals. Authorization also was requested for the accidental mortality of one seal annually. The purpose of the research is to gather fine-scale foraging data needed to identify important habitat and assess the extent of spatial overlap with commercial fisheries.	The permit had not been issued at the end of 2005.

Marine Mammal Commission Recommendation	Agency Response
22 June to U.S. Fish and Wildlife Service	
<p>Regarding continuation of activities under permit no. MA672624-14 following the death of a sea otter under the permit, the Commission recommended that the Service authorize the continuation of the research (i.e., tagging studies and aerial surveys of sea otters off California).</p>	<p>Authorization to resume research was issued on 11 July 2005.</p>
24 June to Congressman Wayne Gilchrest	
<p>Regarding reauthorization of the Marine Mammal Protection Act, the Commission provided Congressman Gilchrest and his staff information regarding threats to North Atlantic right whales, particularly from ship strikes, for use in preparing for a hearing on ways to promote timely adoption of ship strike reduction measures.</p>	<p>No response anticipated.</p>
27 June to U.S. Fish and Wildlife Service	
<p>Regarding the U.S. Fish and Wildlife Service's proposed five-year status review of the Florida manatee pursuant to the Endangered Species Act, the Commission expressed its belief that any decision to alter the level of protection afforded manatees must account for threats and uncertainties associated with the potential loss of major warm-water refuges now used by manatees. The Commission enclosed copies of two papers concerning this issue, which the Commission believed would provide a helpful basis for assessing those threats and the adequacy of management and regulatory programs to address them. The Commission also provided a paper that examined the effectiveness of the Service's boat speed rules established in 2002 to protect manatees in Sykes Creek and the Florida Barge Canal.</p>	<p>The status review notice was amended to include the entire species (<i>Trichechus manatus</i>) and the public comment period was extended to 13 June 2006.</p>
27 June to National Marine Fisheries Service	
<p>Regarding the draft conservation plan for the Cook Inlet Beluga Whale, the Commission recommended that:</p> <ul style="list-style-type: none"> • the current draft of the conservation plan be substantially reorganized and rewritten, and that a revised version of the plan be provided to the Commission for comment; and • the Service proceed in an expeditious manner to reconsider listing of Cook Inlet beluga whales under provisions of the Endangered Species Act. 	

Marine Mammal Commission Recommendation	Agency Response
8 July to National Marine Fisheries Service	
<p>Regarding a request from Eglin Air Force Base, Florida, to take small numbers of marine mammals incidental to Naval Explosive Ordnance Disposal School training operations in the northern Gulf of Mexico, and the Service's proposal to issue regulations that would govern the incidental taking for a period of up to five years, the Commission noted that the proposed activities appear to fit within the definition of a "military readiness activity" as adopted in the National Defense Authorization Act for Fiscal Year 2004 (Pub. L. 108-136). The Commission recommended that the Service analyze the request in light of that definition of the term "harassment." The Commission also expressed concern about the effectiveness of the proposed monitoring program and recommended that if the Service issues the authorization, it explicitly require that operations be suspended immediately if a dead or seriously injured animal is found in the vicinity of the test site, pending authorization to proceed or issuance of regulations authorizing such take under section 101(a)(5)(A) of the Marine Mammal Protection Act. In addition, the Commission expressed concern that an across-the-board definition of temporary threshold shift as constituting no more than Level B harassment inappropriately dismisses possible injury and biologically significant behavioral effects to the affected animals. The Commission reiterated its belief that the Service should provide a better explanation of and justification for using (1) the dual criteria established for determining non-lethal injury, (2) the "non-injurious behavioral response" threshold, and (3) the 23-psi criterion for estimating temporary threshold shift.</p>	
27 July to National Marine Fisheries Service and U.S. Fish and Wildlife Service (jointly)	
<p>Regarding a request for amendment of joint NMFS/FWS permit no. 1008-1673/ MA-100875 (John Wise, Ph.D., Yale University School of Medicine) for the import from Canada of specimen materials from all species of stranded dead marine mammals (excluding walruses, polar bears, and sea otters), the Commission recommended approval of the request with conditions.</p>	<p>The joint amendment had not been issued at the end of 2005.</p>

Marine Mammal Commission Recommendation	Agency Response
4 August to National Marine Fisheries Service	
<p>Regarding permit application no. 1078-1796 (The Georgia Aquarium) for authorization to import two beluga whales from Mexico for public display, the Commission recommended approval of the application with conditions.</p>	<p>The permit was issued on 6 October 2005.</p>
15 August to National Marine Fisheries Service	
<p>Regarding a request for amendment of permit no. 782-1719 (National Marine Mammal Laboratory), the Commission recommended approval of the request with conditions. The permit authorized the harassment of various cetacean species during tagging and biopsy sampling for purposes of estimating abundance and collecting behavioral data. The permit holder requested that the permit be amended to increase the numbers of bowhead whales, beluga whales, and non-endangered cetacean species that could be biopsy sampled and harassed under the permit.</p>	
23 August to National Marine Fisheries Service	
<p>Regarding permit application no. 486-1790 (Brent S. Stewart, Ph.D., J.D.) to conduct scientific research on four species of pinnipeds in the California Channel Islands, the Commission recommended approval of the application with the conditions.</p>	<p>The permit was issued on 3 October 2005.</p>
29 August to National Marine Fisheries Service	
<p>Regarding a request from BP (British Petroleum) Exploration to take by harassment small numbers of marine mammals incidental to oil production operations at the Northstar oil and gas facility offshore Alaska, the Commission recommended that:</p> <ul style="list-style-type: none"> • the Service consult the applicant, the Minerals Management Service, and other industry and government entities, as appropriate, to develop a collaborative long-term Arctic monitoring program; and • the potential effects of climate change be factored, as appropriate and practical, into long-term monitoring and mitigation programs. 	

Marine Mammal Commission Recommendation	Agency Response
30 August to U.S. Fish and Wildlife Service	
<p>Regarding a request for amendment of permit no. PRT-041309 (U.S. Fish and Wildlife Service, Marine Mammal Management, Anchorage, Alaska), the Commission recommended that the request be approved with conditions. The permit authorized aerial and vessel surveys of sea otters in Alaska. The permit holder requested that the permit be amended to extend its duration and to authorize additional research activities.</p>	<p>The amendment had not been issued at the end of 2005.</p>
30 August to National Marine Fisheries Service	
<p>Regarding proposed rules to implement the Atlantic Large Whale Take Reduction Plan, the Commission expressed the belief that the measures considered in the Service's related draft environmental impact statement to prevent entanglement of right whales in vertical buoy lines are not adequate. The Commission recommended that the Service adopt rules to prohibit use of all fishing gear employing vertical buoy lines to mark gear locations at times when whales are inhabiting designated critical habitats until such time as new measures are developed, or existing technology is required, to provide reasonable assurance that right whales will not become entangled.</p>	
30 August to National Marine Fisheries Service and U.S. Fish and Wildlife Service (jointly)	
<p>Regarding request for amendment to extend the duration of a joint NMFS/FWS permit no. 960-1528/PRT-017891 (Museum of Natural History Collections, University of California) authorizing the import and export of marine mammal specimen materials, the Commission recommended approval of the request with conditions.</p>	<p>The joint amendment was issued on 23 December 2005. The Commission's recommendations were adopted.</p>
8 September to U.S. Fish and Wildlife Service	
<p>Regarding permit application no. PRT-101713 (The Marine Mammal Center), the Commission recommended issuance of the permit with conditions. The applicant requested authorization to implant subcutaneous and abdominal radar transmitters in rehabilitated southern sea otters for purposes of enhancement associated with rehabilitation and post-release monitoring activities.</p>	<p>The permit had not been issued at the end of 2005.</p>

Marine Mammal Commission Recommendation	Agency Response
8 September to U.S. Fish and Wildlife Service	
<p>Regarding permit application no. PRT-100361 (Mote Marine Laboratory), the Commission recommended approval with conditions. The applicant requested to harass manatees during aerial surveys, close approaches for photo-identification and assessment of foraging and other behaviors, and collection of skin via epidermal scrubs for use in genetic research.</p>	<p>The permit was issued on 10 November 2005. The Commission's recommendations were adopted.</p>
16 September to National Marine Fisheries Service	
<p>Regarding a request for amendment of permit no. 699-1720-01 (Kathryn Ono, Ph.D.), the Commission recommended approval of the request with conditions. The permit authorized research on harbor seal pups in waters off the Maine coast. The permit holder requested that the permit be amended to expand the geographical location from the coast of Maine to the Massachusetts/Rhode Island border.</p>	<p>The amendment was issued on 1 September 2005.</p>
21 September to National Marine Fisheries Service	
<p>Regarding a request from the Army Corps of Engineers-Jacksonville District to take small numbers of marine mammals by harassment incidental to activities related to expanding and deepening the Port Sutton Navigation Channel in Tampa Harbor, Florida, the Commission recommended that:</p> <ul style="list-style-type: none"> • prior to the applicant initiating blasting, the Service review and approve the applicant's specific blasting plan and evaluate whether the proposed monitoring activities and observer efforts are adequate to detect any bottlenose dolphins that may be within the danger or caution/safety zones calculated for a particular explosion; • the National Marine Fisheries Service and the U.S. Fish and Wildlife Service coordinate their reviews of the proposed activities and any incidental taking authorizations, including requirements for monitoring the conduct and effects of the proposed activities; and • the mitigation activities proposed in the application and the Service's <i>Federal Register</i> notice are carried out as described. 	

Marine Mammal Commission Recommendation	Agency Response
23 September to National Marine Fisheries Service	
<p>Regarding a request from the Minerals Management Service to take small numbers of marine mammals by harassment incidental to the removal of oil and gas drilling and production structures in the Gulf of Mexico, the Commission recommended that the Service initiate the proposed rulemaking, provided that it is satisfied that the planned marine mammal and related monitoring programs will be adequate to verify how and over what distances marine mammals may be affected, that only small numbers of marine mammals will be taken, and that the cumulative impacts on the affected species and stocks will be negligible.</p>	
26 September to National Marine Fisheries Service	
<p>Regarding the National Marine Fisheries Service's draft 2005 stock assessment reports for marine mammals, the Commission recommended that the Service:</p> <ul style="list-style-type: none"> • review a number of specified assessment issues, develop appropriate precautionary policies for addressing them, and take the steps necessary to ensure consistent application of the policies among all regions and for all stocks of marine mammals; • take a consistent, precautionary approach when determining whether a stock of unknown status should be classified as strategic; • develop alternatives to address the problems raised by using estimated stock abundances to pro-rate marine mammal mortality when the stock of origin is unknown; • develop a consistent, precautionary approach to the management of stocks that are declining in the absence of known human impacts; • develop an effective strategy for assessing mortality levels in transboundary stocks of marine mammals with priority given to those stocks that are harvested or known to interact significantly with domestic or international fisheries; and • review current levels of observer coverage, set appropriate standards for such coverage, and implement the changes needed to achieve those standards. 	

Marine Mammal Commission Recommendation	Agency Response
27 September to National Marine Fisheries Service	
Regarding permit application no. 1075-1788 (Shane B. Kanatous, Ph.D.), the Commission recommended issuance of the permit with conditions. The application requested authorization to capture, sedate, biopsy sample, and release Weddell seals in the Antarctic to study diving physiology in the species.	The permit was issued on 4 November 2005.
4 October to U.S. Fish and Wildlife Service	
Regarding a request for amendment of permit no. PRT-067925 (Alaska Science Center, U.S. Geological Survey, Anchorage, Alaska), the Commission recommended approval of the request, with conditions. The permit authorized capture, tagging, and biopsy of northern and southern sea otters. The permit holder requested that the permit be amended to add the authorized activities involving northern sea otters to the authorization under the Endangered Species Act in light of the listing of that species as threatened under that statute.	The amendment had not been issued at the end of 2005.
4 October to U.S. Fish and Wildlife Service	
Regarding a request for amendment of permit no. PRT-078744 (Randall Davis, Texas A&M University), the Commission recommended approval of the request, with conditions. The permit authorized the harassment of northern sea otters during photo identification and behavioral studies. The permit holder requested that the permit be amended to add the authorized activities involving northern sea otters to the authorization under the Endangered Species Act in light of the listing of that species as threatened under that statute.	The amendment had not been issued at the end of 2005.
17 October to National Marine Fisheries Service	
Regarding a request from Bay Marina Management Corporation to take small numbers of marine mammals incidental to maintenance dredging in the area of the Pier 39 Marina, San Francisco, California, the Commission recommended that the authorization be issued, provided that the mitigation and monitoring activities proposed in the application and the Service's <i>Federal Register</i> notice are carried out as described.	The incidental harassment authorization was issued on 17 October 2005.

Marine Mammal Commission Recommendation	Agency Response
21 October to National Marine Fisheries Service	
<p>Regarding proposed revisions to National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act, the Commission recommended that the Service:</p> <ul style="list-style-type: none"> • review its rationale for grouping stocks in assemblages, provide a stronger justification for concluding that the protection of potentially vulnerable stocks will be achieved under the proposed approach, and seek means of collecting the information needed to assess the status of affected stocks so that they are not put at risk by grouping; • ensure that its guidelines establish a time at which all fishing on an overfished stock would cease until such time as a rebuilding plan is in place; • require that F_{target} be less than F_{lim} for all overfished stocks and that rebuilding begin within one year after a stock has been identified as overfished; • before permitting fishing on a stock for which an estimate of B_{lim} or a reasonable proxy cannot be provided, the Service provide explicit, specific guidelines that ensure conservation of that stock, including a description of how the status of the stock will be monitored; • require that stocks reach B_{MSY} in T_{min} times a precise safety factor; • require affirmative evidence of a stock's status before removing protections needed for stock recovery stemming from a designation as overfished; and • first respond to an overfished stock that is not recovering as expected by reducing fishing rates and consider changes in rebuilding time horizons only as a last resort. 	
25 October to National Marine Fisheries Service	
<p>Regarding permit application no. 358-1787 (Alaska Department of Fish and Game), the Commission recommended approval of the application with conditions. The applicant requested authorization to capture, sample, tag, and release harbor seals, spotted seals, ringed seals, bearded seals, and ribbon seals during research on the ecology of these species.</p>	<p>The permit had not been issued at the end of 2005.</p>

Marine Mammal Commission Recommendation	Agency Response
25 October to National Marine Fisheries Service	
<p>Regarding permit application no. 1070-1783 (Alejandro Acevedo-Gutierrez), the Commission recommended approval of the application with conditions. The applicant requested authorization to harass harbor seals during aerial and vessel surveys and scat collection in Washington waters for research on the response of predators to increased prey diversity.</p>	<p>The permit had not been issued at the end of 2005.</p>
31 October to Department of Transportation	
<p>Regarding the Coast Guard’s request for comments concerning its intent to prepare an environmental impact statement as part of the environmental review of an application for a license to operate a liquefied natural gas deepwater port in federal waters northeast of Boston, Massachusetts, the Commission recommended that:</p> <ul style="list-style-type: none"> • to ensure that the proposed facility and associated vessel traffic to and from the proposed port do not adversely affect right whales, the Coast Guard thoroughly evaluate potential impacts of the deepwater port on this and other endangered whale populations inhabiting the region prior to approving the development and operation of the proposed facility; • the environmental impact statement include as one alternative the requirement that all vessels approaching and departing the facility use speeds of 12 knots or less when whales have been sighted in these or other areas where the vessel is operating in the region; • the environmental impact statement consider and evaluate the possible effects of noise from barge traffic, dredging activities, and any other activities associated with the port construction and operation that may affect the behavior of right whales, particularly when feeding; and • if it has not already done so, the Coast Guard initiate formal consultations with the National Marine Fisheries Service pursuant to section 7 of the Endangered Species Act as part of its review process. 	

Marine Mammal Commission Recommendation	Agency Response
3 November to the City of San Diego	
<p>Regarding the City of San Diego’s plans to take by harassment marine mammals at the Children’s Pool in La Jolla, the Commission provided the City with a copy of its 3 November 2005 letter to the National Marine Fisheries Service, noting its belief that it is the Service—as the resource agency responsible for implementing the Marine Mammal Protection Act—rather than the City Attorney of San Diego, that properly should be making determinations concerning section 109(h) of the Act.</p>	
3 November to National Marine Fisheries Service	
<p>Regarding the City of San Diego’s plans to take by harassment marine mammals at the Children’s Pool in La Jolla, the Commission noted that the Service’s 17 October 2005 letter to the City of San Diego suggests that section 109(h) of the Marine Mammal Protection Act provides the necessary authority for the proposed taking of harbor seals at Children’s Pool Beach but does not address the City’s central questions. The Commission expressed its belief that guidance on interpreting section 109(h) is properly within the purview of the Service and should not be deferred to local jurisdictions to make independent determinations as to whether certain activities fit within the scope of the provision. The Commission recommended that the Service and/or National Oceanic and Atmospheric Administration’s Office of the General Counsel provide a more rigorous analysis of the applicability of section 109(h) to each aspect of the proposed taking to determine if other types of taking authorization (e.g., an incidental taking authorization under section 101(a)(5) of the Marine Mammal Protection Act) may be needed.</p>	<p>On 27 February 2006 the Service responded that it has worked closely with the National Oceanic and Atmospheric Administration’s Office of General Counsel in reviewing the interpretation of section 109(h) of the Marine Mammal Protection Act and has determined that:</p> <ul style="list-style-type: none"> • the statutory text is broad and is not limited only to emergency situations and, had Congress intended the provision to have a narrow application, it could have included limitations within the legislative text; • officials or employees of the City of San Diego will likely intentionally harass seals from the beach by non-lethal methods, rather than harassing the seals from the beach incidental to dredging operations on the beach; • the Service has not determined that section 109(h) of the Act authorizes incidental taking; • defining “nuisance” is unnecessary at this time; and • the City of San Diego has not indicated its intent to use contractors to take harbor seals at Children’s Pool and has not requested the Service to designate anyone as an agent in accordance with section 112(c) of the Act.
7 November to National Marine Fisheries Service	
<p>Regarding a request for amendment of permit no. 774-1649 (Southwest Fisheries Science Center, National Marine Fisheries Service), the Commission recommended approval of the request with conditions. The permit authorized the capture, handling, sampling, tagging, and release of Antarctic fur seals. The permit holder requested that the permit be amended to authorize additional activities (e.g., blood sampling, doubly labeled water studies) on adult female seals and fur seal pups.</p>	<p>The amendment was issued on 21 November 2005. The Commission’s recommendation and conditions were adopted.</p>

Marine Mammal Commission Recommendation	Agency Response
<p>16 November to U.S. Fish and Wildlife Service</p> <p>Regarding the Service’s draft study plan for the collaborative Pacific walrus survey, the Commission commended the Service for having made substantial progress on the draft study plan and noted three principal concerns for the Service’s consideration: (1) the study design is premised on several fundamental assumptions, at least two of which are not stated explicitly in the draft study plan; (2) the description of aerial survey methods indicates a potential difficulty with matching thermal data and photographic images of walrus groups; and (3) the plan fails to describe how the line-transect surveys will be designed to observe a representative sample of group sizes while ensuring that the low-altitude plan will be able to complete its primary mission (collecting digital photographs of walrus groups that match those recorded by the thermal survey).</p>	<p>At the end of 2005, a response from the U.S. Fish and Wildlife Service was pending.</p>
<p>15 December to National Marine Fisheries Service</p> <p>Regarding permit no. 1065-1749 (Patrick Butler, Ph.D., University of Birmingham, U.K.), the Commission responded to the Service’s request for the Commission’s views regarding the advisability, from a humaneness perspective, of proceeding with surgical implantation of a heart rate logger in a fur seal, when there is reason to believe that the animal will have an adverse reaction to the procedure. The Commission noted that one of the stated purposes of the research is to develop a heart rate logger and surgical procedures for implanting that instrument “in pinnipeds in general and in Steller sea lions in particular.” From the standpoint of the broader purpose, it appears that surgically implanting the device in northern fur seals on a trial basis—using paraffin-based gel with iodine such as is used when surgically implanting similar devices in sea otters—might be appropriate. However, if the study is, for practical purposes, more narrowly focused on determining an appropriate surrogate for Steller sea lions, continuing to surgically implant the device in species that are likely to experience problems may be problematic from a humane perspective. The Service should seek clarification from the applicant as to the precise scope of the research and its ultimate goals.</p>	

Marine Mammal Commission Recommendation	Agency Response
18 December to National Marine Fisheries Service	
<p>Regarding a request from the Scripps Institution of Oceanography to take small numbers of marine mammals by harassment incidental to conducting a marine seismic survey in the southwestern Pacific Ocean, the Commission noted that uncertainties concerning the effects of sound on beaked whales underscore the need for caution in conducting the proposed activities. The Commission also noted that various monitoring and mitigation measures should be taken to ensure, insofar as possible, that the study does not result in unexpected injuries or deaths to marine mammals.</p>	
27 December to Army Corps of Engineers	
<p>Regarding the Corps' draft environmental impact statement for navigation improvements to the Delong Mountain Terminal at Portsite, Alaska, the Commission noted that the draft environmental impact statement provides a useful description of the tentatively recommended plan and several alternatives and of the potentially affected environment. The Commission noted, however, that the draft seriously understates the potential for the trestle-channel alternative to affect marine mammals and their habitats in the project area. The Commission recommended that:</p> <ul style="list-style-type: none"> • the Army Corps of Engineers and/or the project operators seek the required incidental harassment authorizations from the appropriate agencies; • the draft environmental impact statement be significantly revised to (1) accurately represent what is and is not known about the biology of marine mammals in the project area; (2) clearly describe the individual and cumulative effects of the recommended plan on marine mammals and their habitats; and (3) for each marine mammal species, provide a thorough analysis of cumulative effects analysis that addresses the potential impacts of all current and reasonably foreseeable human activities throughout the species' range; and • unless the analyses recommended by the Commission can conclude that the project will have negligible impacts on marine mammals and their habitats and will have no unmitigable adverse impact on the availability of marine mammals for subsistence hunters, the final environmental impact statement should recommend the no-action alternative. 	<p>No response was received. The environmental impact statement is in preparation.</p>

Marine Mammal Commission Recommendation	Agency Response
29 December to National Marine Fisheries Service	
<p>Regarding permit application no. 918-1820 (Squalus, Inc.), the Commission recommended issuance of the permit with conditions. The applicant requested authorization to import four captive-born juvenile Patagonian sea lions from Mexico for the purposes of public display.</p>	
29 December to National Marine Fisheries Service	
<p>Regarding permit application no. 1076-1789 (The Alliance of Marine Mammal Parks and Aquariums), the Commission recommended that the National Marine Fisheries Service and the U.S. Fish and Wildlife Service should consider adopting a generic approach for authorizing the collection and use of specimen materials by institutions for eventual use for research purposes. The Commission recommended that the Services issue the requested permit with conditions.</p>	

The Marine Mammal Commission

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