



The Marine Mammal Commission

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MARINE MAMMAL COMMISSION

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**Marine Mammal Commission
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Bethesda, Maryland, 20814**

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Chapter I

INTRODUCTION

The Marine Mammal Protection Act provides a cornerstone for U.S. policy protecting marine ecosystems. The Act reflects the value that the U.S. public places in the conservation of marine mammals specifically and our natural world generally. Title II of the Act created the Marine Mammal Commission as an independent federal agency to oversee federal activities and advise the federal government regarding the Act's provisions and primary objective—to maintain the health and stability of the marine ecosystem.

The Marine Mammal Commission consists of three members who are appointed by the President with the consent of the U.S. Senate. One of the Commissioners serves as Chairman and all three must be knowledgeable in marine ecology and resource management. They are supported by a nine-member Committee of Scientific Advisors on Marine Mammals. The Chairman appoints Committee members with the concurrence of the other Commissioners and after consultation with the Chairman of the Council on Environmental Quality, the Secretary of the Smithsonian Institution, the Director of the National Science Foundation, and the Chairman of the National Academy of Sciences. Committee members must be knowledgeable in marine ecology and marine mammal affairs. The Commissioners also are supported by a staff, which is located in Bethesda, Maryland.

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

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

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

- (3) undertake or cause to be undertaken such other studies as it deems necessary or desirable in connection with its assigned duties as to the protection and conservation of marine mammals;
- (4) recommend to the Secretary and to other federal officials such steps as it deems necessary or desirable for the protection and conservation of marine mammals;
- (5) recommend to the Secretary of State appropriate policies regarding existing international arrangements for the protection and conservation of marine mammals and suggest appropriate international arrangements for the protection and conservation of marine mammals;
- (6) recommend to the Secretary such revisions of the endangered species list and threatened species list published pursuant to section 4(c)(1) of the Endangered Species Act of 1973 as may be appropriate with regard to marine mammals; and
- (7) recommend to the Secretary, other appropriate federal officials, and Congress such additional measures as it deems necessary or desirable to

further the policies of this Act, including provisions for the protection of the Indians, Eskimos, and Aleuts whose livelihood may be adversely affected by actions taken pursuant to this Act.

Those duties are aimed at maintaining marine mammal populations as functioning elements of healthy marine ecosystems. Whether that is the case for any particular population is judged on the basis of its status or, more specifically, its current abundance relative to the maximum population size the environment could support over time. In demographic terms, the status of a marine mammal population is determined by its survival and reproductive rates. These, in turn, reflect such things as individual health and condition; exposure and resilience to disease, contaminants, noise, and harmful algal blooms; the quantity and quality of habitat for foraging, reproduction, and rest; natural ecological processes, including predation; and the manner in which human-related threats are managed.

The Commission prepares annual reports to summarize key issues and events that determine or influence the status of marine mammal populations. First and foremost, the Commission uses these reports to inform Congress and the Administration. The reports also serve as an educational tool and a historical record dating back to 1973 (available at <http://www.mmc.gov/reports/annual>). To ensure accuracy, federal and state agencies and knowledgeable individuals review report drafts, and the Commission gratefully acknowledges their efforts. The Commission disseminates the report widely, both within the United States and abroad, with the aim of ensuring that all parties interested in marine mammals and marine ecosystems are well informed about such matters.

Chapters in the Report

In 2009 the Commission held its annual meeting in Honolulu, Hawaii, with a primary focus on cetacean research and management in the central and western Pacific Ocean and conservation efforts for the Hawaiian monk seal. Chapter II gives a broad overview of both of those topics. The vast Pacific supports a diverse group of cetaceans that is among the least studied and least known throughout the world's

oceans. The National Marine Fisheries Service's 2009 stock assessment reports for the central and western Pacific list 24 species and 26 stocks. As scientists learn more about the way marine mammals partition their habitat, it is becoming apparent that, while they are unlikely to discover new species, they are likely to find more stock structure and an increase in the number of identified stocks.

Throughout the 1980s and 1990s the National Marine Fisheries Service, which has management responsibility for most marine mammals in U.S. waters, and the Marine Mammal Commission have focused their efforts in the central North Pacific almost entirely on the endangered Hawaiian monk seal, seeking to reverse its relentless decline. Unfortunately, that single-species focus has led to the neglect of most cetaceans in the region, and much remains to be done to develop a suitable research and management regime for them. Doing so is not only timely, but essential to protect them from the risks stemming from interactions with fisheries. Fishing fleets from many countries ply the waters of the Pacific Ocean, targeting a range of species, mostly in the upper trophic levels of the food web, including tunas, swordfish, and sharks. Those fleets use two main fishing methods, purse seines and longlines, both with a history of marine mammal interactions. Without better knowledge of the cetacean species and stocks in the central and western Pacific, the fisheries that occur in that region, and their interactions, it is simply not possible to describe the status of potentially affected marine mammal stocks with a reasonable degree of confidence. Thus, the National Marine Fisheries Service and its parent organizations, the National Oceanic and Atmospheric Administration and the Department of Commerce, are all faced with a difficult challenge in meeting their research and management responsibilities in the central and western Pacific Ocean.

Despite its past focus on the Hawaiian monk seal, conservation of the species still poses a considerable challenge. This species was listed as endangered under the Endangered Species Act in 1976 after a long history of ill treatment by humans. It likely was extirpated from the main Hawaiian Islands as Polynesians arrived and settled in the islands some 2,000 years ago. It survived in the Northwestern

Hawaiian Islands but, beginning about 200 years ago, the species was decimated by the first westerners to visit those islands. Since then, the Hawaiian monk seal has persisted despite a variety of human-related threats. The first range-wide survey of the species in the 1950s indicated a total of about 3,000 individuals (Kenyon 1972). Since then, numbers have declined, and there are now fewer than 1,000 seals in the Northwestern Hawaiian Islands and perhaps 150 in the main Hawaiian Islands. The major threats to the species in the Northwestern Hawaiian Islands act primarily on juveniles, decreasing their survival to reproductive age. Those threats include starvation, predation by sharks, and entanglement in marine debris (National Marine Fisheries Service 2007). Climate disruption also poses a threat to the species in the Northwestern Hawaiian Islands. It may contribute to declining availability of prey for young seals and cause sea level rise leading to loss of haul-out habitat needed by seals to rest, molt, give birth, and nurse their young (Baker et al. 2006).

Although the number of monk seals in the main Hawaiian Islands is small, their numbers and reproductive output have been increasing. Scientists documented few seal births in the main Hawaiian Islands before the 1990s. Since then, pup numbers have increased, and in 2009 scientists recorded a total of 21 births. Indeed, population projections indicate that the populations in the two regions may be equal (with both numbering fewer than 350 seals) in 15 years if the current rates of decline in the Northwestern Hawaiian Islands and of growth in the main Hawaiian Islands continue unchanged. This growth in the main Hawaiian Islands may prove to be essential for the Hawaiian monk seal to persist. If so, much will depend on the willingness of the human population to make room for it and allow it to recover.

Chapter II ends with a description of three other species involved in interactions with human activities in the North Pacific: the spinner dolphin (*Stenella longirostris*), the false killer whale (*Pseudorca crassidens*), and the dugong (*Dugong dugon*).

Chapter III highlights two recent steps toward a new national ocean policy. In response to a directive from President Barack Obama, the Council on Environmental Quality led two multi-agency efforts to revamp the nation's ocean policy based, in part, on

better spatial planning of our activities in the marine environment. Two previous reviews, one by the Pew Oceans Commission entitled "America's Living Oceans: Charting a Course for Sea Change" (Pew Oceans Commission 2003) and the other by the U.S. Commission on Ocean Policy entitled "An Ocean Blueprint for the 21st Century" (U.S. Commission on Ocean Policy 2004), drew attention to the great need for better management of the world's oceans. The Bush Administration responded with its Ocean Action Plan to move the nation in that direction. In 2009 the Obama Administration began to shape its vision for an ocean policy, with potentially broad implications for all aspects of our use and enjoyment of the world's oceans.

Chapter IV draws attention to marine mammal species and stocks of special conservation concern. Some have been listed as threatened or endangered under the Endangered Species Act, others are being considered for such listing, most have been designated as depleted under the Marine Mammal Protection Act, and all have been or are now at risk from many types of human activities. Disruption of the earth's climate has become a major factor, if not the major, factor, determining the fate of some of the Arctic species, particularly those that depend on seasonal sea ice, but other human activities (e.g., fishing, commercial shipping, and coastal development) also pose serious risks to these and other marine mammal species and stocks. This chapter describes the status of those species of special concern and the factors affecting their status in 2009.

Chapter V considers conservation of species in foreign and international waters. A substantial number of species and stocks in foreign and international waters are at elevated risk of extinction. Some are well studied, but many are not, and the lack of information adds to their peril. Climate disruption will be a key factor in determining their persistence, but in many cases the populations are declining for a suite of reasons ranging from directed capture for food to habitat degradation and loss as an unintended consequence of human action. As a rule, coastal species and species that occur in rivers or lakes are at far greater risk from human activities. Recovery efforts hinge not only on better research and increased funding for conservation but also on the will and values

of human societies that compete with them for food or space or who simply are absorbed in other crises and have chosen to focus on other concerns deemed to be of higher priority.

Chapter VI describes the new and developing challenges to marine mammal conservation in the Arctic. Disruption of the climate is altering marine ecosystems throughout the world's oceans, but those changes may be most severe in polar regions—the Arctic and Antarctic. The most obvious physical change will be the loss of seasonal sea ice, which will likely have profound effects on the biological communities that have adapted to and depend on the ice. In addition, the loss of ice, even if only on a seasonal basis, will have great secondary and tertiary consequences because it will open the Arctic, in particular, to new or expanded human activities, including oil and gas development, commercial shipping, commercial fishing, tourism, and coastal development. This chapter discusses some of the conservation challenges that may arise as the Arctic changes.

Chapter VII describes the Commission's research program. Annual funding for the Commission includes a small amount for research, which the Commission uses to promote marine mammal conservation. The Commission attempts to use this funding to support studies that are likely to have a large impact on future research and management. In many cases, the Commission's support serves as seed funding to encourage other agencies and organizations with greater resources to contribute to and pursue important research. The Commission also uses this funding to convene meetings and workshops on science and conservation. The Commission encourages publication and wide dissemination of the results of its research program to maximize the conservation value of new knowledge and understanding.

Chapter VIII reviews matters pertaining to marine mammal health and strandings. Animals stranded on beaches or in nearshore waters are often the focus of considerable public attention. Strandings generate concern about the well-being of individual animals, and they provide opportunities for responders and scientists to learn about the animals, the factors that caused them to strand, and the implications for their populations. Stranded animals also generate

considerable debate about their handling and future disposition (i.e., such questions as can and should they be rehabilitated, will they be fit for release or require permanent holding in captivity, should they be on display or maintained with minimal human contact). Addressing these issues is a considerable challenge with multiple factors, values, and incentives to be considered by various parties. During 2009 a total of 11 unusual mortality events were ongoing. Ten began between 2006 and 2008, although one was not recognized and declared as such until 2009, and the eleventh began in 2009. Taken together, these events raise serious questions about the influence of factors such as harmful algal blooms, disease, chemical contamination, and the introduction of anthropogenic noise on the health of the nation's coastal ecosystems.

Chapter IX describes issues arising from marine mammal interactions with fisheries. On a global basis, operational fishery interactions are still considered the most direct threat to marine mammals. Those interactions have been or are being managed more effectively in U.S. waters since the 1994 amendments to the Marine Mammal Protection Act, which created a new framework for managing marine mammal interactions. This chapter describes the National Marine Fisheries Service's efforts to assess marine mammal stocks and their interactions with fisheries; take reduction teams established to reduce such interactions; interactions between the tuna fishery in the eastern tropical Pacific and several depleted dolphin stocks; efforts to ensure that fish imported into the United States were caught using methods that meet U.S. standards for protecting marine mammals; challenges in curbing fishing effort that is illegal, unregulated, and unreported; interactions between endangered salmonids and pinnipeds that prey on them at Bonneville Dam on the Columbia River; interactions between aquaculture and pinnipeds on the U.S. West Coast; and increasing interactions between marine mammals and recreational fisheries.

Chapter X reviews research and regulatory activities pertaining to the introduction of human-generated sound in the marine environment. Attention to this issue remains focused largely on the Navy's use of sonar and the potential effects of seismic studies associated with oil and gas exploration and develop-

ment. Commercial shipping adds large amounts of noise to the marine environment but has received relatively little attention compared with other sources. Despite the ongoing controversy over the effects of sound, this is an area where research is progressing rapidly, largely because of support from the Navy and the Minerals Management Service, which are the agencies responsible for activities that introduce considerable amounts of sound into the marine environment. These and other agencies have accelerated research progress by contributing funding, infrastructure, and/or expertise. Much remains to be learned, but investigations such as behavioral response studies are providing valuable insight into marine mammal responses to noise. There is good reason to expect continued progress on this issue if such collaboration is maintained.

Chapter XI lists and briefly describes permits and authorizations issued for the take of marine mammals, either for research purposes or incidental to other activities. Appendix A lists recommendations made by the Marine Mammal Commission in 2009

and responses by the corresponding agencies. Appendix B lists 2009 reports emanating from the Commission or studies conducted with Commission funding.

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Chapter II

SPECIAL FOCUS ON MARINE MAMMALS IN THE PACIFIC ISLANDS REGIONAL ECOSYSTEM

The marine mammal fauna of the central Pacific is the least studied and poorest known of any found in U.S. waters. With the exception of the Hawaiian monk seal and the humpback whale, no marine mammal species or stock in the Pacific Islands region has been studied or monitored thoroughly. In the 10 territories under U.S. jurisdiction in the tropical Pacific south of Hawaii, the species present are poorly known with regard to their stock structure, abundance, trends, and distribution. However, where scientists have gathered some information, evidence indicates that marine mammals in the central Pacific Ocean are affected by many of the same human-related risk factors that occur in other U.S. waters. Those include incidental taking in commercial and recreational fisheries, depletion of prey resources, collisions with ships, physiological and behavioral effects from sound introduced into the ocean, harassment and disturbance by recreational activities, entanglement in marine debris, habitat alterations from climate disruption, and impairment of health or reproduction caused by contaminants, pollution, introduced diseases, and harmful algal blooms.

On 2–4 December 2009 the Marine Mammal Commission held its annual meeting in Honolulu, Hawaii, to focus attention on marine mammal conservation issues in the Pacific Islands region under U.S. jurisdiction. The Commission devoted a full day to a review of recovery efforts for Hawaiian monk seals, one of the nation's most endangered marine mammal species. The remainder of the meeting focused on a review of cetacean research and management issues, both in Hawaii and in other parts of the central and western Pacific within the U.S. Exclusive Economic Zone (EEZ).

The Geographic and Administrative Setting for the Central and Western Pacific Region

The National Marine Fisheries Service is responsible for research and management of marine mammals in U.S. waters of the central and western Pacific Ocean. To appreciate the related scientific and management challenges, it is important to understand

the setting in which they must be addressed. The Pacific Ocean and its associated seas cover nearly one-third of the earth's surface, or about 155 million km² (65 million mi²). At its widest point between Panama and the Malay Peninsula, the Pacific is 17,700 km wide (11,000 mi), stretching nearly 45 percent of the way around the earth's circumference. More than half of the Pacific lies within tropical and subtropical latitudes where the United States has jurisdiction over waters around the state of Hawaii and 10 U.S. territories. The enormous areas and distances involved, together with the lack of infrastructure and bases for logistical support, pose enormous challenges for researchers and managers alike.

The United States has a substantial and largely unappreciated stake in ocean resources of the tropical Pacific. When President Ronald Reagan signed Presidential Proclamation 5030 on 10 March 1983 proclaiming a 200-mile U.S. EEZ off the shores of all U.S. lands, he formally established U.S. sovereign rights and control over 12 million km² (4.6 million

mi²) of ocean territory covering an area 21 percent larger than the nation’s entire land area. The U.S. EEZ comprises the largest ocean area of any country in the world (Figure II-1). Nearly half of that area, or 5.83 million km² (2.25 million mi²), lies in the tropics of the central and western Pacific Ocean.

Seven of the 10 U.S. Pacific territories (Jarvis, Baker, Howland, and Wake Islands, Johnston Atoll, Palmyra Atoll, and Kingman Reef) are the isolated tops of submerged volcanoes and are either uninhabited or occupied by a small number of researchers and site managers. Each of those seven territories is no more than a few square kilometers in size sur-

rounded by vibrant coral reefs typically extending up to an additional 100 km² (Table II-1). These isolated islands are separated from their nearest neighbors by hundreds of kilometers of deep open water. The other three U.S. territories (Guam, the Northern Mariana Islands, and American Samoa) have larger, yet still very small, land areas with a combined human population totaling about 280,000 people. The westernmost U.S. territory, the Northern Mariana Islands, lies more than 13,850 km (8,600 mi) from Hawaii and 18,000 km (11,000 miles) from southern California. Although the total land area of all the U.S. Pacific territories is less than 1,295 km²

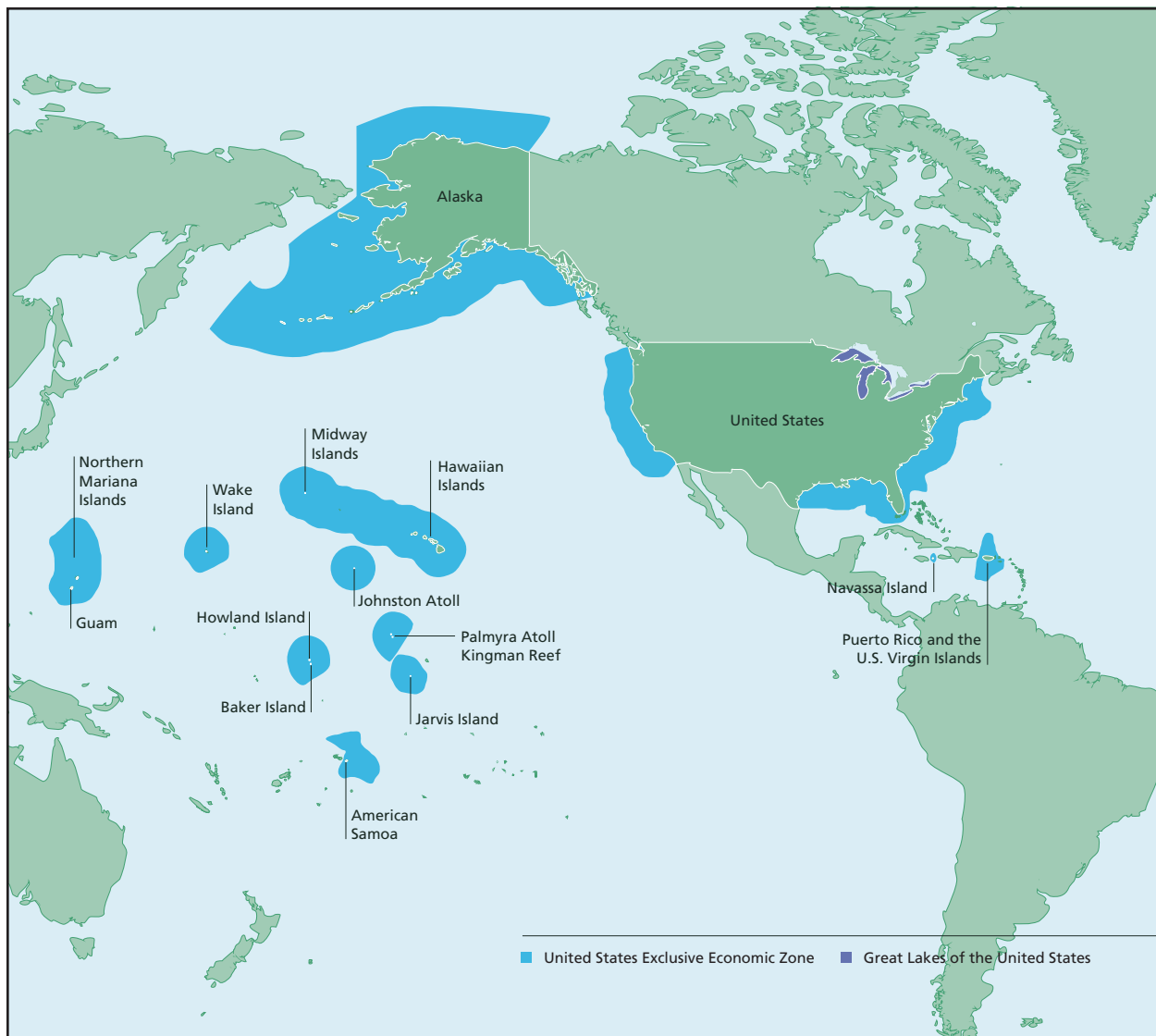


Figure II-1. The U.S. Exclusive Economic Zone. (Source: http://aquaculture.noaa.gov/pdf/20_eezmap.pdf)

(500 mi²), their combined EEZs (excluding Hawaii) cover 3.32 million km² (1.28 million mi²).

Hawaii, with a land area of 16,730 km² (6,460 mi²) and a population of about 1.4 million people, is by far the Pacific Island region's largest in terms of both population number and land area. Its EEZ of 2.5 million km² (962,000 mi²), most of which surrounds the remote Northwestern Hawaiian Islands, is by far the largest contiguous component of the Pacific Islands region EEZ. Hawaii's EEZ is only slightly smaller than that of the EEZ for all the lower 48 contiguous states (i.e., 1.84 million km² or 1.09 million mi²). Compared with a population of more than 150 million people living in coastal counties of the 48 contiguous states (Crossett et al. 2004), Hawaii's population is miniscule, which might sug-

gest a relatively low level of human pressure on EEZ resources. However, with water depths plunging to more than 2,000 m just a few kilometers offshore, productive shallow-water areas are far more limited and isolated than in mainland U.S. EEZ areas and in many ways far more vulnerable to human impacts.

Over the past four years, the United States has taken major steps to protect the waters and resources surrounding Hawaii and the U.S. Pacific territories. In 2006 President George W. Bush established the nation's first marine national monument (the Papahānaumokuākea Marine National Monument) in the remote Northwestern Hawaiian Islands. The designation unified several pre-existing marine refuges, reserves, and sanctuaries managed by the Fish and Wildlife Service, the National Marine Sanctuar-

Table II-1. The size, population, legal status, and administrative entities for U.S. territories in the central and western tropical Pacific. Under U.S. law, all but one are “unincorporated territories,” the exception being Palmyra Atoll, which is an “unorganized, incorporated territory.”

U.S. Territory	Area in Sq. Km Land (EEZ) ¹	Population	Administration
Palmyra Atoll	3.9 km ² (173,183 km ²)	—	The Nature Conservancy and Fish and Wildlife Service, Pacific Remote Islands Marine National Monument
Kingman Reef	0.1 km ² (173,183 km ²)	—	Fish and Wildlife Service, National Wildlife Refuge and Pacific Remote Islands Marine National Monument
Johnston Atoll	2.6 km ² (442,406 km ²)	—	U.S. Air Force and Fish and Wildlife Service, Pacific Remote Islands Marine National Monument
Jarvis Island	5.0 km ² (315,084 km ²)	—	Fish and Wildlife Service, National Wildlife Refuge and Pacific Remote Islands Marine National Monument
Howland Island	2.6 km ² (217,446 km ²)	—	Fish and Wildlife Service, National Wildlife Refuge and Pacific Remote Islands Marine National Monument
Baker Island	2.1 km ² (217,446 km ²)	—	Fish and Wildlife Service, National Wildlife Refuge and Pacific Remote Islands Marine National Monument
Wake Island	6.5 km ² (407,790 km ²)	—	U.S. Air Force and Fish and Wildlife Service, Pacific Remote Islands Marine National Monument
American Samoa	199 km ² (405,097 km ²)	50,000	Local government, Fish and Wildlife Service, Pacific Remote Islands Marine National Monument, and Office of Insular Affairs, Department of the Interior
Northern Mariana Islands	464 km ² (485,760 km ²)	50,000	Local government, Fish and Wildlife Service, Pacific Remote Islands Marine National Monument, and Office of Insular Affairs, Department of the Interior
Guam	544 km ² (485,760 km ²)	180,000	Local government and Office of Insular Affairs, Department of the Interior

¹ Sizes of U.S. EEZ zones provided by D. L. Vandergraf, Mapping and Boundary Branch, Leasing Division, Bureau of Ocean Energy Management, Regulation, and Enforcement, Department of the Interior.

ies Program, and the Hawaii Department of Land and Natural Resources under a joint administrative structure. When designated, the Papahānaumokuākea Monument became the world's largest marine protected area, covering 362,598 km² (140,000 nmi²). The Monument includes a swath of the U.S. EEZ 185 km (100 nmi) wide and 1,930 km (1,200 mi) long that encompasses all lands and waters within 92 km (50 nmi) of the chain of islands, atolls, and submerged seamounts extending northwest of the main Hawaiian Islands (National Oceanic and Atmospheric Administration et al. 2008). Among other things, the designation banned the extraction of seabed minerals within its boundaries and imposed strict controls on all fishing activities. As of the end of 2009 the Monument was under consideration as a UNESCO World Heritage Site.

On 6 January 2009 President Bush also established three other marine national monuments in the central and western Pacific. Those monuments include parts of the U.S. EEZ off all of the 10 U.S. Pacific Island territories except Guam. Covering a combined total of 505,000 km² (195,000 mi²), those designations also restricted both fishing activity and minerals extraction within their boundaries. The largest of the new monuments is the Marianas Trench Marine National Monument in the Northern Mariana Islands, which includes a total of more than 207,200 km² (80,000 mi²). Its borders encompass three areas in the territory's EEZ: (1) waters and coral reefs around the archipelago's three northernmost islands, (2) an area 1,740 km (940 nmi) long and 70 km (38 nmi) wide around the Marianas Trench, which at a depth of just over 11,033 m (36,200 ft)—a mile deeper than Mt. Everest is high—is the deepest spot in the world's oceans, and (3) an area containing at least 21 hydrothermal submarine volcanoes.

The second new monument is the Pacific Remote Islands Marine National Monument. Containing a total of nearly 225,238 km² (87,000 mi²), it includes all waters within 92 km (50 nmi) of shore around Johnston Atoll, Palmyra Atoll, Kingman Reef, and the islands of Wake, Howland, Baker, and Jarvis. The third is the Rose Atoll Marine National Monument. Covering nearly 34,840 km² (13,500 mi²), it extends 92 km (50 nmi) around an isolated reef atop a submerged volcanic peak in American Samoa.

With the U.S. EEZ claim come both the authority and the responsibility to manage the associated living marine resources in this vast area. With actions over the past four years to designate these marine national monuments, a substantial portion of the Pacific Islands U.S. EEZ has been placed under management authorities charged with mandates that emphasize conservation. Together, the four monuments designated during the past four years total nearly 2.3 million km² (867,645 mi²), or more than 20 percent of the entire U.S. EEZ and nearly 40 percent of the U.S. Pacific Islands EEZ.

Management of resources and activities elsewhere in the U.S. EEZ in the Pacific Islands region is carried out by various federal agencies with differing missions. The Fish and Wildlife Service in the Department of the Interior and the National Oceanic and Atmospheric Administration in the Department of Commerce assume primary management authority for the new monuments, but other departments share in those responsibilities by virtue of the potential effects of their activities on marine mammals and marine ecosystems (e.g., Defense, Homeland Security, and Transportation). Within the National Oceanic and Atmospheric Administration, the National Marine Fisheries Service exercises lead management authority over both fisheries resources and protected species, including marine mammals and sea turtles. To manage fisheries, the Service also relies on advice from the Western Pacific Regional Fisheries Management Council. The National Ocean Service, and particularly its Office of Marine Sanctuaries, also shares management responsibilities for some of the new national marine monuments and several marine sanctuaries.

Within the Department of the Interior, the Fish and Wildlife Service manages or co-manages numerous national wildlife refuges that include nearshore ocean areas outside marine national monument boundaries as well as most of the new monuments. The Department's U.S. Geological Survey conducts and supports biological research and also operates the National Wildlife Health Center, which provides leadership in investigating wildlife and ecosystem health issues, including those affecting marine areas and wildlife. The Minerals Management Service manages activities relating to the exploitation of oil,

gas, hard minerals, and energy sources, such as wind and wave power. In the Department of Homeland Security, the U.S. Coast Guard is responsible for enforcing most of the U.S. laws and regulations concerning activities off the nation's coasts including those for protecting marine mammals and managing fisheries. Finally, the U.S. Navy in the Department of Defense supports a substantial amount of marine mammal research to provide information needed to ensure that its operations and exercises do not pose threats to marine mammals. Representatives of most of these agencies participated in the Commission's 2009 annual meeting.

Physical and Biological Features of the North Pacific Ecosystem

Despite its seemingly vast unbroken expanse, the Pacific Ocean, like other oceans, is a complex, dynamic system of diverse ecological habitats. Among other things, those habitats vary as a function of physical factors such as currents, winds and storms, light conditions, temperatures, salinity, and water density. Those factors vary seasonally, annually, and over decadal or longer temporal scales. Together they

establish the conditions that, in large measure, determine biological diversity on spatial scales ranging from small local habitats to the entire ocean basin. That is, in one way or another, the distribution and abundance of all marine life, from the smallest planktonic organisms to the largest whales, are influenced by such physical factors and their variation.

Wind-driven surface currents are among the important forces establishing the boundaries of ocean habitats and affecting the distribution and movement of marine life. At their most basic and largest scale, the Pacific Ocean's surface currents form two major gyres: one circulating clockwise around the North Pacific Ocean basin and the other counterclockwise around the South Pacific basin (Figure II-2). Equatorial surface currents in both hemispheres flow westward from America toward southeastern Asia, transporting waters warmed by the tropical sun. Periodically, that transfer of heat slows or even reverses—a phenomenon known as El Niño—raising temperatures along the Pacific coasts of the Americas and the eastern tropical Pacific with consequences for global weather and oceanographic patterns. The opposite phenomenon, where the transfer of heat to the western tropical Pacific is greater than normal,

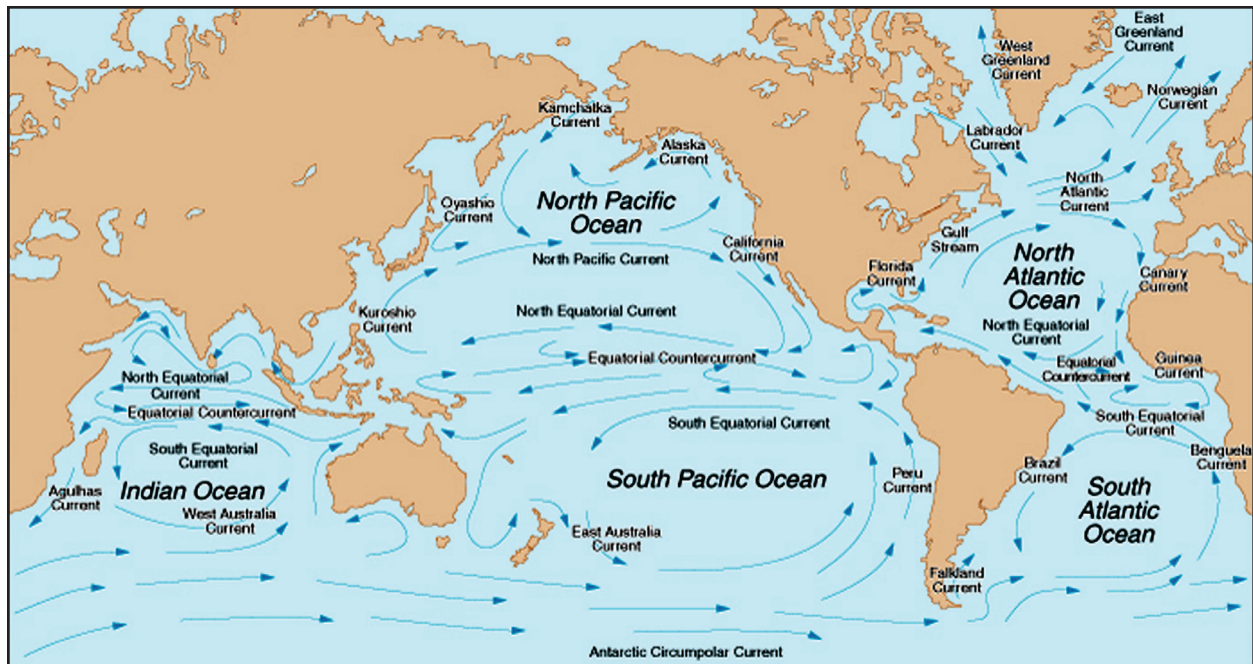


Figure II-2. Surface ocean current patterns in the world's oceans. (Source: <http://oceanmotion.org/html/background/wind-driven-surface.htm>)

is referred to as La Niña, and it too affects global weather and oceanographic patterns.

In coastal areas where transoceanic currents encounter continental margins, local or regional current gyres also may form. For example, when water flowing easterly across the northern North Pacific reaches the continental shelf of northwestern North America, some water deflects northward forming the Alaska Current, and the rest bends southward forming the California Current. The Alaska Current in turn flows north and west, paralleling the southern Alaska coast and forming part of a regional current gyre circulating counterclockwise around the Gulf of Alaska.

In the open ocean, variable currents, shifting wind patterns, and storms periodically cause major currents to loop back upon themselves and become pinched off, forming eddies sometimes hundreds of kilometers in diameter (Olsen 1991). Once formed, these spinning rings of water often veer away from the main current and can maintain their form for days or weeks, following paths that are difficult to predict. The waters entrapped in these eddies may differ significantly from surrounding waters in their physical (e.g., temperature, salinity, nutrient content) and biological (e.g., plankton) properties, thereby creating sharp discontinuities or fronts that tend to concentrate marine life and become temporary foraging areas for apex predators.

The cores of major ocean gyres may extend from tropical to temperate latitudes and are characterized by relatively weak surface currents. Exposed to strong sunlight, their surface waters warm and form pronounced thermoclines that impede exchange or mixing with the colder, more nutrient-rich water found at depth. With a limited supply of nutrients (a condition referred to as oligotrophy), the surface waters support relatively little growth of and production by the planktonic organisms at the base of the marine food web. As a result, surface waters at the center of major ocean gyres are among the least productive waters anywhere in the world's oceans, and they are often referred to as biological deserts. These waters also tend to collect debris (e.g., the Pacific garbage patch) that poses various risks to marine life. These oligotrophic zones expand in summer when solar radiation causes surface temperatures to rise,

strengthening the thermocline, and then shrink in winter when surface waters cool.

Recent studies reveal that oligotrophic zones at the core of ocean current gyres have been expanding at an alarming pace (McClain et al. 2004). This trend is likely a consequence of climate disruption, which is increasing ocean surface temperatures in the tropics and producing more pronounced and deeper thermoclines, and thereby further impeding productivity. Because the primary producers (i.e., phytoplankton) form the base of marine food webs, this could have profound effects on all marine life in these open-ocean ecosystems.

A recent study described the rate of change occurring in the oceans' major gyres (Polovina et al. 2008). That study used satellite-based measures of chlorophyll at the ocean's surface to track ocean productivity since 1998. Chlorophyll is a plant pigment necessary to convert sunlight into chemical energy, and amounts of chlorophyll provide a measure of the amounts of phytoplankton present. Results of the study revealed that the size of these oligotrophic zones in all the world's oceans increased at an average rate of between 0.8 and 4.3 percent per year between 1998 and 2006. The rate of increase for the zone in the South Pacific (245,766 km²; 94,890 mi²) was 1.36 percent per year, and the zone in the North Pacific (353,519 km²; 136,494 mi²) increased at an average rate of 2.18 percent per year. Together, the two Pacific zones, by far the world's largest, increased their expanse by an area nearly equal to the size of Texas each year. Over the nine-year period, the combined size of oligotrophic zones in all of the world's oceans increased by 15 percent or 6.6 million km² (2.55 million mi²)—an area larger than the total land area of the United States (Figure II-3). If this trend continues, the eroding base of open-ocean food chains could have a significant effect on the abundance of pelagic ocean species, including seabirds, turtles, and marine mammals and important fishery resources such as tunas and swordfish.

Marine Mammal Populations in the Pacific Islands Region

Information on the status of marine mammal species and stocks in the Pacific Islands region is the poorest

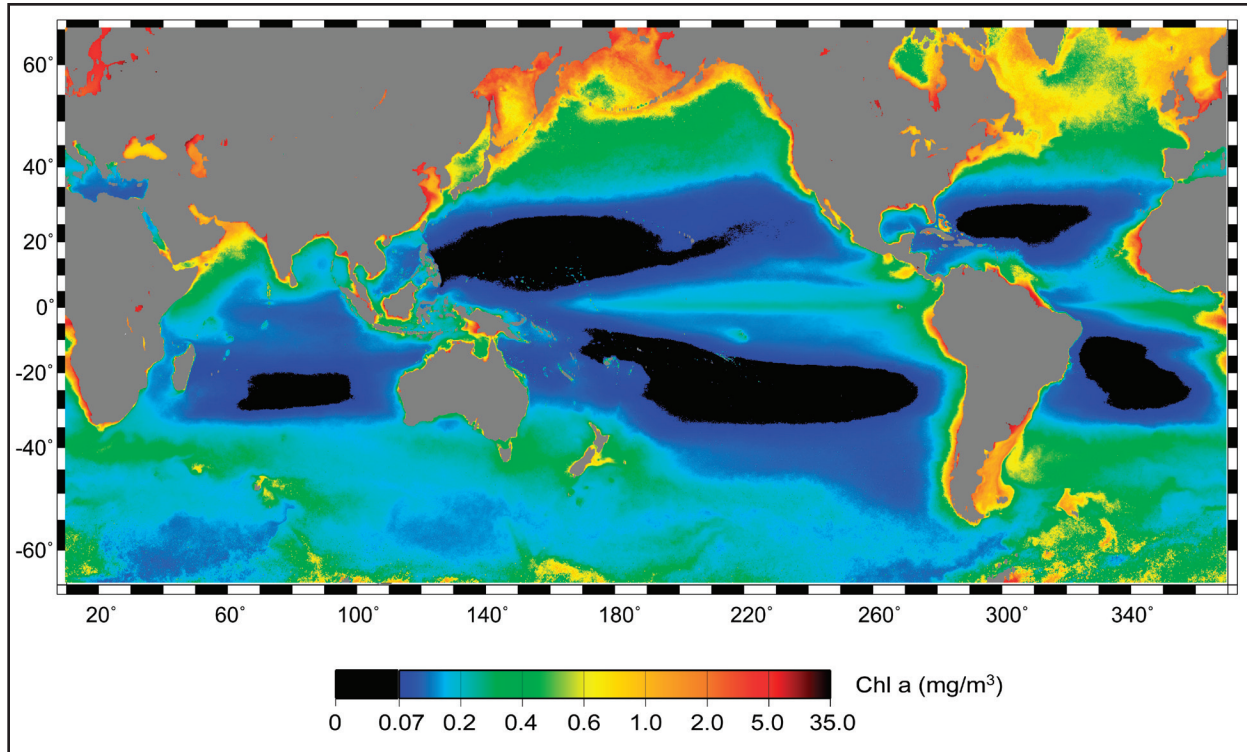


Figure II-3. Surface chlorophyll levels in the world's oceans from a satellite image showing the extent of low productive (oligotrophic) zones (black) in the tropical oceans in 2003. (Figure courtesy of Jeffrey J. Polovina, National Marine Fisheries Service)

of any region in U.S. waters. To provide a basis for managing interactions between marine mammals and commercial fisheries, 1994 amendments to the Marine Mammal Protection Act directed the National Marine Fisheries Service to prepare stock assessment reports for each stock of marine mammals in U.S. waters. The Marine Mammal Protection Act provides much of the statutory framework for managing marine mammal stocks, and section 117 of the Act sets forth assessment procedures that are central to that framework. Marine mammal stock assessment reports are the primary means for documenting the status of marine mammal stocks, and for each stock they should provide a clear description of its distribution, abundance, trend, productivity, potential biological removal level, take by fisheries and other human activities, and status. This information, which is to be reviewed and updated every one to three years, provides the basis for managing marine mammals so that each stock can recover to or remain within its optimum sustainable population range.

Although substantial progress has been made to identify and assess marine mammal stocks in other U.S. waters, progress in the central and western Pacific has lagged far behind. The National Marine Fisheries Service recognizes 24 stocks in the Pacific Islands region (one of those being referred to as a stock complex). However, the region almost certainly supports many more stocks that have yet to be identified. Other than one pinniped, the Hawaiian monk seal, and perhaps one sirenian, the dugong (Eldredge 2003), all of the known stocks are cetaceans. Those stocks listed for the Pacific Islands region in the 2009 compilation of stock assessment reports are shown in Table II-2. The central North Pacific stock of humpback whales, which breeds and calves in Hawaii in winter months and is the best-studied cetacean population in Hawaiian waters, is not included on this table because it spends most of the year feeding off Alaska and is listed as an Alaska stock. Currently, it numbers at least 5,833 whales. It is thought to be increasing at a rate of 5.5 to 6.0 percent per year and

Table II-2. Status of identified marine mammal stocks in the Pacific Islands Region (Carretta et al. 2010). The coefficient of variation is an estimate of precision for the abundance estimate. The National Marine Fisheries Service’s standard is that it be less than or equal to 0.3. That standard is met only for the sperm whale stock

Species	Estimated Abundance	Coefficient of Variation for Estimated Abundance	Population Trend	Potential Biological Removal Level	Number Known or Estimated To Be Killed or Seriously Injured Per Year
HAWAIIAN STOCKS					
Hawaiian Monk Seal	1,146	Undetermined	Decreasing	Undetermined	Unknown
Rough-toothed Dolphin	19,904	0.52	Unknown	132	Unknown
Risso’s Dolphin	2,351	0.65	Unknown	14	Unknown
Bottlenose Dolphin	3,263	0.60	Unknown	20	>0.2
Pantropical Spotted Dolphin	10,260	0.41	Unknown	74	>0.8
Spinner Dolphin	2,805	0.66	Unknown	17	0
Striped Dolphin	10,385	0.48	Unknown	71	Unknown
Fraser’s Dolphin	16,836	1.11	Unknown	79	Unknown
Melon-headed Whale	2,947	1.11	Unknown	14	Unknown
Pygmy Killer Whale	817	1.12	Unknown	3.8	Unknown
False Killer Whale – Pelagic	484	0.93	Unknown	2.5	7.4
False Killer Whale – Insular	123	0.72	Unknown	0.8	0
Killer Whale	430	0.72	Unknown	2.5	Unknown
Short-finned Pilot Whale	8,846	0.49	Unknown	60	0.8
Blainville’s Beaked Whale	2,138	0.77	Unknown	9.6	0.8
Cuvier’s Beaked Whale	12,728	0.83	Unknown	69	Unknown
Longman’s Beaked Whale	766	1.05	Unknown	3.7	Unknown
Pygmy Sperm Whale	7,251	0.77	Unknown	41	Unknown
Dwarf Sperm Whale	19,172	0.66	Unknown	116	Unknown
Sperm Whale	7,082	0.30	Unknown	11	0
Blue Whale	Unknown	Undetermined	Unknown	Unknown	Unknown
Fin Whale	174	0.72	Unknown	0.2	Unknown
Bryde’s Whale	493	0.34	Unknown	3.7	Unknown
Sei Whale	77	1.06	Unknown	0.1	Unknown
Minke Whale	Unknown	Undetermined	Unknown	Undetermined	Unknown
PALMYRA ATOLL STOCKS					
False Killer Whale -- Palmyra	1,329	0.65	Unknown	6.4	0.3
AMERICAN SAMOA STOCKS					
Humpback Whale	Unknown	Undetermined	Unknown	0.04	0
OTHER PACIFIC TERRITORY STOCKS (Johnston Atoll, Kingman Reef, Jarvis Island, Baker Island, Howland Island, Wake Island, Guam, and Northern Mariana Islands)					
None Identified					

to be well on the road to recovery (Allen and Angliss 2010).

Within the U.S. EEZ, scientists can estimate with confidence the abundance of only two cetacean stocks outside Hawaiian waters, a humpback whale stock off American Samoa and a false killer whale stock in the waters around Palmyra Atoll. Information on the status of cetacean stocks in Hawaiian waters is based largely on a single 2002 survey. As a result, the trends of those stocks are generally unknown. During the Commission's 2009 annual meeting, representatives from the National Marine Fisheries Service indicated that the agency was planning a second marine mammal survey within the Hawaiian EEZ but that funding for studies within the EEZs of Pacific island territories has been and presumably will continue to be very limited. They noted that any future surveys likely would be undertaken opportunistically by placing observers aboard vessels of other agencies operating in those areas and by deploying hydrophones that might at least identify the species present. The virtual absence of any data on the many stocks that occur outside Hawaiian waters but still within the designated U.S. EEZ reveals a major gap in the Service's marine mammal stock assessment efforts. In essence, the Service has not yet identified even the basic units of management and conservation for the majority of cetacean stocks in this region and under its purview.

The 2002 survey mentioned earlier was officially entitled the Hawaiian Islands Cetacean and Ecosystem Assessment (HICEAS). Scientists from the National Marine Fisheries Service's Southwest Fisheries Science Center surveyed the Hawaiian EEZ over the course of 180 days and used the collected information to develop abundance estimates for 19 cetacean species. In 2005 scientists with the Pacific Islands Cetacean and Ecosystem Assessment (PICEAS) spent 120 days surveying the EEZ around Palmyra and Johnston Atolls and the high seas south of Hawaii where longline fishing occurs. The goals of that cruise were to estimate the abundance of cetacean species present in the study area and to collect pictures for photo-identification and biopsy samples for genetic analyses to evaluate population structure. Scientists also conducted an opportunistic survey from a ship transiting from American Samoa to

Hawaii, including a stop at Johnston Atoll. The 2009 survey of the main Hawaiian Islands gathered abundance data for 12 insular species. Planned surveys for 2010 include a second HICEAS cruise within the Hawaiian EEZ from August to early December. As they are able, scientists also will conduct opportunistic surveys from research vessels transiting between Guam and Hawaii and as part of other oceanographic surveys in the vicinity of Guam and the Northern Mariana Islands. The opportunistic use of surveys makes sense, given the vast areas that must be covered and the costs of ship time for research cruises. Still, it is likely that large portions of the central and western Pacific will not be surveyed adequately, if at all, and the resulting lack of information precludes a meaningful management approach for marine mammals specifically and marine ecosystems generally.

Given the obstacles to marine mammal stock assessment in this region, the Pacific Islands Fisheries Science Center's Cetacean Research Program is exploring the use of long-term passive acoustic monitoring devices at remote or hard to reach locations. Such monitoring can provide measures of seasonal occurrence, behavior, and movements of vocal cetaceans, including otherwise elusive beaked whales and other odontocetes. In 2005 the Cetacean Research Program, in collaboration with the Scripps Institution of Oceanography, deployed high-frequency acoustic recording packages (HARPs) at the Cross Seamount southwest of the Hawaiian archipelago but within the EEZ, and at the Ladd Seamount in the northwestern Hawaiian Islands. They also have deployed HARPs off the islands of Hawaii (the "Big Island") and Kauai in the main Hawaiian Islands, Pearl and Hermes Reef in the Northwestern Hawaiian Islands, and Palmyra Atoll. They plan to expand HARP coverage in 2010 to Wake Island, the Northern Mariana Islands, Guam, Maui, and Jaggar Seamount, 97 km (60 mi) west of Hawaii. Such acoustic techniques are complicated by certain limitations but are being implemented throughout the world's oceans as a developing assessment tool.

Small boat surveys also can be used to further assessment efforts in the nearshore waters of the Pacific islands and atolls. Scientists from the Pacific Islands Fisheries Science Center conducted such

surveys in 2006 and 2007 around Tutuila, American Samoa, and they are planning similar surveys in 2010 at Wake, Guam, the Northern Mariana Islands, Hawaii, and Saipan. They also are investigating the use of unmanned marine gliders for acoustic monitoring and are analyzing data from towed arrays used around the Pacific.

Since 2003 the Pacific Islands Fisheries Science Center has directed \$200,000 to \$300,000 annually toward development of the Pacific Islands Cetacean Research Program. Given the extensive area, potential number of stocks, lack of infrastructure and research and management capacity, and inherent difficulty in studying cetaceans (including some that are quite elusive), such amounts are woefully inadequate to meet even the most basic research and management needs. Instead, meeting those responsibilities will require a frank appraisal of necessary research and management activities and a commitment by Administration leaders to build the needed programs with required personnel, infrastructure, and fiscal resources.

A number of other agencies can assist the Service in assuming these responsibilities. Other agencies conducting marine activities in the central and western Pacific (e.g., Navy, Office of National Marine Sanctuaries, Fish and Wildlife Service, Coast Guard) also have responsibilities to help insofar as their activities may pose risks to marine mammals or marine ecosystems in those areas. Furthermore, many of the stocks involved likely cross boundaries into the waters of other countries or into international waters, and the Service can solicit the cooperation of its counterparts in those other countries or in multinational regional organizations. That being said, it is clear that the Service's Pacific Islands Fisheries Science Center and Pacific Islands Regional Office must expand their capacity if the Service is to meet its research, conservation, and management responsibilities for cetaceans in U.S. waters.

The longstanding lack of attention to Pacific cetaceans appears to be based in part on (1) the lack of funding to support research and management, (2) limited on-site resources and infrastructure to study and manage cetaceans over such vast areas, and (3) a focus on Hawaii-based species. There is some validity to each of those explanations. However, at

its 2009 meeting, the Commission concluded that status quo was not sufficient to fulfill the Service's statutory obligations for science-based management of living marine resources.

At the end of 2009 the Commission therefore planned to write to the National Marine Fisheries Service early in 2010 to recommend that it increase its capacity to identify and study cetacean stocks throughout U.S. waters in the Pacific region. In this regard, the Service should (1) review its responsibilities for cetacean research and management throughout the Pacific region, (2) develop a strategic plan and budget for addressing those responsibilities, (3) identify strategies to strengthen cooperative partnerships with other agencies and groups that work in the Pacific region and that can complement and facilitate the Service's cetacean research and management objectives, and (4) initiate and expand international partnerships to coordinate U.S. research and management efforts with those of other countries.

Central Pacific Fisheries

From a management and conservation perspective, the utility of stock assessment information is that it provides a basis for determining if human activities, such as large-scale fishing, are having unacceptable effects on those stocks. On a global basis, fishery bycatch is the largest operational threat to marine mammals, and it likely is so for Pacific cetaceans. Fleets of high-seas purse seiners and longliners catch 2.7 million metric tons of tuna each year in the Pacific Ocean. Most of that is taken by fleets from Japan, Taiwan, Korea, and the nations of Central and South America, but purse-seine and longline fleets from Papua New Guinea and other Pacific island countries are increasing in importance in the high-seas fishery. The United States accounts for about 5 percent of the catch. The U.S. purse seine fishery takes about 90,000 metric tons of tuna and is the largest U.S. pelagic fishery. U.S. trollers, based at West Coast ports, land about 12,000 to 14,000 metric tons of albacore tuna. The longline fishery based in Hawaii is the largest in the U.S. EEZ in the central and western Pacific and targets bigeye, yellowfin, and albacore tuna as well as swordfish, mahi mahi, and other species. It accounts for the majority of Hawaii's com-

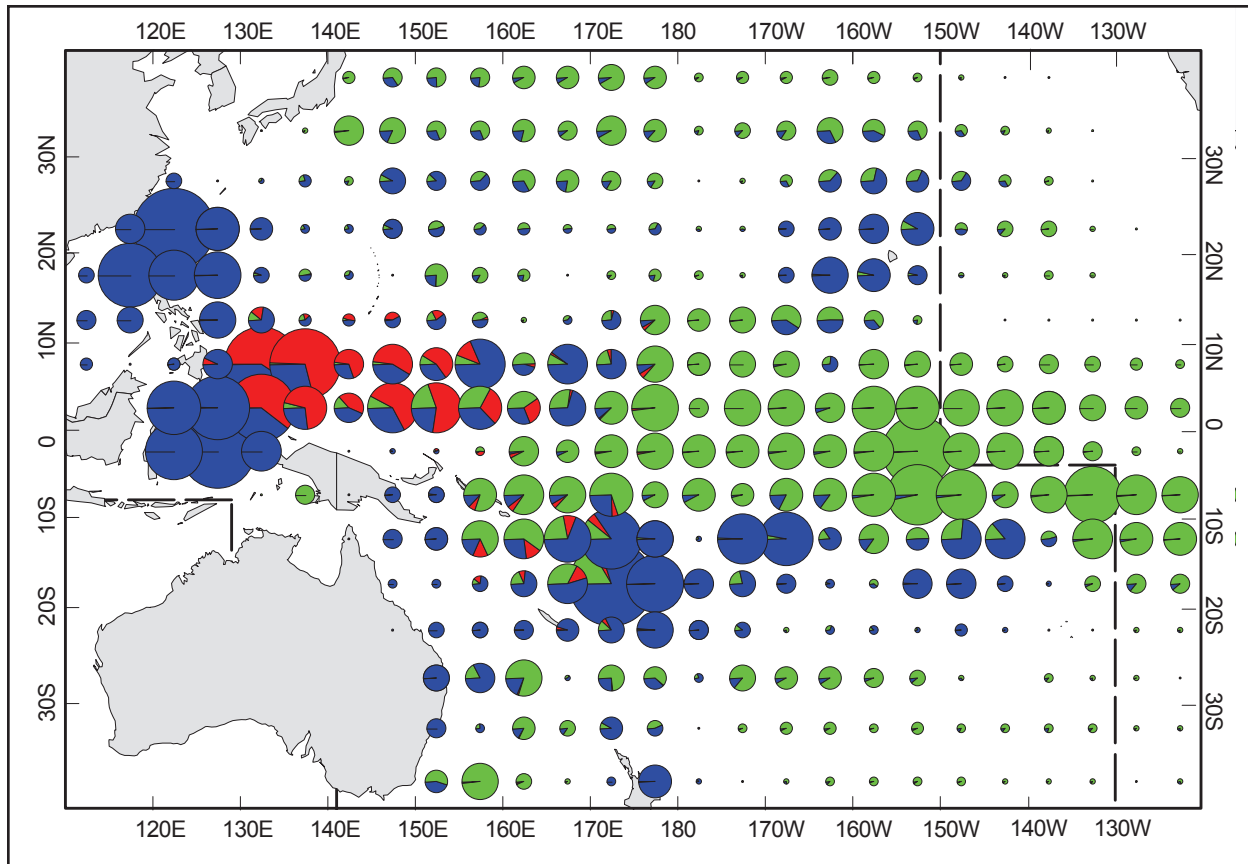


Figure II-4. Distribution of longline effort for distant-water fleets capable of fishing throughout the ocean basin (green), foreign offshore fleets (red), and domestic fleets (blue) for the period 2000–2007. (Source: Williams and Terawasi 2010)

mercial pelagic landings (Western Pacific Regional Fishery Management Council 2010).

The amount and distribution of longline fishing effort in the central and western Pacific (Figure II-4) suggest a considerable potential for interactions between longline fisheries and cetaceans, which may worsen over time if cetaceans increase their depredation of longline bait and catch (see Donoghue et al. 2003). As detailed later in this chapter, such interactions are known to pose significant threats to certain false killer whale stocks in waters around the Hawaiian archipelago where fishing effort is relatively low compared with many other Pacific areas. In addition, many of the marine mammal stocks that occur in the U.S. EEZ also move into international waters or the waters of other nations where they are at risk of being taken in fisheries.

Provisions of the Marine Mammal Protection Act are intended to ensure that the opportunity to

fish these vast areas is accompanied by the management oversight necessary to ensure that they are fished responsibly. As noted earlier, marine mammal stock assessment reports should provide a clear description of each stock's distribution, abundance, trend, productivity, potential biological removal level, take by fisheries and other human activities, and status. That information provides the basis for managing marine mammals so that each stock can recover to or remain within its optimum sustainable population level.

The lack of information needed to assess cetacean stocks and their interactions with fisheries reveals that, to date, the necessary domestic and international oversight of these fisheries in the central and western Pacific has been inadequate. Large-scale fisheries are being pursued in the ranges of marine mammal stocks in the central and western Pacific, but managers have little knowledge of the

extent of interactions with marine mammals and cannot describe what effects they are having. The historic, devastating bycatch of the northeastern offshore spotted dolphin (*Stenella attenuata*) and the eastern spinner dolphin (*Stenella longirostris*) in the U.S. tuna fishery in the eastern tropical Pacific Ocean provides a clear lesson on how a large-scale purse seine fishery can have a major impact on marine mammals. These entrapments resulted in dolphin mortality in the hundreds of thousands per year in the 1960s and 1970s and led to the sharp reduction of several stocks (Wade 1995). Sufficient information exists to confirm that cetaceans also are interacting with longline fisheries, but managers have no basis for characterizing the effects or taking the necessary steps to address them.

Importantly, this lack of information compromises the U.S. position when seeking to improve conservation and management efforts by other countries. Both the Marine Mammal Protection Act (section 101(a)(2)) and the Magnuson-Stevens Fishery Conservation and Management Act set standards for U.S. fisheries and require similar standards for foreign fleets that sell their products in the United States. Congress recently emphasized the importance of those standards in the 2007 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act, and in March 2008 the Center for Biological Diversity and Turtle Island Restoration Network petitioned the Departments of Homeland Security, the Treasury, and Commerce to uphold standards intended to protect marine mammal stocks by preventing importation of swordfish from countries failing to meet those standards. If U.S. fisheries are not held to those standards, then U.S. efforts to impose them on other nations will surely be undermined.

At the end of 2009 the National Marine Fisheries Service's Office of Protected Resources and Office of International Affairs were developing plans to increase substantially their efforts to track fisheries in international and foreign national waters of the central and western Pacific, assess bycatch in those fisheries, and cooperate with foreign nations and regional fishery management organizations to reduce bycatch to safe levels. Doing so will be a complex and arduous task, but it is essential if the Service is to fulfill the purpose of section 101(a)(2) of the

Marine Mammal Protection Act, which established the goal to reduce the incidental kill and serious injury of marine mammals in commercial fisheries to insignificant levels. The Marine Mammal Commission strongly supports the National Marine Fisheries Service in its efforts to meet this goal.

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

The Hawaiian monk seal is the most endangered species of seal in U.S. waters and one of the most endangered seals worldwide. Its abundance has declined by approximately two-thirds since the 1950s when the first counts were made, and the species now numbers fewer than 1,100 animals. Nonetheless, the Hawaiian monk seal offers the best chance for the long-term survival of the genus *Monachus* because its only congeners are the Caribbean monk seal (*M. tropicalis*), which was last seen in the 1950s and was recently declared extinct, and the Mediterranean monk seal (*M. monachus*), which numbers only 400 to 500 seals. In view of the Hawaiian monk seal's critical status, the Commission paid particular attention to its recovery in 2009 and devoted a full day of its annual meeting to a review of its recovery needs.

Hawaiian monk seals occur only in the Hawaiian Archipelago (Figure II-5). Ninety percent of the population lives in the remote Northwestern Hawaiian Islands (NWHI) where most of the seals haul out and pup in relatively discrete colonies on six of the chain's major islands or atolls. In 2009 the total number of seals at those sites fell to 855, and the current rate of decline is 4.5 percent per year. Over the past two decades, however, Hawaiian monk seals have begun to reoccupy the main Hawaiian Islands where their numbers are increasing. The number of recorded births in the main Hawaiian Islands has increased from one or two a year in the early 1990s to a high of 21 in 2009. The total number of seals in the main Hawaiian Islands is now estimated to be about 150. Given trends in the NWHI, a continued increase in this portion of their range is therefore considered essential for the species' persistence and recovery.

Over the past two centuries, human activities in the NWHI have had severe effects on the Hawaiian

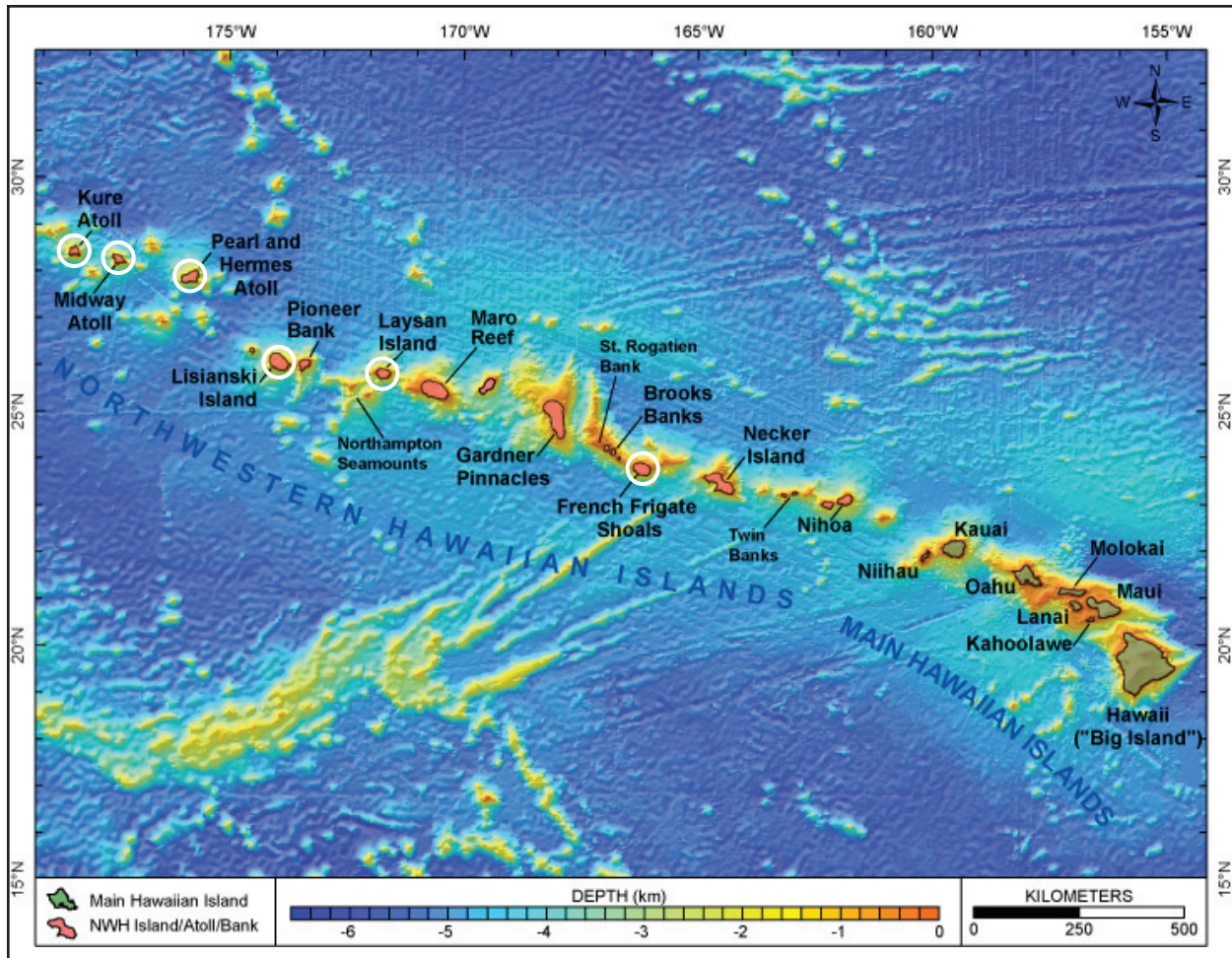


Figure II-5. The Hawaiian Archipelago: Hawaiian monk seal major breeding colonies are circled. (Source: Pacific Islands Benthic Habitat Mapping Center)

monk seal population, both from the killing of seals and the destruction of their haul-out habitat. Management measures since the early 1980s have brought sources of human disturbance in the NWHI under control, but other threats have contributed to the population's decline, including starvation resulting from reductions in food supply caused by past commercial fishing, natural climate variation, and climate disruption; entanglement in marine debris; predation by sharks; aggressive behavior by adult male seals toward pups, juveniles, and adult females; naturally occurring biotoxins; and loss of pupping beaches due to rising sea level. These threats have principally affected monk seal pups and juveniles, preventing them from reaching breeding age. As older reproductive animals die and fewer young animals reach maturity and replace them, pup production and pop-

ulation size in the NWHI are expected to continue to decline in the near future.

The National Marine Fisheries Service has lead responsibility for Hawaiian monk seal recovery. In 2007 the Service adopted a revised Hawaiian Monk Seal Recovery Plan to guide and strengthen recovery efforts. The plan relies heavily on cooperative efforts by state, federal, and local agencies, particularly the Hawaii Department of Land and Natural Resources, the Fish and Wildlife Service, the National Marine Sanctuaries Program, and the U.S. Coast Guard, as well as lifeguards, environmental groups such as the Hawaii Wildlife Fund, the Marine Mammal Center, and volunteer networks of local residents who help monitor and protect seals on public beaches.

The Hawaiian monk seal recovery program has been chronically underfunded. From 2002 to 2007

the recovery program budget was in the range of \$2.1 to \$2.3 million a year. When the revised recovery plan was adopted, it noted that the monk seal decline had reached a crisis stage, and it projected annual funding needs at about \$7.2 million a year over a five-year planning period. Despite this assessment, the 2008 funding level declined to less than \$2 million, which necessarily reduced the Service's monitoring and management efforts in the NWHI. In 2009 Congress recognized the species' plight and directed the Service to provide \$5.6 million toward its recovery.

At its annual meeting in Hawaii in December, the Commission focused its review of monk seals on recovery efforts by the Service and its key partners, the Hawaii Department of Land and Natural Resources, the Fish and Wildlife Service, the National Ocean Service, the Coast Guard, and the National Park Service. The Commission examined activities and plans for both the NWHI and main Hawaiian Islands. At the end of 2009 it was preparing letters of recommendation to the involved agencies regarding future recovery needs for the species.

Absent congressional action on FY 2009 appropriations measures, agency funding was held at the 2008 level through the first half of 2009. When funding became available, the Service was able to modify complex logistics arrangements for field teams and address a number of priority management needs. Nonetheless, in its review at its December meeting, the Commission noted that funding in 2009 remained below projected needs identified in the recovery plan and determined that essential recovery work in future years would require a higher level of support. At the end of 2009 the Commission expected to recommend that the Service increase funding for monk seal recovery to \$7.2 million a year as set forth in the adopted recovery plan until such time as the plan and projected funding needs are reevaluated and updated. Preliminary findings from the Commission's 2–4 December review follow.

Hawaiian Monk Seals in the Northwestern Hawaiian Islands

During its review, the Commission focused on efforts to monitor the status and trends of the NWHI breeding colonies, increase juvenile survival, reduce

shark predation on pups at French Frigate Shoals, and mitigate the impact of marine debris. All of the monk seal breeding atolls and most at-sea foraging habitat in the NWHI lie within the Papahānaumokuākea Marine National Monument designated by President Bush in 2006.

Co-management responsibilities for the Monument are assigned to three entities: (1) the Fish and Wildlife Service, which owns and manages most of the islands and certain nearshore waters in two National Wildlife Refuges, (2) the Hawaii Department of Land and Natural Resources, which owns and manages Kure Atoll and most nearshore areas out to a distance of three miles around the islands, and (3) the Office of National Marine Sanctuaries in the National Ocean Service, which manages federal waters from the state's seaward boundary out to about 50 nautical miles in the NWHI Coral Reef Ecosystem Reserve. Although the designation of the Monument provides an overarching management framework, pre-existing authorities and designations for refuges, reserves, and sanctuaries administered by the three co-management agencies remain in effect. As a result, those agencies are vital partners for monk seal recovery work in the NWHI.

Monitoring and Field Camps: Seasonal field camps at the major breeding colonies in the NWHI are essential for monitoring trends in abundance, pupping, and survival and for conducting management activities such as removing hazardous debris, disentangling seals, and preventing deaths of pups from attacks by sharks and aggressive adult male seals. Because of reduced funding in 2008, both the number of people and length of time spent at NWHI breeding sites were reduced, which limited both data collection and opportunities to address sources of mortality.

The Service used the additional funding available in 2009 to restore and expand field studies, including (1) a long-delayed effort to establish a year-round field camp at one atoll to initiate a deworming trial to reduce the effects of parasitism on the seals and to assess conservation threats during previously unstudied winter months, and (2) increased studies at Nihoa Island. During the Commission's review, Service staff advised that, if funding is available, fieldwork in the NWHI would continue at the 2009

level in 2010. The added field coverage in the NWHI in 2009 was well placed, and at the end of the year, the Commission was planning to recommend that the Service maintain field camps at the 2009 level for the foreseeable future.

In the past, the Service has been unable to direct funding toward evaluation of the monk seals at Nihoa Island. The island is known for its jagged, rocky terrain and sensitive cultural and biological resources. Its monk seal colony is small and appears to be constrained by limited haul-out space. However the site may be important for monk seal recovery because it is surrounded by a large bank that appears to offer ample foraging opportunity. For that reason, it has been identified as a possible site for relocating juvenile seals from French Frigate Shoals where they are likely to starve to death or be killed by sharks. To better assess the status of monk seals at Nihoa and the several seals that were moved there in 2008 (see subsequent discussion), a portion of the 2009 funding increase was used to support a ship-based assessment of seals at the site. Based on its review, the Commission concluded that the Service should support additional ship-based monitoring at this site and consider installing remotely operated cameras to record seal haul-out patterns on the island's one small beach.

Increasing Juvenile Survival: In the late 1980s the survival of seals less than three years old began to decrease, particularly at French Frigate Shoals, which supported more than half of the entire monk seal population at that time. Since then, survival rates of young seals have varied but generally have been lower than expected at all NWHI breeding sites. Although a variety of factors affect juvenile survival, including shark predation and entanglement in marine debris, an increase in the number of underweight and starving pups with no evidence of disease indicated that a decrease in prey availability was a significant factor in the reduced juvenile survival at French Frigate Shoals. Similar observations at other sites also suggested that prey availability had declined throughout much of the NWHI.

The reasons for reduced prey availability are unclear but may include a combination of natural environmental cycles, climate disruption, decreased productivity in the central Pacific Ocean, residual

effects of past commercial fishing and pollution. The National Marine Fisheries Service has used several strategies to mitigate the effects of nutritional stress, including transporting young seals to Oahu for six to eight months to improve their physical condition and then releasing them at sites where the environment was considered to be more favorable, and moving seals directly from one breeding site to another, either with or without a period of captive support at the new site. In 2009 the Service initiated trials to reduce intestinal parasites that may interfere with absorption of nutrients and moved a number of young seals to Nihoa Island to see if they would fare better in an area where prey is likely to be more abundant.

Deworming Trials: Parasites in the digestive tract of seals compete for nutrients from ingested food that otherwise would be available to the seals. Loss of nutrition could become a significant factor in the health and survival of seals when prey availability is limited. Veterinarians regularly use drugs to reduce or eliminate parasitic worms in many animals, and in 2009 the Service began a multi-year deworming trial on a sample of juvenile seals at Laysan Island to test the efficacy of drug treatments. The Commission supported the study and, at the end of the year, expected to recommend that the Service complete the study as soon as possible to determine whether deworming improved survival rates or nutritional condition and might be applied more broadly.

Translocations: In 2008 and again in 2009 six juvenile seals were moved from French Frigate Shoals, where prey availability appears low, to Nihoa Island, where foraging grounds are extensive but haul-out space is limited to a single small beach. Many more pups would need to be translocated for this approach to be useful in increasing the number of breeding-age adults in the total population, but it is not clear that the island could support them because of the limited haul-out area. In addition, the main Hawaiian Islands provide the only natural habitat where juvenile survival rates are at levels comparable with those of the 1980s and foraging opportunities show no sign of being limited. For these reasons, the Commission concluded that the best option for improving juvenile survival in the NWHI appears to be a large-scale translocation aimed at

temporarily moving some portion of newly weaned pups from the NWHI to the main Hawaiian Islands. When the translocated animals reach ages three to five, they would be returned to their atoll of birth to join that colony's breeding age class. Maintaining weaned pups in captivity until they reach maturity also has been considered but would be more expensive and would pose greater risk of introducing disease and modifying behavior that could complicate reintroduction and re-adaptation to the wild.

The Commission therefore concluded that the Service should develop protocols for a possible large-scale translocation while concurrently conducting an interim test of this approach. The test would be used to verify the potential for increased survival, observe the movement of translocated seals around the main Hawaiian Islands, and evaluate the feasibility of moving seals at age three to five years back to their breeding colonies. At the end of 2009 the Commission therefore expected to recommend that the National Marine Fisheries Service consult with the recovery team and key recovery program partners to design a potential monk seal translocation plan with separate assessment and implementation phases.

Because of the continuing decline in births in the NWHI and the time required to assess survival and breeding rates of translocated seals, obtain permits, and prepare documents for public review, the Commission concluded that the Service should initiate translocation planning and assessment work as quickly as possible.

Shark Predation: For unknown reasons, shark predation on pre-weaned and newly weaned pups increased sharply at French Frigate Shoals in the mid-1990s. Since then, sharks have killed approximately 20 to 35 percent of all pups born at that atoll. This high predation rate is observed only at French Frigate Shoals, where it is now the largest known source of pup mortality. All other direct observations of predation events have involved Galapagos sharks, which rarely occur in shallow water. A small number of sharks appears to have learned to patrol monk seal pupping beaches, targeting pre-weaned and newly weaned pups. To reduce such predation, the Service has deployed various shark deterrents and attempted to kill sharks patrolling pupping beaches. Deterrent

devices have not been effective, and although the Service has removed 12 sharks since 2001, they have become wary of people and are now difficult to catch or kill. Meanwhile, shark predation remains an important source of mortality of pups at French Frigate Shoals.

Efforts to kill sharks are particularly controversial because of recent actions to manage the NWHI for the protection of all marine life and the uncertainty about the hypothesis that just a few sharks are involved. To help ensure that management decisions are based on the best possible scientific information, the Commission has recommended in the past that the Service tag Galapagos sharks to document their movement and foraging patterns at French Frigate Shoals. Such research has since been funded by the National Marine Sanctuaries Program with help from the Service. The results indicate that the Galapagos shark population at French Frigate Shoals numbers at least a few hundred individuals and that only a very small portion of the population occurs in the shallow lagoon. Given the small number of Galapagos sharks that appear to be involved and the large number of other large predators, such as ulua (a species of jack), that occur in the atoll's lagoon, the Commission concluded that removal of some Galapagos sharks could significantly reduce mortality among pre-weaned and newly weaned monk seal pups without affecting the shark population and without significantly reducing the number of top predators in the atoll's ecosystem.

For 2010 the Service had proposed catching as many as 20 Galapagos sharks within 400 m of French Frigate Shoals pupping beaches. To do so, Service scientists planned to use various methods, including a short multi-hook drum line, hand lines, and a spring-loaded net that could be triggered when sharks came within a few feet of where the net had been set. Although the Commission recognized and shared concern about killing sharks expressed, for example, by Native Hawaiians and officials at the Papahānaumokuākea Monument, it concluded that the Service's proposal was necessary to protect the atoll's monk seal colony as a functioning element of the local ecosystem. The Commission therefore expected to recommend in early 2010 that the Service proceed with its plans to catch sharks and that co-

managers of the Papahānaumokuākea Marine National Monument approve the necessary permits to authorize the activity.

Marine Debris: Over the past three decades, nearly 300 seals have been found entangled in marine debris (Figure II-6), most found on beaches in the NWHI by monk seal field personnel. More than 200 of those seals were disentangled; most of the others escaped unaided, but eight animals died before they could be rescued. Of particular concern are an unknown, but potentially significant number, of monk seals that may become entangled at sea and die unobserved before they can make it back to shore. Most entangled seals are juveniles, and most entanglements involve derelict nets and other types of lost and discarded fishing gear. In 2009 nine seals were found entangled. Six of these were captured, disentangled, and released uninjured, and three were able to free themselves.

Other than disentangling seals, the only approach proven effective in reducing entanglement risks has been removal of derelict nets and other hazardous debris. Monk seal field crews have cleaned NWHI beaches since the 1980s, and in the late 1990s teams of divers began removing net debris caught on nearby reefs. The Coral Reef Ecosystem Division of the Service's Pacific Islands Fisheries Science Center has funded and organized the interagency efforts directed at removing debris in the water because it

kills and injures species other than seals, including seabirds, sea turtles, fishes, and corals. In 2005 the involved agencies reduced cleanup efforts to a level thought to match accumulation rates, but that level has not kept up with the amount of accumulated netting and debris.

The Coast Guard and National Oceanic and Atmospheric Administration have provided vessel support for removing such debris. The Coral Reef Ecosystem Division and National Marine Debris Program expect to continue funding at 2009 levels (\$225,000 and \$100,000, respectively) until 2012. In 2009 the Papahānaumokuākea Marine National Monument also contributed \$225,000, which supported an additional 60 days of removal effort. The Commission has little doubt that the removal efforts have prevented monk seal deaths. At the end of 2009 the Commission expected to recommend that the National Marine Fisheries Service work closely with the agencies heading up the annual NWHI debris removal program to ensure that lagoon areas near monk seal pupping beaches are kept as free of nets and other hazardous debris as possible. It also expected to write to the National Ocean Service to commend it for past support of NWHI debris removal and to recommend that the Service continue to do so as often as is necessary and possible. Finally, the Commission also expected to recommend that the Pacific Islands Fisheries Science Center attempt to

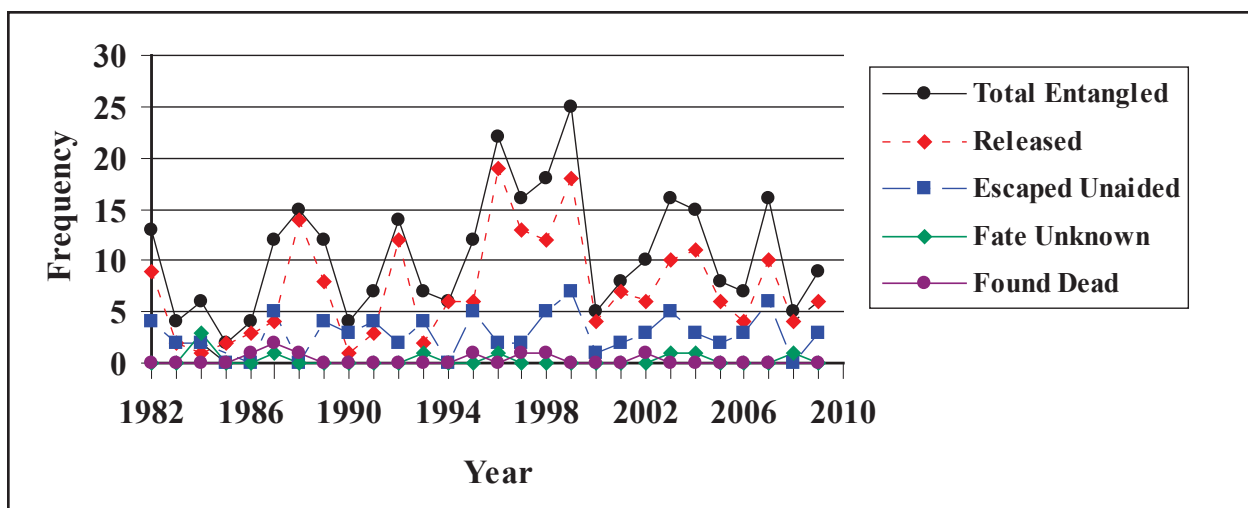


Figure II-6. Number of entangled Hawaiian monk seals observed from 1982 through 2009. Data provided by the National Marine Fisheries Service, Pacific Islands Fisheries Science Center.

analyze observed monk seal entanglement rates with regard to debris removal efforts at major pupping atolls to assess its effectiveness in reducing monk seal entanglement risks.

Papahānaumokuākea National Marine Monument Science Plan

On 10 July 2009 the National Oceanic and Atmospheric Administration published a *Federal Register* notice (74 Fed. Reg. 33209) requesting comments on a draft natural resources science plan for the Papahānaumokuākea Marine National Monument. The plan is to be updated at five-year intervals and its purpose is to identify a long-term (15-year) research and monitoring framework for guiding and improving the development of information necessary to manage the Monument's natural resources, including Hawaiian monk seals and their prey. On 10 August 2009 the Commission sent comments noting that preparation of a research plan to address long-term needs for all components in such a large and complex ecosystem was a difficult task, and it commended the authors for preparing such a comprehensive draft document.

The framework for the plan was based on an archipelago-wide marine research plan that had been developed before the Monument was established. Although the Commission acknowledged the value of such consistency, it noted that doing so made it difficult to relate research tasks to activities and issues set forth in the more recent Monument management plan. Believing that it was more important for the research plan to relate planned studies to specific management issues, the Commission recommended that the plan be reorganized accordingly.

The Commission also recommended that the plan clarify the criteria and procedures used to set priorities for research projects. It proposed using a simpler numerical ranking system, including additional criteria to ensure that proposed research can be done only within the Monument, and limiting the take of animals to the lowest possible number necessary to accomplish research objectives. Finally, recognizing that it would be impossible to identify all possible research needs for all ecosystem components, the Commission recommended that the plan clarify that

the list of identified research topics is not intended to preclude other possible projects but rather to illustrate the importance of relating research projects to specific information needs and management activities identified in the Monument management plan.

At the end of 2009 the National Oceanic and Atmospheric Administration had not yet completed the Monument's natural resources science plan.

Hawaiian Monk Seals in the Main Hawaiian Islands

Monk seal numbers are increasing in the main Hawaiian Islands, where they were present only in low numbers before the 1990s. Since then, the numbers of sightings and births have increased steadily, and the total number of seals in the area is thought to be about 150. Both juvenile and adult seals in the main Hawaiian Islands appear to be in better physical condition than those in the NWHI. If current trajectories of seal numbers in the NWHI and main Hawaiian Islands persist, the number of seals in the main Hawaiian Islands will exceed that in the NWHI in 15 years. Continued growth of the population in the main Hawaiian Islands is therefore considered essential for the species' recovery.

Reoccupation of the main Hawaiian Islands by monk seals raises new and difficult management issues stemming from increasing interaction between seals and people. The most common and challenging management concerns involve interactions between seals and beachgoers, swimmers, divers, and recreational fishermen. Because the Service's staff is limited and is based only on Oahu and because interactions occur daily throughout the main Hawaiian Islands, the Service has had to rely extensively on assistance from personnel in other agencies with related missions, as well as volunteers from the public and non-governmental groups.

The Service's Pacific Islands Regional Office is directly responsible for monk seal management, but the staff has been limited in number and not able to provide adequate leadership, oversight, and attention to many urgent recovery needs. Indeed, in the past the office had no staff that it could dedicate full-time to work on Hawaiian monk seal recovery. In 2009, however, the Regional Office used part of its increased

funding to hire a Hawaiian monk seal recovery coordinator to work with cooperating agencies and oversee monk seal management on a full-time basis. The Commission has recommended the creation of such a position for many years, and it welcomed the Service's action. During its 2–4 December review, the Commission directed particular attention to several issues relevant to Hawaiian monk seals in the main Hawaiian Islands, including research and monitoring, development of a main Hawaiian Islands management plan, responses to emergency situations, monk seal health care facilities, development of volunteer networks, and public outreach and education.

Research and Monitoring: Because monk seals are widely scattered in the main Hawaiian Islands and often occur in remote locations, monitoring animals in this portion of their range has been challenging. To date, scientists have depended largely on sighting records of tagged or otherwise known individuals to track trends. The National Park Service staff at the Kalaupapa National Historic Park on Molokai has been particularly helpful in collecting and maintaining these records. Over the past 10 years, the park's beaches have become a regular pupping area, producing a third or more of all pups born in the main Hawaiian Islands. The park may be the site of an incipient monk seal colony, and its staff has helped tag and monitor seals using the park.

In 2009 the National Marine Fisheries Service used part of its funding to conduct aerial surveys to determine the reliability of sighting histories for estimating seal abundance and characterizing seal distribution in the main Hawaiian Islands. The survey had not been completed and analyzed at the end of 2009, but it recorded six pups on the coast of Niihau, raising the total number of known births in the main Hawaiian Islands in 2009 to at least 21.

During the Commission's review, the Service indicated that it planned to increase research and monitoring work in the main Hawaiian Islands and to develop a research plan to guide those efforts. The Commission strongly concurs with the need to do so, and at the end of 2009 it expected to recommend that the Pacific Islands Fisheries Science Center consult with staff of the Pacific Islands Regional Office and the Hawaiian Monk Seal Recovery Team to develop the research plan and either link it closely

to or make it part of the main Hawaiian Islands management plan that the Service is also developing (see later discussion). The Commission also expected to recommend that the plan be completed within one year and that it include a long-term strategy for collecting accurate data on annual pup production, age structure, age-specific survival, abundance, habitat-use patterns, and other demographic parameters comparable with data collected at NWHI breeding sites. Other important elements that the Commission thought essential to include were—

- satellite tagging and Crittercam studies to improve information on habitat-use patterns,
- development of a main Hawaiian Islands geographic information system and database to archive and analyze data on habitat-use patterns,
- studies of monk seal prey preferences,
- assessments of the frequency and location of interactions with recreational fishing,
- telemetry tagging to assess the adaptation and survival of injured monk seals treated and returned to the wild, and
- development of aversive conditioning and translocation techniques to prevent seals from using areas where they could be exposed to risks associated with human interactions.

Because of the extensive amount of work that is needed, the Commission also expected to recommend that the Service's Science Center assign a member of its staff to work fulltime on conducting, assisting, and generally overseeing all Hawaiian monk seal research activities included in the main Hawaiian Islands research plan.

Finally, the Commission noted that the extensive database on Hawaiian monk seals currently is archived using a complex data management system that requires special expertise to access and manipulate. Thus, it is not readily accessible to recovery partners and concerned scientists. The Commission considers greater access to the database to be both appropriate and necessary and therefore expects to recommend that the Science Center convert the database to a more user-friendly management platform and either hire or assign an additional fulltime database expert to help enter, verify, reformat and respond to requests for data in a timely manner.

Development of a Main Hawaiian Islands Management Plan: The increase in the number of seals in the main Hawaiian Islands has led to increased interaction between seals and people. Among other things, seals that haul out on public beaches are exposed to harassment and may interact with pet dogs or feral animals that can transmit infectious diseases. Swimmers and divers also interact with seals, and several persons have been bitten during such interactions. Such problems have been aggravated by people offering food or otherwise encouraging close encounters that reinforce seal behaviors leading to more frequent interactions. Seals also take bait from the hooks of recreational fishermen. If the seals become hooked, they sometimes must be captured so the hook can be removed or, if they swallow it, surgical treatment may be necessary. Because the Service staff is limited in number, the Service must seek assistance from local volunteers and the staffs of other agencies and groups, particularly the Hawaii Department of Land and Natural Resources, the Coast Guard, the National Ocean Service, the National Park Service, the Marine Mammal Center, and the Waikiki Aquarium.

One of the first tasks identified in the revised Hawaiian Monk Seal Recovery Plan is preparation of a management plan for monk seals in the main Hawaiian Islands. The plan should identify actions to minimize interactions between seals and people and provide guidance to coordinate and prioritize cooperative work by recovery partners. The Service had not been able to complete a plan but indicated at the Commission's meeting that doing so would be one of the main priorities for its newly hired Hawaiian monk seal recovery coordinator. The Commission agrees that this plan is a priority, and at the end of 2009 it expected to recommend that the Service work closely with the Hawaiian Monk Seal Recovery Team to complete the plan within a year.

The Commission believes that major sections of the management plan should focus on (1) volunteer response networks, (2) education and outreach for specific groups (e.g., recreational fishermen, commercial fishermen, Native Hawaiians, other Hawaii residents, tourists), (3) actions to manage seal distribution (e.g., aversive conditioning for seals using habitat where they are exposed to risks, relocating

those seals), (4) responding to distressed or nuisance seals, (5) health care facilities for holding and treating seals, and (6) enforcement of the laws and regulations intended to protect the seals.

Volunteer Response Networks: The monk seal recovery program is fortunate that many committed residents are willing to help with routine but important research and management activities. On most of the islands, one or more volunteer networks have organized and committed time and funding to assist in various ways. Depending on circumstances, these groups may monitor seals that haul out, post temporary barriers around seals on busy beaches to keep people at a safe distance, collect and report sighting data, prepare and distribute public education materials and public service announcements, present programs to schools and other groups on monk seal conservation, and become trained to assist in emergency capture situations.

During the Commission's meeting, a representative of one such group, Hawaiian Monk Seal Response—Oahu, described its activities. It is apparent that volunteer groups offer a cost-effective means of engendering public support and accomplishing many important recovery tasks. However, maximizing such efforts will require identifying the most helpful work, ensuring that accepted protocols are followed when approaching seals, and ensuring that presented information is accurate and consistent with conservation policies and standards. At the end of 2009 the Commission expected to recommend that the Service's Pacific Islands Regional Office hire an additional staff member to work fulltime to encourage the formation of volunteer networks on various islands and provide assistance and guidance for their monk seal conservation activities.

Response to Emergency Situations and Hawaiian Monk Seal Health Care Facilities: In the recent past, the Service has had to capture and hold one or two seals per year because they were orphaned as pups, sustained injuries requiring medical treatment, or had become acclimated to humans and posed a threat to people (Figure II-7). Currently the Service does not have a facility dedicated to maintaining and treating Hawaiian monk seals with health issues. During the Commission's meeting, staff of the Pacific Islands Regional Office noted that arrangements had

been made with the Waikiki Aquarium for temporary use of surgical facilities and a small pool to treat and hold injured seals and that the Kaneohe Marine Corps Base had agreed to allow temporary shore pens on its property to hold seals requiring longer maintenance. These organizations should be commended for their help, but the Commission believes that a dedicated facility is essential for providing captive care for seals in the main Hawaiian Islands.



Figure II-7. An Hawaiian monk seal pup that survived a shark bite. (Photo courtesy of S. Cania, Joint Institute for Marine and Atmospheric Research, University of Hawaii, Manoa)

To meet this need, the Service and the Marine Mammal Center, a non-profit private organization providing medical care for stranded marine mammals, have been working together to raise private funds for constructing and operating a monk seal health care facility. At the time of the Commission's meeting, the Center had obtained conceptual approval from the National Energy Laboratory Hawaii Association to develop a facility on its property in Kona on the island of Hawaii and had prepared preliminary construction plans for a facility costing between \$1 and \$1.5 million. The Center's veterinary and health care staff is experienced and well qualified for treating and maintaining seals, and the Commission was encouraged by the progress that was being made to develop a dedicated monk seal care facility. However, it was also concerned that, if built, a stable source of

funding may not be available to cover all operating costs. Therefore, at the end of 2009 the Commission expected to recommend that the Service enter into an agreement with the Marine Mammal Center to cover expenses needed to operate the Hawaiian monk seal care facility.

Public Outreach and Education: Because of the large number of people using beaches and near-shore waters, the potential for interaction with seals is high. To minimize the risk of interactions that could harm seals, both residents and visitors to Hawaii must be made aware of monk seals and their highly endangered status and be advised of actions they should take if they encounter seals in different situations. The urgency for greater outreach and education was underscored in 2009 when three monk seals were deliberately killed in the main Hawaiian Islands.

During the Commission's meeting, the Service advised that a portion of its increased funding in 2009 was used to contract with a professional education firm to conduct a survey of public perceptions and attitudes toward seals that could be used as a basis for developing a targeted outreach program. The Commission believes that the survey is an appropriate and necessary step and concluded that, once results are available, the Service will need to work with agency partners to implement and expand a cooperative education and outreach program that is targeted at key community segments likely to interact with seals and that will deliver a consistent and well-articulated conservation message. At the end of 2009 the Commission expected to recommend that the Service's Pacific Islands Regional Office move expeditiously to hire a full-time public education specialist to lead development of this program.

Petition to Expand Critical Habitat

Section 4(b) of the Endangered Species Act authorizes the National Marine Fisheries Service to designate critical habitat for species listed as endangered or threatened. Once designated, federal agencies are required to consult with the Service on any activity likely to destroy or adversely modify habitat features essential for the species' conservation.

On 9 July 2008 the National Marine Fisheries Service received a petition to expand the boundaries of critical habitat areas for Hawaiian monk seals that

were designated in 1987. Based on new information on monk seal habitat-use patterns in the NWHI and the species' reoccupation of the main Hawaiian Islands since that designation, the petition sought to include waters within the 500-m isobath throughout the NWHI, as well as all beaches and adjacent waters within the 200-m isobath around the main Hawaiian Islands. On 3 October 2008 (73 Fed. Reg. 53583) the Service announced that the petition contained sufficient information to suggest that the action may be warranted and requested public comment. On 2 December, the Commission responded recommending that the Service proceed with developing a proposed rule consistent with the requested action in the NWHI. For the main Hawaiian Islands, the Commission recommended that the proposed rule include the beaches used regularly by multiple seals and adjacent waters out to the 200-m isobath within the home ranges of such seals as inferred from tracking studies that have been performed to date.

On 12 June 2009 the Service published a *Federal Register* notice (74 Fed. Reg. 27988) announcing its intent to proceed with rulemaking to revise critical habitat boundaries for the Hawaiian monk seal. To do so, it noted that it would (1) determine the species' geographic range at the time of designation (i.e., 1976), (2) identify the principal physical or biological features essential to its conservation, (3) delineate areas within its geographic range containing those biological features, (4) identify any areas outside of its range at the time of listing that are essential for the species' conservation, and (5) conduct the required economic, national security, and other analyses to determine if any areas could be excluded from the critical habitat consideration. At the end of 2009 the Commission understood that steps had been taken by the Service to begin this process.

Interagency Hawaiian Monk Seal Summit

In March 2006, as the Hawaiian monk seal recovery plan was being updated, the Marine Mammal Commission wrote to the National Marine Fisheries Service, noting that recovery of the Hawaiian monk seal would require increased efforts by partner agencies as well as by the Service. The Commission recommended that the Service convene a meeting of

high-level decision-makers from key partner agencies to identify areas where further cooperation is needed to address conservation issues in the most cost-effective and coordinated way possible. The Service agreed and asked the Commission to help organize such a meeting, which was subsequently scheduled for October 2008. However, shortly before it was to be held, the Service decided that the meeting should be postponed until after the 2008 elections and that additional consideration be given to developing an agreement to guide cooperative efforts among the agencies.

On 23 February 2009 the Service convened a meeting of agency leaders from the Hawaii Department of Land and Natural Resources, the National Ocean Service, the Fish and Wildlife Service, and the Marine Mammal Commission to discuss how best to move ahead. Based on that meeting, the agencies agreed to consider development of an interagency memorandum of agreement and that representatives of each of the agencies should meet to develop a recommended approach. Representatives of those agencies, as well as the Coast Guard and the National Park Service, subsequently met on 2 April 2009 and agreed that an interagency agreement should be completed to guide cooperative actions. The Service's Pacific Islands Regional Office subsequently circulated a draft agreement but made no further progress.

During the Commission's December meeting, the Service indicated that it had reconsidered the merits of proceeding with development of a joint agreement based on further communications with some of the other agencies and concern about the length of time that would be required to clear a six-party agreement through review processes in the various agencies. Instead, the Service indicated that it would prefer to merge any plan for cooperation with the process for developing the main Hawaiian Islands management plan. Although agreeing that such an approach had merit, the Commission noted that the fundamental need was to ensure that heads of agencies recognized the importance of providing their staffs with the resources and support needed to conduct Hawaiian monk seal recovery tasks. During the meeting, Service staff assured the Commission that they recognized and shared that concern.

Spinner Dolphin (*Stenella longirostris*)

Under the Marine Mammal Protection Act, all activities involving the taking of marine mammals are prohibited unless authorized or permitted under the Act's provisions. Taking is defined as harassing, hunting, capturing, or killing any marine mammal. The term "harassment" also is statutorily defined and includes any act of pursuit, torment, or annoyance that has (1) the potential to injure a marine mammal or marine mammal stock in the wild or (2) the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

Over the past 20 years, human activities involving intentional interactions with marine mammals have increased markedly (Hoyt 2001). Among other

things, such activities involve whale-watching ventures, feeding of wild dolphins, and swimming with wild dolphins. In Hawaii, many of these activities have developed to take advantage of the natural history and habitat-use patterns of spinner dolphins (*Stenella longirostris*) (Figure II-8). The Commission's annual report for 2004 (available at <http://mmc.gov/reports/annual>) summarizes background on this particular issue, detailing the history of stalled and ineffective efforts to address such interactions in a way that ensures that the dolphins are being protected from harassment.

Hawaiian spinner dolphins feed offshore at night and then return to particular nearshore bays during the daytime to rest and socialize. This regular behavior creates a predictable opportunity for those wishing to interact with the dolphins in the wild. Despite benign intentions, swimmers, tour boat operators, and kayakers disturb spinner dolphins, disrupting their daily resting, social, and reproductive behaviors



Figure II-8. Spinner dolphins off Penguin Banks, west of Molokai, Hawaii. (Photo courtesy of National Marine Fisheries Service, Pacific Islands Fisheries Science Center)

and possibly causing them to abandon their primary nearshore habitat. The disturbance affects individual animals and may have population-level consequences as well.

For the past two decades, the National Marine Fisheries Service has been inconsistent in its efforts to address this issue. In 1991 the Service promulgated regulations to specify that feeding marine mammals in the wild constitutes a taking and is prohibited (56 Fed. Reg. 11693). The Service also issued useful but unenforceable guidelines for responsible wildlife viewing. In 1992 it published a proposed rule that would have established specific approach distances (61 Fed. Reg. 45836), but the rule was subsequently withdrawn in response to negative public comments. In 2002 it published an advance notice of proposed rulemaking to solicit input as to what interactions between the public and wild marine mammals constitute takings under the Marine Mammal Protection Act and should be regulated (67 Fed. Reg. 4379). The notice included a discussion of the Service's policy that activities involving close approaches or direct interactions with wild marine mammals have the potential to disrupt the animals' behavioral patterns and, as such, constitute harassment under the Marine Mammal Protection Act.

The Marine Mammal Commission has been involved with this issue, and in a May 2002 letter to the Service, the Commission recommended that it promulgate regulations specifying that any activity intended to enable in-water interactions between humans and dolphins in the wild constitutes a taking and is prohibited. The Commission included a session on this topic at its 2004 meeting, held in Kona, Hawaii. Based on that session, the Commission wrote to the National Marine Fisheries Service, the state of Hawaii's Department of Land and Natural Resources, and the National Oceanic and Atmospheric Administration making eight recommendations to reduce dolphin-human interactions in Hawaii.

Following establishment of the Pacific Islands Regional Office in 2004, the National Marine Fisheries Service again took up this issue and convened the first spinner dolphin working group meeting in September 2005. On 12 December 2005 the Service published another advance notice of proposed rulemaking regarding measures to protect spinner dol-

phins in the main Hawaiian Islands (70 Fed. Reg. 73426). The Commission responded on 13 January 2006 and recommended that the Service go forward with a proposed rule that—

- closes those areas identified as the most important resting areas to all human activities, either during specified hours or when dolphins are present;
- allows access to other areas used by dolphins under certain vessel operating conditions (which might include speed limits, limits on the number of vessels, etc.);
- establishes generally applicable rules for all other areas, specifying minimum approach distances (e.g., no approaches closer than 50 yards) and other limitations (e.g., no touching animals, no pursuing animals); and
- provides the maximum possible clarity for enforcement purposes.

On 2 October 2006 the National Marine Fisheries Service published a notice of intent to prepare an environmental impact statement analyzing alternatives to manage human interactions with spinner dolphins (71 Fed. Reg. 57923). The notice identified a proposed action and four alternatives as follows:

- Proposed Action – institute partial (time-area based) closures for certain specified spinner dolphin resting habitat (or a subset thereof) in the main Hawaiian Islands;
- Alternative 1 – maintain the status quo (the no-action alternative);
- Alternative 2 – establish a minimum distance inside which approach of spinner dolphins would be unlawful;
- Alternative 3 – regulate certain specific human behavior within spinner dolphin resting habitat identified by the Service (could include prohibitions on swimming with spinner dolphins, speed restrictions, or similar measures); and
- Alternative 4 – close spinner dolphin resting habitat (or a subset thereof) as identified by the Service.

On 24 November 2006 the Commission responded, reiterating the recommendations in its response to the 2005 advance notice of proposed rulemaking. Since then, the Service and others have sought to gather information on the resting sites used

by spinner dolphins in the main Hawaiian Islands and on the impact of human activities that are occurring there.

Marine Mammal Commission 2009 Annual Meeting

A special session on spinner dolphins was held at the Commission's 2009 annual meeting in Honolulu, Hawaii (2–4 December). At the meeting, the National Marine Fisheries Service and the state of Hawaii's Department of Land and Natural Resources described management activities since 2006 and ongoing and planned research on spinner dolphins.

Research Updates: In 2009 research on spinner dolphins in Hawaii focused on three main topics. First, genetic analyses comparing spinner dolphins in the main Hawaiian Islands with those from other regions. The results indicate not only that main Hawaiian Islands dolphins are different from those

in the NWHI, but also that there is notable structure within the main Hawaiian Islands population. On the basis of studies by Galver (2002) and Andrews (2009), the National Marine Fisheries Service's Pacific Islands Fisheries Science Center was preparing to propose the division of the Hawaiian spinner dolphin stock into seven separate stocks, including three stocks within the main Hawaiian Islands (Figure II-9).

Second, the development of a Pacific Islands Photo-identification Network will create a catalog of individually identified spinner dolphins. The catalog will provide a basis for future studies on dolphin stock abundance, habitat use, movements of individuals, reproductive rates, and mortality rates. The catalog also may provide a basis for assessing the effects of disturbance and for evaluating the effectiveness of implemented management measures.

Third, a multi-year collaboration of researchers from Duke University (North Carolina) and Murdoch

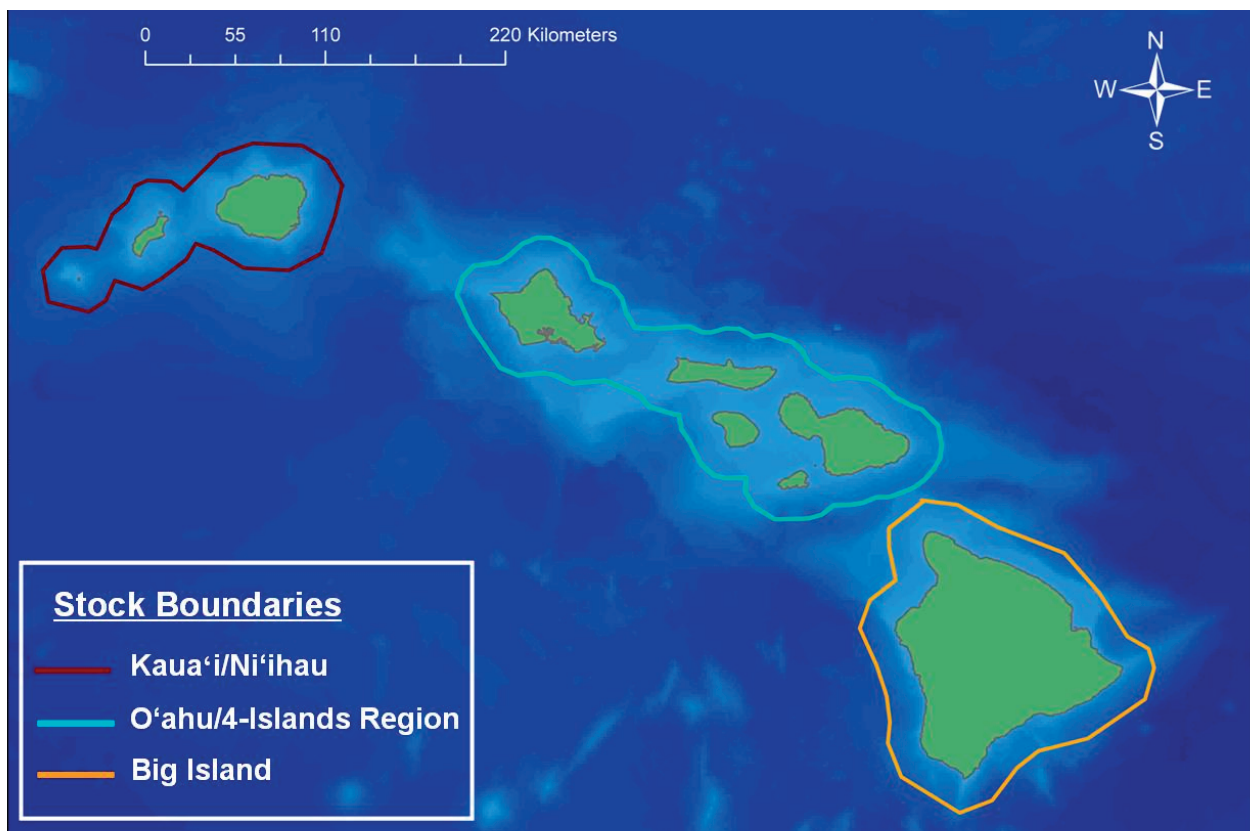


Figure II-9. Proposed stock structure of spinner dolphins within the main Hawaiian Islands. A 10-nmi boundary would define the outer limit of each stock, and animals outside the 10-nmi boundary would be treated as part of an offshore stock. (Map courtesy of Marie Hill, Joint Institute for Marine and Atmospheric Research)

University (Western Australia) will evaluate the effectiveness of time-area closures. This study was being planned in 2009 to begin in 2010. It will characterize and compare spinner dolphin behavior in two sets of bays where the dolphins either are or are not exposed to human disturbance.

Management Updates: At the Commission's 2009 annual meeting the National Marine Fisheries Service's Pacific Islands Regional Office also presented information on three spinner dolphin management alternatives under consideration. Those alternatives include time-area closures, minimum distance limits when approaching dolphins (similar to those proposed for southern resident killer whales, see Chapter IV), and restrictions on certain activities near dolphins. The latter would aim to prevent such activities such as leapfrogging (constantly moving ahead of dolphins to force them to pass by), herding of dolphins by boats, and driving through dolphin groups. The Service has not yet moved forward on any of these measures and, at the 2009 annual meeting, informed the Commission that it was awaiting the results of the scientific studies described in the previous section to provide a more informative basis for management action.

In the absence of regulations, the National Marine Fisheries Service has been working to increase public awareness about this issue by posting signs on beaches and visiting hotels to educate guests about the potential cost to the dolphins of interaction with humans in the resting bays. The Service also is implementing a "Dolphin SMART" program (<http://sanctuaries.noaa.gov/dolphinmart>) throughout the Hawaiian Islands.

The state of Hawaii has long been interested in this issue but limited in its ability to intervene. The limitation stems from an interpretation of the Marine Mammal Protection Act detailed in a 20 June 2008 letter from the National Oceanic and Atmospheric Administration's General Counsel stating that "enforcement of Hawaii state laws and regulations [is] preempted by Section 109(a) of the MMPA, insofar as those laws and regulations relate to the taking of marine mammals." The letter goes on to specify that section 109(a) of the Act "provides that [n]o state may enforce...any State law or regulation...relating to the taking of any species...of marine

mammal within the State unless the Secretary of Commerce has transferred management authority for that species to the State." Nonetheless, the state expressed its support of the Service's current and planned management activities related to spinner dolphins and offered to collaborate as possible.

At the end of 2009 the National Marine Fisheries Service was working on a draft environmental impact statement for proposed regulations, the proposed time-area control research was scheduled to begin in mid 2010, and the Commission was drafting follow-up letters on the spinner dolphin issue to the Service and the state of Hawaii's Department of Land and Natural Resources.

False Killer Whales (*Pseudorca crassidens*) and Longline Fisheries

The false killer whale is a highly social member of the family Delphinidae. It reaches body lengths of nearly 6 m (20 ft). Populations of false killer whales occur throughout tropical and temperate seas worldwide. The geographic boundaries of some populations appear to overlap. The National Marine Fisheries Service recognizes three stocks of false killer whales in the central Pacific region (Carretta et al. 2009): (1) a Hawaiian insular stock generally occurring within 75 nmi of the main Hawaiian Islands and estimated to number just over 120 whales, (2) a Hawaiian pelagic stock ranging from about 23 to 28 nmi off the Hawaiian Islands seaward to beyond the 200-mile U.S. EEZ and estimated to number just over 480 whales, and (3) a Palmyra stock occurring within and beyond U.S. waters around Palmyra Atoll southeast of the main Hawaiian Islands and estimated to number around 800 whales. The Service recognizes these stocks based on genetic analyses, sighting patterns, and photo-identification studies. However, stock structure is poorly understood for this species, and the central Pacific almost certainly contains additional false killer whale stocks.

Fishery Interactions

In recent years, bycatch of false killer whales in longline fisheries in the central Pacific region and depredation by the whales on fish caught in those

fisheries have become significant conservation and management issues. Two Hawaii-based longline fisheries have been most involved: a deep-set longline fishery targeting tuna and a shallow-set longline fishery for swordfish. Daily each vessel in those fisheries typically sets 50 or more miles of line strung between a series of floats. Data compiled by fisheries observers indicate that an estimated 24 false killer whales and 15 unidentified cetaceans likely to be false killer whales were hooked or entangled on lines in the Hawaii deep-set longline fishery between 1994 and 2007 (Carretta et al. 2009).

For more than five years the deep-set longline fishery is estimated to have taken an annual average of 7.4 false killer whales in waters beyond 75 nmi but within the U.S. Exclusive Economic Zone around Hawaii. These whales were most likely from the pelagic stock, and the documented take was two to three times the stock's potential biological removal level (2.9 whales per year, as estimated in 2009; Carretta et al. 2009). On that basis, the stock was designated as "strategic" in accordance with the Marine Mammal Protection Act.

The extent of interaction between other false killer whale stocks in the central Pacific and Hawaii-based longline fisheries is not clear. To date, no takes of false killer whales from the Hawaiian insular stock have been confirmed. However, such takes likely occur, based on documented dorsal fin disfigurement consistent with injuries from fishing gear (Baird and Gorgone 2005). Incidental takes from the Palmyra stock are currently estimated at 0.3 whale per year, which is below its calculated potential biological removal level (6.4 whales per year).

The number of false killer whales taken by foreign longline fleets in international waters also is a concern, but nothing is known about such takes because international observer and reporting programs are non-existent or inadequate. Foreign takes may have a significant impact on the Hawaii pelagic stock, as well as the Palmyra stock, because members of those stocks are known to move in and out of the U.S. EEZ. Potential biological removal levels also are uncertain because they are based on imprecise abundance estimates that in turn reflect shortcomings in stock assessment efforts. U.S. observer data are sufficient, however, to demonstrate that these stocks

are affected by longline fisheries; moreover, further action is needed to assess the bycatch of false killer whales in foreign pelagic longline fisheries operating outside U.S. waters.

Take Reduction Efforts

In recent decades the National Marine Fisheries Service has implemented a number of measures to limit bycatch of marine mammals in waters of the Hawaiian Archipelago. Such measures include requirements for 100 percent logbook reporting of interactions causing serious injury or death of a marine mammal, limits to fleet size, exclusion zones or areas where fishing is prohibited, vessel monitoring systems, placement of observers on vessels, and gear modifications. The utility of these measures varies depending on the characteristics of the fishery and the distribution and foraging behavior of the marine mammals involved. When fishery interactions involve marine mammal stocks with wide distributions, the best means of avoiding interactions may be through modifications of fishery practices or gear. When the interactions involve marine mammal stocks with small and well-defined distributions, as is the case for a number of insular stocks around the Hawaiian Archipelago, the most effective fishery management methods may be no-fishing (exclusion) zones that keep the marine mammals and fisheries separated geographically.

Since 2004 the Marine Mammal Commission has recommended repeatedly that the National Marine Fisheries Service convene a take reduction team to recommend measures to decrease false killer whale takes in the longline fisheries. For several years, the Service declined to convene a team, citing existing commitments to maintain other established take reduction teams and limited funding to form a new team. In March 2009 *Hui Malama I Kohola*, the Center for Biological Diversity, and the Turtle Island Restoration Network filed suit against the Service (*Hui Malama I Kohola v. National Marine Fisheries Service*, Case No. 09-00112 DAE-BMK) to force establishment of the team, preparation of a take reduction plan, and implementation of the measures needed to reduce false killer whale mortality and serious injury in the longline fisheries to insignificant levels approaching the zero mortality rate goal.

Despite the lawsuit, the Service proceeded with other fisheries management proposals that would affect false killer whales in the central Pacific region. On 19 June 2009 the Service published a notice (74 Fed. Reg. 21658) requesting comments on a proposed rule to eliminate limits on the number of sets by pelagic longline vessels in Hawaii to increase fishing opportunities for the fishing fleet. The Service previously had imposed a cap on the number of sets as a conservation measure to limit the incidental take of sea turtles by longline vessels in lieu of requirements to use circle hooks and specific types of bait.

On 3 August 2009 the Commission responded to the Service's request for comments and conveyed its concern about the likely effect of the proposed increase in fishing on false killer whales. The Commission recommended that the Service limit the increase in fishing effort to relatively small increments to ensure that the fishery remains ecologically sustainable and that it maintain 100 percent observer coverage of the shallow-set longline fleet. In the 3 August letter, and in a subsequent letter on 9 September 2009 regarding stock assessment reports, the Commission again recommended that the Service convene a take reduction team for false killer whales in Hawaii.

As a separate but related matter, on 30 September 2009 the Natural Resources Defense Council submitted a petition to the National Marine Fisheries Service to list the insular population of false killer whales as endangered under the Endangered Species Act. The petition was based on the small size of the insular stock and potential threats to its survival. At the end of 2009 the Service was in the process of reviewing the petition to assess its merits.

To facilitate a more comprehensive evaluation of conservation needs for false killer whale stocks in the Pacific Islands region, the Commission contracted for a review of information on the biology, ecology, and conservation threats to false killer whales in Hawaii. Among other things, the report (Baird 2009) summarized recent photo-identification and satellite-tracking studies that indicated that the insular population has declined substantially since the 1990s. The results also indicate that whales in the insular stock use nearshore and offshore waters

around the Hawaiian Islands out to 110 km from shore, where they may interact with the Hawaii-based longline fleet. Other potential conservation threats to the stock include interactions with other Hawaiian fisheries and exposure to elevated levels of persistent organic pollutants. The report also noted that members of the pelagic stock may occur as close as 46 km from shore. Although the insular and pelagic stocks overlap in geographic distribution, genetic differences (Chivers et al. 2007) support the Service's finding that the two populations are distinct.

On 7 October 2009 the Service's Pacific Islands Regional Office wrote to the Commission advising that it would convene a take reduction team for false killer whales and the Hawaii-based longline fisheries in early 2010. The office invited the Commission to participate in a 19–20 November "pre-take reduction team" meeting to inform interested stakeholders about its intent to form a team, discuss available scientific and procedural information, and seek input from interested parties. The Commission attended this meeting, at which the Service reviewed available information on false killer whales in the Pacific region, provided information on observed incidental take of the species in longline fisheries, and described the fisheries and their related management measures and catches. The Service's representatives also advised that, pending availability of funding for fiscal year 2010, it expected to send letters of invitation to prospective team members in January 2010. At the Commission's 2–4 December 2009 annual meeting in Hawaii, the Service advised that it was still determining the scope of the team but intended to form a team in early 2010. The Service hoped that the team would finish its deliberations and have recommendations for a plan by July 2010.

Dugongs (*Dugong dugon*) in Okinawa

The waters surrounding the Japanese island of Okinawa are home to a small, demographically isolated population of dugongs (*Dugong dugon*). The exact size of this population is unknown, but only 10 dugongs were sighted during surveys conducted in 1998 and 1999 (Shirakihara et al. 2007). The government of Japan has listed the Okinawa dugong population

as a natural monument, reflecting its importance in the culture and history of native Okinawans. In 2007 the Japanese Ministry of Environment classified the Okinawa dugong population as critically endangered.

In recent years, Okinawans have raised concerns regarding the planned construction of a U.S. Marine Corps airbase at Camp Schwab on the east side of Okinawa. The plans would extend the runways for the base into Henoko Bay, which is considered to be prime dugong habitat. Construction of an offshore airstrip in this area of coral reefs and sea grass beds and expanded operations at the base have the potential to harm dugongs through loss of sea grass beds, pollution, vessel strikes, and both physical and acoustical disturbance. The concerns regarding the impact of the planned base on dugongs have prompted local protests and have been a key issue in Japanese elections, both at the local and national level.

In September 2003 a coalition of conservation groups and individuals filed a lawsuit against the U.S. Department of Defense (*Okinawa Dugong v. Rumsfeld*, now known as *Okinawa Dugong v. Gates*). Because of questions concerning the extraterritorial reach of the Endangered Species Act and the National Environmental Policy Act to actions by U.S. agencies in foreign countries, the plaintiffs focused their complaint on alleged violations of the National Historic Preservation Act, specifically the failure of the Department of Defense to conduct a comprehensive public assessment of the effects of the project on dugongs.

The U.S. District Court for the Northern District of California has issued two rulings in the case. The first opinion, issued on 2 March 2005, determined that, because of its designation as a natural monument, the Okinawa dugong is “property” protected under Japan’s Law for the Protection of Cultural Properties, the Japanese equivalent of the U.S. National Register of Historic Places. As such, the court found section 402 of the National Historic Preservation Act to be applicable to this population of dugongs. That provision requires that before any federal agency can approve and engage in an “undertaking” outside the United States that may adversely affect a property listed on the World Heritage List or the country’s equivalent of the National Register of Historic Places, it take into account the effect on

the protected property and adopt measures to avoid or mitigate any adverse effects. The court directed the parties to submit supplemental information and briefs to enable it to ascertain whether (1) the involvement of the Department of Defense in the base relocation and planning decisions constituted a federal undertaking or, alternatively, whether those decisions were being made solely by Japan and (2) whether the base relocation may directly and adversely affect the dugong.

The second ruling in the case, issued on 24 January 2008, addressed these and related issues. The court noted that, although Japan ultimately would select the site of the new base and would fund and carry out the construction, the site selection and its design were constrained by operational considerations specified by the Department of Defense. In the court’s view, the record before it contained clear evidence of “a cooperative and bilateral process of intertwined decision-making” that constituted an undertaking by the Department of Defense sufficient to trigger the requirements of the National Historic Preservation Act. The court also found that construction and operation of an airbase at Henoko Bay had the potential to affect dugongs adversely. The defendants had contended that the environmental assessment being prepared by Japan under its laws would consider possible impacts to the dugong population, but the court noted that this did not absolve the Department of Defense from conducting its own analysis under the applicable U.S. law. The court therefore ordered the Department of Defense to take the necessary actions to comply with the National Historic Preservation Act, including identifying what additional information it needed to evaluate the effects of the proposed base relocation on dugongs and specifying the individuals within the Department of Defense responsible for reviewing that information to determine whether modifications are needed to avoid or mitigate adverse impacts on dugongs.

The exact steps that the Department of Defense must take to come into compliance with section 402 of the National Historic Preservation Act and to satisfy the court’s order remain unclear. Although regulations have been promulgated to guide the implementation of similar review requirements for domestic activities and impacts, no regulatory

guidance has been provided for federal undertakings outside the United States. This prompted the federal defendants to seek additional direction from the district court, while contending that the agency retained discretion for determining how to comply with the statutory requirements. Plaintiffs contended that, in the absence of specific regulatory guidance, the court should direct the Department of Defense to follow the procedures established for reviewing domestic activities. As of the end of 2009 this issue had yet to be resolved.

The Marine Mammal Commission reviewed the situation concerning dugongs in Okinawa at its 2009 annual meeting. Among the participants in the discussion were residents of Okinawa who apprised the Commission of the importance of dugongs in their culture and conveyed their concerns regarding the threats to dugongs posed by the proposed base relocation. Although the United States and Japan concluded a bilateral agreement in 2006 on realignment of U.S. troops in Japan, the recent elections in Japan had changed the situation. Newly elected Prime Minister Yukio Hatoyama had pledged during his campaign to move the base from Okinawa entirely, rather than just relocate it to a less-populated area. At a joint press conference held by Prime Minister Hatoyama and President Obama on 13 November 2009, the leaders announced the formation of a high-level working group to resolve the issue and to consider alternative sites for the base.

Because of the uncertainty concerning the future of the base relocation to Henoko Bay, the Commission decided not to make recommendations concerning the Okinawa dugongs until the high-level working group has completed its review. If, after the review of the relocation plan, the proposal remains unchanged, the Commission intends to review and comment on the Department of Defense's analysis of impacts on dugongs under the National Historic Preservation Act when it becomes available.

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Chapter III

OCEAN POLICY AND MARINE SPATIAL PLANNING

In 2003 the Pew Oceans Commission published its report entitled “America’s Living Oceans: Charting a Course for Sea Change” (Pew Oceans Commission 2003). In 2004 the U.S. Commission on Ocean Policy published its report entitled “An Ocean Blueprint for the 21st Century” (U.S. Commission on Ocean Policy 2004). Both reports called for profound changes in the way the United States views the oceans and manages its relationship with them. President Bush’s Administration responded by issuing its Ocean Action Plan, which laid out a strategy for beginning that transition. In 2009 President Obama followed suit by issuing a memorandum to create a new ocean policy.

The President’s Memorandum

On 12 June 2009 President Obama issued a Memorandum for the Heads of Executive Departments and Agencies through which he established an Interagency Ocean Policy Task Force. He designated the Chair of the Council on Environmental Quality to lead the task force, which was to consist of senior officials from 24 federal agencies. The President directed the task force to develop recommendations for a national policy on ocean, coastal, and Great Lakes ecosystems and resources. The recommendations were to be developed within 90 days and were to include—

- an ocean policy based on promoting the health of marine and Great Lakes ecosystems and resources, sustainability of coastal economies, preserving maritime heritage, facilitating adaptive management, and coordination with U.S. security and foreign interests;
- a policy coordination framework to facilitate integration and collaboration across jurisdictional (e.g., federal, state, tribal, local) boundaries; and
- an implementation strategy that identifies and prioritizes a set of objectives for the United States to pursue.

The President also directed the task force to develop and recommend a framework for effective coastal and marine spatial planning. Through this framework, the task force was to craft an integrated and ecosystem-based approach for guiding sustainable use of marine and Great Lakes resources. The task force would then terminate upon completion of its duties.

The New National Ocean Policy

On 27 July 2009 the Marine Mammal Commission wrote to the Chair of the Council on Environmental Quality to offer its ideas for a national ocean policy. The Commission highlighted the need for bold vision and requested that the task force give strong consideration to a series of guiding principles as it develops its recommendations. Specifically, the Commission endorsed the principles of sustainability and ecosystem-based management laid out in the President’s memorandum, while noting the need to measure progress toward those goals based on appropriate criteria and indicators. The Commission concurred with the need to link ocean-land-atmosphere processes, but it also emphasized the need to understand how those systems also are linked to those societal traits (i.e., human demographics, patterns of con-

sumption, competing demands, alternative values) that lead to ecosystem degradation. It recognized the importance of multiple uses of marine resources and services, but it also noted that the multiple-use philosophy must go hand in hand with recognition of the ocean's finite capacity to produce those resources and services. On the principle of international leadership, the Commission urged the United States to take a strong leadership role in global ocean policy, leading by example even in cases where other countries do not follow. Finally, the Commission recommended a strong commitment of time and resources to develop and then implement a successful ocean policy.

To meet its responsibilities, the task force sought public comment through a series of regional meetings. It hosted public information and comment sessions in Alaska (21 August 2009), San Francisco (17 September 2009), Providence (24 September 2009), multiple Pacific islands (29 September 2009), New Orleans (19 October 2009), and Cleveland (29 October 2009). Several task force members attended each meeting, and the audiences heard from regional government representatives and expert panelists describing stakeholder interests of special concern to each region. The task force posted more than 1,900 public comments available for review online (<http://www.whitehouse.gov/administration/eop/ceq/initiatives/oceans/interimreport/comments>).

Interim Report on Ocean Policy

On 10 September 2009 the interagency task force released its "Interim Report of the Interagency Ocean Policy Task Force" and sought further public comment (74 Fed. Reg. 48521). The report laid out an ambitious and forward-looking ocean policy that recognized the many challenges facing marine environments and promoted many important principles, as recommended by the Commission. It also made further recommendations to the President that would facilitate comprehensive ocean conservation and management. Specifically, the report stressed the importance of taking an ecosystem-based approach, restoring ecosystems where damage has already occurred, and facilitating ocean resilience and adaptation. The task force recommended a more systematic form of marine spatial planning to guide, manage, and spatially allocate the multiple uses of marine

resources, and it sought to link marine environmental systems to human activities, both terrestrial and at sea. It emphasized the importance of utilizing sound science in decision-making, and it recommended adequate funding to support that science and its effective integration into management and conservation. Moreover, it recommended new strategies to integrate and coordinate activities within and among all levels of government, from local to international levels, and promote higher-level involvement and commitment to upholding this policy. It encouraged the United States to ratify the Law of the Sea Convention.

The Commission concurred with the vision, principles, and proposals put forth by the task force in its interim report but found that the report lacked the specificity that would be essential for implementing a new system of ocean governance and policy that would be fully effective and operational. In its 17 October 2009 comment letter to the Council on Environmental Quality regarding the interim report, the Commission noted that a bold ocean policy vision would not be attainable if it did not make fundamental changes and receive greater priority throughout the government, and it urged the task force to put forth a more detailed implementation strategy accordingly. The Commission also urged the task force to promote greater priority in the Obama Administration to upholding ocean research, management, use, and conservation in the face of other conflicting crises that may draw attention from ocean matters.

The Commission offered other comments on specific elements of the interim report—not because it disagreed with the proposal and recommendations, but because it generally sought more detail regarding how the task force would turn its vision into reality. On the topic of ecosystem-based management, the Commission urged the task force to define the concept in such a way as to continue to protect single species but also to promote a stronger ecological basis for management decisions, and it urged the federal government to recognize more explicitly and respect the inherent limits of natural marine ecosystems—in terms of productivity, carrying capacity, resilience, adaptability, and ability to absorb human impacts—and to work within those limits. It also urged the task force to effectively incorporate eco-

system dynamics into its plans and spatial designations for marine spatial planning, and it promoted strong measures for those areas to ensure that they are appropriately managed for their intended purpose while sustaining underlying ecosystem functions. Related to the topics of ecosystem management and marine spatial planning, the Commission urged the task force to offer a stronger proposal for ocean observations and its associated infrastructure needs. To date, ocean observation efforts have fallen short of what is needed to achieve effective collection, assimilation, and dissemination of comprehensive ocean data to support spatial and ecosystem-based ocean management.

The Commission also offered several recommendations to the task force based on the properties of climate change (i.e., complexity, uncertainty, urgency) and the human development patterns that drive it. The Commission found that the task force based its recommendations on the assumption that human needs could be met through better ocean management. In contrast, the Commission noted that—if human needs for energy, food, and water maintain their current trajectories—they would soon outpace the productive capacity of marine environments. The Commission therefore recommended an ocean policy based on more precautionary and explicit recognition of the manner in which ocean conservation will be affected by continued human population growth as well as the need to address this issue through immediate actions. It also recognized the uncertainties inherent in attempting to manage oceans and human activities affecting it, and it called for greater investment in research, funded by those who benefit from ocean industries, to reduce those uncertainties. The Commission also noted the global nature of climate change and ocean systems worldwide, emphasizing how both are affected by, and will affect, nations worldwide. As such, the Commission recommended that the task force establish a stronger plan for pursuing and achieving international cooperation on ocean and atmospheric systems.

The Commission also provided comments on the policy coordination framework proposed by the task force. The Commission noted that, within the U.S. federal government, a realignment of priorities and interagency processes is necessary to address

climate and ocean issues, as these are inherently linked to other national priorities such as energy, transportation, defense, the economy, and quality of life. Therefore, the Commission recommended structural and functional changes throughout U.S. federal agencies, not limiting the responsibilities to those agencies with direct ocean-related mandates. The Commission also noted that each agency brought into the ocean policy effort would need to commit to promoting its effectiveness—even if it means adjusting their priorities, plans, and budgets—and the task force should clarify the mechanisms for monitoring and evaluating the implementation of activities of each agency in the policy coordination framework. The Commission applauded the task force’s recommendation to use benchmarks and indicators to measure progress under the ocean policy. It noted that such markers are necessary for assessing the status of marine ecosystems and the socioeconomic benefits sought from them (e.g., food, energy, raw materials, transportation, and national security).

Finally, the Commission recognized that the previous administration also had developed and promoted a U.S. Ocean Action Plan, which served as a document to guide, plan, and advance the United States’ systems for governing and managing ocean ecosystems and resources. The Commission noted that useful lessons could be drawn from that recent experience, and it recommended that the interagency task force (a) review the structure and function of the previous framework under the Ocean Action Plan to determine if it was effective and why or why not, (b) describe how those involved in the task force’s proposed framework will assess their effectiveness, and (c) describe how the task force’s framework will move society toward the goal of healthy, sustainable marine ecosystems.

Interim Framework for Marine Spatial Planning

On 9 December 2009 the task force submitted an “Interim Framework for Effective Coastal and Marine Spatial Planning” (Interim Framework) to the President. The task force announced this report in the *Federal Register* (74 Fed. Reg. 67178) and requested public review and comment by 12 Febru-

ary 2010. In this document, the task force defined coastal and marine spatial planning as “a comprehensive, adaptive, integrated, ecosystem-based, and transparent spatial planning process, based on sound science, for analyzing current and anticipated uses of ocean, coastal, and Great Lakes areas.” The framework identifies areas most suitable for various types or classes of activities to reduce conflicts among uses, reduce environmental impacts, facilitate compatible uses, and preserve critical ecosystem services to meet economic, environmental, security, and social objectives. The task force emphasized the need for integration, cooperation, and coordination within and among governments, and it set forth a series of goals, guiding principles, and a proposed timeline to facilitate progress toward achieving its vision.

To put its concepts into operation, the task force described regional ocean planning zones within which regional planning bodies would implement the marine spatial planning framework via development agreements and work plans. Each region would have flexibility to adapt to its unique resources, economies, and planning needs and would (1) establish its own objectives, (2) identify existing efforts for managing marine resources, (3) engage stakeholders, (4) consult with scientific experts, (5) analyze appropriate data, (6) evaluate alternative use scenarios and trade-offs, (7) issue a draft plan with environmental impact analyses for public comment, (8) release a final plan for review by the National Ocean Council, and (9) implement, monitor, and evaluate

the plan. Each regional plan would describe its area and regulatory context; assess regional environmental and socioeconomic conditions; describe its objectives, strategies, and mechanisms; identify plans for ensuring compliance, monitoring, and enforcement; and establish a process for resolving disputes. The National Ocean Council, to be established based on the task force’s ocean policy recommendations, would first establish national objectives and national outcome-based performance measures and then review each plan to ensure consistency with the national ocean policy.

At the end of 2009 the Commission was reviewing this framework in light of the priorities and concepts it described in earlier letters and preparing to provide comments to the task force.

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Chapter IV

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 effects of human-related activities. Chapter II presented information pertaining to species occurring in the central Pacific islands region—Hawaiian monk seals, spinner dolphins, false killer whales, and dugongs. Chapter V presents information pertaining to species occurring primarily in foreign and international waters. This chapter focuses on species occurring in U.S. waters. 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 IV-1). In addition, the Commission often directs attention to other species or populations of marine mammals not so listed whenever special conservation challenges arise that may affect them.

During 2009 special attention was directed to polar bears, Pacific walruses, Arctic ice seals, Cook Inlet beluga whales, southern resident killer whales, North Pacific and North Atlantic right whales, sea otters in Alaska and California, and Florida manatees.

Polar Bear *(Ursus maritimus)*

The polar bear, perhaps the quintessential symbol of the Arctic, is the largest member of the genus *Ursus*. The species is distributed throughout the circumpolar Arctic in 19 populations totaling 20,000 to 25,000 bears (Aars et al. 2006). Polar bears evolved to exploit the Arctic sea ice niche and, in recent years, climate disruption has led to a rapid decrease in sea ice habitat. The projected effects of climate disruption, coupled with other threats, has raised serious concerns about the fate of polar bears, dependent as they are on sea ice habitat and healthy populations of ice seals for prey. The risk to polar bears has been

recognized for more than a decade and prompted the Polar Bear Specialist Group of the International Union for Conservation of Nature (IUCN) to adopt a resolution in 2001 calling for increased research into the effects of global warming (Lunn et al. 2002). In 2005 the Polar Bear Specialist Group recommended that the species' status be changed from "lower risk" to "vulnerable" based on the likelihood of an overall decline of more than 30 percent in the size of the total population within the next 35 to 50 years (Aars et al. 2006). This threat also prompted the Fish and Wildlife Service in 2008 to list the polar bear as a threatened species throughout its range.

Two populations of polar bears are found within the jurisdiction of the United States. The Beaufort Sea stock numbers about 1,500 animals and ranges into Canada (Regehr et al. 2006). Although this population appeared to remain stable through the 1980s and 1990s at about 1,800 animals, it apparently declined by about 20 percent to about 1,500 animals by the mid-2000s. The available information is insufficient to confirm this statistically because of differ-

Table IV-1. Marine mammals listed as endangered (E) or threatened (T) under the Endangered Species Act or depleted (D) under the Marine Mammal Protection Act, as of 31 December 2009

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	East Africa to Japan; Philippines; Australia; Palau
Polar Bear			
Polar Bear	<i>Ursus maritimus</i>	T/D	Throughout its range in the circumpolar Arctic
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>	T/D	Aleutian Islands to Cook Inlet, Alaska
Seals and Sea Lions			
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>Arctophoca philippii townsendi</i>	T/D	Baja California, Mexico, to Southern California
Northern fur seal	<i>Callorhinus ursinus</i>	D	North Pacific from California to Japan; Bering Sea
Steller sea lion, western population	<i>Eumetopias jubatus</i>	E/D	North Pacific from Japan to Prince William Sound, Alaska (west of 144° W longitude)
Steller sea lion, eastern population	<i>Eumetopias jubatus</i>	T/D	North Pacific from Prince William Sound, Alaska, (east of 144° W longitude) to central California
Saimaa ringed seal	<i>Pusa hispida saimensis</i>	E/D	Lake Saimaa, Finland
Whales, Porpoises, and Dolphins			
Chinese river dolphin (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
NE 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
Common bottlenose dolphin, U.S. mid-Atlantic coastal population	<i>Tursiops truncatus</i>	D	Atlantic coastal waters from New York to Florida
Beluga, Cook Inlet population	<i>Delphinapterus leucas</i>	E/D	Cook Inlet, Alaska
North Atlantic right whale	<i>Eubalaena glacialis</i>	E/D	North Atlantic Ocean
North Pacific right whale	<i>Eubalaena japonicus</i>	E/D	North Pacific Ocean/Bering Sea
Southern right whale	<i>Eubalaena australis</i>	E/D	South Atlantic, South Pacific, Indian, 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
Gray whale, western North Pacific population	<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.

ences in methods and analyses among the relevant studies. However, several independent observations—including reduced cub survival, smaller body size, poorer body condition than in the adjacent northern Beaufort Sea population, earlier emergence from dens, reduced survival of adult females in years with an extended open-water season and with sea ice farther from shore, and several occurrences of cannibalism, starvation, and incidents in which bears clawed their way through thick ice attempting to capture seals—are all consistent with the hypothesis that the population is under nutritional stress due to earlier and more extensive retreat of ice in summer and later formation of ice in fall and winter (Regehr et al. 2006, 2010; Amstrup et al. 2006; Stirling et al. 2008).

The United States shares jurisdiction of the Chukchi/Bering Seas stock with Russia (Lunn et al. 2002). The best estimate of abundance is about 2,000 bears, but this is a crude approximation only. Otherwise, little information is available on the status of the Chukchi/Bering Seas stock, but high levels of human-caused mortality, including illegal hunting, are currently being reported in Russia, where harvest has not been allowed since 1956. As with the Beaufort Sea stock, this stock has experienced a reduction in sea ice habitat in recent years (Durner et al. 2009), but the effects of this reduction on individuals and the population as a whole currently are unknown.

Stock Assessments

Section 117 of the Marine Mammal Protection Act requires the Fish and Wildlife Service to prepare stock assessments for each marine mammal stock under its jurisdiction that occurs in waters under the jurisdiction of the United States, including the southern Beaufort Sea and Chukchi/Bering Seas stocks of polar bears. By virtue of the polar bear being listed as a threatened species under the Endangered Species Act, these stocks are considered “strategic” and, as such, stock assessment reports are to be reviewed at least annually.

The Service published a notice in the *Federal Register* on 18 June 2009 (74 Fed. Reg. 28946) announcing the availability of new draft stock assessment reports for the southern Beaufort Sea and Chukchi/Bering Seas stocks of polar bears. The Com-

mission provided comments on those draft reports in a 21 September 2009 letter.

The Commission believed that the draft assessment report for the southern Beaufort Sea stock did a good job of summarizing the relevant information but suffered from certain shortcomings when applying that information. For example, although the Service included recent data that supported a shift in the geographic boundary of this stock, the draft assessment report retained the older range delineation, primarily because the new range had yet to be accepted by the parties to the Polar Bear Management Agreement for the Southern Beaufort Sea between the Inuvialuit Game Council of Canada and the North Slope Borough of Alaska. The Commission recognized the valuable role of the parties to that agreement in managing this shared stock of polar bears but noted that the parties’ views should not be determinative for purposes of preparing a stock assessment report. The Commission advised that the Marine Mammal Protection Act required the assessment report to reflect the best scientific information available and recommended that the most credible information be included in the final report. The Commission further noted that a shift in the stock boundary would necessitate a reassessment of the minimum population estimate for the stock.

The Commission also observed that the Service had used an outdated estimate of the maximum net productivity rate for polar bears (6.03 percent) that was unrealistically high, given the environmental changes occurring and predicted to continue throughout the polar bears’ range. Because loss of sea ice was likely to have adverse effects on the reproductive and denning success of polar bears and on the survival of cubs, the Commission indicated that reliance on an estimate of reproductive potential derived 15 years ago, before polar bears began to experience the effects of climate disruption, was no longer appropriate.

Using the old stock boundary and what the Commission believed was an unrealistically optimistic estimate of the maximum net productivity rate for the stock, the Service calculated a potential biological removal level for the stock of 22 animals per year. The draft report noted, however, that annual removals from the population, primarily from subsistence

hunting, averaged 54 per year. The Commission recognized that potential biological removal levels were developed to govern incidental taking of marine mammals in commercial fisheries, not subsistence hunting, but nevertheless expressed concern that recent harvests from this stock exceeded the potential biological removal level by more than a factor of two. The Commission therefore recommended that the Service work with the North Slope Borough, the Inuvialuit Game Council, and Canadian authorities to review whether current harvest limits are sustainable and make adjustments as necessary.

The Commission's comments on the draft stock assessment report for the Chukchi/Bering Seas stock focused on two critical shortcomings, the lack of a reliable population estimate and the lack of a recent assessment of productivity in key denning areas. Not only do these data gaps undermine the Service's ability to prepare an adequate stock assessment report but they make it nearly impossible to detect trends in abundance, reproductive and survival rates, and age and sex composition of the stock as the effects of climate disruption and habitat loss are felt. To begin to address these shortcomings, the Commission recommended that the Service give top priority to reaching an agreement with Russia on a joint strategy to survey and monitor this population.

The minimum population estimate of about 2,000 individuals included in the draft stock assessment report is based on an estimate developed by the IUCN Polar Bear Specialist Group. The Commission noted, however, that the estimate appears to be a best estimate, rather than a minimum estimate. If this is the case, a downward adjustment might be needed to provide reasonable certainty that the current population is equal to or larger than the estimate. The Commission identified a need for the Service to provide an explanation as to why 2,000 bears would be both an appropriate best estimate and minimum estimate if it were retained in the final stock assessment report. As with the southern Beaufort Sea stock, the Service used a maximum net productivity rate of 6.03 percent to calculate the potential biological removal level for the Chukchi/Bering Sea stock. If the estimates of the minimum population size and net reproductive rates are too high, the potential biological removal level calculated using those estimates would also be

unrealistically high. The Commission noted that this was a concern given the uncertain but potentially large number of removals from this stock, particularly in the Russian portion of the range.

The Service published a notice of availability of the final stock assessment reports in the *Federal Register* on 30 December 2009 (74 Fed. Reg. 69139). Those reports are available at <http://www.nmfs.noaa.gov/pr/sars/species.htm#fws>.

Listing Polar Bears under the Endangered Species Act

In February 2005 the Center for Biological Diversity petitioned the Secretary of the Interior to list the polar bear as a threatened species under the Endangered Species Act. The petition contended that the polar bear "faces likely global extinction in the wild by the end of this century as a result of global warming." Citing a recent report by the Arctic Climate Impact Assessment (2004), the petition predicted that summer sea ice coverage will decline by more than 50 percent and possibly disappear completely. The petition contended that even partial loss of sea ice has the potential to drive the polar bear to extinction within the foreseeable future.

Under the provisions of the Endangered Species Act, the Fish and Wildlife Service is required to make a determination within 90 days of receiving a listing petition as to whether the petition presents substantial information that the listing may be warranted. If an affirmative finding is made, the Service must promptly initiate a review of the species' status and, within 12 months of receipt of the petition, publish either (1) a finding that listing is not warranted, (2) a proposed rule to list the species, or (3) a finding that listing is warranted but precluded by other pending listing proposals. The Fish and Wildlife Service published a finding on 9 February 2006 that the petition presented sufficient information to initiate a more thorough status assessment of polar bears worldwide. The Endangered Species Act defines an "endangered species" as any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined as any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act specifies

that a status assessment and subsequent listing determination be based on the following five factors: (1) present or threatened destruction, modification, or curtailment of habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; and (5) other natural or manmade factors affecting the species' continued existence.

On 9 January 2007 the Fish and Wildlife Service published a proposed rule to list all populations of polar bears as threatened under the Endangered Species Act. The Service believed that the species as a whole met the definition of a threatened species and the various populations need not be listed separately. The proposed rule analyzed each of the five factors that are to be considered in making listing determinations and found that the first factor—present or threatened destruction, modification, or curtailment of the species' habitat or range—was sufficient basis for listing. The Service reviewed various climate models that indicate a likelihood that sea ice, on which polar bears are dependent for hunting, seasonal movements, resting, and mating, will continue to decrease in extent and thickness. The Service noted that some models predict that, during summer months, sea ice will disappear almost completely by the end of this century. Researchers have already detected a link in certain areas (e.g., southern and western Hudson Bay, southern Beaufort Sea) between a warming climate and declines in polar bear condition, distribution, and numbers (Regehr et al. 2007, 2009; Stirling et al. 1999; Stirling and Parkinson 2006). The Service found that other potential listing factors could take on added importance as polar bears are further stressed by habitat change, but that none of these other factors, by themselves, currently threatens the species throughout all or a significant portion of its range.

Shortly after publication of the proposed listing rule, the Secretary of the Interior asked the U.S. Geological Survey to develop new information, models, and interpretations regarding polar bears and their sea ice habitats that would be made available within the one-year decision-making time frame. Specifically, the Secretary asked the agency to (1) develop population projections for the southern Beaufort Sea

population and analyze existing data pertaining to two polar bear populations in Canada, (2) evaluate Northern Hemisphere sea ice projections as they relate to polar bear habitat and the species' future distribution, and (3) model future range-wide polar bear populations by developing a synthesis of the range of likely spatial and numerical responses to sea ice projections. In response to this directive, the U.S. Geological Survey prepared nine new reports on polar bear status and demography, uncertainty concerning climate models, and the relationships between sea ice projections and polar bear distribution. These were made available for comment by the Fish and Wildlife Service on 20 September 2007.

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

The Marine Mammal Commission submitted comments on the proposed rule and additional comments on the implications of the reports prepared by the U.S. Geological Survey. The Commission's ini-

tial comments noted that polar bears currently have a relatively large total population size and a broad distribution and that the Commission did not believe that the species currently is in danger of extinction. However, the Commission concurred with the Service that the loss of sea ice habitat as a consequence of continued climate disruption and the lack of adequate management mechanisms to address sea ice recession will likely place the species in danger of extinction throughout all or a significant portion of its range within the foreseeable future (i.e., within the 45-year time frame considered by the Service). The Commission therefore supported listing the species as threatened.

After reviewing the information in the U.S. Geological Survey reports, the Commission submitted supplementary comments. The Commission believed that the papers made available by the Service made a compelling case that the polar bear as a circumpolar species faces threats that are likely to reduce its numbers in the foreseeable future to the point where the risk of extinction is significant. The Commission further noted that some populations already are in danger of extinction unless the declining trends in sea ice coverage are reversed. Based on the new information indicating that polar bears inhabiting the divergent ice ecoregion and the seasonal ice ecoregion could be extirpated by the middle of the 21st century, the Commission recommended that populations in those regions (the southern Beaufort Sea, Chukchi Sea, Laptev Sea, Kara Sea, Barents Sea, western Hudson Bay, and southern Hudson Bay) be listed as endangered. The Commission also reiterated its earlier recommendation that polar bear populations in the other two ecoregions be listed as threatened.

The Fish and Wildlife Service published a final rule on 15 May 2008 (73 Fed. Reg. 28212) listing the polar bear throughout its range as a threatened species. The listing rule presented detailed information on the population trends and demographics of polar bears worldwide and addressed the five listing factors to be considered under section 4(a)(1) of the Endangered Species Act. The Service's analyses focused on the factor pertaining to the present or threatened destruction, modification, or curtailment of the species' habitat or range, concluding that list-

ing was warranted based on the ongoing and projected decline of sea ice habitat and the effect that this will have on polar bear populations worldwide.

The listing decision prompted legal challenges from both sides. The state of Alaska, hunters, and various trade associations filed lawsuits contending that polar bears did not meet the listing criteria under the Endangered Species Act. The environmental group that had petitioned for the listing and other environmental organizations sued the Service contending that a listing as endangered was warranted. As discussed later in this section, these challenges were pending at the end of 2009.

Special Rule for Polar Bears

If a species is listed as endangered under the Endangered Species Act, all of the prohibitions set forth in section 9 of the Act automatically apply. For species listed as threatened, however, this is not the case. Rather, section 4(d) of the Act directs the Fish and Wildlife Service to adopt such regulations as are "necessary and advisable" for the conservation of the species. The Service has the option of adopting the full suite of prohibitions applicable to endangered species or choosing a different combination tailored to the threats faced by the particular species. In the case of polar bears, the Service published an interim final rule under section 4(d) concurrent with its listing decision. Both were published in the *Federal Register* on 15 May 2008 (73 Fed. Reg. 28212).

For the most part, the Service relied on the provisions applicable under the Marine Mammal Protection Act and the Convention on International Trade in Endangered Species of Fauna and Flora (CITES). If an activity is authorized under a permit or authorization issued under the Marine Mammal Protection Act or is subject to one of the Act's exceptions or exemptions, no additional authorization under the Endangered Species Act would be needed. This would include, for example, subsistence hunting and trade in handicrafts, cultural exchanges among circumpolar Natives, taking in defense of life or property or for the welfare of the animal, scientific research and enhancement permits, and incidental take authorizations. Similarly, no additional Endangered Species Act authorization would be needed for

the import or export of a polar bear or its parts if it is authorized under a CITES permit or is allowed under one of the Convention's exceptions (e.g., for personal or household effects). If, however, one of the Marine Mammal Protection Act or CITES exceptions is not applicable, an authorization under the Endangered Species Act provisions would be required. The interim final rule also clarified that, as a consequence of the listing, certain activities that previously were permissible could no longer be authorized, such as the taking or importation of polar bears for purposes of public display or the importation of polar bear trophies from Canada.

Another provision of the interim final rule specified that none of the prohibitions that otherwise would be applicable under its regulations implementing the Endangered Species Act will apply to the taking of a polar bear "that is incidental to, but not for the purpose of, carrying out an otherwise lawful activity within any area subject to the jurisdiction of the United States, except Alaska."

Federal actions, including those carried out, funded, or authorized by federal agencies, that may affect a listed species or its critical habitat are subject to consultation under section 7 of the Endangered Species Act to ensure that they are not likely to jeopardize the continued existence of the species or destroy or adversely modify critical habitat. Although an action may affect species or habitats that occur outside the area where the action will take place (e.g., through indirect effects), the Service stated that, to meet the applicable regulatory standards, such effects must (1) be caused by the action subject to consultation and (2) be reasonably certain to occur. The Service explained that "effects are only appropriately considered in a section 7 analysis if there is a causal connection between the proposed action and a discernible effect to the species or critical habitat that is reasonably certain to occur." The Service recognized that every agency action that contributes greenhouse gases to the atmosphere arguably could trigger a consultation for polar bears or other species that are affected by climate disruption. Nevertheless, the Service thought that there was an insufficient basis for drawing a causal connection between emissions from a specific federal action and impacts on the species or its critical habitat. As such, the Service

indicated that it does not intend to consult on federal actions that occur outside the polar bear's range but that could affect the species or its habitat through the release of greenhouse gases.

The Marine Mammal Commission's comments on the interim rule are discussed in its 2008 annual report. In summary, the Commission noted that the regulations relied almost exclusively on the provisions of the Marine Mammal Protection Act and CITES to provide for the conservation of polar bears. However, inasmuch as those same provisions had not been sufficient to keep the species from reaching the point where it warrants listing as a threatened species, the Commission did not see how relying on those provisions without any supplementation would satisfy the mandate of the Endangered Species Act to bring the species to the point where the Act's protective measures are no longer needed. Most notably, the interim final rule did not include any provisions specifically designed to address the primary threat faced by polar bears: the ongoing and projected loss of sea ice habitat.

The Fish and Wildlife Service published its final special rule for polar bears under section 4(d) of the Endangered Species Act on 16 December 2008 (73 Fed. Reg. 76249). In most respects, the final rule tracked the provisions of the interim final rule. Minor clarifying changes were made to the provision concerning deference to authorizations under the Marine Mammal Protection Act and CITES. The one substantive change concerned the provision applicable to incidental takes. The Service adopted a recommendation made by the Commission that the exemption for such takings be revised to be applicable to all areas within the current range of the polar bear that are subject to U.S. jurisdiction, not just within Alaska. Also on 16 December 2008 the Fish and Wildlife Service and the National Marine Fisheries Service published a final rule making changes to the regulations governing consultations under section 7 of the Endangered Species Act regulations (73 Fed. Reg. 76272). Those regulations adopted parallel changes in how greenhouse gas emissions would (or would not) be addressed during section 7 consultations.

Several legislators expressed dissatisfaction with the special rule for polar bears and the corresponding changes in the section 7 regulations. In response,

Congress added a provision to the Omnibus Appropriations Act, 2009 (Pub. L. 111-8, section 429) granting the agencies a 60-day period in which to withdraw or re-issue those regulations without the need to undertake a new rulemaking. The Fish and Wildlife Service and the National Marine Fisheries Service made partial use of this authority and published a final rule in the *Federal Register* on 4 May 2009 (74 Fed. Reg. 20421) rescinding the changes to the section 7 regulations. The Secretary of the Interior, however, declined to use this authority to withdraw or modify the special rule for polar bears. In an 8 May 2009 press release, the Secretary explained that revoking the final rule would mean reverting to the 15 May 2008 interim final rule, which would not add to the protections provided to polar bears but would lead to uncertainty and confusion. In making that announcement, Secretary Salazar committed the Department of the Interior to monitoring the implementation of the special rule closely to determine if additional measures are needed.

As discussed later in this section, legal challenges to the adoption of the special rule and its content are part of ongoing litigation concerning the listing of polar bears and related actions.

Critical Habitat

Section 4(b)(6)(C) of the Endangered Species Act requires that critical habitat be designated concurrent with publication of an endangered or threatened listing determination except in certain circumstances. One of the exceptions is when the agency responsible for the listing finds that critical habitat for the species “is not then determinable,” in which case it has one additional year in which to complete the designation process. In its final listing rule, the Service invoked this exception to extend the deadline for designating critical habitat, or determining that such a designation is not prudent, until 15 May 2009. However, as discussed in the following litigation section, the Service later entered into a settlement agreement with environmental groups extending this deadline until 30 June 2010.

The Fish and Wildlife Service published a proposed rule to designate critical habitat for the polar bear on 29 October 2009 (74 Fed. Reg. 56058). Although the polar bear is a circumpolar species and

essential habitat occurs outside the United States, regulations implementing the critical habitat requirements of the Endangered Species Act (50 C.F.R. § 424.12(h)) specify that critical habitat designations are to be limited to areas under the jurisdiction of the United States. In accordance with this limitation, the Service proposed to designate approximately 519,403 km² (200,541 mi²) in Alaska and adjacent territorial waters and waters within the U.S. Exclusive Economic Zone as critical habitat for the polar bear.

As part of its review to identify those areas containing physical and biological features essential to the conservation of polar bears, the Service identified three “primary constituent elements” meeting those criteria: (1) sea ice habitat used for feeding, breeding, denning, and movements, (2) terrestrial denning habitat, and (3) barrier islands used for denning and movements along the coast and that provide refuge from human disturbance. The Service determined that those areas faced potential threats from climate disruption; oil and gas exploration, development, and production; human disturbance; and commercial shipping and therefore merited special management considerations or protection and that each habitat type warranted inclusion in the proposed critical habitat designation. In proposing to include sea ice habitat in the proposed designation, the Service recognized that such habitat varies seasonally and from year to year and that polar bear use of such habitat is not uniform. Thus, the Service proposed to limit the inclusion of sea ice habitat to those areas over the continental shelf in waters 300 m or less in depth. The southern boundary of the proposed designation was set to correspond to the range of the Chukchi/Bering Seas population, as established by telemetry data. By far, sea ice habitat constitutes the largest area included in the proposed designation, accounting for 96 percent of the area proposed.

Two provisions of the Endangered Species Act allow the Service to exclude certain areas from a critical habitat designation. Section 4(b)(2) of the Act directs the Service to consider the economic and other relevant impacts of specifying particular areas as critical habitat and allows it to exclude such areas if it determines that the benefits of doing so outweigh the benefits of designation. Section 4(a)(3)(B)(i) of the Act directs the Service not to designate as critical

habitat any lands or other areas owned or controlled by the Department of Defense or designated for the Department's use if those areas are subject to an integrated natural resources plan prepared under the Sikes Act and that plan provides benefits to the species for which critical habitat is being designated. At the time that the proposed rule to designate critical habitat was published, the Service had yet to complete its economic analysis of the impact of the proposed designation. As such, the Service did not propose excluding any areas on the basis of economic considerations. The Service indicated that it was preparing such an analysis that would be made available for public review and comment and considered in its final determination. The Service identified 11 areas operated by the Department of Defense (primarily radar installations) within the proposed critical habitat area that potentially qualified for exclusion under the second exception. The Service indicated that it would review the applicable integrated natural resources plans for these facilities to see if those plans provide benefits to polar bears.

The Marine Mammal Commission submitted comments regarding the proposed critical habitat designation on 28 December 2009. The Commission noted that, although the area proposed by the Service is large, because of considerable inter-annual variation in the distribution of different sea ice habitat types and the large ranges of individual polar bears, the entire area proposed for designation constitutes important habitat that, for one reason or another, is essential to the conservation of the species. As such, the Commission supported adoption of the proposed rule. The Commission agreed with the Service's determination that there currently was no need to designate critical habitat in areas outside the existing range of polar bears. The Commission cautioned, however, that as sea ice is lost in the future, polar bears will have little choice but to move into marginal habitats. As such, less-productive areas that currently are not essential for conserving the species may become so in the future. This being the case, the Commission recommended that, once an initial designation has been finalized, the Service establish a schedule for periodic reviews to consider changes in habitat-use patterns and the need to supplement the original designation.

The Commission also reiterated a point that it had made in commenting on the proposed regulations to list the polar bear under the Endangered Species Act. The Commission took exception to the Service's view that addressing the underlying reason that the species is at risk of extinction and essential habitat is being lost (i.e., global climate disruption) was beyond the scope of the Act. In the Commission's view, failing to address this central issue is contrary to the very purpose of the Act. The fact that this is a complex, global problem does not exclude it from the Act's mandates to conserve listed species, including the polar bear, and the ecosystems on which those species depend. The Commission therefore recommended that the Service work with other key agencies, including the Environmental Protection Agency, the Department of Energy, and the Department of Transportation, to develop a coordinated strategy to identify how best to use their authorities to address climate disruption, thereby promoting the conservation of polar bears and protecting the species' essential habitat.

The Commission's comments also considered possible exclusions of certain areas from a critical habitat designation. The Commission agreed that the Service should consider exclusions of military sites based on their integrated natural resources plans but noted that, for polar bears in particular, there was a need to ensure that such plans provided adequate long-term protection for the species and its habitat. In light of the projected changes in available polar bear habitat in the foreseeable future and likely shifts in distribution, the Commission advised that any exclusion would need to be reviewed periodically to ensure that the applicable plans remain adequate to protect polar bears and to identify revisions that may be necessary to address changing and emerging threats. The Commission deferred commenting on other possible exclusions pending completion of the Service's economic analysis. It noted, however, that, just as the National Marine Fisheries Service had done in its proposed designation of critical habitat for the Cook Inlet beluga whale, the analysis of possible economic impacts from a critical habitat designation should focus on whether there are any new impediments to economic activities beyond those already caused by the requirement that federal activ-

ities not jeopardize the continued existence of listed species.

Publication of the economic analysis of the effects of designating critical habitat for the polar bear was pending at the end of 2009. The Service anticipated completing the designation in 2010.

Recovery Plan

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

At the end of 2009 the Fish and Wildlife Service was considering whether and, if so, how best to proceed with the preparation of a polar bear recovery plan. Presumably, efforts to develop such a plan will consider the existing conservation plan developed under the Marine Mammal Protection Act. However, the conservation plan was finalized in 1994 and does not address impacts associated with climate disruption, which is now recognized as the primary threat to the species.

Trophy Imports

Amendments to the Marine Mammal Protection Act enacted in 1994 allow the Secretary of the Interior to issue permits authorizing the importation of

polar bear trophies from sport hunts conducted in Canada, provided that certain findings are made. Among other things, the applicable provision (section 104(c)(5)) requires the Secretary to find that Canada has a monitored and enforced sport hunting program that is consistent with the purposes of the Agreement on the Conservation of Polar Bears and the Marine Mammal Protection Act and based on scientifically sound quotas that will ensure the maintenance of the affected population stock at a sustainable level. Imports of trophies had been approved from 6 of 13 management units identified by Canada. Imports from a seventh management unit (M'Clintock Channel) also had been approved but only for bears that were legally harvested prior to 1 April 2000 when the sustainability finding was revoked. Imports from the other management units never were authorized except under a grandfather provision that allowed the importation of any polar bear trophy legally taken in Canada before 18 February 1997, the date on which the Fish and Wildlife Service published regulations implementing the polar bear import provision.

All of this changed, however, when the Fish and Wildlife Service listed the polar bear as a threatened species. Under the statutory definition of “depletion,” any species or population of marine mammal listed as endangered or threatened under the Endangered Species Act is automatically considered to be depleted under the Marine Mammal Protection Act. In accordance with section 102(b)(3), depleted marine mammals may be imported into the United States only for purposes of scientific research or for enhancing the survival or recovery of the species or stock. In an opinion issued by the Department of the Interior’s Solicitor on 23 May 2008 (available at <http://www.doi.gov/solicitor/opinions.html>), the agency determined that this general import prohibition took priority over the specific permit provision applicable to polar bear trophies. The opinion concluded that “Congress did not intend to allow the importation of sport-hunted polar bear trophies from Canada under section 104(c)(5) of the MMPA if polar bears were listed as a threatened species or endangered species under the ESA.” The Solicitor noted, however, that the Service can still authorize the importation of polar bear parts under scientific research or enhancement

permits, provided that all of the applicable statutory and regulatory requirements have been satisfied. Consistent with the Solicitor's determination, the Service suspended its review of pending applications for trophy import permits and informed those who had been issued import permits but had yet to import their trophies that those permits were no longer valid. Some of the hunters whose import permit applications were pending at the time of the listing, as well as hunting organizations, filed lawsuits challenging the Service's determination. As discussed later, these lawsuits have been consolidated with several other cases stemming from the listing of polar bears under the Endangered Species Act.

Following the listing of the polar bear as a threatened species, Conservation Force submitted applications on behalf of several hunters seeking enhancement permits to authorize the importation of polar bear trophies from Canada. All of the bears had been taken in sport hunts from the Gulf of Boothia population, which was not one of the populations that had been approved by the Fish and Wildlife Service under the trophy import provision. The applicants contended, among other things, that allowing U.S. hunters to import trophies taken in Canada's sport hunting program enhanced the survival and recovery of polar bears by providing (1) socioeconomic benefits to Native communities, thereby providing an incentive for Inuit hunters to support effective management programs, (2) additional funding to support population monitoring and other research and management measures, and (3) an incentive for Canada to adopt and enforce harvest limits that further the goals of the Marine Mammal Protection Act.

The Marine Mammal Commission provided comments on these applications to the Fish and Wildlife Service on 16 December 2008. In its comments, the Commission reviewed the history behind enactment of the Marine Mammal Protection Act's enhancement permit authority. The Commission had participated in drafting those provisions and explained that Congress had crafted a rather narrow exception and, notwithstanding the potential for some general conservation benefit, never intended for sport hunting to be considered an enhancement activity. The Commission also provided an analysis of whether the

proposed imports and underlying hunting activities satisfied the applicable statutory criteria for obtaining an enhancement permit. The Commission indicated that the applicants had not demonstrated that the proposed taking and importation are likely to contribute significantly to maintaining or increasing the distribution or numbers of polar bears necessary to ensure their survival or recovery. The applicants seemed to be suggesting that Canada would not be managing polar bears responsibly were it not for the incentives provided by sport hunting, something that would be contrary to its obligations as a party to the Agreement on the Conservation of Polar Bears. The Commission further noted that for an activity to qualify for an enhancement permit, it should address the factors that are causing a decline in the population or otherwise compromising its persistence. In this case, the hunting and importation of polar bear trophies would do nothing to address the primary threat faced by the species, the loss of sea ice habitat.

The Commission also noted that all of the bears for which permits were being sought had been taken from a population for which imports had not been approved under the trophy import provisions. That is, the Service has yet to determine that the management program for that population is based on scientifically sound quotas that ensure the maintenance of the population at a sustainable level. For that reason, the Service would have even less basis for concluding that imports would meet the enhancement permit requirements.

Consistent with the Commission's recommendation, the Service denied those applications on 2 February 2009. This prompted Conservation Force to seek reconsideration of the denials on behalf of the applicants. The Service forwarded that request to the Marine Mammal Commission to provide supplemental comments and recommendations. The Commission responded in a letter dated 17 April 2009. In particular, the Commission noted that the request seemed to blur the distinction under the Marine Mammal Protection Act of what constitutes "enhancement" under the applicable permit provision and the more general statutory definition of the term "conservation and management." Not all conservation and management activities constitute enhancement. The Commission did not believe that Canada's hunting program, or

authorizing the importation of trophies taken under that program, would do anything to address the factors identified by the Service in its listing rule as posing a threat to the survival of the polar bear.

One of the criteria for issuing an enhancement permit is whether the proposed taking or importation is consistent with any conservation or recovery plan adopted for the species. Conservation Force argued that this requirement was irrelevant in this instance because, in its view, the population is robust and not in need of recovery. The Commission observed that, if this were the case, there would be no need to enhance the status of the population. As such, the statutory requirement that the taking or importation be necessary to ensure the survival or recovery of the species or stock would not be met. Consistent with these comments, the Commission again recommended that the requested enhancement permits be denied.

The Service denied the request for reconsideration on 28 April 2009. This prompted Conservation Force to sue the Service seeking to overturn that determination. These claims will be considered as part of the consolidated lawsuit related to the listing decision, issuance of the special 4(d) rule, and other permit actions.

The listing of polar bears and its implications for the importation of trophies from Canada also attracted the attention of Congress. Shortly after the close of the initial comment period on the proposed listing rule, members of Congress introduced two bills designed to “ensure that citizens of the United States do not contribute to polar bear mortalities in Canada” by eliminating the trophy import permit provision and adding a new provision specifying that no permit may be issued to authorize the importation of polar bear parts taken in a sport hunt. Following publication of the listing rule and the Service’s determination that it could no longer authorize the importation of polar bear trophies, Alaska’s congressman introduced two bills to reinstate the permitting authority. The first bill would have allowed polar bears legally taken in Canada before 14 May 2008 to be imported into the United States, notwithstanding the listing. The second bill took a broader approach and would have reinstated the permitting authority of section 104(c)(5) in its entirety. Under the second

bill, hunters not only would be able to import polar bear trophies taken prior to the publication of the listing rule, but they would have been able to import trophies taken in Canada in the future from approved management units.

Shortly after the new Congress convened in 2009, Congressman Young of Alaska reintroduced the bills that would authorize imports of polar bears taken in Canada. The bill limited to polar bears taken before the date of listing as threatened was designated as H.R. 1054. Senator Crapo introduced a similar bill in the Senate as S. 1395. The second, broader bill was introduced as H.R. 1055.

The Subcommittee on Insular Affairs, Oceans, and Wildlife of the House Committee on Natural Resources held a hearing on 22 September 2009 to consider H.R. 1054. The Deputy Director of the Fish and Wildlife Service testified on behalf of that agency. His testimony explained the legal framework that precluded the Service from authorizing imports and explained that, following publication of the proposed listing rule, the agency had engaged in outreach efforts with hunting groups and outfitters in Canada to apprise them that imports would no longer be allowed if the species were listed. The Service attempted to contact those hunters who had been issued permits, but who had not yet imported their trophies, to advise them that the listing decision was imminent and could go into effect as early as 15 May 2008. The witness indicated that, on the date of listing, 44 applications seeking permits to import polar bear trophies had been received and were under review or awaiting final agency action. During questioning, the Deputy Director expressed general support for the intent of the bill but indicated that it would need to be amended to clarify that the legislation would apply only to those individuals who had applied for a permit prior to the effective date of the listing. At the end of 2009 no further action on H.R. 1054 had been taken by the subcommittee.

Litigation

The Service’s listing of polar bears and issuance of the special rule almost immediately spawned a variety of legal challenges. Environmental groups contended that the species should have been listed as endangered rather than threatened. The state of

Alaska and others claimed that listing polar bears as threatened was unwarranted. Hunters who had applied for or had been issued trophy import permits challenged the Service's interpretation that such imports could no longer be authorized. Litigants also challenged the special rule, some contending that it should have incorporated all of the protections afforded species listed as endangered and others that it had been too inclusive of those prohibitions.

The lawsuit filed by environmental organizations also challenged the Service's decision to defer designation of critical habitat. As part of a settlement agreement associated with the lawsuits, the Service agreed to publish a final rule by 30 June 2010 designating critical habitat for the polar bear and to issue guidelines under the Marine Mammal Protection Act setting forth non-lethal means that can be used to deter polar bears that present threats to public safety. Under the terms of the agreement, the Service is to finalize the guidelines by 31 March 2010.

At the end of 2009 all of the cases, which originally had been filed in multiple judicial districts, had been consolidated into a single case to be considered by Judge Emmet Sullivan in the U.S. District Court for the District of Columbia. The judge has established separate briefing schedules for the main issues in the case and anticipates hearing oral argument in the autumn of 2010.

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 handicraft and clothing. Subsistence hunters take polar bears from both stocks that occur in Alaska (Table IV-2). The Fish and Wildlife Service's marking and tagging program has provided data on the numbers of polar bears taken since 1988, the year that program was instituted. Under the program, Alaska Native hunters are required to report, within 30 days, on each polar bear taken and to present the animal's skin and skull for tagging. The Service has established a network of "taggers" located in each of the hunting villages who tag the bear parts and measure the skull size, determine the sex of the bear, record the location where the bear was taken, and collect a tooth for aging.

Table IV-2 Numbers of polar bears reported taken by Alaska Natives, 1980–2009

Harvest Year	Total Take	Chukchi/ Bering Seas Stock	Beaufort Sea Stock
1980–1981	109	71	38
1981–1982	92	69	23
1982–1983	88	56	32
1983–1984	297	235	62
1984–1985	120	67	53
1985–1986	133	103	30
1986–1987	104	68	36
1987–1988	128	91	37
1988–1989	142	83	59
1989–1990	103	78	25
1990–1991	82	60	22
1991–1992	62	34	28
1992–1993	81	43	38
1993–1994	128	78	50
1994–1995	96	73	23
1995–1996	46	12	34
1996–1997	92	38	54
1997–1998	61	33	28
1998–1999	108	85	23
1999–2000	66	36	30
2000–2001	96	53	43
2001–2002	108	76	32
2002–2003	66	27	39
2003–2004	65	21	44
2004–2005	66	34	31
2005–2006	89	57	32
2006–2007	71	50	21
2007–2008	35	21	14
2008–2009	35	11	24

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

The number of bears taken from the Chukchi/Bering Seas stock has declined since the 1980s. The average annual take in the 1980s was 92, about 50 per year during the 1990s, and about 45 per year since 2000. The causes for this reduction are not well understood but may be related to (1) changing climate conditions and the altered duration, extent, movement, and thickness of the sea ice in the area, (2) a population decline, (3) the suspected but not quantified increase in the number of bears taken from this population in Russia, thus reducing the number of bears available to hunters in Alaska, and (4) a decline in the number of active Native hunters. In contrast to the Chukchi/Bering Seas population, the average number of polar bears taken from the Beaufort Sea stock has remained relatively constant since 1980 at about 36 bears per year.

In the 2007–2008 and 2008–2009 hunting seasons, the number of bears taken for subsistence by Alaska Natives dropped to the lowest level on record. Although hunters may not yet have reported to the Service on all bears taken, the available data indicate that only 35 bears were taken in each of these seasons. Some of the factors noted previously may have contributed to this decline. During this season, nearshore ice initially was heavy, which may have limited hunter access to bears. Later, the ice became thin and unstable and perhaps too dangerous for hunters to use safely. Other possible contributing factors are the cost of fuel, which may have limited access to remote hunting areas, or concern about the conservation status of polar bears.

Since 1994 the marking and tagging program has collected information on whether polar bears reported by Alaska Natives were taken as part of traditional subsistence hunts or in defense of life or property. Although the number of polar bears taken in defense of life or property varies considerably, the trend generally has been increasing in recent years, from about three a year in the mid-1990s to about 12 a year since 1998. This trend appears to be related to changing sea ice conditions; polar bears must spend more time

on shore and their prolonged presence results in more human/bear interactions. During the 2008–2009 season, seven polar bears were reported to have been taken in defense of life or property. This decline may be related to the overall decline in the number of bears taken or it could reflect increasing use of non-lethal deterrence measures to respond to bears that come near villages (Figure IV-1).

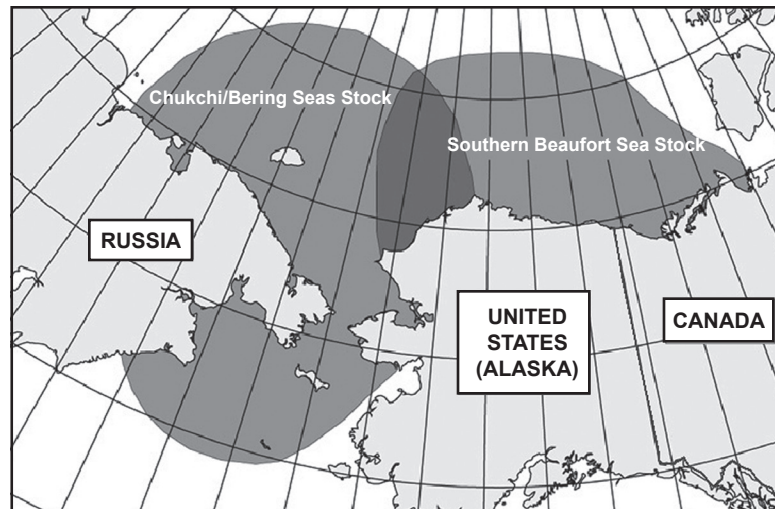


Figure IV-1. The United States shares jurisdiction over two distinct polar bear populations, the southern Beaufort Sea population with Canada and the Chukchi/Bering Sea population with Russia.

Take information from Alaska does not indicate the total removal of bears from these stocks because they are shared with either Canada (Beaufort Sea stock) or Russia (Chukchi/Bering Seas stock) and are subject to hunting in those countries as well. To address the potential for overharvesting of the shared Beaufort Sea population, the North Slope Borough, representing polar bear hunters in Barrow, Nuiqsut, Wainwright, Atkasuk, and Kaktovik, entered into a management agreement with the Inuvialuit Game Council, representing hunters in Canada. The agreement was signed in 1988 and remains in effect. Although outside the scope of the Marine Mammal Protection Act, the agreement is more restrictive than the provisions of the Act in some respects. For example, it prohibits the taking of bears in dens or bears constructing dens and protects family groups made up of females and cubs, as well as any cubs less than 1.5 m (5 ft) in length. In addition, the parties to the

agreement jointly establish annual hunting limits, which are divided between the parties before the hunting season. In part because of that agreement, the Beaufort Sea stock has been fairly well studied and maintained in good health. However, cub survival and the body condition of bears age three and older in this population have declined over the past 25 years, coinciding with a decline in the availability of preferred ice habitats (Rode et al. 2007).

The situation is markedly different for the Chukchi/Bering Seas stock. There has never been a quantitative estimate of abundance for this stock. The most recent estimate of 2,000 animals is based on expert opinion, and the IUCN Polar Bear Specialist Group recently identified the size of this population as unknown. Up-to-date and reliable data are needed on bear recruitment, survival, and movement patterns. As noted earlier, questions remain about the number of polar bears being removed by hunters in Russia where hunting currently is prohibited but illegal kill levels may be substantial. To address these concerns, the United States and Russia have concluded a bilateral agreement to conserve this stock, set hunting limits, and provide a vehicle for cooperative research. Efforts to implement that agreement are described in the following section.

International Polar Bear Agreements

Polar bears can traverse great distances, often crossing national boundaries and moving into international waters. This being the case, efforts to conserve them often require international cooperation. The United States participates in both multilateral and bilateral agreements to conserve polar bears.

Agreement on the Conservation of Polar Bears: In addition to the two polar bear stocks that occur in the Alaskan Arctic (Figure IV-1), several other stocks occur throughout the Arctic in Canada, Greenland, Norway, and Russia. In the 1950s and 1960s an increasing number of polar bears were being taken by hunters. For that reason, the United States and other countries where polar bears occur negotiated the multilateral 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 important bear habitats, such as denning and feeding areas 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.

The Agreement on the Conservation of Polar Bears also calls on the party nations to consult with one another to further the conservation of polar bears and to exchange information concerning their research and management programs, particularly with respect to shared populations. However, until recently, the party nations had not established a formal mechanism for consulting and had met only rarely. Rather, they relied largely on the Polar Bear Specialist Group, established under the auspices of the IUCN and composed of polar bear experts from the five polar bear range states, as the primary conduit for the exchange of information. The Specialist Group meets periodically, usually every three or four years, to review matters pertaining to research and management of polar bears and to provide scientific advice and technical support that can be used by the contracting governments to implement the agreement.

In 2007 the United States called for a meeting of the parties to the agreement to provide an international forum in which to exchange information on polar bear research and management programs, review the status of polar bear populations, and consider additional measures that the parties could take to strengthen polar bear conservation programs. The United States hosted a meeting of the polar bear range states in Shepherdstown, West Virginia, in June of that year. This was the first time that the parties to the 1973 polar bear agreement had met since 1981. The participants in the Shepherdstown meeting considered the exchange of information and discussion of polar bear conservation needs to be valuable and agreed that more frequent meetings were needed to assess and oversee implementation of the polar bear agreement. The five range states agreed to hold meetings biennially or as otherwise scheduled by the parties.

The parties to the Agreement on the Conservation of Polar Bears met next on 17–19 March 2009 in Tromsø, Norway. A member of the Commission's staff and a member of the Commission's Committee of Scientific Advisors on Marine Mammals, in his capacity as a member of the Polar Bear Specialist Group, attended that meeting. The objectives of the meeting were to provide an update of the conservation status of polar bears, review implementation of the agreement, identify useful polar bear conservation strategies, and discuss mechanisms to improve implementation of the agreement.

Participants at the Tromsø meeting identified climate disruption as the most important long-term threat to polar bears but recognized that the action needed to mitigate that threat is beyond the scope of the polar bear agreement. Nevertheless, the parties expressed concern that their obligations under the agreement to conserve polar bears and to protect the ecosystems upon which polar bears depend can only be met if global temperatures do not rise to the point where sea ice retreats from extensive parts of the Arctic. Consistent with this view, meeting participants identified an urgent need for an effective global response to climate disruption and recommended that the significance of climate disruption to polar bears be brought to the attention of those working in other fora in which strategies to address the issue are being negotiated. The polar bear range states concluded that, absent an effective response to projected sea ice loss, the best available management strategy would be to reduce other stressors to polar bears and their habitats to the extent possible. Although of less importance than climate disruption, the parties identified several other threats to polar bears. These include habitat loss, overharvesting, contaminants and pollution, disturbance from industrial development and other human activities in Arctic areas, and increased shipping as ice-free periods lengthen.

To respond to these threats, the parties agreed to initiate a process for developing a coordinated approach for identifying and implementing needed conservation and management measures. The first step would be for each range state to develop a national action plan, with the expectation that such plans would form the basis for a comprehensive cir-

cumpolar plan. The Polar Bear Specialist Group was tasked with preparing an outline of the topics that should be addressed in the national plans and identifying those elements that would benefit from international cooperation. The parties expected that significant progress will be made toward drafting national plans before the next biennial meeting.

Article VII of the Agreement on the Conservation of Polar Bears calls for all parties to conduct research pertaining to polar bear conservation and management, coordinate their research activities, and exchange data and other research results. Participants at the Tromsø meeting pledged to continue to pursue research needed to support polar bear conservation. They also recognized the value of the Polar Bear Specialist Group in meeting their research and coordination obligations under the agreement and agreed to ask the specialist group to serve as the scientific advisory group to the parties.

The parties also agreed that they should develop a process to assess the effectiveness of the agreement in achieving its core objectives. It was decided that such an effort should be discussed at future biennial meetings. The parties also reconfirmed their commitment to convene meetings biennially, tentatively agreeing that a meeting would be held in 2011 in Canada and in 2013 in Russia. The final report and other materials related to the Tromsø meeting are available at <http://www.polarbearmeeting.org/content.ap?thisId=500038172>.

United States–Russia Polar Bear Agreement: In the early 1990s the Fish and Wildlife Service began discussions with its Russian counterparts to develop a unified management approach for the Chukchi/Bering Seas polar bear stock shared by the two countries. These discussions culminated in the two countries signing a protocol in 1992 expressing their intent to pursue a joint management agreement. The 1994 amendments to the Marine Mammal Protection Act provided further impetus for a bilateral polar bear treaty. Section 113(d) of the Act called on the Secretary of the Interior, acting through the Secretary of State and in consultation with the Marine Mammal Commission and the state of Alaska, to consult with Russian officials on the development and implementation of enhanced cooperative research and management programs for the shared stock.

In October 2000 efforts to pursue greater cooperation between the United States and Russia with respect to the Chukchi/Bering Seas polar bear stock culminated with the signing of the Agreement between the Government of the United States of America and the Government of the Russian Federation on the Conservation and Management of the Alaska–Chukotka Polar Bear Population. The agreement specifies that subsistence taking by Native residents of Alaska and Chukotka is to be the only allowable consumptive use of the affected stock of polar bears. The agreement establishes a joint commission composed of a governmental official and a representative of the Native people from Russia and the same from the United States. The bilateral commission 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 commission, either party may transfer a portion of its allowable take to the other party. Once in place, the commission will establish a scientific working group to assist in setting annual sustainable harvest levels and identifying scientific research to be carried out by the parties.

Other provisions of the agreement prohibit the taking of denning bears, females with cubs, or cubs less than one year old and the use of aircraft and large motorized vessels for hunting polar bears. Also, the agreement directs the parties to undertake all efforts necessary to conserve polar bear habitats, particularly denning areas and those areas where polar bears concentrate to feed or migrate. Implementation of these provisions is expected to help ensure that the United States is in full compliance with the provisions of the multilateral 1973 polar bear treaty. Additional information concerning the Chukchi/Bering Seas polar bear stock and the treaty can be found at the Web site maintained by the Fish and Wildlife Service’s Alaska Region (<http://alaska.fws.gov/fisheries/mmm/polarbear/issues.htm>).

Implementation had been stalled pending ratification by the parties and, on the United States side, enactment of implementing legislation. Section 902 of Public Law 109-479, enacted on 12 January 2007, added a new Title V to the Marine Mammal Protection Act and provided domestic authority to carry

out U.S. responsibilities under the agreement. Among other things, the new title—

- set forth the procedures by which U.S. commissioners are selected,
- established 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,
- relied on the existing authorities under Title I of the Act for enforcement,
- directed the Secretary of the Interior to promulgate regulations to implement the provisions of the Act and the agreement,
- authorized the Secretary to share authority for managing the taking of polar bears with the Alaska Nanuuq Commission,
- allowed the United States to vote on issues before the U.S.–Russia Polar Bear Commission (to be established under the agreement) only if the two U.S. commissioners have no disagreement on the vote, and
- authorized appropriations to carry out functions related to the agreement through fiscal year 2010.

The final hurdle to convening a meeting of the polar bear commission was cleared just before the end of 2008 when President Obama appointed Geoffrey L. Haskett, the Fish and Wildlife Service’s Alaska Regional Director, to be the federal representative, and Charles H. Johnson, Executive Director of the Alaska Nanuuq Commission, to be the Alaska Native representative.

The polar bear commission held its first meeting in Moscow on 23–25 September 2009. A member of the Marine Mammal Commission staff served on the U.S. delegation. Among the main action items considered at the inaugural meeting was the adoption of rules of procedure to govern operation of the commission. The parties agreed to hold annual meetings alternating between the two countries as the host nation. The parties also agreed that, in general, the commission would meet in open session and that observer status may be accorded to representatives of political subdivisions of the two countries, non-governmental organizations, and intergovernmental

organizations that demonstrate an ability to contribute to the commission's work. The Alaska Nanuuq Commission and the Association of Traditional Marine Mammal Subsistence Hunters of Chukotka were granted permanent observer status. The commission also took note of the importance of the Agreement between the Native Peoples of Alaska and Chukotka Regarding the Conservation and Use of the Alaska-Chukotka Polar Bear Population and agreed to receive and consider recommendations from the joint committee established under that agreement.

Article VII of the agreement requires the commission to establish a scientific working group and allows it to establish other working groups as necessary. At the Moscow meeting, the commissioners agreed that, for the time being, only the scientific working group would be established. The parties agreed that the scientific working group would consist of 10 members, 5 from each country. The United States indicated that its members would include a habitat expert, a polar bear ecologist, a population biologist, a senior scientist, and someone with expertise in Native traditional ecological knowledge. The commission tasked the working group with providing guidance on a variety of scientific matters related to the commission's work, foremost among these being the formulation of recommendations concerning annual sustainable harvest levels and annual take limits.

The parties to the agreement deferred adopting any harvest levels pending the receipt of advice from the scientific working group. The commissioners agreed to maintain the status quo until its next annual meeting, with the United States continuing to allow hunting in accordance with the subsistence provisions of the Marine Mammal Protection Act and Russia retaining its ban on all hunting under a 1956 law. The expectation coming out of the Moscow meeting was that the commission would meet in Anchorage, Alaska, in June 2010 and that the scientific working group would meet earlier in the year to provide its recommendations at least 30 days before the commission meeting.

Interior Department–Environment Canada Memorandum: Recognizing that Canada is home to about two-thirds of the world's polar bears, and thus a key partner in conserving the species, the

Secretary of the Interior met with Canada's Minister of the Environment on 8 May 2008 to discuss the Endangered Species Act listing decision to be made by the Secretary the following week. That meeting resulted in a memorandum of understanding between the Department of the Interior and Environment Canada for the conservation and management of shared polar bear populations. The memorandum calls for the development of a cooperative polar bear conservation action plan and the creation of a bilateral oversight group to meet at least annually to develop, implement, review, and coordinate cooperative conservation projects and programs. The oversight group held its first meeting in Inuvik, Northwest Territories, Canada, on 19–20 November 2009. A representative of the Commission participated in that meeting by teleconference.

The oversight group adopted terms of reference to guide its consultations. Among other things, the terms of reference limit each side to three members, although support staff and observers also are permitted to attend meetings. In addition, the terms of reference specify that the oversight group's primary focus will be on the shared southern Beaufort Sea polar bear population. A representative of each government provided an overview of its research and management programs, and Native representatives reviewed insights gleaned from traditional ecological knowledge. Another topic of key interest to Canada was the recent U.S. proposal to change the listing status of polar bears under the Convention on International Trade in Endangered Species of Wild Fauna and Flora from Appendix II to Appendix I (see CITES, Chapter V). Such a change would limit Canada's ability to authorize exports of polar bear parts and products from its subsistence hunts and trophies from its sport hunts to other countries. The meeting also gave the participants an opportunity to review the results of a recently concluded meeting on responding to human-bear interactions, to update one another on actions being taken to implement the recommendations from the range states meeting in Tromsø, and to discuss possible shifts in the boundary used to delineate the southern and northern Beaufort Sea polar bear populations.

Convention on International Trade in Endangered Species of Wild Fauna and Flora: The Con-

vention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulates international trade in animal and plant species that are threatened with extinction or may become so if trade is not controlled. Although not specific to polar bears, CITES contributes to the conservation of polar bears, which are listed on Appendix II to the Convention, by controlling international trade. In line with its listing of polar bears as threatened under the Endangered Species Act, the Fish and Wildlife Service, which has primary responsibility for implementing CITES for the United States, published a notice in the *Federal Register* seeking comment on whether it should propose changing the listing status of polar bears to Appendix I. As discussed in greater detail in the CITES section of Chapter V, the Commission believed that trade is not currently a significant threat to polar bears and recommended against submitting an up-listing proposal for consideration at the 2010 Conference of Parties. As discussed in Chapter V, the Service nevertheless submitted such a proposal.

Northern Ice-Associated Pinnipeds

Alaska Natives, scientists, managers, and conservationists often refer to the bearded, ribbon, ringed, and spotted seals as ice seals because they, like the walrus, associate with sea ice. Although these ice seal species have not been systematically assessed, scientists generally have assumed until recently that their populations in U.S. waters were relatively largely unaffected by human activities other than in local areas (e.g., as a result of subsistence harvests by Alaska Natives). As is now evident, climate disruption, the associated rapid changes in sea-ice habitat and other environmental and ecological conditions, and the current and anticipated increases in human activities in the Arctic all pose serious risks to these species and to Arctic marine ecosystems.

The National Marine Fisheries Service is the lead federal agency responsible for conservation of seals, and on matters pertaining to ice seals it cooperates with the Ice Seal Committee, which is composed of Alaska Natives who harvest seals for subsistence purposes. The Fish and Wildlife Service is the lead federal agency responsible for conservation of wal-

ruses, and it cooperates with another Alaska Native organization, the Alaska Eskimo Walrus Commission. The Services and these organizations work with Alaska Native communities, the Arctic Marine Mammal Program of the Alaska Department of Fish and Game, the U.S. Geological Survey, university researchers, and conservation organizations to conduct and support research and management activities related to the walrus and ice seal species.

On the whole, however, support for research and assessment activities involving these species has been and continues to be inadequate, as is readily apparent in their stock assessment reports (<http://www.nmfs.noaa.gov/pr/sars/region.htm>). Undoubtedly, these species live in remote and inhospitable environments, and research and assessment are logistically difficult and expensive. Nonetheless, even with the growing awareness of climate disruption and the associated threats to Arctic marine ecosystems, the Services have yet to secure and provide the resources needed to assess changes in the health and status of these species and to develop management strategies to protect and conserve them in the foreseeable future.

In addition to the threats posed by climate disruption, human activities will change the Arctic as sea ice recedes and Arctic nations seek to secure and use the Arctic's natural resources. Such activities include oil and gas development, commercial fishing, commercial shipping, military activities, tourism, and coastal development. Collectively, these activities may affect walruses and ice seals by disturbing them at sea and on land and ice, displacing them from important habitat, contaminating their feeding and resting areas, and injuring or killing them in fishing gear. Commercial shipping through the Arctic undoubtedly will increase as sea ice recedes. Shipping likely will not pose a significant risk of collisions with these species, but it may increase disturbance from noise or the simple presence of vessels. Shipping also may lead to contamination of habitats, particularly from accidents that spill oil, fuels, or other toxic chemicals. Oil and gas development may disturb each of these species by generating noise, moving vessels and barges to support construction and drilling operations, constructing various types of infrastructure (e.g., platforms, pipelines),

and developing coastal areas needed to support oil and gas operations. Oil and gas development also poses a risk of contamination through discharge of drilling wastes and leaks or spills of oil, fuel, and other toxic chemicals. A large spill could have significant consequences for the walrus population if it occurred or spread at a time and in an area occupied by a large number of walruses, such as seasonally happens near the Bering Strait.

Petitions to List Ice-Associated Pinnipeds under the Endangered Species Act

On 20 December 2007, 7 February 2008, and 28 May 2008, the Center for Biological Diversity submitted three petitions to list respectively the ribbon seal, the walrus, and bearded, ringed, and spotted seals under the Endangered Species Act. The petitions were based on threats from (1) loss of Arctic sea ice, (2) suspected high harvest levels in Russia, (3) oil and gas exploration and development, (4) rising contaminant levels in the Arctic, and (5) bycatch and competition for prey resources from commercial fisheries. Status reviews were completed for the ribbon seal (December 2008) and spotted seal (October 2009) and, at the end of 2009, were still in preparation for bearded seals, ringed seals, and walruses. The completed status reviews for the ribbon seal and spotted seal provide a valuable and comprehensive synthesis of current knowledge. However, both reviews reveal significant deficiencies in data needed to make informed management decisions.

On 28 March 2008 the National Marine Fisheries Service released its 90-day finding on the petition to list the ribbon seal. The Service found that the petition contained substantial scientific and commercial information and that the status of this species warranted full review. On 30 December 2008 the Service announced its 12-month finding, indicating that listing of the ribbon seal was not warranted at the current time. The petition was originally based on concerns that “global warming...is resulting in the rapid melt of this species’ sea-ice habitat” and that existing regulatory mechanisms were not adequate to address this and other risks to ribbon seals. However, the Service found that “although the ribbon seal population abundance is likely to decline gradually for the foreseeable future, primarily from slight

but chronic impacts on reproduction and survival caused by reduced frequency of years with sea ice of suitable extent, quality, and duration of persistence, it is not in danger of extinction or likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”

On 4 September 2008 the National Marine Fisheries Service released its 90-day finding regarding the petition to list the bearded, ringed, and spotted seals. The Service found that this petition also contained substantial scientific and commercial information and that the status of these species warranted full review. On 20 October 2009 the Service released its proposed rule and 12-month finding regarding the spotted seal. It identified three distinct population segments of the spotted seal and indicated its intent to proceed with listing the southern distinct population segment as threatened under the Endangered Species Act. Decisions for bearded and ringed seals are still pending. On 21 December 2009 the Marine Mammal Commission wrote to the Service, supporting listing of the spotted seal southern distinct population segment and identifying the need to develop more suitable information to assess the status of the Okhotsk and Bering Sea distinct population segments. The Commission reiterated the need to devise and implement a research plan to address the major uncertainties and programmatic shortcomings revealed in the status review, including a realistic research budget. The Commission was particularly concerned about the inadequate basis for the Service’s conclusions regarding the Okhotsk and Bering Sea distinct population segments, as revealed in the Service’s statement that “in the absence of current information on the abundance levels or threats that may occur within each of the subdivisions...we have no basis to conclude that the spotted seal may be considered threatened or endangered.” Finally, the Commission called for strengthened efforts under the existing Agreement between the Government of the United States of America and the Government of the Russian Federation on Cooperation in the Field of Protection of the Environment and Natural Resources and with the Department of State on how to improve collaboration with Russian, Korean, Chinese, and Japanese researchers and managers responsible for the threatened southern distinct population segment.

On 3 December 2008 the Center for Biological Diversity filed suit against the Fish and Wildlife Service and the Secretary of the Interior for failing to respond to the petition to list the walrus. On 10 September 2009 the Fish and Wildlife Service recognized sufficient information in the petition to indicate that listing the Pacific walrus under the Endangered Species Act may be warranted. At the end of 2009 the Service anticipated making a determination on the listing in the fall of 2010.

The following sections summarize existing information on walrus and ice seals and related research and management activities in 2009.

Pacific Walrus *(*Odobenus rosmarus divergens*)*

Walrus (*Odobenus rosmarus*) are subdivided into two subspecies: Atlantic walrus (*O. r. rosmarus*) and Pacific walrus (*O. r. divergens*). The Atlantic subspecies is composed of Atlantic and Laptev Sea populations, is considerably less abundant than the Pacific subspecies, is less studied, and does not occur in U.S. waters. Although some marine mammal and taxonomic literature recognizes the Laptev walrus as a separate subspecies (*O. r. laptevi*), the Society for Marine Mammalogy does not (Table IV-3).

Pacific walrus occur along the continental shelf of the Bering, East Siberian, Chukchi, and Beaufort Seas and are easily recognized by their prominent tusks and large size (an average male weighs about 1,200 kg [2,645 lb]). In winter, most Pacific walrus concentrate in polynyas and open leads southwest of St. Lawrence Island and in Bristol Bay. In summer, most females, juveniles, and calves follow the retreating pack ice into the Chukchi Sea, staying with the ice edge throughout the summer as it recedes and passes over the continental shelf. The retreating ice edge provides a resting platform that slowly passes over feeding grounds, facilitating access to prey while reducing the likelihood of depleting any single feeding site. Other females and calves remain on land, particularly in the Gulf of Anadyr. Most adult males remain year-round in the Bering Sea, Gulf of Anadyr, and Karaginski

Bay. In summer, they rest on and feed from terrestrial haul-out sites. The four most common haul-out sites in Alaska are Round Island, Cape Peirce, Cape Newenham, and Cape Seniavin, all in Bristol Bay. In addition, Hagemeister Island, also in Bristol Bay, has seen increased haul-out activity in recent years. Other walrus remain at terrestrial haul-out sites along the north coast of the Chukotka Peninsula and on Wrangel Island in the Chukchi Sea. During fall, walrus move south with the advancing ice, sometimes aggregating in herds of thousands as they pass back through the northern Bering Sea. Walrus can live for up to 40 years. Mature females produce a calf every two or three years, breeding in late winter and usually giving birth in May. They feed in shallow waters, usually less than 80 m deep, and consume mostly clams and other benthic invertebrates such as snails and marine worms. They use their flippers and snouts to root in soft sediments, feeling for prey with their sensitive vibrissae. They use their tongues to create suction and remove animals from their shells. They also eat seals, although the frequency with which they do so is not clear, and seals are not considered common prey. Walrus collectively consume an estimated 3 million metric tons of prey per year, making them an important ecological component of the Bering and Chukchi Seas ecosystems (Ray et al. 2006). The only non-human predators on walrus are polar bears and killer whales, although adult walrus are formidable prey.

Status, Trends, and Commercial Harvests

The pristine abundance of the Pacific walrus population is not known but may have been on the order of 200,000. Commercial hunting began in ear-

Table IV-3. Current abundance and trend estimates for Pacific, Atlantic, and Laptev Sea walrus populations

Region	Abundance	Year	Trend
Bering-Chukchi Seas ¹	129,000*	2006	Unknown
Atlantic ²	18,000–20,000	2005–2008	Mixed
Laptev Sea ³	4,000–5,000	1982	Unknown

¹Speckman et al. in press; ²COSEWIC 2006, Lydersen et al. 2008, Witting and Born 2005; ³Fay 1982.

* Not corrected for full range of Pacific walrus (see text).

nest in the mid-1800s and caused wide fluctuations in walrus abundance over the next century (Fay 1982). By the late 1800s declines in walrus numbers were so severe that they contributed to widespread famine and starvation among Native populations (Allen 1895). The population must have recovered to some extent in the early 1900s, but commercial hunting intensified again in the 1930s, peaking in 1937–1938 when Russian hunters alone took more than 8,000 Pacific walrus (Krylov 1968). By the 1950s the Pacific walrus population had been reduced to 50,000 to 100,000 animals (Fay 1982). In the 1960s the Soviet Union and the state of Alaska independently established conservation measures to protect the Pacific walrus, and the population rebounded. From 1975 to 1990 U.S. and Russian scientists conducted joint range-wide aerial surveys every five years to estimate abundance of the Pacific walrus population. The 1990 survey resulted in an estimate of 201,039 animals (Gilbert et al. 1992). Scientists did not survey the population between 1990 and 2006, partly because surveys are expensive and difficult to coordinate. In addition, the prior surveys produced population estimates with such wide confidence intervals that they were considered of little

value for describing population trends. In 2006 the Fish and Wildlife Service, U.S. Geological Survey, and the Russian institutes Giprorybflot and Chukotka TINRO surveyed the population again using newly developed aerial census techniques. The Fish and Wildlife Service reported the population estimate for the surveyed area as 129,000 with relatively wide 95 percent confidence limits of 55,000 to 507,000 individuals. These figures were not corrected for the full range of walrus, including two areas where walrus normally occur, and therefore the 2006 estimate is considered to underestimate the true population size.

Effects of Climate Disruption

Climate disruption and the associated reduction in sea ice habitat pose a serious threat to walrus. These animals are able to swim and feed for only a limited number of days and require resting habitat, either suitably thick sea ice or land near feeding areas (Figure IV-2).

The proximity of such habitats to adequate food sources determines whether walrus are able to maintain a positive energy balance (i.e., consume enough prey to provide for their energy needs). In



Figure IV-2. A walrus herd resting on and swimming around a chunk of pack ice during the spring breakup in the Chukchi Sea, off the National Petroleum Reserves, Alaska. (Photograph by Steven Kazlowski, Minden Pictures)

2007 the summer sea ice declined by 40 percent compared with previous years. Large numbers of walrus came ashore in Alaska (which has not been common in recent decades) and northern Chukotka after the sea ice had retreated northward beyond the shallow continental shelf where walrus feed. Under such circumstances, they are more likely to deplete their local food supply because they are limited to feeding around the haul-out area. In addition, when hauled out on land, they are more vulnerable to disturbance and, if disturbed, more prone to injury from trampling. Calves and yearlings are particularly vulnerable to injury by large adults moving to and from the water. The risk of injury can be greatly exacerbated if the animals are startled and stampede toward the water.

In 2007 Chukotka Natives and biologists observing haul-out areas reported high levels of mortality, particularly among calves, and suspected that the cause was trampling. Conditions in 2008 were less severe, and relatively few walrus hauled out on land in northern Alaska. However, in 2009 walrus again hauled out in large numbers along the coasts of northern Alaska and Russia. At Icy Cape, Alaska, the animals apparently stampeded, killing at least 131 calves. The cause of the stampede is not known, but the Fish and Wildlife Service and the Eskimo Walrus Commission continue to work with communities in Russia and Alaska to prevent such occurrences by avoiding activities that might disturb walrus hauled out on land.

Subsistence Harvests

For several thousand years, Native communities in Alaska and Russia have relied on the Pacific walrus as a vital economic and cultural resource. Natives have depended, and continue to depend, on meat, ivory, and other walrus parts for food and other subsistence needs, including the production of handicrafts. In modern times, ivory carvings have become a particularly important source of income in some villages.

In the 1960s and 1970s the Alaska Department of Fish and Game monitored the subsistence harvest. The Marine Mammal Protection Act of 1972 included exemptions to its moratorium on taking to allow Alaska Natives to continue harvesting marine mam-

mals for subsistence purposes or for making authentic handicrafts and clothing, provided that the take is not wasteful. The Fish and Wildlife Service assumed responsibility for harvest management in 1980. Currently, the Service and the Eskimo Walrus Commission work together with Native communities to manage the subsistence harvest, collect biological samples from harvested animals, and conduct a statutorily required ivory tagging program. In the 1960s and 1970s authorities monitored the harvest in seven villages. Currently, they monitor only the spring hunt in the two villages where most of the hunting occurs—Gambell and Savoonga on St. Lawrence Island. A Fish and Wildlife Service employee and local residents hired for this purpose record the number of walrus taken and collect biological samples during a short period (about four weeks) in the spring.

In 1988 the Fish and Wildlife Service initiated a marking, tagging, and reporting program to help monitor the walrus harvest and prevent illegal trade in ivory. This program requires the reporting of all walrus harvested and the tagging of tusks within 30 days of the harvest. Although the Service intends for the program to be comprehensive, compliance is incomplete in some villages.

In addition, the Service also administers a walrus harvest monitoring program, which is an observer-based data-collection program in the communities of Gambell and Savoonga, Alaska, during the spring walrus hunt. This program provides additional information on the walrus harvest and important data on walrus vital rates (e.g., reproductive rates). Because the harvesting of some walrus (including calves) is not reported, the Service must use correction factors of unknown accuracy to estimate the total harvest. As a result, such estimates are uncertain.

Hunters also shoot and then fail to recover an additional and potentially significant number of walrus. Fay et al. (1994) used data collected between 1952 and 1972 to estimate that 42 percent of walrus shot were not recovered. The Fish and Wildlife Service still uses that correction factor for struck-and-lost animals, although its accuracy and reliability are uncertain, particularly given recent ice conditions and hunting practices and equipment. The total estimated harvest by Russians and Americans in 2008

(the latest year for which complete data are available) was between 3,484 and 3,739 walrus (Table IV-4). In 2006 and 2007 Kawerak, Inc., in conjunction with the Alaska Department of Fish and Game, conducted a household survey and estimated that 2,591 walrus were harvested by 12 communities in the Bering Strait area where most hunting occurs in Alaska. The numbers taken in recent years are about half those taken in the mid-1980s. The change could reflect a purposeful reduction in harvests, a decline in the walrus population, or both.

The Fishery Department in Russia's Agricultural Ministry manages walrus harvests in Russia. Since 1992 Russian managers have allowed only Native people to harvest walrus, and the 2009 quota for that harvest was 1,500. In 1998 Russia suspended its walrus harvest monitoring and research programs because of economic constraints. In 1999 the Eskimo Walrus Commission and the Fish and Wildlife Service secured funding from various sources, including the North Slope Borough and the National Park Service, to train and support Native villagers from Russia's Chukotka region in the collection of walrus harvest data. That support continued through 2005. In 2008 the National Park Service's Beringia Program provided further funding under a cooperative agreement with the Eskimo Walrus Commission, and that funding will be used for collection of Russian harvest data until 2012.

Some developments provide positive indication that co-management results in better management of harvests. In 2007 the Native villages of Gambell and Savoonga decided to renew their local hunting ordinances that had originally been developed in the 1920s. Traditional ordinances limited the number of walrus that could be harvested on a hunting trip. The two communities worked to ensure consistency with one another and with the Marine Mammal Protection Act. In addition, in 2002 the Marine Mammal Commission recommended initiation of a long-term tissue sampling effort to provide information on age-

Table IV-4. Estimated subsistence take of Pacific walrus, 2003–2008

Year	Number Harvested		Struck and Lost	Total Number Taken
	United States	Russia		
2003	2,003 – 2,376	1,425	2,482 – 2,752	5,910 – 6,553
2004	1,452 – 1,701	1,118	1,861 – 2,041	4,431 – 4,860
2005	1,292 – 1,451	1,436	1,976 – 2,091	4,704 – 4,978
2006	1,221 – 1,428	1,047	1,643 – 1,792	3,911 – 4,267
2007	2,180 – 2,634	1,173	2,428 – 2,757	5,781 – 6,564
2008	1,252 – 1,401	778	1,470 – 1,578	3,500 – 3,757
2009	2,349 – 2,569	NA	1,701 – 1,860	4,050 – 4,429
Mean (2003-2008)	1,567 – 1,831	1,163	1,977 – 2,169	4,706 – 5,163

Russian harvest information from Chukotka TINRO and the Russian Agricultural Department. U.S. harvest information from the Fish and Wildlife Service and adjusted for unreported walrus using mark-recapture methods that produce upper and lower harvest bounds. Number struck and lost estimated assuming a 42 percent struck-and-lost rate from Fay et al. (1994).

specific reproduction, prey selection, contaminant levels, and other important parameters to facilitate evaluation of the population's status and trends. Accordingly, the Service and the Eskimo Walrus Commission have been developing guidelines for collection of biological samples, although efforts have sometimes been limited by lack of funds. In 2009 monitoring and sample collection continued with some adjustments that were felt to benefit the program, including administering hunter participation through local tribal councils.

Stock Assessment Report

The Fish and Wildlife Service's management responsibilities include preparation and updating of a stock assessment report for the Pacific walrus. The Marine Mammal Protection Act requires that the Service update this stock assessment report every three years, and in 2007 the Center for Biological Diversity sued the Service for failing to do so. The Service completed its most recent report on 30 December 2009 (http://alaska.fws.gov/fisheries/mmm/walrus/pdf/Final_%20Pacific_Walrus_SAR.pdf).

The 2009 Pacific walrus stock assessment report estimates the potential biological removal level as 2,580 walrus based on a minimum population estimate of 129,000. For the past five years, the mean

harvest estimate is about 4,700 (Table IV-4). The differences have yet to be reconciled. However, the population would need to be in excess of 234,000 animals to sustain an annual harvest of 4,700, and there is no basis for assuming it is that large. Therefore, the harvest level is probably unsustainable, besides being above the potential biological removal level. In addition, Native hunters and scientists report marked changes in walrus habitat, an increasing prevalence of animals in poor condition, reduced calf production, and poor calf survival, all of which raise important concerns about the population's future.

Ringed Seal (*Pusa hispida*)

The ringed seals are the most common and most ice-dependent of the Arctic seals. They comprise five subspecies. The most widely distributed (*P. h. hispida*) occurs throughout the Arctic Ocean. The others are *P. h. ochotensis* in the Sea of Okhotsk and Sea of Japan, *P. h. botnica* in the Baltic Sea, and two freshwater subspecies, *P. h. saimensis* in Lake Saimaa in eastern Finland and *P. h. ladogensis* in Lake Ladoga in Russia. Ringed seals can live for up to 30 years. Adults range from 115 to 136 cm in length and weigh 40 to 65 kg, males being slightly larger than females. Ringed seals play an especially important role in the Arctic where they prey on Arctic cod and a variety of invertebrates and are themselves the primary prey of polar bears. Polar bears prefer fat to other parts of a seal, and ringed seal pups are approximately 50 percent fat by wet weight (Stirling 2002). In the eastern Beaufort Sea, up to 80 percent of polar bear diets may be young-of-the-year ringed seals. If ringed seal productivity declines, the health of the polar bear population is likely to suffer accordingly (Stirling 2002).

Status and Trends

Scientists have not surveyed Arctic ringed seals in all parts of their range, and current overall abundance is unknown. Educated guesses generally range from one to four million (e.g., Frost et al. 1988). The Arctic and Okhotsk subspecies are the most abundant (Table IV-5). A century ago, the Baltic subspecies numbered between 190,000 and 220,000, but by the late 1970s it had been reduced to as few as 5,000

Table IV-5. Current abundance and trends of ringed seal subspecies

Subspecies	Abundance	Year	Trend
Arctic ¹	~2.5 million	1970s	Unknown
Okhotsk Sea ¹	>800,000	1971	Unknown
Baltic Sea ²	5,000–8,000	1990s	Mixed
Lake Saimaa ³	280	2005	Increasing
Lake Ladoga ⁴	3,000–5,000	2001	Unknown

¹Frost et al. 1988, ²Karlsson et al. 2007, ³Sipilä and Kokkonen 2008, ⁴Agafonova et al. 2007

(Harding and Härkönen 1999). Although the decline likely resulted from commercial harvesting, reduced fertility from exposure to environmental contaminants also may have contributed (Harding and Härkönen 1999). The future status of this subspecies is unclear but likely will depend heavily on changes in ice habitat and contaminants. At the start of the twentieth century, the Ladoga subspecies numbered 20,000 animals, but by the 1970s it had been reduced to 10,000, in part by bounty hunting (Agafonova et al. 2007). Current bycatch of Ladoga ringed seals is as high as 10 to 16 percent (Verevkin et al. 2006), which clearly is unsustainable. The Saimaa ringed seal numbers in the low hundreds and is vulnerable to climate disruption, inbreeding, fisheries bycatch, and high pup mortality. Hence, conservation of this subspecies will require careful and steadfast management (Sipilä and Kokkonen 2008).

Effects of Climate Disruption

Ringed seals depend on ice and may decline greatly or even be extirpated throughout much of their range as a consequence of climate disruption. Arctic ringed seals in particular rarely haul out on land but rather stay with sea ice throughout much of the year to reproduce, molt, rest, feed, and avoid predators. For much of the winter and spring, they use shorefast ice (ice attached to land) or the pack ice, often in areas with greater than 90 percent ice coverage. In consolidated ice, which can be up to 2 or 3 m thick, they maintain breathing holes by abrading ice along the inside of the holes. Females excavate birth lairs in snowdrifts that form over their breathing holes to protect themselves from predators while they rest, give birth, and nurse their pups. Such

lair also must protect the females and their pups from exposure to harsh Arctic weather.

Changes in sea ice habitat undoubtedly will have a significant impact on ringed seals. If poor ice conditions or precipitation causes a lair occupied by a pup to collapse before the pup is capable of fending for itself, it may die from inclement weather or predation. Late ice formation, early breakup of shorefast ice, and increased precipitation already have affected ringed seal denning behavior along the shorefast ice of the eastern Beaufort Sea, threatening female reproductive success and pup survival (Harwood et al. 2000). When summer sea ice has receded to the point that the Arctic is ice-free, the seals will either have to remain at sea during the ice-free period or haul out on land. Ringed seals in the Baltic Sea, Sea of Okhotsk, and the freshwater lakes of Finland do haul out on land (Laidre et al. 2008), suggesting that seals of the Arctic subspecies may be able to do so as well, but they likely will be restricted to those areas that are not easily accessible to predators (e.g., polar bears, wolves, foxes, grizzly bears). Ringed seals also are vulnerable to climate disruption because the loss of ice likely will alter the nature and extent of primary production and the trophic food web that is based on that production. At present, ringed seals in the Arctic depend on Arctic and polar cod, species that associate with sea ice.

Whether individual seals will be able to cope with all these factors by changing their behavior or whether their populations will persist by virtue of strong selection on their natural history traits is not clear. The ability of scientists to predict the effects of climate disruption on ringed seals will depend heavily on whether the necessary research is conducted to investigate their natural history, behavior, adaptability, and changes in abundance with receding ice habitat. Undertaking such studies will require collaboration and cooperation by all interested and concerned stakeholders. Research by the Alaska Department of Fish and Game, federal agencies, and university researchers has been bolstered in recent years by participation of Alaska Natives, who have helped tag and track ringed and bearded seals and collected samples for genetic research and stock identification. Such research provides information on seasonal movements, diving behavior, and habi-

tat use. Participation in research builds management capacity in Alaska Native villages through education and direct involvement in the research effort. It also provides cost-effective and practical support for researchers studying Arctic pinnipeds and promotes exchange between scientists and Alaska Natives, who contribute traditional ecological knowledge of the animals and their habitat. The National Oceanic and Atmospheric Administration, National Fish and Wildlife Foundation, and Minerals Management Service have funded collaborative projects, which benefit all persons, agencies, and organizations involved by increasing research capacity and providing better information for conservation and management purposes.

Subsistence Harvests

Historically ringed seals have been harvested for both commercial and subsistence purposes. Russian commercial harvests were as high as 72,000 animals a year between 1955 and 1965 (Kovacs et al. 2008). During the 1990s Canadian Inuit harvests were estimated in the tens of thousands (Reeves et al. 1998), and Greenland hunters harvested 70,000 annually (Teilmann and Kapel 1998). Household surveys during the 1980s and 1990s indicate that Alaska Natives took between 9,000 and 10,000 ringed seals a year (Allen and Angliss 2010). Kawerak, Inc., in conjunction with the Alaska Department of Fish and Game, conducted household subsistence surveys in 2006–2007 and estimated that Alaska Natives from 12 communities in the Bering Strait region harvested 1,357 ringed seals a year. None of these numbers include animals struck and lost. In the Arctic, subsistence harvesting undoubtedly will have a far smaller influence on ringed seals than climate disruption. Nonetheless, ill-managed harvests may compound the effects of climate disruption, contributing to local reductions in seals or possibly even extirpation in areas that might otherwise support some seals. Careful management of harvests will be essential to prevent such adverse effects.

Stock Assessment Report

The National Marine Fisheries Service is responsible for management of ringed seals in U.S. waters. To that end, the Service prepares a stock assessment

report for ringed seals in Alaska waters, the most recent being completed in 2006 (<http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2006seri.pdf>). The report does not include a minimum population estimate, a description of population trends, or an estimate of the subspecies' potential biological removal level. In the absence of such information, scientists are hampered in their ability to describe the current status of ringed seals in the Arctic, judge the sustainability of local subsistence harvests, or predict the future impact of climate disruption.

Pacific Bearded Seal *(Erignathus barbatus nauticus)*

Bearded seals (*Erignathus barbatus*) are composed of an Atlantic subspecies (*E. b. barbatus*) and a Pacific subspecies (*E. b. nauticus*) that overlap in distribution in the Russian and Canadian Arctic. In the western North Pacific, bearded seals use continental shelf habitat as far south as Hokkaido, Japan, and in Alaska they inhabit the continental shelf of the Bering, Chukchi, and Beaufort Seas. They generally prefer loose, mobile pack ice with 70 to 90 percent sea ice coverage, cracks in larger floes, and shorefast ice. In the spring in Alaskan waters, they tend to be more abundant from 20 to 100 nmi offshore rather than within 20 nmi of shore except for high nearshore concentrations in Kotzebue Sound (Bengtson et al. 2000, Bengtson et al. 2005, Simpkins et al. 2003). They may maintain breathing holes but do so less frequently than ringed seals. Bearded seals in the Okhotsk, White, and Laptev Seas use terrestrial haul-out sites when sea ice is not available. However, seals in the Bering and Chukchi Seas rarely do so. Instead, those seals not migrating north with the sea ice remain in open waters. Bearded seals can live for about 30 years. At full size, they measure up to 2.5 m in length and weigh as much as 361 kg (female) to 390 kg (male) in weight (Kelly 1988). A dense “beard” of whiskers on the top lip and a relatively small head distinguish the species from other seals. They are especially vocal underwater, and their sounds have been used by Native hunters over millennia to locate them. They tend to be solitary, occurring in low densities throughout their range. They congregate in late winter in nearshore pack ice to

give birth to pups on sea ice, nurse their pups for about 15 days before weaning them, and then mate. They do not excavate lairs like ringed seals, and pups can swim within a few hours of birth. Females with pups stay in the water more than 90 percent of the time, presumably to avoid predation by polar bears. They molt between April and August. They prefer continental shelf areas and are primarily benthic foragers, preying on various invertebrates and demersal fishes. Killer whales, Greenland sharks, and occasionally walrus prey on bearded seals, and Arctic Natives harvest them for subsistence purposes.

Status and Trends

Population estimates from the 1970s suggested that the Pacific population of bearded seals living in the Bering and Chukchi Seas ranged from 250,000 to 300,000 animals (Table IV-6). Current population size and trends are not known.

Table IV-6. The most current estimates of abundance of bearded seals (trends not known)

Region	Abundance	Year
Bering and Chukchi Seas ¹	250,000–300,000	1970s
Okhotsk Sea ¹	200,000–250,000	1968–1969
Canadian waters ²	190,000	1958–1979
Greenland, Norwegian and Russian Arctic	Unknown	—

¹Fedoseev 2000, ²Cleator 1996

Effects of Climate Disruption

Like the walrus, bearded seals use sea ice as a resting platform between benthic feeding bouts and depend on relatively shallow areas for feeding. An early northward retreat of spring sea ice over the Chukchi Sea continental shelf may reduce bearded seal foraging efficiency, thereby affecting their condition, health, and ability to survive and reproduce. As the ice edge moves out over deep water, bearded seals may be forced to haul out on land, where they are more vulnerable to disturbance and predation. As generalist feeders, they may adapt more readily to changes in ecosystem food webs.

As with all Arctic species, determining the effects of climate disruption on bearded seals will require baseline information for comparative studies. In recent years, Alaska Natives have joined scientists from the Alaska Department of Fish and Game, University of Alaska, and National Marine Mammal Laboratory to study bearded seal life history traits. Most recently, this collaboration has focused on methods to capture live adult seals and fit them with satellite-linked data recorders. The results from such studies will be useful in describing bearded seal distribution and movement patterns, diving and foraging behavior, key habitats, and other traits that can be used to develop correction factors for surveys of abundance.

Subsistence Harvests

The bearded seals is one of the most important subsistence resources for Alaska Native communities along Alaska's western and northern coasts. The Alaska Department of Fish and Game (2000) estimated that Alaska Natives harvested between 6,500 and 7,000 bearded seals annually prior to 2000. Current statewide harvest levels are not known, but household subsistence surveys conducted in 2006–2007 by Kawerak, Inc., and the Alaska Department of Fish and Game indicate that 2,476 bearded seals were harvested by 12 communities in the Bering Strait area. Some unknown number of bearded seals are struck and lost each year, and Reijnders et al. (1993) estimated that the loss rate for bearded seals in Greenland may be as high as 50 percent. If struck-and-lost rates are similar in Alaska, then a large and potentially significant number of bearded seals are killed each year and not accounted for in the subsistence harvest. Here again, human activities that affect this Arctic marine mammal cannot be managed without better information.

Stock Assessment Report

The National Marine Fisheries Service is responsible for management of the bearded seal, including preparation of a stock assessment report. The Service prepares a report only for the Pacific subspecies because, with rare exceptions, bearded seals occur in U.S. waters only in the North Pacific, Bering Sea, and Alaskan Arctic. The Service completed its most

recent stock assessment report for the Pacific bearded seal stock in 2006 (<http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2006sebe.pdf>). It did not include a minimum population estimate, description of population trends, or an estimate of the potential biological removal level. Indeed, the lack of basic information about the stock precludes a meaningful assessment of its status and its vulnerability to climate disruption, subsistence harvests, and the other human activities projected to increase in the Arctic in the foreseeable future.

Ribbon Seal (*Histriophoca fasciata*)

The ribbon seal is one of the most recognizable of all pinnipeds because of the striking color pattern of adults. They are distributed primarily in the Okhotsk, Bering, East Siberian, and Chukchi Seas. They breed in two distinct areas, one in the Sea of Okhotsk and the other in the Bering Sea. They appear to use sea ice only during whelping, mating, and molting, all of which occur between March and June. During that period, they appear to prefer marine habitat with broken sea ice covering 60 to 80 percent of the surface or less than 15 cm thick so that they can break through to breathe. Mature females usually produce a single pup every year and nurse the pup for three or four weeks before weaning. As the ice retreats into the Chukchi Sea, some ribbon seals follow it while others remain in the Bering Sea. Those not following the ice do not haul out on land, and recent tracking data indicate that they disperse throughout the Bering Sea and Aleutian Islands region. Ribbon seals can live for up to 30 years, and they tend to be solitary throughout much of their lives. They feed on pelagic fish species such as walleye pollock but are thought to be relatively flexible in their foraging locations and habits.

Status and Trends

Ribbon seals are difficult to count because they are widely dispersed. Burns (1981) estimated 240,000 ribbon seals worldwide in the mid-1970s, with 90,000 to 100,000 in the Bering Sea. Fedoseev (2002) estimated that ribbon seals in the Sea of Okhotsk increased from 200,000 (1968–1974) to 630,000 (1988–1990). The accuracy of these estimates is

unknown. Ribbon seal numbers may have varied markedly in the late 1900s because of fluctuations in harvesting. In its status review of ribbon seals, the National Marine Fisheries Service assumed a single global population of more than 200,000 animals. However, the accuracy of that estimate is uncertain, and, at best, it should be considered an approximation based on limited information.

Effects of Climate Disruption

The National Marine Fisheries Service expects that ribbon seal abundance will decline gradually as the extent, quality, and duration of sea ice declines with climate disruption. Although the Service's status review concluded that the population is not currently in danger of extinction or likely to become so in the foreseeable future, it added the ribbon seal to its Species of Concern list (<http://www.nmfs.noaa.gov/pr/species/concern/#list>) and noted in its final rule that "there are no known regulatory mechanisms that effectively address global reductions in sea ice habitat at this time."

The Service's conclusion regarding extinction risk for the ribbon seal was based in part on the fact that the summer sea ice minimum generally occurs in September, whereas ribbon seals depend on the ice for reproduction and molting in the spring months. Sea ice will undoubtedly recede in the coming decades, but existing information is not sufficient to project the extent and quality of sea ice during the spring. The seals may be able to adapt by whelping, breeding, and molting earlier in the spring. In addition, changes in ice conditions almost certainly will act as a strong selective force on the ribbon seal population, favoring those seals that reproduce earlier in the season or are more capable of whelping and rearing their young in poor ice conditions. Finally, the seals may be able to use terrestrial haul-out areas, although doing so in many areas will expose them to disturbance and predation.

Changes in the trophic structure of Arctic ecosystems also may affect ribbon seals and their ability to forage successfully. However, ribbon seals already appear to be flexible foragers so they may be able to adapt to changing foraging conditions. Given their tendency to disperse widely and lead relatively solitary lives, they appear to be less vulnerable to human

activities. Nonetheless, it remains to be seen whether and to what extent they are affected by oil and gas development, commercial shipping and fishing, and other human activities. At present, they do not appear to interact with commercial fishing operations. Whether they interact ecologically is unknown.

Subsistence Harvests

Russian commercial harvests removed as many as 20,000 ribbon seals a year in the 1950s, but current harvests are primarily for subsistence purposes. Household surveys in the 1980s and 1990s indicate that about 200 ribbon seals are harvested each year in Alaska (Allen and Angliss 2010). Household subsistence surveys conducted in 2006–2007 by Kawerak, Inc., in conjunction with the Alaska Department of Fish and Game, estimated that 91 ribbon seals were harvested by 12 communities in the Bering Strait area. These estimates do not include seals that were struck but lost.

Stock Assessment Report

The National Marine Fisheries Service is responsible for management of the ribbon seal, including preparation of its stock assessment report, the most recent having been completed in 2006 (<http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007serb.pdf>). The report did not include a minimum population estimate, an indication of population trends, or an estimate of the potential biological removal level. The lack of such information has confounded the Service's ability to determine the status of ribbon seals, assess risks to them from climate disruption, and guide measures to ensure their conservation. The Service has not updated its stock assessment report since.

Spotted Seal (*Phoca largha*)

Spotted seals are distributed along the western North Pacific continental shelf from as far south as the Yellow Sea and Sea of Japan to the Sea of Okhotsk and into the Bering, Chukchi, and Beaufort Seas. Their distribution overlaps that of closely related harbor seals (*Phoca vitulina richardi*), and, like harbor seals, they prey on a range of species in coastal waters and periodically haul out on shore to rest. They have been

reported breeding in eight distinct areas, but based on small samples and preliminary analyses of genetic composition, potential geographic barriers, and significance of breeding groups, the National Marine Fisheries Service treats them as three distinct population segments occurring in the Bering Sea, the Sea of Okhotsk, and the Yellow Sea and Peter the Great Bay in the Sea of Japan.

Spotted seals are more gregarious than ribbon and bearded seals, and scientists have reported groups of more than 10,000 hauled out on the Kamchatka coast (Lowry and Burkanov 2008). In the late fall when sea ice begins to advance southward, spotted seals leave their coastal haul-out sites and begin to use the ice as a resting and foraging platform. They are common on small ice floes close to the ice edge, although tracking data indicate that some animals can be found well within the ice pack, hundreds of kilometers from the ice edge.

Adult spotted seals are between 1.5 and 1.7 m long and weigh 70 to 130 kg with little difference between the sexes. They can live for up to 35 years. They breed in late winter, and adult females give birth in March. They wean their pups after three to four weeks, and they mate shortly thereafter. Three of the eight known breeding areas are in the Bering Sea and five are in the Sea of Okhotsk or Sea of Japan. Spotted seals feed mostly on schooling fish (e.g., pollock, capelin, arctic cod, herring) and epibenthic fish (e.g., flounder, halibut, sculpin), as well as crab and octopus. In turn, they are preyed upon by Pacific sleeper sharks, killer whales, golden eagles, Steller's sea eagles, ravens, gulls, polar and brown bears, wolves, Arctic foxes, walruses, and Steller sea lions (Quakenbush 1988).

Status and Trends

The National Marine Fisheries Service does not have what it considers a reliable estimate of current abundance for the spotted seal. Burns (1973) estimated a world population of 335,000 to 450,000 spotted seals with 200,000 to 250,000 in the Bering and Chukchi Seas in the early 1970s. Fedoseev (1971) estimated that 168,000 spotted seals were in the Okhotsk Sea in 1969 but later estimated a population ranging from 67,000 to 268,000 between the late 1960s and 1990s. In its status review for the

spotted seal, the National Marine Fisheries Service estimated that the current Bering Sea and Sea of Okhotsk populations each exceed 100,000 seals. In contrast, the population in the Yellow Sea and Peter the Great Bay is much reduced. Counts of seals hauled out at this population's two breeding sites indicated 2,500 and 800 seals respectively (not corrected for seals in the water). This last population appears to be at far greater risk of extinction, and in recent decades China, South Korea, and Russia have sought to protect it by banning hunting, establishing a nature reserve, and giving the spotted seal special conservation status in portions of its habitat. To date, those measures have not proven sufficient to conserve and recover the population.

Effects of Climate Disruption

Compared with the ringed, bearded, and ribbon seals, spotted seals may be the least dependent on ice. For the most part, they appear to use the southern ice edge for pupping and foraging, but they also are capable of using coastal waters without ice, at least for a portion of their annual cycle. As with most Arctic marine mammals, the likely effects of climate disruption remain uncertain (see, for example, Burek et al. 2008). However, the Arctic Marine Mammal Program of the Alaska Department of Fish and Game has studied the diet, growth rates, body condition, age distribution, and productivity of spotted seals since 1962, and the results suggest that conditions in Alaska were least favorable for spotted seals in the 1970s (Quakenbush et al. 2009) and have improved since then. That finding supports the idea that climate disruption may not have affected spotted seals adversely in recent decades.

Subsistence Harvests

Historically the Russians harvested spotted seals for commercial purposes. In Alaska they are harvested for subsistence purposes, and household surveys indicate that Alaska Natives took about 5,300 spotted seals a year in the 1980s and 1990s (Allen and Angliss 2010). Household subsistence surveys conducted in 2006–2007 by Kawerak, Inc., in conjunction with the Alaska Department of Fish and Game, estimated that 2,509 spotted seals were harvested by 12 communities in the Bering Strait area.

This estimate does not include animals struck and lost. Current harvest levels are unknown, and, absent better information, the effect of subsistence harvests of spotted seals cannot be described on a local basis or for the North Pacific population as a whole.

Stock Assessment Report

The National Marine Fisheries Service is responsible for management of the spotted seal, including preparation of its stock assessment report, the most recent having been completed in 2006 (<http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2006sesp.pdf>). The report did not include a minimum population estimate, indication of population trends, or an estimate of the potential biological removal level. In the absence of reliable information about population abundance and demography, scientists are currently unable to describe with confidence the current status of spotted seals in Alaska waters, the current or pending effects of climate disruption on them, or the sustainability of current subsistence harvests. The Service has not updated the stock assessment report since.

Cook Inlet Beluga Whale (*Delphinapterus leucas*)

The Cook Inlet beluga whale stock is one of five beluga stocks that occur in U.S. waters. Its geographical isolation suggests—and mitochondrial DNA analyses confirm—that it is a distinct stock. Unlike other beluga stocks in U.S. waters, the Cook Inlet stock has experienced a significant decline in recent years. Although the population is believed to have numbered more than 1,300 as recently as the 1970s, it declined rapidly during the 1990s, primarily as a result of overharvesting by Alaska Native subsistence hunters. The current abundance is likely fewer than 400 whales. Because of their proximity to Anchorage, belugas in Cook Inlet are potentially affected by a variety of activities that occur in the vicinity of Alaska's largest urban area. National Marine Fisheries Service analyses of beluga sightings in Cook Inlet over the past 30 years indicate that the stock's summer range has contracted substantially in recent years. Compared with sightings in the 1970s and 1980s, animals are now rarely seen in offshore waters or in

the lower reaches of the inlet. In June, when the Service conducts aerial surveys of the population, belugas generally are concentrated in a few groups in the inlet's upper reaches around the Susitna River delta, Knik Arm, Turnagain Arm, and Chickaloon Bay.

Endangered Species Act Listing

On 31 May 2000 the National Marine Fisheries Service designated the Cook Inlet beluga whale stock as depleted under the Marine Mammal Protection Act. At that time, the Service declined to list the stock under the Endangered Species Act, primarily because it believed that overharvesting by subsistence hunters was the primary threat to the stock and had been adequately addressed. The Service concluded that, although the population had been reduced to a small size, it did not satisfy the Endangered Species Act's listing criteria because, with a positive intrinsic growth rate, it was not in danger of extinction and was unlikely to become endangered within the foreseeable future.

Contrary to the Service's expectations, however, the Cook Inlet beluga did not increase after harvest regulations were established in 1999. In fact, it appears that the stock has continued to decline, despite the fact that subsistence hunters are reported to have taken only five whales in the past 10 years. A recent analysis of data from abundance surveys completed by researchers at the National Marine Mammal Laboratory (Hobbs et al. 2009) concluded that the population has declined, on average, by 1.49 percent per year since 1999. Abundance estimates dating back to 1994, when the Service instituted its monitoring program, and the confidence limits around those estimates, are provided in Figure IV-3. The point estimates of the population size for 2005 and 2006 were the lowest ever, with estimates of 278 and 302 whales, respectively, in those years. The point estimates of abundance derived from surveys conducted in 2007 and 2008 jumped to 375 but declined to 321 in 2009. However, given the uncertainty associated with these estimates, the inter-annual differences are not statistically significant.

In light of the observed population trend and unanswered questions about the cause or causes of the decline, the Marine Mammal Commission recommended that the National Marine Fisheries Service

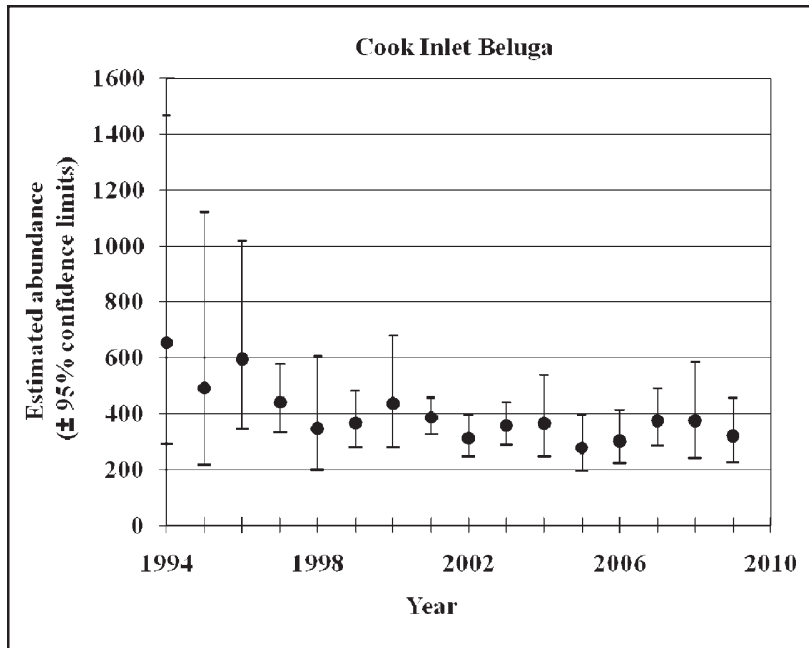


Figure IV-3. Abundance estimates (and upper and lower 95 percent confidence limits [CL]) of Cook Inlet beluga whales, 1994–2009. (Data courtesy of National Marine Fisheries Service)

revisit its Endangered Species Act listing decision. On 24 April 2006 the Commission wrote to the Service reiterating its opinion that listing the stock as endangered was warranted. The Commission noted that the Cook Inlet beluga stock numbered about the same as the North Atlantic right whale population, which is generally considered by the Service and others to be among the most critically endangered cetacean species. The Commission also pointed to a recent IUCN Red List assessment of the Cook Inlet beluga stock, which concluded that it qualified as “critically endangered” under the applicable IUCN criteria (Lowry et al. 2006). The Commission recommended that the Service expedite publication of a proposed listing determination rather than going through the intermediate step of preparing a new status review. In fact, the Commission recommended that the Service consider using the emergency listing provisions of the Endangered Species Act as an interim measure. The Commission also identified an urgent need to provide additional funding for an expanded research program to investigate the factors affecting the population and identify possible remedial actions.

The Service published a proposed rule to list the Cook Inlet beluga as an endangered species on 20 April 2007 (72 Fed. Reg. 19854) but declined to use expedited procedures. In fact, the Service subsequently invoked a provision of the Endangered Species Act to take additional time, extending the decision-making deadline by six months to consider comments from the state of Alaska questioning the sufficiency of the available data and to allow it to evaluate the results of the 2008 abundance survey. That delay in the listing action prompted the Commission to write to the Secretary of Commerce recommending that the agency withdraw the six-month extension and proceed immediately with listing the Cook Inlet beluga whale stock as endangered. The Commission

noted that the purported disagreement over the population trend was not scientifically credible, and it disputed the notion that the 2008 population estimate might somehow change the conclusions about the population trend that supported listing.

As the Commission had expected, adding the 2008 abundance estimate to the available time series changed the outcome of the Service’s analysis very little. The likelihood that the population was continuing to decline dropped from 65 to 62 percent, but that remained the most likely trend. The estimated likelihood that the population would go extinct within 100 years remained at 26 percent, and, applying the model it considered most realistic, the Service concluded that there was a 70 percent probability of extinction within 300 years. Consistent with results from the updated analyses, the Service published a final rule listing the Cook Inlet beluga as an endangered species on 22 October 2008. The final rule indicated that the Service intended to designate critical habitat for the stock in a separate rulemaking because it did not have sufficient information to determine such habitat for the species. This aspect of the listing rule and subsequent actions concerning

the designation of critical habitat are discussed in the following section.

Section 11(g)(2) of the Endangered Species Act requires those seeking to challenge an agency action for an alleged violation of the Act to provide written notice at least 60 days prior to filing a lawsuit. On 12 January 2009 Alaska's Attorney General wrote to the Secretary of Commerce and the head of the National Marine Fisheries Service indicating the state's intention to file a suit challenging the listing of the Cook Inlet beluga whale stock. The state cited several alleged violations, including the Service's failure to (1) properly consider conservation practices and protection measures being taken in Alaska, (2) respond adequately to the state's comments on the proposed rule, (3) document sufficiently its basis for determining the Cook Inlet stock of beluga whales to be a distinct population segment of the species eligible for listing, and (4) provide an additional opportunity for public review and comment of documents and data relied on in the final listing rule but not available at the time the proposed rule was published. At the end of 2009 the state of Alaska had yet to file a lawsuit challenging the listing decision but indicated that it still intended to do so.

Critical Habitat

Section 4(b)(6)(C) of the Endangered Species Act requires that critical habitat be designated concurrent with publication of an endangered or threatened listing determination except in certain circumstances. One of the exceptions is when the agency responsible for the listing finds that critical habitat for the species "is not then determinable," in which case it has one additional year in which to complete the designation process. In its 22 October 2008 final listing rule, the National Marine Fisheries Service indicated that it did not have sufficient information on the "primary constituent elements" of Cook Inlet beluga whale habitat or on the possible economic consequences of designating certain areas as critical habitat. The Service therefore concluded that a designation of critical habitat was not then determinable and indicated its intention to designate critical habitat in a separate rulemaking.

Critical habitat is defined under the Endangered Species Act as specific areas occupied by the species

at the time that it is listed that include physical or biological features (1) essential to the conservation of the species and (2) which may require special management considerations or protection. Areas outside the current range of the species also qualify for designation as critical habitat if such areas are determined to be essential for the conservation of the species. The Service must consider the economic impact of a critical habitat designation and may exclude certain areas if it determines that the benefits of the exclusion outweigh the benefits of including those areas in the designation. The Service published an advance notice of proposed rulemaking on 14 April 2009 (74 Fed. Reg. 17131) seeking information relevant to making those determinations. Among other things, the Service solicited comments concerning the physical and biological features that are essential to the conservation of the Cook Inlet beluga whale stock, whether those features require special management considerations or protection, whether any areas currently unoccupied by the species are essential for its conservation, what benefits would accrue to the species from designation of critical habitat, what economic and other impacts would result from such a designation, and whether the failure to include any particular area in the designation would result in the extinction of the species.

The Marine Mammal Commission provided comments on the advance notice of proposed rulemaking on 14 May 2009. The Commission noted that it had previously submitted comments relevant to the designation of critical habitat in conjunction with its comments on the proposed listing. For instance, in a 24 April 2006 letter, the Commission had recommended that the Service, at a minimum, consider designating as critical habitat all areas identified in the draft conservation plan for the species as being high-value habitat. In a 3 August 2007 letter to the Service commenting on the proposed listing rule, the Commission supplemented its earlier comments, recommending that the Service include additional areas in its critical habitat designation to protect winter habitat, secondary summer habitat, and areas that currently are unoccupied by the species but that were used historically and that likely will be important to support population recovery. Consistent with its earlier comments, the Commission recom-

mended in its 14 May 2009 letter that the National Marine Fisheries Service designate all waters of Cook Inlet from Kalgin Island northward to the headwaters of Knik and Turnagain Arms and all coastal waters less than 18 m in depth in other portions of the inlet as critical habitat for the Cook Inlet beluga whale stock.

In making that recommendation, the Commission indicated that it was focusing on the first part of the statutorily required analysis (i.e., are these areas essential for the conservation of the species and in need of special management or protection) but had not considered exclusions based on possible economic or other considerations. The Commission observed, however, that the Endangered Species Act specifies that areas not be excluded from a critical habitat if the exclusion would result in the extinction of the species. The population viability analysis prepared by the Service and discussed in the final listing rule had indicated a 62 percent probability that the population would continue to decline, a 26 percent chance of extinction within 100 years, and a 70 percent chance of extinction within 300 years. At the same time, several possible causes for the observed population trend had been identified, including disturbance and other impacts associated with development in the upper part of Cook Inlet and cumulative effects on important habitat. In light of the relatively high risk of extinction and the fact that habitat loss and degradation had not been ruled out as possible causes of recent population declines, the Commission noted that excluding any essential habitat from the designation based on economic considerations may well result in the extinction of the species.

Although the National Marine Fisheries Service was to have completed the process to designate critical habitat within one year of the listing determination (i.e., by 22 October 2009), the Service did not publish a proposed rule until 2 December 2009 (74 Fed. Reg. 63080). The Service proposed designating two adjacent areas within Cook

Inlet as critical habitat (see Figure IV-4). The first area includes 1,918 km² (741 mi²) in the northernmost portion of the Inlet—the area northeast of a line from the mouth of Threemile Creek to Point Possession, including the Susitna River delta, Chickaloon Bay, Turnagain Arm, and Knik Arm. This area contains shallow tidal flats, river mouths, and estuarine habitat that are particularly important for foraging and as nursery sites. The second area includes all waters south of the first area to 60° 25' N latitude, nearshore areas south of 60° 25' N latitude along the west side of the inlet, and Kachemak Bay, near Homer, on the east side of the lower inlet. This area of 5,891 km² (2,275 mi²) is of lesser importance during the spring

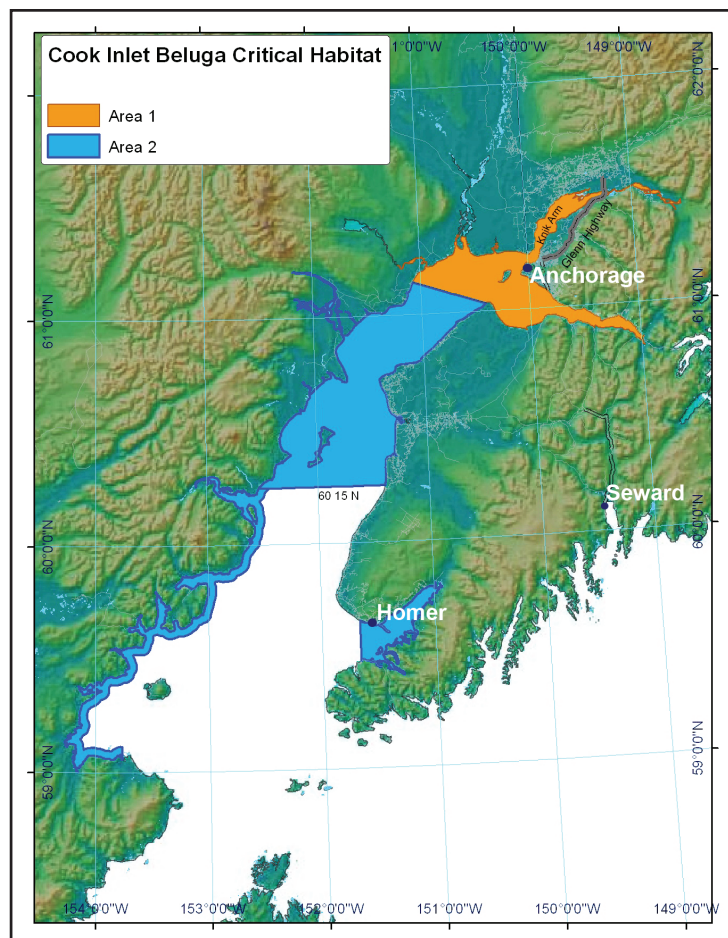


Figure IV-4. The National Marine Fisheries Service has proposed designating two adjacent areas in Cook Inlet as beluga whale critical habitat. Area 1 is particularly important for foraging and as nursery sites. Area 2 provides important feeding and transit areas in the fall and winter. (Map courtesy of National Marine Fisheries Service)

and summer but provides important feeding and transit areas in the fall and winter. The Service did not include any habitat outside the areas currently inhabited by beluga whales in the proposed designation “because any such areas are presently unknown ... and the value of any such habitat in conserving this species cannot be determined.” However, it did not address whether the current range of Cook Inlet belugas, which has contracted as the stock has declined, would be sufficient to support recovery.

The Service prepared a draft economic assessment to evaluate the impact of designating the proposed areas as critical habitat as part of a cost-benefit analysis. The assessment is available at <http://www.fakr.noaa.gov/protectedresources/whales/beluga/management.htm#habitat>. The assessment notes that the regulatory impact of a critical habitat designation is confined largely to triggering review under section 7 of the Endangered Species Act, which mandates that federal actions (i.e., those actions authorized, funded, or carried out by a federal agency) not result in the destruction or adverse modification of critical habitat. However, section 7 review also is prompted by virtue of listing a species as endangered or threatened, requiring federal agencies to ensure that federal actions are not likely to jeopardize the continued existence of any listed species. The economic assessment observed that most actions that would adversely modify or destroy critical habitat also would violate the jeopardy prong of section 7. Therefore, the possible economic impact of a critical habitat designation (e.g., by preventing a project from going forward or requiring changes in a proposed action) should be viewed in terms of the incremental impact of the critical habitat review over and above that already required to determine whether an action would jeopardize the species. When viewed in that context, the Service concluded that the potential economic impact of a critical habitat designation was relatively modest. On the other side of the equation, the Service determined that considerable benefits would accrue from designating critical habitat, not only in the context of section 7 but by providing public notice of areas and features important to species conservation. A critical habitat designation, the Service observed, also may result in other ancillary

benefits such as improving the ecological functioning of the Cook Inlet ecosystem or allowing more opportunities for whale-watching activities. The Service did not propose excluding any areas from the identified critical habitat based on economic considerations. However, the Service proposed to exclude from the designation any manmade structures that exist as of the date a final designation becomes effective as well as the land on which such structures rest.

The Service proposed excluding two areas under a separate provision of the Endangered Species Act. Section 4(a)(3)(B)(i) of the Act directs the Service not to designate as critical habitat any lands or other areas owned or controlled by the Department of Defense or designated for the Department’s use if those areas are subject to an integrated natural resources management plan prepared under the Sikes Act and that plan provides benefits to the species for which critical habitat is being designated. The Service proposed excluding areas within Elmendorf Air Force Base and Fort Richardson’s Eagle River Flats live-fire range from the critical habitat designation under this provision. The Port of Anchorage had sought a similar exclusion based on its designation as a Strategic Military Seaport by the Army, but the Service declined to include such an exclusion in its proposed rule pending receipt of additional information.

At the end of 2009 the Commission was planning to comment on the proposed critical habitat rule early in 2010.

Conservation Plan

Section 115(b) of the Marine Mammal Protection Act directs the National Marine Fisheries Service to prepare a conservation plan as soon as possible for any stock that it designates as depleted unless it determines that such a plan will not promote the conservation of the species or stock. Conservation plans are to be modeled on recovery plans required under the Endangered Species Act. As discussed in the previous annual report, on 22 October 2008, the same day that it published the final rule listing the Cook Inlet beluga whale as an endangered species, the Service published a notice of availability of the final conservation plan. The plan is available on the Ser-

vice's Web site at <http://www.fakr.noaa.gov/protectedresources/whales/beluga/management.htm#conservation>.

Once a species is listed under the Endangered Species Act, the Service is required to prepare a recovery plan unless it determines that such a plan will not promote the conservation of the species. The Service indicated in its listing rule that it intended to prepare a recovery plan for the Cook Inlet beluga whale stock. Because of the similarity between the two plans, the conservation plan presumably will provide the starting point for preparation of a recovery plan. Section 4(f) of the Act governs the development and implementation of recovery plans. It specifies that each recovery plan should include (1) a description of site-specific management actions necessary to achieve the plan's goal for the conservation and survival of the species, (2) objective, measurable criteria that, when met, would warrant de-listing, and (3) estimates of the time required and the costs associated with carrying out the measures needed to achieve the plan's recovery goal and intermediate steps toward that goal.

Section 4(f) also authorizes the Service to establish a recovery team consisting of public and private agencies and institutions and other qualified persons to assist in the development of a recovery plan. The National Marine Fisheries Service intends to establish a recovery team to assist in the development of the recovery plan for the Cook Inlet beluga whale stock. At the end of 2009 the Service was preparing a *Federal Register* notice announcing its intent to prepare a recovery plan and soliciting information on Cook Inlet belugas and their habitats relevant to preparing the plan.

Regulation of Native Subsistence Hunting

Section 101(b) of the Marine Mammal Protection Act allows Alaska Natives to take marine mammals for subsistence purposes or for making and selling handicrafts, provided that the taking is not done in a wasteful manner. Other limits may be placed on such taking only through formal rulemaking and only if a stock has been designated as depleted or is considered depleted by virtue of being listed as endangered or threatened under the Endangered Species Act. Estimates derived from a variety of sources

indicate that high levels of subsistence hunting of Cook Inlet belugas occurred throughout much of the 1990s. Part of the impetus for this hunting was the availability of commercial outlets in Anchorage for beluga muktuk (a popular Native food composed of the epidermis and underlying blubber of the whale). Such sales are generally allowed under the Marine Mammal Protection Act, which specifies that edible portions of marine mammals taken by Alaska Natives for subsistence purposes or for the creation of authentic Native handicrafts may 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 overharvest and the precipitous decline of the Cook Inlet beluga whale stock led to a number of actions to limit hunting, prevent further decline, and promote the eventual recovery of the stock. Those actions culminated in the publication of final harvest regulations in the *Federal Register* on 15 October 2008 (73 Fed. Reg. 60976).

The key component of the regulations is a harvest table that sets forth the allowable harvest of Cook Inlet belugas according to estimated abundance levels and growth rates, and subject to adjustments based on whether observed mortality from sources other than subsistence hunting exceeds the expected number of deaths for a population of its size. No harvest is allowed if the average population estimate over the previous five-year interval is less than 350. Once the average reaches 350, a limited number of strikes would be allowed (e.g., one strike per year under a low or intermediate growth rate). The number of allowed strikes would increase under other scenarios to a maximum of 32 strikes over five years at a population of 700 or greater if the population is experiencing a high growth rate. These regulations are codified at 50 C.F.R. § 216.23(f)(2)(v). Because the average population over the previous five years was below 350, no harvest is allowed for the years 2008 through 2012, and none is known to have occurred in 2009.

Development Projects

The Marine Mammal Protection Act prohibits the unauthorized taking of any marine mammal. Activities other than commercial fishing operations

that incidentally take marine mammals, including Cook Inlet belugas, generally require an authorization under section 101(a) (5) of the Act. In addition, now that it is listed as an endangered species, activities that may affect Cook Inlet belugas are subject to the consultation requirements of section 7 of the Endangered Species Act. During 2008 and 2009 the Commission provided recommendations on two development projects ongoing or planned in the area near Anchorage—a proposal to build a bridge across the Knik Arm in upper Cook Inlet and the renovation and expansion of the Port of Anchorage.



Figure IV-5. A beluga whale calf swims alongside its mother in Cook Inlet in 2008. (Photo courtesy of LGL, Alaska Research Associates)

Knik Arm Bridge: The state of Alaska established the Knik Arm Bridge and Toll Authority in 2003 for the purpose of overseeing the construction of a bridge across Knik Arm in upper Cook Inlet. The bridge would connect the municipality of Anchorage with the Mat-Su Borough. In September 2006 the bridge authority, in conjunction with the Federal Highway Administration, published a draft environmental impact statement under the National Environmental Policy Act to consider alternatives for the proposed bridge project and their impacts. The Commission's comments on the impact statement questioned the conclusion that the proposed bridge construction and operation would not have significant effects on Cook Inlet belugas. The statement had identified most of the possible sources of impact, including disturbance from construction activities, increased vessel operations, and increased human use of the Knik Arm area; masking of sounds used by belugas for communication, navigation, and pred-

ator avoidance; alteration of habitat-use patterns, particularly in transit corridors into and out of Knik Arm; changes in the distribution and abundance of prey; and increased risk of strandings. Nevertheless, the Commission believed that the impact statement had erroneously discounted the significance of these potential effects. The Commission found the statement's assessment of possible cumulative impacts to be especially wanting, particularly in light of the fact that the beluga whale stock seems to be experiencing an ongoing decline for undetermined causes, even in the absence of the additional stressors likely to result from construction and operation of the bridge.

In August 2006 the National Marine Fisheries Service published a notice in the *Federal Register* announcing receipt of an application from the Knik Arm Bridge and Toll Authority seeking an incidental take authorization under the Marine Mammal Protection Act for the proposed bridge construction (71 Fed. Reg. 49433). The Commission commented on 22 September 2006 recommending, among other things, that a rulemaking to issue the requested authorization be deferred until the Service could, with reasonable confidence, support a conclusion that those activities would have no more than a negligible impact on the Cook Inlet beluga whale stock. On 12 March 2009, before the Service had either denied the application or published a proposed rule to authorize incidental taking, the bridge authority wrote to the Service withdrawing its application.

As of the end of 2009 it remained unclear whether the Knik Arm Bridge and Toll Authority would resubmit its application for an incidental take authorization, in part because of questions concerning funding for the project.

Port of Anchorage: On 18 March 2008 the National Marine Fisheries Service published a notice in the *Federal Register* proposing to issue a one-year incidental harassment authorization to the Port of Anchorage to cover the taking of belugas and other marine mammals incidental to a terminal redevelopment project (73 Fed. Reg. 14443). The Service also solicited comments as to whether it should issue regulations to authorize incidental taking for an additional five years.

The Commission provided comments by letter of 17 April 2008, noting that the planned redevelop-

ment had the potential to affect belugas in at least three ways: (1) by disturbance from sounds during construction, (2) by permanently altering beluga habitat, and (3) by increasing vessel traffic that could disturb and possibly injure belugas during and after port expansion. Because the Cook Inlet beluga whale stock already has been reduced to a dangerously low level and is continuing to decline for undetermined reasons, the Commission did not see how the Service could conclude that activities that would increase the level of disturbance in an important feeding area—even if that increase were relatively small—would not have more than a negligible impact on the population and its chances for recovery. In light of the relatively high density of belugas in the project area, the uncertainties about the factors causing or contributing to the stock’s recent decline, and the absence of an adequate analysis of the potential effects of port construction and operation on the whales, the Commission believed a negligible impact determination to be premature and overly speculative. The Commission therefore recommended that the Service defer issuance of the requested authorization until it had further evaluated the uncertain but potentially significant impacts of the planned activities and could provide a well-supported basis for making a determination that the activities, once mitigated, would not have more than a negligible impact on the Cook Inlet beluga whale stock.

Despite the Commission’s concerns, the Service issued the proposed incidental harassment authorization. Notice of the authorization was published in the *Federal Register* on 18 July 2008 (73 Fed. Reg. 41318). The Service found that the project “will not result in increased disturbance to marine mammals or their habitat such that [it] would result in more than a negligible impact to the stock.” The Service concluded that pile driving is the only activity associated with the project with the potential to harass marine mammals and, in its view, the anticipated reactions of belugas would be short term and only consist of mild or moderate stress responses. The Service also believed that beluga whales would habituate to the sounds and that reactions would diminish over time. The *Federal Register* notice provided the Service’s response to the Commission’s general concern that the cumulative impacts of the

port redevelopment project, in combination with other risk factors, would have more than negligible impacts on beluga whales. The Service acknowledged “some uncertainty” in the factors that were inhibiting recovery of the Cook Inlet beluga whale stock but nevertheless determined that, because of their natural tendency to avoid or habituate to loud sounds, the availability of a “harassment-free” migration route to prime feeding grounds, and the mitigation measures that would be implemented (e.g., soft-starts for pile driving, stopping activities if marine mammals are sighted within safety zones, and not allowing pile driving in conditions with poor visibility within the project area), issuance of the authorization would have a negligible impact on this beluga stock.

The Service published a notice in the *Federal Register* on 18 December 2008 (73 Fed. Reg. 77013) that it had received an application from the Port of Anchorage seeking a five-year incidental take authorization under section 101(a)(5)(A) of the Marine Mammal Protection Act for the port redevelopment project to cover activities from July 2009 to July 2014. The Commission submitted comments on 20 January 2009, reiterating its previous concerns. Once again, the Commission did not see how the Service could support a finding that the proposed redevelopment activities would have no more than a negligible impact on the Cook Inlet beluga whale stock given that it is in danger of extinction for as yet undetermined reasons and the project presents some of the same risks that have been identified as possibly causing or contributing to the stock’s lack of recovery. The Commission therefore recommended that the Service refrain from issuing proposed incidental take regulations until it has a better understanding of the causes of the observed decline of this beluga whale stock and it has prepared a supplemental environmental assessment.

Contrary to the Commission’s recommendations, on 23 April 2009 the Service published a proposed rule (74 Fed. Reg. 18492) to authorize the taking of belugas and other marine mammals incidental to port construction. The Commission commented on the proposed rule by letter of 26 May 2009. The Commission reiterated its earlier comments and recommended that the Service withdraw the proposed rule until it has conducted further research to identify the

factor or factors that are causing or contributing to the decline and/or lack of recovery of the Cook Inlet beluga whale stock and can discount the types of disturbance and other factors associated with port construction and use as being significant contributors. The Commission noted that, in listing the Cook Inlet beluga whale stock as an endangered species, the Service had recognized that the stock is in danger of extinction. The reasons for this precarious status have yet to be determined but may include some of the factors associated with the proposed dock construction and subsequent use of the expanded port facilities. Because the status quo already seems to be jeopardizing the continued existence of the species, and, unless something is done to reverse recent trends, the stock likely will continue to decline, the Commission did not see how the Service could determine that the additional impact associated with port construction would be negligible.

Despite the Commission's recommendations, the Service issued regulations on 20 July 2009 (74 Fed. Reg. 35136) authorizing the taking of belugas and other marine mammals incidental to the proposed port redevelopment through 14 July 2014. The Service disagreed with the view that the status quo is jeopardizing the continued existence of the Cook Inlet beluga whale stock based apparently on the agency's commitment to promote the conservation and recovery of the stock. Similarly, it concluded that the incremental impacts from port construction and the associated loss of 135 acres of intertidal and sub-tidal habitat would not add to the existing risks to the stock in a significant way. The Service issued a one-year letter of authorization under those regulations to the Port of Anchorage on the 15 July 2009 effective date of those regulations. A notice of that authorization was published in the *Federal Register* on 18 September 2009 (74 Fed. Reg. 47925).

Southern Resident Killer Whale (*Orcinus orca*)

Killer whales inhabit all the world's oceans. They are classified as a single species with no identified subspecies although some scientists consider this monotypic taxonomic structure to be incorrect and in need of revision (Reeves et al. 2004, Krahn et al.

2004). Killer whales occur in "ecotypes" that can be distinguished genetically and on the basis of color patterns, vocalizations, prey, and foraging behavior. In the northeastern North Pacific Ocean, scientists have identified three ecotypes: a transient ecotype that ranges widely along the coasts of Canada and the United States, an offshore ecotype that occurs principally in pelagic offshore waters, and a resident ecotype that occurs seasonally in specific inshore bays and sounds. Although the ranges of different ecotypes overlap, their members rarely, if ever, interbreed, and each typically specializes on exploiting a different segment of the available prey base. Each ecotype may consist of multiple populations with each population composed of one or more pods that form close-knit social groups organized around matrilineal relationships.

Scientists have identified four populations of the resident ecotype in the northeastern North Pacific Ocean (Krahn et al. 2004). The southern resident killer whale population is one of those and consists of J, K, and L pods. Whales in this population summer in Puget Sound and the adjacent inland waters of Washington State and southern British Columbia where they feed on migrating salmon. From September to May, the whales apparently use coastal waters between British Columbia and central California. Historically, the population is thought to have numbered more than 200 whales. Between the late 1960s and early 1970s, about 50 whales were removed for public display and research, and by 1976 the population had declined to about 70 whales. Such removal is no longer permitted in U.S. waters, but the population has not recovered as expected.

Listing Actions

In 2001 the Center for Biological Diversity petitioned the National Marine Fisheries Service to list southern resident killer whales as endangered or threatened under the Endangered Species Act. In 2002 the Service determined that the action was not warranted because the population did not constitute a distinct population segment as defined under the Act. The Service did, however, initiate steps that led to the population's designation as depleted under the Marine Mammal Protection Act in 2003 (68 Fed. Reg. 31980). The Center for Biological Diversity

challenged in U.S. District Court the legal basis for not listing the population under the Endangered Species Act, and in 2003 the court instructed the Service to reevaluate the population's status relative to the Act's definition of a distinct population segment. After doing so, in 2004 the Service proposed that southern resident killer whales be listed as threatened (69 Fed. Reg. 76673), and in 2005, after considering comments on its proposal, adopted a final rule classifying the population as endangered rather than threatened (70 Fed. Reg. 69903). In 2001 Canada's Department of Fisheries and Oceans also designated the southern resident killer whale population as endangered under the Canadian Species at Risk Act.

Population Status in 2009

According to the 2009 U.S. Pacific Marine Mammal Stock Assessments the population of southern resident killer whales consists of 85 individuals. The major factors that may be impeding recovery of this population are all human-related. Human activities have reduced dramatically the salmon stocks that constitute the prey base for this population. Human activities also have introduced high levels of contaminants into the marine environment (e.g., polychlorinated biphenyls or PCBs and polybrominated diphenyl esters, a relatively new class of chemicals used in flame retardants), which the whales have accumulated through the food web. Such contaminants may compromise reproductive or immune function. Human disturbance also may be impeding recovery of the southern resident population. The summer range of this population, the inland waters of Washington and British Columbia, is home to a large commercial whale-watching industry as well as high levels of recreational boating and commercial shipping. The presence of these boats and the noise they create may be a significant source of stress for the whales, and masking of the whales' communication and foraging may result in behavioral changes that compromise their ability to survive or reproduce. Finally, collisions with vessels may be another factor impeding population recovery.

Critical Habitat

In November 2006 the National Marine Fisheries Service designated critical habitat for southern resident killer whales, including essentially all of Washington's inland waters with the exception of Hood Canal, 18 military sites, and waters less than 20 feet deep.

Recovery Plan Development and Implementation

In November 2006 the National Marine Fisheries Service circulated a proposed recovery plan for southern resident killer whales for public and agency comment (71 Fed. Reg. 69101). On 24 January 2008 the Service finalized the recovery plan (National Marine Fisheries Service 2008) (73 Fed. Reg. 4176), including more specific downlisting and delisting criteria where possible. For example, the Service revised the draft delisting standard dealing with reproduction to require that each pod include more than two adult males of reproductive age or that available information indicates that one male is sufficient. In March 2008 Canada's Department of Fisheries and Oceans completed a recovery strategy for the southern resident killer whale (Canada Department of Fisheries and Oceans 2008) that is complementary to the U.S. plan, focusing on problems relating to prey availability, contaminants, and disturbance.

In 2009 the Service initiated, continued, or expanded a range of activities intended to promote recovery of the southern resident killer whale population. Those activities included measures to promote recovery of threatened and endangered runs of salmon that are prey for the whales and various measures to improve ecosystem conditions by reducing contaminants, noise, and disturbance.

Vessel Interactions

In March 2007 the National Marine Fisheries Service published a request for information regarding regulations or other measures that should be instituted to protect killer whales from significant interactions with vessels (72 Fed. Reg. 13464). During 2008 the Service evaluated the potential impact of such regulations on natural resources (e.g., marine mammals, fish, and the marine ecosystem) and the human environment (e.g., economics, recreation, and

transportation). On 29 July 2009 the Service published proposed regulations with a draft environmental assessment for protecting killer whales from vessel strikes in the northwest region.

In developing its proposed regulations, the Service considered all comments and suggested alternatives from the March 2007 comment request. It then distilled these down to seven possible actions and one proposed action, each of which included 10 common elements. The regulations would—

- apply to all activities in the navigable inland waters of Washington State. The specific protected areas within inland waters are identified;
- apply to all killer whales, not just endangered southern residents;
- not exempt any vessel operators from the harassment or take prohibitions under the Marine Mammal Protection Act or the Endangered Species Act;
- apply to motorized, non-motorized, and self-propelled vessels;
- not apply to federal, state, and local government vessels operating in the course of their official duties;
- not apply to vessels participating in the vessel tracking system;
- not apply to activities, such as scientific research, authorized under permit by the Service;
- not apply to treaty fishing vessels lawfully engaged in actively setting, retrieving, or closely tending fishing gear;
- not apply to any vessel where the operator could prove the vessel maneuver resulting in a violation was required for safety; and
- not apply to personal use of private vessels in the proposed no-go zone for access to private property by landowners adjacent to the no-go zone.

The alternative actions considered included the following:

- No-action: The Service would not promulgate any new regulations but would continue the education and outreach program with all of the partners involved in the “Be Whale Wise” education campaign, which includes voluntary

guidelines designed to help boaters avoid harassment.

- 100-yd approach regulation: This alternative effectively formalizes “Be Whale Wise” guidelines that advise boaters to stay 100 m (100 yd) away from killer whales.
- 200-yd approach regulation: This alternative would increase the viewing distance suggested in the “Be Whale Wise” guidelines and require boaters to stay 200 yds away from killer whales.
- Protected area: The proposed protected area is equivalent to the current voluntary no-go zone along the west side of San Juan Island. This includes an 800 m (0.5 mi) wide zone centered on the Lime Kiln lighthouse and a 400 m (0.25 mi) wide zone from Eagle Point to Mitchell Point. The protected area would be enforced 1 May through 30 September.
- An expanded protected area: The proposed no-go zone would extend 800 m (0.5 mi) offshore from Eagle Point to Mitchell Point and would be enforced 1 May through 30 September.
- Speed limit of 7 knots within 400 yds of killer whales.
- Prohibition: Keep clear of the whales’ path, prohibiting vessels from intercepting or placing a vessel in the oncoming path of a killer whale or positioning a vessel so that wind or currents carry the vessel into the path of the whales.
- Proposed action: A combination of the third, fifth, and seventh alternatives. This would result in a 200-yd minimum approach distance and an extended no-go zone on the west side of San Juan Island between 1 May and 30 September; it would also prohibit vessels from intercepting whales.

On 19 October 2009 the Service announced an 80-day extension to the public comment period for the proposed rule and draft environmental assessment. At the end of 2009 the Commission was preparing its comments.

North Pacific Right Whale (*Eubalaena japonica*)

The North Pacific right whale, like its North Atlantic counterpart, nearly was hunted to extinction by commercial whalers. Exploitation in the North Pacific peaked in the mid-1800s and continued through the early 1900s. In 1935 the League of Nations adopted an international ban on hunting for right whales because they had been depleted severely worldwide. Both the North Pacific and North Atlantic right whale species are believed to consist of separate populations occurring on opposite sides of their respective ocean basins. In the North Pacific, the western population occurs off China, Korea, Japan, and Russia. Surveys by Japanese scientists in the late 1980s and early 1990s indicated that about 900 right whales remained in the Sea of Okhotsk in summer, but the reliability of that estimate is questionable, and earlier estimates in the low hundreds may be more likely (Brownell et al. 2001).

The eastern population occurs in the southeastern Bering Sea and eastern North Pacific Ocean. It probably began to recover in the early and mid-1900s after the international hunting ban was adopted, but between 1963 and 1967 whalers from the former Soviet Union illegally killed 372 right whales off Alaska and nearly eliminated the population (Doroshenko 2000). From the late 1960s to the mid-1990s, right whale sightings in the eastern North Pacific were so rare that each sighting was considered worthy of separate scientific publication. Reported sightings were scattered between Baja California and Alaska, with a few sightings near Hawaii. In the summer of 1996 four whales were seen feeding together in the southeastern Bering Sea along the western edge of Bristol Bay (Goddard and Rugh 1998). Each year since then, the National Marine Fisheries Service has organized surveys in the southeastern Bering Sea to better document and monitor the population's status through development of a North Pacific right whale photo-identification catalogue and collection of genetic samples. Scientists using these data have estimated that the population consists of only about 30 individuals, making the eastern North Pacific right whale population the

smallest—and one of the most endangered—cetacean populations in the world (Wade et al. in review).

The National Marine Fisheries Service has lead responsibility for the protection and conservation of right whales. Until recently, the Service managed both the North Pacific and the North Atlantic populations as one species, the northern right whale (*Eubalaena glacialis*), which was listed as endangered throughout its range. Recent genetic studies indicate that these are separate species, *E. japonica* (North Pacific) and *E. glacialis* (North Atlantic) (Rosenbaum et al. 2000, Gaines et al. 2005). Accordingly, the Service proposed separate listings as endangered for the two species, and this was finalized on 6 March 2008 (73 Fed. Reg. 12024). In 2006, in response to a petition from the Center for Biological Diversity, the Service designated a large portion of the southeastern Bering Sea north of the Alaska Peninsula and a small area south of Kodiak Island as North Pacific right whale critical habitat under the Endangered Species Act.

In 2009 the Minerals Management Service was planning to lease areas in and around designated right whale critical habitat in the southeastern Bering Sea for oil and gas development. Potential oil spills, collisions with vessels, and noise associated with exploration and development could threaten the few remaining right whales in the region. To assess those risks and ensure that appropriate protection measures are taken, the Minerals Management Service and the National Marine Fisheries Service entered into an agreement in 2008 to support a multi-year right whale research project in the southeastern Bering Sea. Because the National Marine Fisheries Service has no direct budget for studies of right whales in the North Pacific, all funding for research under the agreement is being provided by the Minerals Management Service. The research program has involved aerial and ship-based surveys in the southeastern Bering Sea, satellite telemetry studies, foraging ecology and behavior studies, passive acoustic monitoring, and photo-identification.

In the summer of 2009 research continued on all of those topics. Preliminary results of the aerial and shipboard surveys included sightings of seven individual whales, four of which had been identified in previous years and three that had not. The three new

animals increased the minimum number of individuals in the photo-identification catalogue to 17. As a result of photo-identification analyses, researchers also were able to confirm that a right whale photographed in Hawaii in early April 1996 was the same animal seen in the southeastern Bering Sea nearly five months later in late July (Kennedy et al. 2009). This is the first time a North Pacific right whale seen off Alaska during the summer has been matched to a whale seen in a low-latitude region in winter. Biopsy samples were collected from three of the seven whales sighted in 2009 but had not been analyzed by the end of the year. Based on past genetic analyses, biopsy samples have revealed at least 21 different whales, including 15 males and 6 females (Wade et al. in review). The strong bias toward males bodes poorly for the population's long-term survival.

Tagging efforts in 2009 only were marginally successful. A short-term tag designed to study dive behavior was successfully deployed but fell off after only 20 minutes due to a tag attachment malfunction. Satellite-linked tags for tracking longer-term movements and habitat-use patterns were attached to three whales, but none broadcast signals for longer than two months. During the period of tag transmission (i.e., late July through mid September) all three whales remained in the southeastern Bering Sea within the designated critical habitat area north of the Alaska Peninsula. Passive acoustic monitoring from sonobuoys detected right whale calls along track lines immediately to the northwest of the designated critical habitat, but most calls and most effort were within the critical habitat boundaries.

At the end of 2009 the Commission understood that right whale studies under the agreement between the Minerals Management Service and the National Marine Fisheries Service would be continued in 2010.

North Atlantic Right Whale *(Eubalaena glacialis)*

The North Atlantic right whale is also endangered. Individuals can reach lengths of nearly 18 m (60 ft) and weigh up to 70 tons. Unrelenting pursuit by commercial whalers from the middle ages through the

early 20th century all but eliminated the species from coastal waters off Western Europe and left only a small population off the East Coast of the United States and Canada. In 1935 the League of Nations adopted an international ban on the hunting of right whales. The population size at that time was unknown. In 1970 the species was listed as endangered under the predecessor to the current Endangered Species Act. By the late 1970s when the first dedicated right whale studies began, the western North Atlantic population was estimated to number about 300 animals.

At the end of the 1900s the western population showed little sign of recovery. In the 1980s scientists documented an average of 12 births a year, and in the 1990s fewer than 10 births were recorded in most years (Kraus et al. 2005). In 2000 only a single calf was known to have been born. During the 1980s and 1990s it also became apparent that right whales were being killed by collisions with ships and entanglement in commercial fishing gear, particularly lines from lobster traps and gillnets. The National Marine Fisheries Service has lead responsibility for protecting right whales, and in 1991 it adopted a right whale recovery plan. Subsequent efforts to implement effective conservation measures have progressed very slowly.

In recent years, prospects for recovery of the western North Atlantic right whale population have taken a positive turn. Since 2000 the number of births has increased to an average of nearly 25 animals a year, and in 2009 a record high of 39 calves was recorded (New England Aquarium, unpubl. data). The reason for the abrupt increase in calving is uncertain, but it may be related to an increase in the abundance or biomass of right whale prey, principally small copepods, in the species' feeding grounds off New England and southeastern Canada (Greene and Pershing 2004). From 2001 through 2009 more than 210 calves were born, and the population size has increased to more than 400.

In the past three years, the National Marine Fisheries Service has adopted several regulations that should help reduce ship strikes and entanglement risks, thereby improving prospects for recovery. In particular, the Service adopted (1) seasonal restrictions to limit the speed of large vessels to 10 knots

in certain times and areas off the U.S. East Coast where right whales are most likely to occur, (2) a permanent ban on gillnet fishing in right whale calving grounds during the calving season, and (3) requirements that all trap fisheries off the U.S. East Coast, including the lobster fishery, replace floating line used to link strings of traps together with sinking line that should not float up into the water column between traps where it could entangle passing whales. Although entanglements involving large whales continue to occur and significant conservation issues have not been adequately addressed—particularly the risks of entanglement in buoy lines used to mark the location of commercial fishing gear—the recent measures offer the most meaningful prospects for protection since management needs for the species were recognized in the 1980s and the Service adopted its right whale recovery plan.

Documented Right Whale Deaths and Injuries in 2009

Right whale deaths confirmed by observed carcasses since 1970 are summarized in Figure IV-6. The numbers are biased low because an unknown

number of deaths (or carcasses) are not observed. In 2009 observers reported seeing four right whale carcasses. For the second consecutive year, no deaths were attributed either to a ship strike or an entanglement, whereas about two deaths per year were attributed to those causes between 2000 and 2007. However, observed entanglements and collision-related injuries involving live whales have not decreased, suggesting that the lack of confirmed deaths from these causes over the past two years may be misleading.

The four carcasses observed in 2009 included a calf, two juveniles, and an animal of unknown age, all of which died of unknown causes. The first carcass was that of a juvenile that stranded alive at Cape Lookout, North Carolina, on 28 January and had to be euthanized. This whale, born in 2007, was last seen alive in good condition on 3 February 2008. The second carcass was that of a newborn calf seen floating 13 nmi off St. Augustine, Florida, on 17 February. Observations of the carcass indicate that it had been bitten by sharks, but it was not possible to determine if the bites occurred before or after death. The third carcass was an eight-year-old juve-

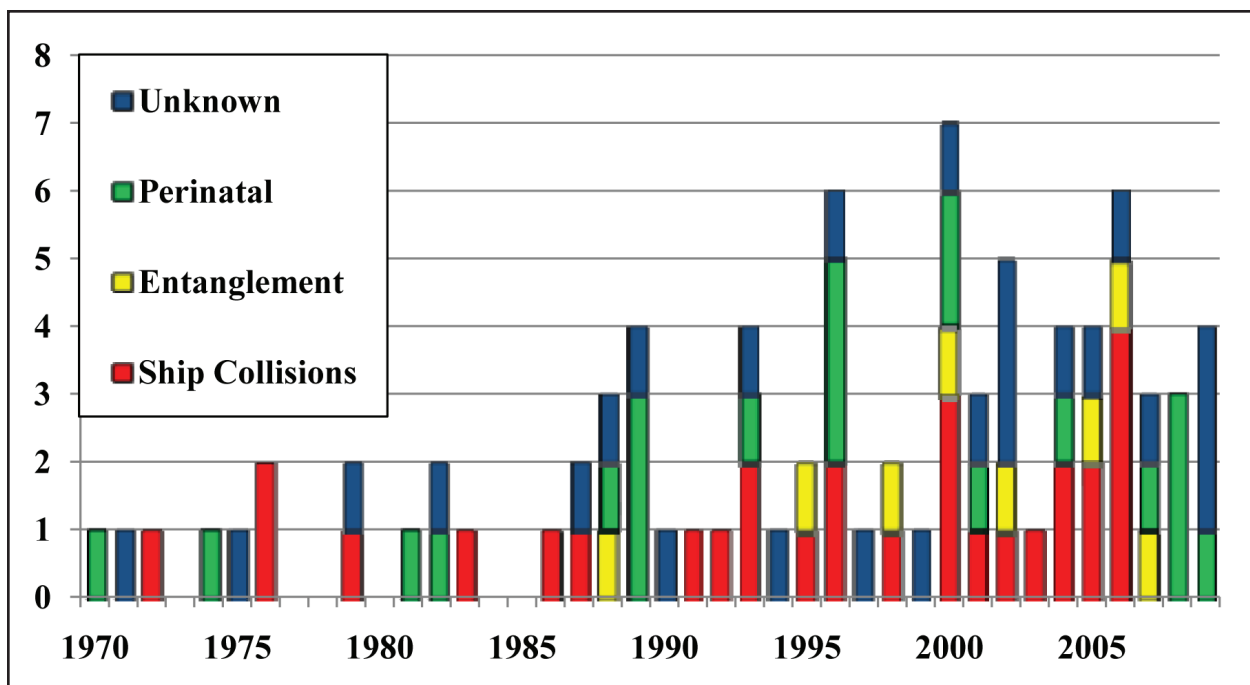


Figure IV-6. Known mortality of North Atlantic right whales by cause of death, 1970–2009. (Unpublished data compiled by the New England Aquarium)

nile found floating 60 nmi east of Nantucket, Massachusetts, on 25 February. Its carcass was too far from shore to retrieve, but photographs showed no obvious signs of it having been either hit by a ship or entangled in fishing gear. The last carcass, also seen floating and unrecovered, was reported 100 nmi east of Long Island, New York and Massachusetts, on 19 December. Because the latter two carcasses were near major shipping channels east of New York and necropsies were not conducted, ship strike cannot be ruled out as the cause of one or both deaths.

In addition to the four observed deaths in 2009, nine injured whales were sighted alive, seven entangled with fishing gear and two with vessel-related injuries. The seven entanglements were one less than the record for new entanglements in a year observed in 2002 and 2008. The year's first case involved a badly entangled 6-year-old juvenile (#3311) seen by an aerial survey team on 14 January off Brunswick, Georgia. It was towing a small orange buoy and had an extensive amount of line wrapped around the upper jaw and trailing behind its flukes. It had been seen gear-free nine months earlier in the Bay of Fundy, Canada. Although a disentanglement team removed more than 150 m (~500 ft) of line the day it first was seen entangled, a considerable amount of gear remained on the animal, and the team attached a telemetry tag to a trailing line to relocate the whale for further disentanglement work. Over the next two and half months, the animal moved north to the eastern tip of Long Island, New York, and then back to Florida. During that period, a disentanglement team made several unsuccessful attempts to approach and sedate the whale with a newly designed darting gun and a mixture of midazolam and butorphenol. On 6 March off northern Florida, a team made a third attempt to sedate the animal and slowed it enough that the team could approach it. The team removed some of the line, but some remained lodged in the whale's mouth. Unfortunately, the whale's condition had deteriorated badly by March, and the team was not able to attach a telemetry tag. At the end of 2009, the whale had not been resighted, and its prospects for survival were poor.

The second animal was an entangled juvenile female (#3420) seen 25 miles east of the Florida-Georgia border on 31 January with line exiting the

left side of its mouth. A rescue team was unable to remove the gear but did attach a telemetry tag to trailing line. Two weeks later, as the animal was moving north, the tag pulled free with 15 m (50 ft) of line. The whale was last seen on 28 August 2009 in the Bay of Fundy in good condition. No line was visible, but the sighting was too brief to confirm whether the whale was completely free of gear.

The third animal was a two-year-old juvenile sighted on 7 February on the calving grounds off Georgia with line wrapped around its rostrum. It may have been entangled in that area as it had been seen gear-free a month earlier off St. Augustine, Florida. Rescuers removed 14 m (45 ft) of line on 12 February, but some line still remained caught on the animal. It was last seen in 2009 on 10 March in Cape Cod Bay with some line still in its mouth.

On 31 March 2009 a 31-ft twin-engine recreational boat traveling at 26 knots six miles off Hilton Head, South Carolina, struck an unidentified whale. The collision tore the port-side propeller shaft from the boat, causing it to begin to sink. The Coast Guard rescued the three people aboard the vessel, and the vessel operator reported seeing blood in the water from the struck whale. An aerial search did not locate the animal. On 15 December, a right whale survey team off Georgia sighted a juvenile whale (#3745) that may have been the injured animal (Figure IV-7). It had two sets of propeller scars on its back and flukes that were consistent with those from a small twin-engine boat. In addition, whale #3745 had been seen without injury off the southeastern U.S. coast on 29 February, just a month before the collision. Whale lice (i.e., orange cyamids) observed along the wounds in December suggest that at that time the wounds were more than a few weeks old. The scarred whale observed in December appeared to be in fair condition. The National Marine Fisheries Service opened an investigation of the incident that had not been concluded at the end of the year.

On 19 April 2009 a 15-m (50-ft) research vessel operated by the Stellwagen Bank National Marine Sanctuary struck a juvenile female right whale (#CT50). The vessel was traveling at 22 knots in Massachusetts Bay at the time of the incident. The whale surfaced suddenly just a few feet in front of the vessel, providing no time for the vessel or the

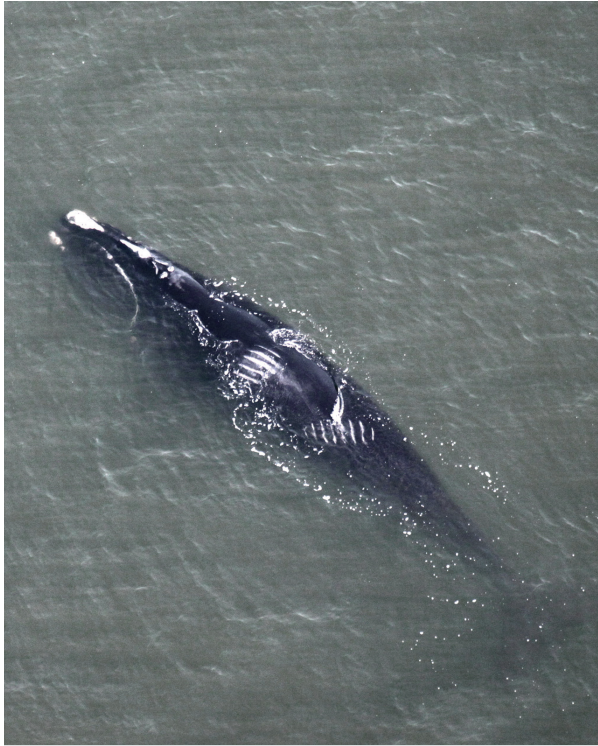


Figure IV-7. Two-year-old right whale possibly struck by a recreational boat off Hilton Head, South Carolina, on 31 March 2009. (Photo courtesy of the New England Aquarium)

whale to take evasive action. The vessel was undamaged and remained with the animal for 45 minutes. The injuries consisted of a gash on the whale's left fluke that appeared to be non-lethal. However, when the animal was resighted on 2 September in the Roseway Basin off Canada, the gash on its fluke was still open, its fluke was starting to curl, its skin showed signs of graying, and its condition had deteriorated to fair. The National Marine Fisheries Service opened an investigation of the event, which was ongoing at the end of 2009.

On 18 July 2009 an adult male (#1019) was photographed 39 miles south of Nantucket, Massachusetts, with line and a yellow 50-cm (20-in) buoy trailing 20 to 30 m (70 to 100 ft) behind its flukes. It had been seen gear-free three months earlier in Cape Cod Bay but was not seen again in 2009 after the July sighting.

On 4 September 2009 a recreational fisherman reported an adult female (#1151) near Jeffrey's Ledge off Portsmouth, New Hampshire, with two lines

wrapped around its rostrum. The whale's movements were significantly reduced, indicating entanglement of its torso. A rescue team arrived a few hours after the report and cut the lines over the whale's back. The cut lines parted forcefully, apparently pulled down by the weight of submerged gear. The animal dove and then resurfaced free of all gear and apparently in good condition. This whale had been seen gear-free with a calf just a week earlier. Although the calf was not observed when its mother was disentangled, it was resighted late in 2009 off the southeastern U.S. coast in good condition.

On 26 September 2009 a whale-watching boat in Cape Cod Bay, Massachusetts, reported a calf trailing line and a red bullet-shaped buoy behind its flukes. A disentanglement team reached the animal within a few hours and successfully removed all the entangling gear, including the buoy, lines and a 1-m (3-ft) wire mesh lobster trap. The whale previously had been seen gear-free on 24 March off Florida.

On 26 November 2009 a recreational fisherman photographed another calf less than a mile south of Cape Lookout, North Carolina, with line trailing from the right side of its head. The report was submitted two weeks after the sighting, and the whale was not resighted before the end of the year.

In addition to whales observed entangled in gear, several animals, including four calves, were observed on northern feeding grounds with new entanglement scars. The wounds on one of those calves, the calf of whale #1240, appeared serious enough to raise concern about its fate. In addition, seven animals last seen entangled in previous years were resighted in 2009. Three were gear-free in good condition, two were gear-free in fair or improving condition, and two were still entangled and in fair condition.

Since 2000, 48 entanglement cases involving live right whales have been recorded (Table IV-7). Of those, 31 cases could be considered resolved because the whales either had been resighted gear-free in good condition (23 whales), were found dead from entanglement injuries (3 whales), or are assumed dead (5 whales) because they have not been resighted for six or more years. Three other entangled whales were never identified, precluding follow-up analyses. Fourteen cases remained unresolved at the end of 2009.

Table IV-7. Fate of North Atlantic right whales observed entangled between 2000 and 2009 (unpublished data compiled by the New England Aquarium)

Status When Last Sighted through 2009	No Gear Removed	Some Gear Removed	All or Most Gear Removed	Total
Gear-free – good condition	12	6	5	23
Gear-free – fair, poor, or uncertain condition	3	1	1	5
Entangled – good condition	–	–	–	–
Entangled – fair, poor, or uncertain condition	5	3	1	9
Known or assumed dead	6	1	1	8
Unidentified right whales not resighted	2	–	1	3
Total	28	11	9	48

Measures to Reduce Entanglement in Fishing Gear

As indicated in Figure IV-5, the New England Aquarium has attributed the deaths of 7 of 60 right whales whose carcasses were observed since 1990 to entanglement in commercial fishing gear, principally lines from lobster traps and gillnets. Entanglement-related deaths are less likely to be observed and documented than deaths from ship strikes. Whales killed by ship strikes tend to die quickly and their fat reserves keep their carcasses afloat until they drift ashore or are found by mariners. Entangled whales, however, die slowly from impaired feeding or persistent infections caused by abrading lines. They deplete their fat reserves by the time they die and tend to sink, thereby limiting the likelihood of being observed and documented. Such deaths can only be inferred based on the animals' disappearance from the sighting records. For example, four whales last seen entangled between 2000 and 2003 are now assumed to have died because they have not been resighted for six or more years. They are not included in Figure IV-5 because there are no carcasses to confirm their deaths. If they were included, entanglement deaths for those years would equal vessel-related deaths over that four-year period.

The National Marine Fisheries Service relies on the Atlantic Large Whale Take Reduction Team, discussed later, to recommend regulatory and non-regulatory measures that will reduce entanglement risks. The measures are then included in an Atlantic Large Whale Take Reduction Plan. The team was estab-

lished in 1996 and is composed of representatives from relevant fisheries, environmental groups, state and federal agencies, and the scientific community. The team has met periodically since 1996 because the measures in the plan have failed to reduce the observed occurrence of right whale entanglements.

The plan's regulatory measures are implemented under authority of the Marine Mammal Protection Act. They consist primarily of gear modifications that the Service deems likely to reduce entanglement risks. Those modifications include weak links placed at various positions on vertical lines and net panels, knotless lines, sinking groundlines in place of floating groundlines, and time-area management zones where various combinations of such gear requirements apply. The plan's non-regulatory measures include disentanglement efforts, research on new gear modifications, public outreach, and enforcement. As noted in past annual reports, the Marine Mammal Commission consistently has recommended increased use of seasonal area closures to prevent all types of hazardous fishing gear in designated critical habitats at times of the year when right whales aggregate regularly. With two exceptions—a recent prohibition on gillnet fishing in the calving grounds adopted after a right whale died in a gillnet set in that area in 2005 and a closure excluding lobster traps in the Great South Channel in spring—the team and the Service have dismissed this alternative with no meaningful evaluation.

After a five-year process to replace inadequate measures, the Service finally adopted new measures

to modify the Atlantic Large Whale Take Reduction Plan in September 2008. The most important measure requires that virtually all trap and pot fisheries along the U.S. Atlantic coast use sinking line in place of floating line for connecting individual traps into strings, which can number from 2 to 20 or more traps. The provision effectively would eliminate thousands of miles of groundlines that can float up into the water column between traps and entangle whales. In its comments on the proposed measure, the Commission strongly supported the requirement but noted that risks of entanglement in buoy lines had not been addressed adequately and therefore again recommended that the Service adopt seasonal closures in designated right whale critical habitats to prohibit the use of fishing gear with lines, such as buoy lines, that pose entanglement risks.

Recognizing that the take reduction plan did not successfully address entanglement risks involving vertical buoy lines, the Service reconvened the Atlantic Large Whale Take Reduction Team in 2009 to seek advice on additional regulatory provisions for vertical lines. Because of the team's large size and regional differences in fisheries, the Service convened two separate subgroups. A northeast subgroup met 1–2 April and a mid and south Atlantic subgroup met 28–29 April. During the meetings, the Service noted that it hoped to complete new rules for vertical lines by April 2014 and asked the team to develop a list of possible management measures. It also advised that it was undertaking a modeling study to identify areas of greatest entanglement risk by examining the co-occurrence of whales and fishing gear. The two subgroups identified a range of potential measures including full or seasonal closures, various types of previously identified gear modifications, gear marking requirements, caps on fishing effort, requirements for using longer strings or buoy line caps to reduce the number of buoy lines, education and outreach, and revising certain state regulations that currently limit the use of longer strings of traps.

At the end of 2009 the Commission understood that the Service planned to reconvene the take reduction team in 2010 to continue discussions on management options for reducing vertical lines. It also understood that the Service would take the following steps prior to the next meeting:

- contact state fisheries agencies to request that they gather and provide data on the number of traps set per buoy line in relevant fisheries;
- prepare a paper identifying options for marking gear to help identify fishing areas, gear parts, and fisheries that are the source of gear removed from whales;
- prepare a paper on options for encouraging the development of lineless fishing gear (i.e., systems that keep buoys and buoy lines on the bottom until gear is ready to be retrieved);
- proceed with developing a model to evaluate entanglement risks based on the co-occurrence of whales and fishing gear;
- attempt to secure funding for research on potential vertical line modifications; and
- prepare a proposed plan for evaluating the effectiveness of management measures.

Collisions with Ships

Since 1990 the National Marine Fisheries Service, based on close inspection of carcasses, has attributed 21 of 60 reported right whale deaths (35 percent) to collisions with vessels. Because 14 of the 60 carcasses were not recovered or examined closely, it is likely that more than 35 percent of the known deaths were caused by ship strikes. Observations of massive propeller wounds and blunt trauma injuries on examined carcasses indicate that the vast majority of vessel-related deaths were caused by large vessels.

On 10 October 2008 the Service published a final interim rule implementing the central parts of a new right whale ship-strike reduction strategy. The rule became effective in December 2008 but for a five-year period only, during which the Service is to evaluate its effectiveness. The rule requires that large vessels restrict their speeds to 10 knots within designated times and areas where right whales are most likely to occur. It applies to all vessels greater than 20 m (65 ft) entering or departing a U.S. port, including both U.S. and foreign flagged vessels. As discussed in past annual reports, the Commission has recommended regulations to limit vessel speed since the mid-1990s. In 2008 the Commission expressed strong support for adoption of the Service's rule, although it recommended that the rule be made per-

manent by eliminating the five-year sunset provision. The times and areas where required speed limits apply (Figure IV-8) include portions of the species' winter calving grounds off the southeastern U.S. coast, its spring and summer feeding areas off New England, and its nearshore migratory corridor off U.S. mid-Atlantic coastal states. The designated areas include the following:

- 15 November through 15 April: a management area about 20 to 30 nmi off northeastern Florida and southern Georgia near the ports of Jacksonville and Fernandina Beach, Florida, and Brunswick, Georgia;
- 1 November through 30 April: a mid-Atlantic management area out to 20 nmi from shore between Brunswick, Georgia, and Wilmington, North Carolina, and around entrances to the ports of Morehead City and Beaufort, North Carolina, the Chesapeake Bay, Delaware Bay, the port of New York/New Jersey, and Block Island Sound off Narragansett Bay;
- 1 January through 15 May: a management area in Cape Cod Bay;
- 1 March through 30 April: a management area off Race Point at the northern tip of Cape Cod; and

- 1 April through 31 July: a management area in the Great South Channel east of Cape Cod.

The Service's new ship-strike reduction strategy also includes non-regulatory measures. The Service and the U.S. Coast Guard, in consultation with the International Maritime Organization, have (1) established recommended access routes into and out of major ports adjacent to the right whale calving grounds off northwestern Florida and Georgia, (2) designated the right whale feeding ground in the Great South Channel east of Cape Cod as an "Area to Be Avoided," and (3) redesigned an established vessel traffic separation scheme leading into and out

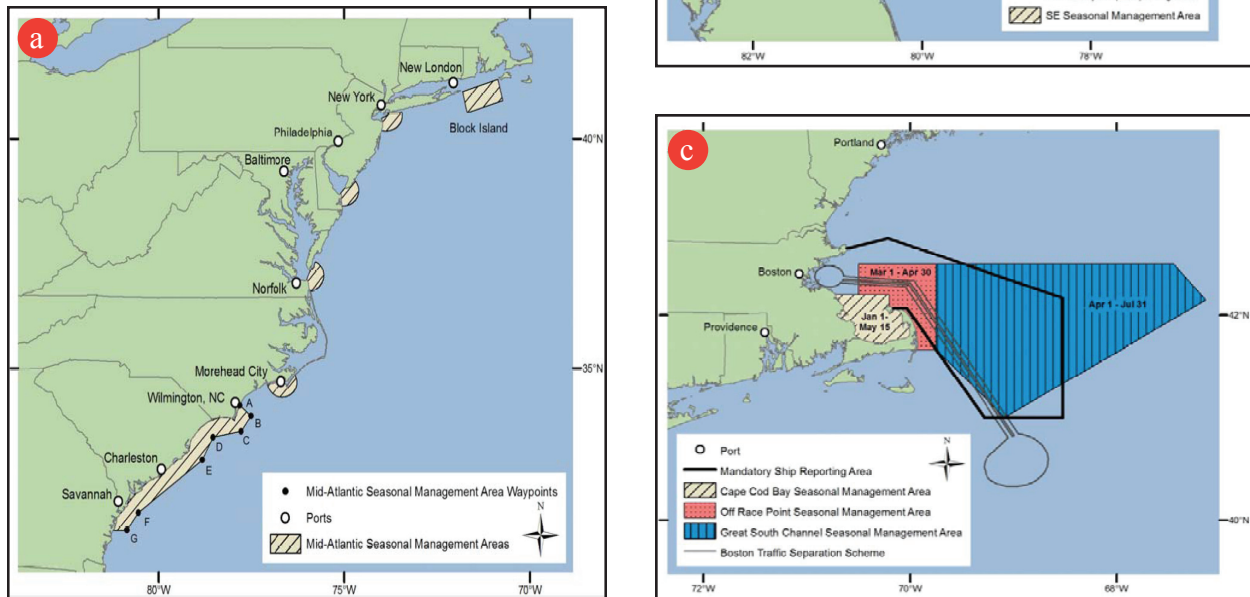


Figure IV-8. Right whale management areas requiring large vessels (>65 ft) to seasonally restrict their speed to 10 knots; (a) late fall-early spring migratory corridor, (b) winter calving grounds off the southeastern U.S. coast, and (c) spring-summer feeding grounds off Massachusetts. (Source: National Marine Fisheries Service)

of Boston, Massachusetts, near right whale feeding grounds in Cape Cod Bay. The last measure became effective on 1 June 2009. Although not mandatory, these routes and areas are marked on all nautical charts and used routinely by operators of large vessels to plot their course.

Right whales occasionally aggregate in large numbers at unpredictable locations outside regularly used habitats. To protect whales in those areas, the Service's ship-strike reduction strategy also includes provisions for establishing dynamic management areas around reliable sightings of right whale groups outside the seasonal management areas. When a group is sighted, the Service and Coast Guard broadcast a notice to mariners announcing its location and requesting vessel operators transiting the area to be on alert for whales and reduce speeds to no more than 10 knots. Once announced, dynamic management areas remain in effect for 15 days after the initial sighting. Compliance with the request, however, is strictly voluntary. During 2009 the Service and the Coast Guard announced 19 temporary management areas to protect aggregations of feeding whales, all in waters off New England.

As noted in the Commission's previous annual report, regulatory elements of the Service's strategy, initially proposed in June 2006, were delayed for several years by concerns raised elsewhere in the Administration, including the White House Council of Economic Advisors and the Vice President's Office. One of the provisions required of the Service to proceed with rulemaking was a sunset clause limiting the rule to five years (i.e., until December 2013) and requiring analysis of its effectiveness. To address these requirements, the Service held a workshop in October 2008 to develop a strategy to evaluate the rule's effectiveness. Participants in the workshop noted that data collection and analysis would need to be completed by the end of 2011. They also concluded that the Service should continue to monitor right whale deaths for evidence of ship collisions, continue aerial surveys to determine whether the boundaries of designated management areas accurately reflect waters in which right whales are most likely to occur, and monitor compliance by vessel operators with speed limits.

In 2009 the Service collected data on ship movements through designated management areas using

a recently developed automatic identification system. The International Maritime Organization is initiating this system internationally to enhance navigational safety. It requires all vessels greater than 300 gross tons to carry transmitters that continuously broadcast their identity and location. A preliminary analysis of vessel speeds in designated management areas for the first three months after the rule went into effect indicates that compliance rates have been poor. Overall, only 20 percent of vessels transiting seasonal management areas complied fully by limiting their speed to 10 knots or less; about 50 percent traveled at 12 knots or less. Compared with speeds used before the effective date, the proportion of vessels traveling at 10 knots remained essentially unchanged, while the proportion traveling at 12 knots or less increased by about 20 percent (i.e., from 30 percent prior to the rule to 50 percent afterward). Thus, it appears that only a small proportion of ships accustomed to travelling at higher speeds in the past slowed to levels approaching, but not reaching, the 10-knot limit. The highest rates of compliance were in management areas off Massachusetts, where 50 percent of the vessels traveled at 10 knots or less and 90 percent traveled at 12 knots or less.

During 2009 the Service and the Coast Guard took a number of steps to inform mariners of the new rules. These included notices to mariners, announcements on weather radio channels, articles and notices in professional maritime journals and publications, press releases, messages transmitted through mandatory ship reporting systems previously established in the right whale calving grounds and feeding areas, distribution of placards and brochures, additions to editions of the *Coast Pilot*, notices on national weather buoy Web sites, and other means.

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

Sea otters in Southwest Alaska currently are classified for management purposes as a separate population of the northern sea otter subspecies, *Enhydra lutris kenyoni*. The other two subspecies are the southern sea otter (*E. l. nereis*), found only along the coast of central California, and the Asian sea otter

(*E. l. lutris*), which inhabits waters from northern Japan to the Commander Islands (Wilson et al. 1991). As with all sea otters, the Southwest Alaska population nearly was exterminated by commercial fur hunters in the 1700s and 1800s. By the time the International Fur Seal Treaty was signed in 1911 banning the hunting of sea otters, only 13 isolated populations remained throughout the species' range—a range that once extended around the rim of the North Pacific Ocean from Mexico to Japan. Several of the sea otter colonies surviving in 1911 were in Southwest Alaska, and by the 1960s, they substantially had recovered and reoccupied their former habitat in that region (Kenyon 1969). Southwest Alaska sea otters now inhabit nearshore waters along a 2,500-km stretch of coast from Kodiak Island and the western side of Cook Inlet to the western tip of the Aleutian Islands.

Like all sea otters, Southwest Alaska sea otters rarely occur in waters deeper than about 100 m, although they occasionally cross deepwater channels that separate island groups. However, their movements generally are limited. Adult males tend to move the farthest and are known to move 400 km or more, although movements of 100–200 km are more typical (Jameson 1989). Adult females are more sedentary and rarely move more than about 20 km (Ralls et al. 1996). Otters inhabit areas with substrates ranging from fine mud or sand to rock and feed primarily on an assortment of benthic invertebrates (e.g., clams, sea urchins, snails, crabs, and worms) and fish.

Based on surveys conducted through 1976, Calkins and Schneider (1985) estimated the abundance of sea otters in Southwest Alaska to be between 94,050 and 128,650 otters in the mid-1970s, which was thought to have been at or near the pre-exploitation population size in that region. In the late 1980s or early 1990s, however, their numbers began to decline precipitously for unknown reasons. Surveys conducted between 2000 and 2008 suggest that their current abundance is about 43 to 58 percent below 1976 levels, with declines in some areas exceeding 90 percent (Burn and Doroff 2005, Estes et al. 2005, U.S. Fish and Wildlife Service 2008). The greatest declines have been in the western Aleutian Islands and along the southern part of the Alaska Peninsula. At some small islands, sea otters may have disap-

peared entirely. Because of the decline, the Fish and Wildlife Service designated the Southwest Alaska sea otter population as threatened under the Endangered Species Act in 2005.

Sea otter reproduction rates in Southwest Alaska apparently did not decline over the period of the population collapse. Thus, the cause of the decline is thought to be related to one or more of the following sources of mortality: predation, starvation, disease, oil spills, incidental take in commercial fisheries, subsistence harvests, poaching, and intra-specific aggression. The leading hypothesis is an increase in predation by killer whales (Estes et al. 1998). What may have caused killer whales to increase predation on sea otters is uncertain and is subject to various theories related to changes in the Bering Sea ecosystem and its food webs resulting from natural and human-caused factors.

The U.S. Fish and Wildlife Service has lead responsibility for the recovery of sea otters. Other agencies and groups, particularly the U.S. Geological Survey and Alaska Native organizations, assist with research and management activities.

Development of a Southwest Alaska Sea Otter Recovery Plan

In 2006 the Fish and Wildlife Service convened a recovery team for southwest Alaska sea otters. The team is composed of representatives of certain federal and state agencies, Alaska Native organizations, and the academic community. Charged with developing a recovery plan for the population, the team met six times between 2006 and 2008 to discuss potential recovery strategies and goals, specific recovery actions, research activities, and criteria for removing the stock from the list of endangered and threatened wildlife. In 2009 the team focused on drafting the recovery plan. Substantial progress was made, and, at the end of 2009, the team expected to provide a draft plan to the Service in the spring of 2010.

Designation of Critical Habitat

With few exceptions, section 4 of the Endangered Species Act requires the designation of critical habitat for species listed as endangered or threatened. Critical habitat includes areas whose physical or biological features are deemed essential for the con-

servation of a species and which may have special management needs. Once designated, any federal agencies conducting, authorizing, or funding activities that might destroy or adversely modify such critical habitat must consult with either the Fish and Wildlife Service or the National Marine Fisheries Service (depending on the species involved) to identify reasonable and prudent alternatives necessary to avoid such effects.

On 16 December 2008 the Fish and Wildlife Service published a *Federal Register* notice (73 Fed. Reg. 76454) proposing to designate 15,225 km² (5,879 mi²) of coastal waters as critical habitat for southwest Alaska sea otters. The proposed area included waters from the mean-high-tide line seaward to either the 20 m isobath or a distance of 100 m from shore, whichever was greater, along almost all shorelines around Kodiak Island and from Kamishak Bay on the western shore of Cook Inlet westward along both sides of the Alaska Peninsula and the Aleutian Islands. The proposal also included additional areas in certain shallow bays on the north side of the Alaska Peninsula where sea otters frequently occur farther from shore. The proposal excluded developed sites with piers, docks, harbors, breakwaters, and other such areas, which constitute a very small percentage of shoreline available as sea otter habitat in this part of Alaska.

On 17 February 2009 the Marine Mammal Commission provided comments to the Service on its proposal. The Commission noted that the Service had provided a thorough and commendable analysis of the primary constituent elements of sea otter habitat. Among other points in support of the proposed boundary, the Service's analysis noted that the kelp forests providing protection from marine predators occur primarily in waters less than 20 m deep and that the 20 m isobath and 100 m distance from shore generally occur very close to each other in most areas. The Commission agreed that all of the areas proposed for designation seemed warranted, and it recommended that the Service adopt a final rule designating critical habitat boundaries for southwest Alaska sea otters that includes all areas identified in the proposal.

The Commission also noted, however, that the purpose of identifying the constituent elements and

designating critical habitat is not simply to address factors causing the decline but also those factors that might impede recovery. In this regard, the Commission noted that the designated critical habitat should include adequate foraging habitat for maintaining and recovering the population. Although data are limited on sea otter foraging behavior in Southwest Alaska, recent studies in Southeast Alaska revealed that 84 percent of sea otters tagged with time-depth recorders foraged at depths of 2 to 30 m, that 85 percent of the females' foraging dives were to depths shallower than 20 m, and that more than half of the males dove to depths greater than 45 m at some point during the study (Bodkin et al. 2004). Believing that the critical habitat boundaries should include representative foraging habitat for male otters as well as females, the Commission recommended that the Service either expand the proposed seaward boundary from the 20 to 30 m isobath off all shoreline areas identified in the proposed rule or explain why foraging areas between the 20 and 30 m isobaths, which include a habitat rich in a primary constituent element (in this case, food for a significant portion of male otters), do not require protection for the population to recover.

On 8 October 2009 the Fish and Wildlife Service published a final rule (74 Fed. Reg. 51988) designating critical habitat boundaries. The final rule adopted boundaries that essentially were the same as initially proposed in December 2008. The seaward boundary was set at the 20 m isobath or 100 m from shore, whichever was greater, around the shorelines noted in Figure IV-9. In response to the Commission's comment recommending an extension of the boundary to 30 m, the Service stated that the study referenced by the Commission did not justify establishment of a 30-m boundary criterion and that, while the greater depth would include additional foraging area, there was no clear scientific rationale for the specific water depth suggested. Citing results from the same study referenced by the Commission, but with regard to dive patterns of female otters only, the Service concluded that a seaward boundary set at the 20 m isobath was scientifically justified because 85 percent of the females dove to depths of less than 20 m and the waters shallower than 20 m therefore include the majority of the most important sea otter foraging and

reproduction habitat. Based on that reasoning and also noting that shallow waters less than 20 m deep offer protection from predators, the Service determined that prey resources in water depths of 20 to 100 m are not features essential to the conservation of Southwest Alaska sea otters and therefore were not included within the designated boundaries.

Research Activities

Because of limited funding and the extensive range of the southwest Alaska sea otter population, the Service’s efforts to monitor trends in the popula-

tion’s abundance generally have relied on surveying segments of their range. For that reason, the Service has divided the range of this population into five management units: the western Aleutian Islands, the eastern Aleutian Islands, Bristol Bay along the north side of the Alaska Peninsula, the eastern end of the south side of the Alaska Peninsula, and Kodiak–Kamishak Bay–Alaska Peninsula (Figure IV-8). During 2009 the Service continued assessment efforts by conducting skiff surveys at population index sites selected to monitor sea otter numbers in the western Aleutian Islands management unit where declines have been

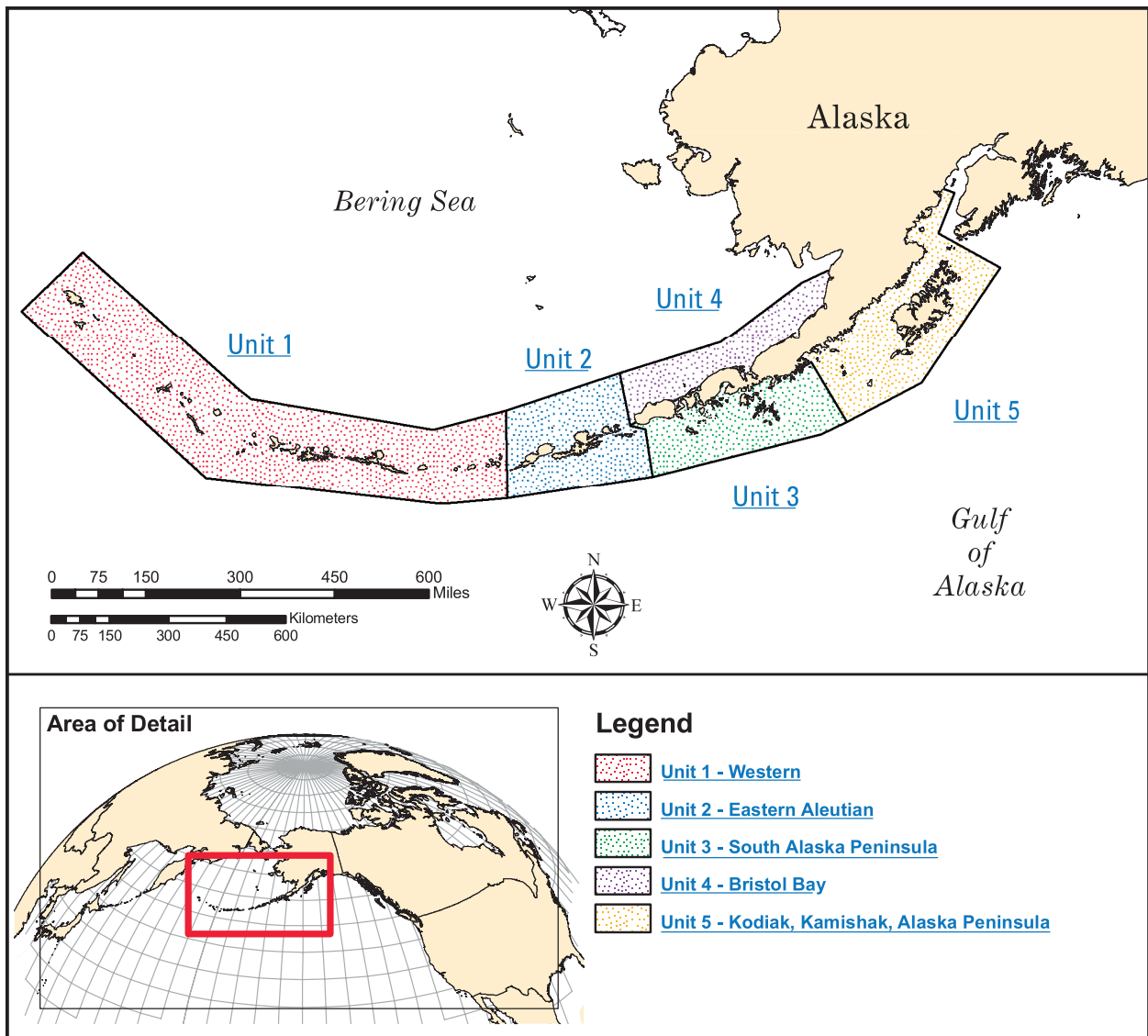


Figure IV-9. Critical habitat for the Southwest Alaska distinct population segment of the northern sea otter. (Source: U.S. Fish and Wildlife Service, Alaska Region)

greatest. At the end of 2009 the Service had not yet published the survey results, but preliminary analysis indicated that population numbers in at least some areas of that management unit may have stabilized and that the decline may be abating. Although the survey produced the highest overall count in a decade, it was still at only a small fraction of the species' pre-decline levels (Burn et al. 2010).

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

Before their near-extirpation by commercial hunters in the 1700s and 1800s, sea otters occurred in coastal waters around the rim of the North Pacific Ocean from the Baja Peninsula, Mexico, north to the Aleutian Islands and west to Japan. South of Alaska, the only sea otters surviving that era of commercial hunting were a few tens of animals living along the remote Big Sur coast of central California. These were the remnants of a separate subspecies called the southern sea otter. In the decades following adoption of an international ban on hunting sea otters in 1911, this small colony slowly increased in abundance and range (Figure IV-10). To promote its recovery, the southern sea otter population was listed as threatened under the Endangered Species Act in 1977.

Each spring the U.S. Geological Survey counts sea otters along their mainland range in California. The 2009 count totaled 2,654 animals including 2,263 independent otters and 391 pups. The total was 3.8 percent below the 2008 count of 2,760 otters but included 65 more pups. This was the second year in a row that the total count declined, but survey conditions

vary from year to year, and a three-year running average of counts is considered a better indicator of population trends (Figure IV-11). The trend lines suggest that the population has leveled off in the past three to four years.

Although sea otter populations in other areas, including Washington and parts of Alaska, have increased at rates approaching 20 percent per year during recovery periods, even in the best years growth of the California population has been at a much slower rate, generally 5 percent or less (Estes 1990, U.S. Fish and Wildlife Service 2003). Although the

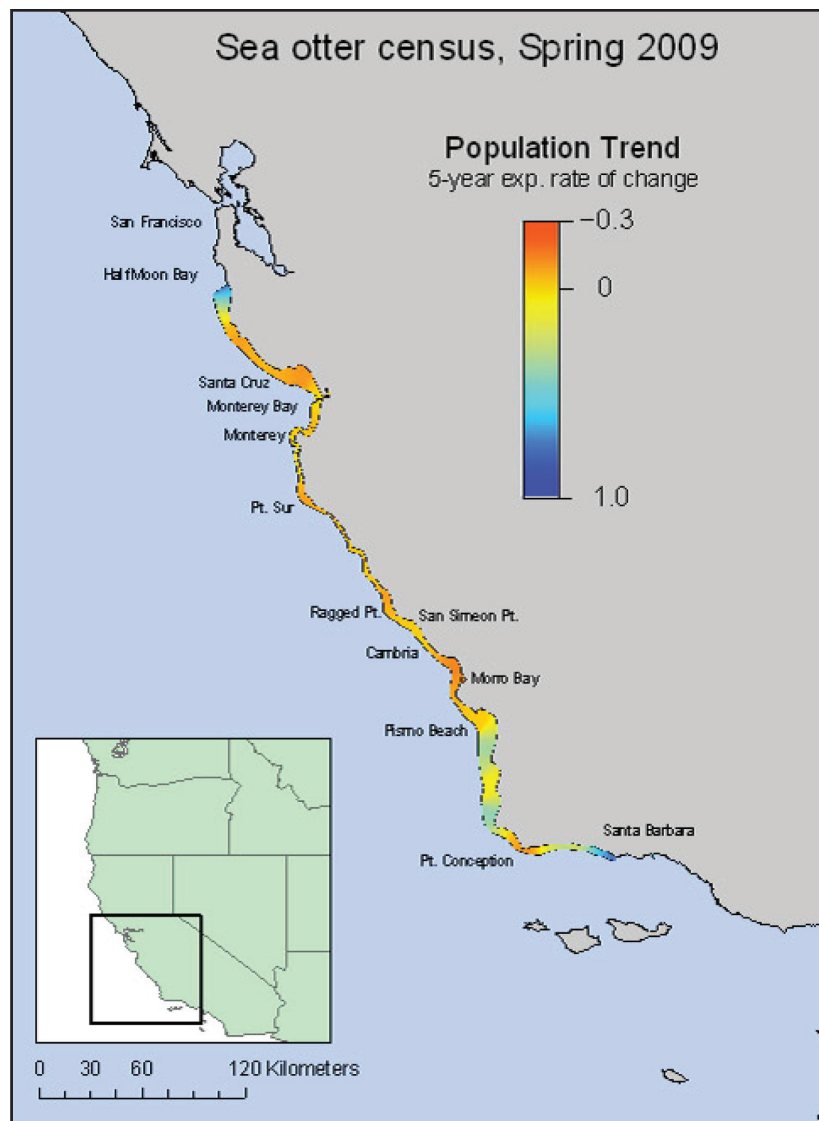


Figure IV-10. Current range of the southern sea otter population (Hatfield and Tinker 2009).

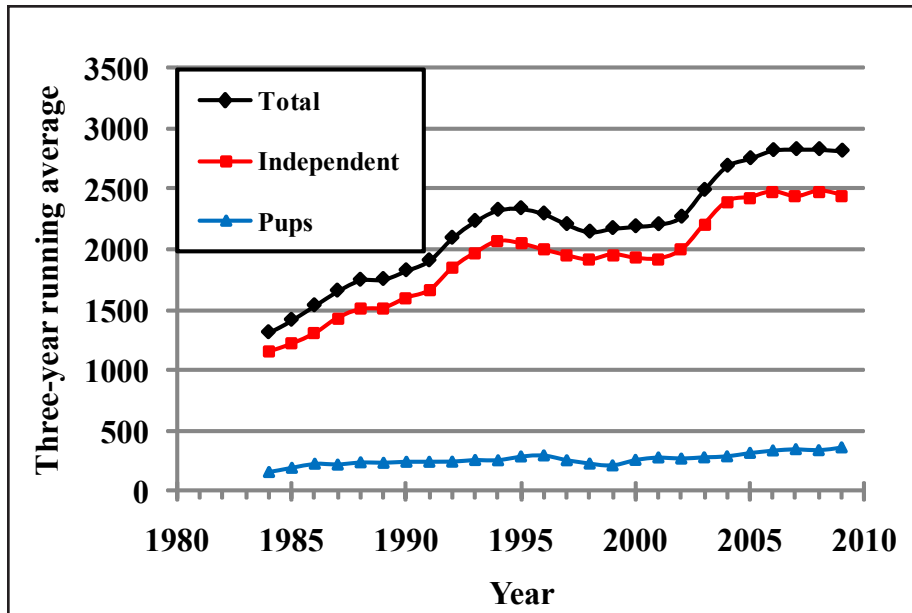


Figure IV-11. Population trends for southern sea otters based on a three-year running average of spring counts from 1984 through 2009. (Source: U.S. Fish and Wildlife Service)

reasons for its slow growth rate are uncertain, possible causes include mortality due to effects of toxins and pathogens (Miller et al. 2007) and food limitations (Tinker et al. 2008).

Future of the San Nicolas Island Translocation Project

In the late 1980s the Fish and Wildlife Service moved 140 sea otters from the population's mainland range to San Nicolas Island. The purpose of the move was to establish a separate colony that could be used to help restore the mainland colony in the event of a catastrophic event (i.e., an oil spill) affecting most or all of the mainland population. San Nicolas Island lies 65 nmi offshore and is the most remote of the southern California Channel Islands.

The translocation of the otters sparked considerable controversy because of concern that otters from the new colony would expand rapidly and colonize other offshore islands and the mainland coast south of their range. Because the diet of sea otters includes shellfish important for commercial and recreational fisheries, such potential expansion raised fears that those resources would be depleted by foraging otters as they expanded their range southward. To address that concern and fulfill the requirements of the leg-

islation (Pub. L. No. 99-625) authorizing the translocation, the Fish and Wildlife Service adopted additional regulations establishing a "no-otter" management zone south of their range. Otters observed in the management zone were to be captured and moved back to San Nicolas Island or north into the core of their mainland distribution.

Several otters died during attempts to capture and move them, and capture efforts were suspended in 1993. Although a small colony

numbering a few tens of animals eventually became established on San Nicolas Island, it failed to increase as expected and, by the late 1990s, numbered fewer than 25. By that time the mainland population had begun to show signs of a declining trend, and large numbers of sea otters from the mainland population were entering the management zone seasonally. In July 2000 the Service prepared a biological opinion under the Endangered Species Act on the containment component of its translocation program. The opinion was to determine whether the capture and release of large numbers of sea otters would have effects that were previously not considered. The opinion concluded that a continuation of containment efforts would jeopardize the population's recovery, in part by artificially restricting its range and hence increasing its vulnerability to the effects of oil spills, disease, and stochastic events. The Service therefore published a policy statement in January 2001 (66 Fed. Reg. 6649) advising that it would continue its suspension of efforts to catch sea otters in the no-otter zone pending re-evaluation of the translocation program. In 2003 the Service adopted a revised southern sea otter recovery plan (U.S. Fish and Wildlife Service 2003), which advised allowing natural range expansion.

In 2005 the Service took further steps to end the translocation program when it published a draft supplemental environmental impact statement on the future of the translocation project. The preferred alternative was to formally declare the project a failure, terminate regulations for the sea otter management zone, allow the mainland population to expand southward naturally, and leave in place the few otters that had become established at San Nicolas Island. At the end of 2009 the count of otters at San Nicolas Island was 33 independent animals and 6 pups, slightly below the 2008 count of 37 independent otters and 5 pups. The Commission has supported the Service's proposed action and, as noted in previous annual reports, recommended that steps be taken to finalize the draft statement and file a record of decision on the matter.

In 2009 the Service took no action to announce a final decision. The Navy raised concern about possible legal constraints on its exercises and activities at San Nicolas Island and perhaps elsewhere if the sea otter colony at San Nicolas Island were left in place. Because of the delay in reaching a final decision on the matter, the Environmental Defense Center and the Otter Project filed a lawsuit against the Fish and Wildlife Service on 30 September 2009 over its alleged failure to protect sea otters in the no-otter management zone. At the end of 2009 the suit had not been resolved, but, as in previous years, the Service continued its suspension of efforts to catch and remove otters found in the management zone.

H.R. 556, the Southern Sea Otter Recovery and Research Act

On 15 January 2009 Representative Sam Farr of California and co-sponsors introduced a bill, H.R. 556, in the U.S. House of Representatives to promote the protection and recovery of southern sea otters. The bill was referred to the House Committee on Natural Resources, which held a public hearing on its provisions in the spring of 2009. Based on results of the hearing, the bill was revised, approved by the full House of Representatives, and forwarded to the Senate for its consideration. On 29 July it was referred to the Senate Subcommittee on Science, Commerce, and Transportation as S. 1748.

If adopted, the bill would establish the Southern Sea Otter Recovery and Research Act. In part, the proposed act would authorize appropriations of up to \$5 million per year between 2010 and 2015 to the Secretary of the Interior to carry out research and management activities on southern sea otters. It also would direct the Secretary to establish a peer review panel to provide advice on research and management priorities, reappoint a southern sea otter recovery implementation team, and prepare periodic reports on the status of sea otter recovery. At the end of 2009 the Senate subcommittee had not taken action on the bill.

Florida Manatee (*Trichechus manatus latirostris*)

The West Indian manatee (*Trichechus manatus*) occurs from the southeastern United States along Atlantic and Caribbean coasts to Brazil and is listed under the U.S. Endangered Species Act as endangered throughout its range. The Florida manatee (*T. m. latirostris*) is a subspecies found almost exclusively in coastal waters of the southeastern United States. In winter, Florida manatees are confined almost entirely to warm-water refuges in the southern two-thirds of the Florida peninsula (Figure IV-12), but in spring they disperse with a few individuals ranging as far north as southern New England and as far west as Texas.

The abundance of Florida manatees has increased slowly over the past 30 years. Coordinated statewide winter surveys (coinciding with cold periods when most manatees are expected to be near warm-water refuges) have been conducted since 1991. Counts resulting from those surveys generally have increased, and the 2009 count was the highest on record. On 19–23 January 2009 the survey counted at least 3,802 manatees, including 2,148 along Florida's east coast and 1,654 along its west coast. Because annual counts vary greatly depending on winter conditions, they are not useful as indicators of short-term changes in abundance. In addition, because scientists do not know the number of manatees that are not present at the refuges during any individual survey and because at least some animals at refuges likely are not counted,

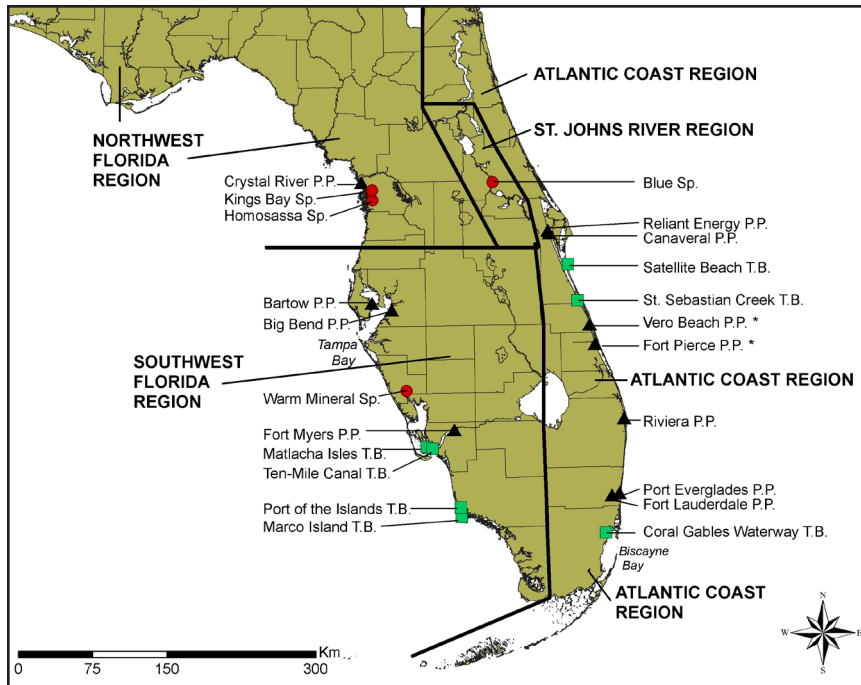


Figure IV-12. Distribution of manatee subpopulations and warm-water refuges (T.B. = thermal basin; P.P. = power plant). (Source: Fish and Wildlife Service 2001, Laist and Reynolds 2005)

results provide only a minimum estimate of total abundance at the time of the survey.

Because of their strong site fidelity to winter warm-water refuges, Florida manatees can be divided into four demographic subpopulations: Atlantic coast, upper St. Johns River, southwestern Florida, and northwestern Florida (Figure IV-12). Few individuals move between the east and west coasts, but a north-south dispersal in summer months results in overlapping distributions of the southwestern and northwestern subpopulations on the west coast and the St. Johns River and Atlantic coast subpopulations on the east coast.

Major threats to Florida manatees include collisions with boats, loss of warm-water refuges, and poisoning associated with periodic red-tide outbreaks. Human-related mortality has increased as the population has grown and has been a longstanding source of concern for Florida manatee conservation (Table IV-8). In 2009 a new record high of 433 deaths was recorded, surpassing the previous record of 420 in 2006. The 2009 total included record high numbers of perinatal deaths (115) and cold stress-related

deaths (56), and the number of deaths from watercraft (97) nearly equaled the previous record of 98 set in 2002.

The U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission share lead responsibility for Florida manatee research and management. Those agencies work with many other agencies and groups that assist with funding or recovery activities.

Warm-Water Refuges

Perhaps the greatest long-term threat to Florida manatees is the loss of warm-water refuges. To survive periods of cold winter weather, virtually all Florida manatees, including those in southernmost Florida, rely on local areas where water temperatures remain above about 20–22°C (68–72°F). Three types of warm-water refuges have been identified: natural springs, waters fed by warm-water discharges from power plants, and passive thermal basins where hydrographic conditions trap heat from various sources such as solar radiation or decay of organic matter (Laist and Reynolds 2005). Statewide winter counts from 1997 to 2007 suggest that 48 percent of all manatees rely on power-plant outfalls to survive the coldest winter periods, whereas 18 percent use natural springs, 14 percent use passive thermal basins, and the remainder are scattered among other locations that may include small springs, thermal basins, or other types of industrial outfalls (Laist 2008).

All the power plants that create such refuges were originally built more than 35 years ago although several have been substantially remodeled to extend their operational lives. Over the past decade, concerns have been raised about the loss of such refuges as old plants are decommissioned and replaced by new ones. In the mid- to late 1970s the Environmental Protection Agency adopted regulations restricting

Table IV-8. Number and percentage (in parentheses) of known annual mortality of Florida manatees in the southeastern United States (excluding Puerto Rico) 1978–2009

Year	Watercraft No. (%)	Floodgate And Locks No. (%)	Other Human- Related ¹ No. (%)	Perinatal No. (%)	Cold Stress No. (%)	Other ² No. (%)	Total
1978	21 (25)	9 (11)	1 (2)	10 (12)	--	43 (51)	84
1979	24 (31)	8 (10)	9 (12)	9 (12)	--	28 (36)	78
1980	16 (24)	8 (12)	2 (3)	13 (19)	--	28 (42)	67
1981	25 (21)	2 (2)	4 (3)	13 (11)	--	75 (63)	119
1982	20 (17)	3 (3)	2 (2)	14 (12)	--	81 (67) ³	121
1983	15 (19)	7 (9)	5 (6)	18 (22)	--	36 (44)	81
1984	34 (26)	3 (2)	1 (1)	26 (20)	--	67(51)	131
1985	35 (27)	3 (2)	5 (4)	25 (20)	--	60 (47)	128
1986	33 (26)	3 (2)	1 (1)	27 (22)	12 (10)	49 (39)	125
1987	39 (33)	5 (4)	4 (3)	30 (25)	6 (5)	34(29)	118
1988	43 (32)	7 (5)	4 (3)	30 (22)	9 (7)	41 (31)	134
1989	51 (29)	3 (2)	5 (3)	39 (22)	15 (8)	63 (36)	176
1990	51 (23)	3 (1)	5 (2)	45 (21)	50 (23)	64 (29)	218
1991	56 (31)	9 (5)	7 (4)	53 (29)	2 (1)	54 (30)	181
1992	38 (23)	5 (3)	7 (4)	48 (29)	1 (1)	69 (41)	168
1993	35 (24)	7 (5)	7 (5)	39 (26)	2 (1)	58 (39)	148
1994	51 (26)	16 (8)	5 (3)	46 (24)	4 (2)	72 (37)	194
1995	43 (21)	8 (4)	5 (2)	56 (28)	0 (0)	91 (45)	203
1996	60 (14)	10 (2)	1 (0)	61 (15)	17 (4)	267 (64) ³	416
1997	55 (22)	8 (3)	9 (4)	61 (25)	4 (2)	109 (44)	246
1998	67 (27)	9 (4)	6 (2)	53 (22)	12 (5)	97 (40)	244
1999	83 (30)	15 (5)	8 (3)	54 (20)	6 (2)	107 (39)	275
2000	79 (28)	7 (3)	9 (3)	58 (21)	14 (5)	112 (45)	279
2001	82 (24)	1 (0)	7 (2)	63 (19)	32 (10)	151 (45)	336
2002	98 (31)	5 (2)	9 (3)	53 (17)	18 (6)	132 (42) ³	315
2003	75 (20)	3 (1)	7 (2)	72 (19)	48 (13)	178 (46) ³	383
2004	69 (24)	3 (1)	4 (1)	72 (26)	52 (18)	82 (29)	282
2005	80 (20)	5 (1)	9 (2)	89 (22)	29 (7)	186 (47) ³	398
2006	87 (21)	5 (1)	4 (1)	70 (17)	21 (5)	233 (55) ³	420
2007	75 (23)	2 (1)	5 (2)	59 (18)	19 (18)	162 (50)	322
2008	90 (27)	3 (1)	6 (2)	101 (30)	25 (7)	112 (33)	337
2009	97 (22)	5 (1)	7 (2)	115 (27)	56 (13)	153 (35)	433

Data provided by the Florida Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission; data for 2009 are preliminary.

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

² Includes deaths due to other natural and undetermined causes.

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

thermal discharges into U.S. waters. Plants built in the 1970s or earlier are eligible for a waiver of those restrictions, but those built since that time are not. The situation is of greatest concern along Florida's Atlantic coast, where more than two-thirds of all manatees regularly use outfalls from aging power plants. Neither warm-water springs along the upper St. Johns River nor passive thermal basins along the Atlantic coast are likely able to support the current number of manatees in this region if the older power plants are closed. As a result, the Atlantic coast manatee subpopulation, which now includes nearly half of all Florida manatees, could decline significantly if those plants are closed.

Natural warm-water springs provide suitable winter habitat, but many are blocked by dams or other obstructions that prevent manatees from using them. For the long term, the Marine Mammal Commission has therefore recommended that managers prepare for the eventual elimination of power-plant outfalls by improving manatee access to and use of natural springs and thermal basins. The Commission also has worked with power companies and the responsible management agencies to develop a temporary approach that could sustain manatees within their current winter range if power plants are closed in the near future. As discussed in previous annual reports, the Commission has supported studies to develop temporary enclosures using solar or gas-fired heaters located near current power plant outfalls.

In 1999 the Fish and Wildlife Service convened a warm-water task force as part of its Florida Manatee Recovery Team. The task force was composed of representatives of power companies, federal and state agencies, and the academic community and was charged with developing an action plan for identifying and maintaining an optimal network of warm-water habitats for each of the four regional manatee subpopulations. Although the task force developed a draft warm-water action plan, the Service has not finalized the plan, and the team has been inactive since 2007 when the Service disbanded the Florida manatee recovery team.

In 2008 Florida Power & Light Company announced that it was considering repowering its Cape Canaveral and Riviera Beach plants, both of which are used by large numbers of manatees. Over

the past decade, the company has repowered plants in Fort Lauderdale and Fort Myers. Repowering involves replacing oil-fired generators with natural gas generators while retaining the existing cooling systems and outfalls. Doing so would extend the life of those plants, extend the waivers of thermal discharge regulations, and maintain thermal outfalls for another 30 years or longer.

Repowering the two plants poses a significant short-term risk, however, as it requires closing the plants for a three-year construction period during which plant outfalls would not be available to the manatees that have come to depend on them. Initial plans called for closing the Riviera Beach plant beginning in the spring of 2010 and the Cape Canaveral plant beginning in the spring of 2011. Maximum winter counts at those facilities through 2009 have exceeded 400 manatees at the Riviera plant and 500 manatees at the Cape Canaveral plant. Experience indicates that animals tend to stay near closed outfalls rather than travel to other refuges. Thus, the closures could result in high levels of cold-related mortality. Closure of the Cape Canaveral plant poses the greater risk because it is farther north (where winter temperatures are coldest) and more isolated from other nearby warm-water sources.

Recognizing the threat that temporary plant closures pose to manatees, Florida Power & Light Company began planning for the installation of electric water-heating units at both its Cape Canaveral and Riviera Beach power plants. In 2009, because of declining electricity demand apparently associated with the recent economic downturn and the high cost of oil, the company decided to place its Riviera Beach facility on long-term reserve status. This action involved shutting the plant down and maintaining it in standby mode so that it could be brought back on line when power demand increases and economic factors improve. The Riviera Beach plant did not operate in 2009 except during one extremely cold period in early February when the company voluntarily restarted the plant solely to provide a warm-water discharge for manatees. During that period, scientists counted 398 manatees in the plant discharge area.

In 2009 Florida Power & Light Company also installed and tested the first of two water-heating

units at the Riviera Beach plant. Discharge from the water heater empties into the same area used to discharge cooling water effluent when the plant is operating normally. The heater will be used whenever ambient water temperatures fall below 18.3°C (65°F). During late fall and early winter 2009, no cold stress-related manatee deaths were observed near the plant.

Also in 2009 Reliant Energy closed a power plant built in 1959 in Brevard County near Cape Canaveral. In the past, up to 240 manatees had been seen using its outfall on cold winter days. Reliant Energy took no steps to mitigate the possible impact on manatees, but its plant is located just a few miles from Florida Power & Light Company's Cape Canaveral power plant, and manatees that use the Reliant Energy power plant had an alternative source of warm water during the cold winter months. Nevertheless, at least 16 cold stress-related deaths were documented in Brevard County in 2009—14 between January and April and 2 in November and December. Those deaths accounted for almost 30 percent (16 of 56) of all cold stress-related deaths recorded in the state in 2009. The last year in which both the Reliant Energy and Florida Power & Light Company plants in Brevard County operated throughout the winter was 2007 when 18 cold stress-related deaths were recorded statewide and 3 cold-stress deaths were recorded in Brevard County. Because winter conditions were more severe in 2009 than in 2007, it is unclear if the higher number of cold stress-related deaths in Brevard County in 2009 was related to the shutdown of the Reliant Energy plant. At the end of 2009 the future of the Reliant Energy plant was uncertain.

The long-term survival of manatees will depend on close coordination between power companies and regulatory agencies and will require careful monitoring by scientists. It will be important to ensure that this coordination continues as power plant operations change over the next few decades.

Petition to Revise Critical Habitat

On 29 September 2009 the Fish and Wildlife Service published a notice (74 Fed. Reg. 49842) that it had received a petition from several environmental groups asking that the boundaries of critical

habitat for Florida manatees be revised. Critical habitat boundaries for manatees in Florida were designated initially in 1976 and included waters in almost all Florida counties in which manatees were believed to occur at that time. Since 1976 much has been learned about the habitat-use patterns and distribution of manatees in Florida, and their distribution has expanded as their numbers have increased. In part, the petition requested that the Service identify essential constituent elements of manatee habitat, describe management needs for designated critical habitat areas, and expand the designated boundaries to include most areas where manatees now occur regularly during at least part of the year.

The 29 September notice stated that the Service had concluded that the petition and other information in its files indicated that revision of critical habitat may be warranted, and it requested information and comments on the status of Florida manatees, physical and biological features essential to their conservation, threats to the species' habitat, and data on Florida's human population growth since critical habitat was designated in 1976.

On 29 October 2009 the Commission responded to the Service's request, recommending that the Service ensure that designated areas incorporate both winter and summer habitat (i.e., warm-water refuges, key foraging areas, and associated travel corridors) necessary for the conservation and recovery of each of the four regional subpopulations. The Commission also recommended that the designated areas include all warm-water refuges used regularly by at least a few manatees each year, as well as major natural warm-water springs, such as Silver Spring on the Oklawaha River, that currently are not used or used infrequently by manatees but that likely were used historically and could become important for recovery in the foreseeable future. As essential features for those areas, the Commission recommended that the Service identify characteristics necessary to provide heat energy sufficient to support manatees during periods of cold weather (e.g., discharge rates, water flow, and basin dimensions) and shelter from sources of disturbance (i.e., human activities) that could disrupt or interfere with manatee thermoregulation.

The Commission also noted the importance of feeding areas within convenient swimming distances

of warm-water refuges, generally within 20 to 30 km, and recommended that the Service review available information on the location and geographic extent of winter foraging areas used by manatees near all major warm-water refuges and ensure that all such areas are included in the designated critical habitat. Although summer feeding areas and food availability do not seem to be limited, the Commission recommended that designated foraging areas used regularly in winter by a significant percentage of each Florida manatee subpopulation be included in the designation and that conditions necessary to maintain their forage and seclusion from sources of disturbance that could disrupt feeding be identified as essential physical and biological features.

Finally, the Commission noted that manatees may move through almost all Florida waters greater than 1 m deep and not blocked by dams or other obstructions, but that all such areas should not be considered critical to their recovery. Some areas, however, are essential for movement between vital habitats. Therefore, the Commission recommended that the Service include as critical habitat those travel corridors used by manatees between warm-water refuges and principal winter feeding areas and other frequently used travel corridors between major summer foraging areas.

As of the end of 2009 the Service was reviewing responses to its notice and planned to announce how it would proceed in 2010.

Florida and Puerto Rico Manatee Stock Assessment Reports

The Marine Mammal Protection Act was revised in 1994 to establish a new system for regulating and authorizing the incidental take of marine mammals in U.S. waters. As part of that system, the Act requires the Fish and Wildlife Service and the National Marine Fisheries Service to prepare assessment reports for each population stock under its respective jurisdiction. For stocks considered to be strategic, including those listed as endangered or threatened or whose levels of take exceed the stock's potential biological removal level, reports are to be reviewed annually. The Act defines the potential biological removal level as "the maximum number of animals, not including natural mortalities, that may be removed from a

marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population." For a given stock, the potential biological removal level is calculated from estimates of the population's minimum estimated abundance, reproductive rate, and a recovery factor intended to account for possible errors and uncertainty in scientific information on population parameters.

The Fish and Wildlife Service prepared stock assessment reports for Florida and Puerto Rico manatees in 1995 but did not attempt a revision until 2009. As noted in previous annual reports, the Commission had recommended on numerous occasions that the Service update these reports. On 12 June 2009 the Service published a *Federal Register* notice (74 Fed. Reg. 28062) requesting comments on draft revised stock assessment reports for both Florida and Puerto Rico manatees. The Commission responded to the request on 10 September 2009. On 30 December 2009 the Service released revised stock assessment reports and responded to the comments it had received (74 Fed. Reg. 69137). The Commission's comments and the Service's response are discussed here.

Although the Service's Florida Manatee Recovery Plan (U.S. Fish and Wildlife Service 2001) noted that Florida manatees are composed of four relatively discrete regional management units and establishes population benchmarks to be applied independently for each unit, the draft stock assessment report for Florida manatees concluded that "there is no data to support distinguishing these (management) units as stocks ... and there is no conservation benefit to managing these units as stocks." Thus, the draft report treated manatees throughout Florida as a single stock and calculated a single potential biological removal level.

The Commission disagreed with the Service's conclusion that there was no information to distinguish management units. For purposes of identifying individual marine mammal stocks, it noted that genetic, geographic, demographic, or phenotypic information may be used and that both geographic and demographic information supports recognition of separate management units. The Commission also noted that management efforts to protect warm-water refuges require actions tailored to each regional man-

agement unit, and it therefore disagreed with the Service that there was no conservation benefit to managing the units as separate stocks. The Commission thus recommended that the Service revise sections of its draft report setting forth population parameters, potential biological removal levels, and human-caused mortality and serious injury to present information for each of the four regional management units identified in the current Florida Manatee Recovery Plan.

In its revised stock assessment report, the Service noted that, although the Florida manatee population has been divided into four management units and threats to the population are evaluated on a regional basis using a core biological model, it believed that analyzing each management unit separately in the stock assessment report would add little benefit for purposes of managing interactions with fisheries. The revised stock assessment report therefore continued to identify Florida manatees as a single stock and calculated a single potential biological removal level of 12 manatees per year for the Florida manatee population.

With regard to deaths and serious injuries in fishing gear, the draft report stated that commercial fishing had not caused any deaths or serious injuries between 2003 and 2007. It also noted, however, that six manatees had died due to entanglement in fishing line and associated gear considered to be derelict gear and that several others caught in fishing gear had been documented. It was not clear how the Service had determined that all the deaths involved derelict rather than active fishing gear. In addition, with regard to live animals found entangled, the draft report noted that none was considered seriously injured because none of the rescued and treated animals died and because manatees entangled in fishing gear have been known to survive, despite the loss of limbs, without human intervention or medical treatment. The Commission questioned whether the injuries of at least some entangled animals requiring capture and medical treatment, including those losing limbs due to entanglement, should not be considered serious. To provide a better basis for justifying such assessments, the Commission recommended that the draft report be expanded to add a table in the section on fishery-related injuries that

provides information on each entangled animal, listing the date it was rescued, the management unit in which it was found, the nature and treatment of its injury, and its current condition.

In its response to this comment, the Service advised that all six manatee deaths attributed to fishing gear involved ingestion of monofilament line with single hooks, lures, or sinkers indicative of recreational fishing gear. With regard to serious injuries, the Service noted that it had no definition of the term “serious injury” and, while that made interpretation and analysis of injuries difficult, it did not consider any of the recent injuries to be serious. Thus, it continued to conclude that there had been neither any deaths or serious injuries related to commercial fisheries during the 2003–2007 period considered in the stock assessment report.

With regard to the draft stock assessment for Puerto Rico manatees, the Commission noted that the report cited information indicating that surveys in 1991 and 1992 sighted an average of 67 adult manatees and that a survey in 2009 sighted 64 adults. It then concluded, however, that the findings indicate that the population size may have increased. The cited information seemed to indicate that the population had been stable rather than increasing, and the Commission therefore recommended that the Service either add information to the draft report to better support the conclusion or revise the draft report to indicate that the current population trend is uncertain but, at best, appears to be relatively stable.

The Service agreed with the Commission’s comment and, in its final revised assessment, noted that the population size appears to have been relatively stable since 1991.

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Chapter V

INTERNATIONAL ASPECTS OF MARINE MAMMAL CONSERVATION AND MANAGEMENT

The Departments of Commerce, the Interior, and State, in consultation with the Marine Mammal Commission, are instructed by section 108 of the Marine Mammal Protection Act to protect and conserve marine mammals under existing international agreements and to negotiate additional agreements as needed to achieve the purposes of the Act. Furthermore, section 202 of the Act requires that the Marine Mammal Commission recommend to the Secretary of State and other federal officials appropriate policies regarding international arrangements for protecting and conserving marine mammals.

During 2009 the Commission was engaged in a number of international efforts to protect and conserve marine mammals, both through participation in international organizations and working multilaterally with scientists, managers, agencies, and organizations of other nations to address specific issues involving marine mammals. 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. Its purpose is to provide for the proper conservation of the world's whale stocks and thus make possible the orderly development of the whaling industry. In doing so, the IWC conducts a continuing review of the status of those stocks and adopts and modifies conservation measures as appropriate. Bulgaria, Dominican Republic, Estonia, Ghana, and Poland joined the IWC in 2009, bringing the total number of member nations to 88 at year's end. The 2009 meeting of the IWC was held in Funchal, Madeira, Portugal, on 23–27 June. As at the previous meeting, a central issue considered at that meeting was the future of the IWC. This and other matters considered by the IWC during 2009 are summarized in this section.

Future of the IWC

Over the past several years, the ability of the IWC to function efficiently has been undermined by a rift between two factions. On one side are those

countries that favor a return to commercial whaling and the member countries that are sympathetic to their concerns. On the other side are countries favoring a more protectionist approach that emphasizes non-lethal uses of whales. These factions are fairly evenly split, and, on many critical issues, neither side is able to garner the three-quarters majority needed to pass amendments to the IWC schedule, including the establishment of catch limits.

In 1982 the IWC established a moratorium on commercial whaling that entered into effect during the 1985–1986 whaling season. The purpose of the moratorium was to promote the recovery of a number of whale stocks that had been depleted by whaling. The schedule amendment that established the moratorium indicated that the provision would be kept under review and specified that, by 1990 at the latest, the IWC would undertake a comprehensive assessment of the effects of the moratorium on whale stocks and consider the establishment of new catch limits. In the early 1990s the IWC adopted a Revised Management Procedure, which establishes the methodological framework for setting catch limits, should the moratorium on commercial whaling be lifted.

The procedure is one element of a Revised Management Scheme that, if adopted, would guide the overall conservation of whales and the management of commercial whale harvests. The scheme would establish not only the mechanisms for setting harvest limits but identify other measures and practices needed to ensure that those limits are not exceeded. Although the IWC had been working on the scheme since the early 1990s, its Working Group on the Revised Management Scheme concluded at its 2006 meeting that discussions were at an impasse and recommended that further work on the scheme be suspended.

Despite the moratorium, commercial whaling has continued. Norway filed a timely objection to the moratorium, thus exempting its whaling operations. In addition, Iceland, which withdrew from the IWC in 1992, was allowed to rejoin in 2002 subject to a reservation allowing it to resume commercial whaling beginning in 2006. Iceland agreed, however, not to engage in commercial whaling if it determined that sufficient progress was being made to negotiate the Revised Management Scheme. Japan withdrew an initial objection to the commercial whaling moratorium effective in 1988 but that same year began a scientific whaling program targeting hundreds of Antarctic minke whales (*Balaenoptera bonaerensis*). Article VIII of the whaling convention allows member countries to issue special permits authorizing its nationals to take whales for purposes of scientific research and to process and sell the whale meat if it decides to do so. Scientific whaling under this provision is outside the control of the IWC. Since it ceased commercial whaling, Japan has gradually increased the number of whales killed under its scientific whaling program, has expanded the number of species being taken, and has established a separate program targeting whales in the North Pacific. In addition, Japan has been advocating for several years for the recognition of a new category of whaling—small-type coastal whaling—to authorize whaling by four of its coastal communities with a history of whaling. Japan contends that such whaling is akin to aboriginal subsistence whaling, which is sanctioned by the IWC. Several other countries, including the United States, believe that Japan's small-type coastal whaling is

just a limited form of commercial whaling and oppose authorizing such whaling while the commercial whaling moratorium remains in place. Despite repeated consideration by the IWC, proposals to authorize small-type coastal whaling have never come close to achieving the three-quarters majority necessary for adoption.

Another area of contention within the IWC is the establishment and recognition of whale sanctuaries. The IWC established an Indian Ocean Sanctuary in 1979 and a Southern Ocean Sanctuary in 1994. These sanctuaries are areas in which commercial whaling is prohibited. Nevertheless, Japan filed an objection to the schedule amendment that created the Southern Ocean Sanctuary, exempting itself from that provision as it pertains to minke whales. In addition, Japan continues to conduct research whaling in the Southern Ocean Sanctuary despite opposition from many IWC members. On the other side of this issue, some member countries continue to press for the establishment of additional whale sanctuaries in the South Atlantic and the South Pacific but have been unable to garner the votes needed for adoption.

The United States is particularly concerned about the potential for some pro-whaling countries to block the adoption of aboriginal subsistence harvest limits, particularly the one authorizing the taking of bowhead whales (*Balaena mysticetus*) by Alaska Native hunters, as a way of seeking concessions from the United States on other unrelated issues. These countries successfully blocked adoption of a bowhead whale quota in 2002, although a five-year harvest limit was ultimately approved at a special IWC meeting later that year. When the five-year authorization next came up for review in 2007, countries in favor of commercial whaling again threatened to block the adoption of a harvest limit for the aboriginal subsistence whaling of bowhead whales. In light of then-emerging efforts to improve the operation of the IWC and find ways to resolve the significant issues it faces, the nations favoring commercial whaling acquiesced in approving new bowhead whale harvest limits, which were adopted by consensus. Nevertheless, if these countries are not satisfied with the progress made within the IWC to address other issues of concern, they almost certainly will have the votes neces-

sary to block the adoption of new harvest limits when the current authorization expires in 2012.

At its 2007 meeting, the IWC began to address the problem of a polarized and ineffective commission. After considerable discussion, the IWC members agreed in general that the IWC needed to resolve the impasse and that, in doing so, the parties should take into account the results of three international meetings that had recently been convened—one involving nine countries from Latin America exploring ways to “modernize the IWC into a more conservation oriented organization,” one hosted by Japan to identify actions needed to restore the IWC to “an effective resource management organization” that would oversee the sustainable use of whales, and one sponsored by the Pew Foundation to review the status of whale stocks and fashion a compromise that would promote the effectiveness of the IWC. The parties agreed to pursue this issue prior to the 2008 annual meeting and held a meeting in March 2008 focused largely on the process that would be established to resolve the differences within the IWC. Participants at the latter meeting recommended several ways in which the IWC could improve the way it functions, including (1) striving to reach consensus whenever possible, (2) ensuring that adequate notice is given of issues to be considered by the IWC, (3) recognizing the diversity of views and interests within the IWC and the need for parties to respect the views of others, (4) improving the negotiation process within the IWC, including the use of both open and closed sessions and cooling-off periods, and (5) reviewing the composition and function of the IWC Scientific Committee.

The results of the March 2008 meeting formed the basis for discussions at the IWC’s 2008 annual meeting in Santiago, Chile. Members agreed to make every effort to resolve issues by consensus and put issues to a vote only as a last resort. To maximize the prospects for reaching consensus, members agreed that the full text of all proposals for action by the IWC should be circulated at least 60 days before annual meetings. To reduce the uncertainty surrounding voting, the parties agreed that new members be required to wait 30 days after adherence to the whaling convention before being allowed to vote. The parties also agreed to continue to attempt to resolve

the substantive differences among their members and established a Small Working Group on the Future of the IWC. The working group was tasked with reporting the initial results of its deliberations to an intersessional meeting of the IWC in 2009 and with submitting a final report on possible compromises at least five weeks before the IWC’s June 2009 annual meeting.

The working group met twice in 2008 and again in March 2009. The United States participated in all of those meetings and has been a key participant in trying to forge a compromise solution to the issues facing the IWC. The working group submitted its report to the IWC on 18 May 2009. That report and related documents are available on the IWC’s Web site (<http://www.iwcoffice.org/commission/futuredocs.htm>). The working group identified 33 issues that require resolution within the IWC, although only 13 of those were identified as being controversial and requiring immediate attention. Three were highlighted as the most pressing issues to resolve if a compromise is to be reached—research whaling, the creation of and compliance with sanctuaries, and Japan’s proposal for small-type coastal whaling. The report noted that, although the working group had fallen short of its goal of developing a proposal for consideration at the 2009 IWC meeting, considerable progress had been made. The working group therefore recommended that the ongoing efforts be continued for an additional year with the goal of reaching a decision at the 2010 meeting.

In keeping with that recommendation, the IWC at its 2009 annual meeting adopted a resolution to continue and expand its work on the future of the IWC to develop a package of proposals for consideration no later than at the 2010 meeting. The working group was reconstituted for an additional year and supplemented by the formation of a smaller support group that could meet more frequently and advise the working group on possible solutions to the key issues. The United States was among the 12 nations selected to participate as part of the support group. The support group met twice in 2009 and planned to hold a third meeting early in 2010 prior to a meeting of the working group scheduled for March 2010.

Aboriginal Subsistence Whaling

The moratorium on commercial whaling does not apply to aboriginal subsistence whaling, which is managed under separate provisions of the whaling convention. The IWC authorized subsistence whaling from the following stocks at its 2007 meeting: (1) the Bering/Chukchi/Beaufort Seas stock of bowhead whales, (2) the eastern North Pacific stock of gray whales (*Eschrichtius robustus*), (3) common minke (*Balaenoptera acutorostrata*), fin (*Balaenoptera physalus*), and bowhead whale stocks off Greenland, and (4) North Atlantic humpback whales (*Megaptera novaeangliae*) off St. Vincent and the Grenadines.

Bowhead whales are an important food source for inhabitants of remote areas of Alaska, and hunting whales is central to the cultural traditions of some Native villages. Members of the Alaska Eskimo Whaling Commission are the primary hunters of bowhead whales, with a limited number of the available strikes reserved for Native hunters in Russia. As authorized by the IWC for the period from 2008

to 2012, subsistence hunters may land up to a total of 280 bowhead whales, with no more than 67 whales to be struck in any year, except that up to 15 unused strikes from the previous year may be carried over into the subsequent year. The National Marine Fisheries Service published a notice in the *Federal Register* on 9 March 2009 (74 Fed. Reg. 10035) announcing that the strike limit of bowhead whales for 2009 would be 82 whales, including a carryover of 15 unused strikes from 2008. Of these, 75 strikes had been allocated to Alaska Native hunters, with 7 strikes reserved for Natives in Russia. As indicated in Table V-1, in 2009 Alaska Natives struck 38 bowhead whales, successfully landing 31.

The IWC adopted a strike limit of 620 gray whales for the same five-year period, with a maximum of 140 to be taken in any one year. Russian Natives are the primary subsistence hunters of gray whales, but a small number of the allowable strikes is allocated to hunters from the Makah Tribe, which resides on the Olympic Peninsula in Washington. However, under a 2004 ruling by the Ninth Circuit

Table V-1. Whales taken during 2009 by country and by purpose (subsistence, scientific research, commercial)

	Aboriginal Subsistence Whaling	Scientific Research Whaling	Commercial Whaling
<i>North Atlantic</i>			
Denmark for West Greenland 10 fin, 164 common minke, 3 bowhead East Greenland 4 common minke	—	—	—
Iceland	—	—	125 fin, 81 common minke
Norway	—	—	484 common minke
St. Vincent and the Grenadines	1 humpback	—	—
<i>North Pacific</i>			
Japan	—	100 sei, 50 Bryde's, 162 common minke, 1 sperm	—
Korea	—	—	16 common minke ¹
Russian Federation	116 gray	—	—
United States	38 bowhead	—	—
<i>Antarctic</i>			
Japan	—	1 fin 506 Antarctic minke ²	—

¹ Unlike other whaling, this hunt is not conducted under a reservation or objection to the commercial whaling moratorium and is illegal under Korean law.

² The total includes takes from the 2009–2010 whaling season.

Court of Appeals (*Anderson v. Evans*), the Makah Tribe is precluded from whaling unless and until it obtains authorization to hunt whales through a waiver of the taking moratorium under the Marine Mammal Protection Act.

At the 2007 IWC meeting, Denmark requested authorization for an aboriginal subsistence take on behalf of Greenland. The request proved to be controversial because it sought to increase the number of West Greenland common minke whales that could be taken from 175 to 200 a year and to expand the species covered by the authorization to include 10 humpback whales and 2 bowhead whales per year. Denmark also requested the renewal of previous authorizations for the annual take of 19 fin whales and 12 minke whales off East Greenland. Several countries, including the United States, thought that the science underlying the proposal, particularly with respect to the requests concerning humpback and bowhead whales, needed to be strengthened before they could support its adoption. The United States initially recommended that consideration of the requested takes of these two species be deferred until the IWC Scientific Committee could provide further advice. Based on the initial reaction from several nations, Greenland revised its proposal, dropping the request for a humpback whale quota, adding a requirement that the catch limit for minke whales off West Greenland be subject to annual review by the Scientific Committee, and conditioning the taking of bowhead whales in a given year on a determination by the Scientific Committee that the take would be unlikely to endanger the stock. The IWC adopted the revised proposal.

At its 2008 meeting, the IWC Scientific Committee provided interim advice that the taking of minke, fin, and bowhead whales under the catch limits adopted the previous year would not harm the affected stocks. Denmark also indicated that it would again seek authorization of an aboriginal subsistence quota of 10 humpback whales from the West Greenland stock and sought the advice of the Scientific Committee before presenting the proposal to the IWC. The Scientific Committee's interim management advice indicated that striking up to 10 humpback whales per year would not harm the stock. When the proposal was presented to the IWC for its

consideration, Denmark indicated its willingness to reduce its take of fin whales voluntarily from 19 to 8 per year if the humpback proposal were adopted. Despite this advice, and the proposed reduction in the number of fin whales that would be taken, the proposal again met with opposition.

Several countries expressed the view that, although the science indicated that the proposed humpback quota would not be detrimental, Denmark had not made a convincing case that taking the additional whales was necessary to meet the subsistence needs of Greenlanders. Ultimately, the proposal was put to a vote and failed to pass, not even garnering a simple majority.

At the 2009 IWC meeting, Denmark again sought approval of its proposal to add humpback whales to the species authorized to be taken for subsistence purposes in Greenland. The IWC's Scientific Committee reviewed that request and concluded that the annual catch of 10 humpback whales would not harm the affected stock. Therefore, as at the 2008 meeting, the discussion focused on whether Greenland had sufficiently demonstrated a need for these whales. The statement submitted by Greenland had expressed its need for whales in terms of tons of whale meat rather than the number of animals being requested. This necessitated the use of conversion factors and prompted questions from several countries concerning those factors. Noting that there was a lack of consensus on this proposal, the chair of the IWC encouraged the interested members to pursue discussions outside the Commission meeting. Following such discussions, Denmark introduced a revised proposal that would limit its request for 10 humpback whales to the 2010 hunting season. However, concerns over the conversion factors remained. In response, the chair of the IWC suggested that a scientific working group be established to address issues related to the conversion factors and that the Commission, with the benefit of the advice from the working group, hold an intersessional meeting to consider the humpback whale proposal prior to the next hunting season. Denmark acquiesced to this proposal.

The number of whales taken during 2009 for subsistence purposes is shown in Table V-1.

Continuing Commercial Whaling

Despite the moratorium on commercial whaling, two countries still engage in the practice: Norway, which lodged an objection to the moratorium when it was adopted, and Iceland, which left the IWC in 1992 but was allowed to rejoin in 2002 with a reservation to the moratorium. Under its reservation, Norway authorized the take of up to 885 common minke whales in 2009. Iceland has established annual whaling quotas of 100 common minke whales and 150 fin whales for each year from 2009 through 2014. The numbers of whales taken by Norway and Iceland during their 2009 commercial hunts are provided in Table V-1.

Scientific Whaling

The International Convention for the Regulation of Whaling allows scientific whaling (whaling undertaken for the purpose of collecting scientific information) to be conducted outside the management sphere of the IWC. Japan is the only country currently engaged in such whaling, with ongoing research programs in Antarctic waters and in the North Pacific. Iceland began a scientific whaling program in 2003, but that program ended in 2007.

Japan issued a special permit for scientific whaling in Antarctic waters during the 2008–2009 season that authorized the lethal take of 850 (± 10 percent) Antarctic minke whales, 50 fin whales, and 50 humpback whales. This reflected a reduction in the authorized take of Antarctic minke whales, which had been 935 during the previous whaling season. The lethal take levels for the 2009–2010 season remained unchanged from 2008–2009. Japan's scientific whaling catches in Antarctic waters for 2009–2010 are shown in Table V-1.

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

humpback whales throughout the remainder of 2008 and during the 2009–2010 season. It remains unclear whether Japan will begin hunting humpback whales in future years.

At the 2009 meeting members also discussed the issue of safety at sea, particularly as it relates to interference by the Sea Shepherd Conservation Society with Japan's research whaling activities in the Southern Ocean. Although member nations supported the right of whaling opponents to engage in legitimate and peaceful forms of protest, they expressed deep concern over the escalation of the types of confrontations that are occurring. As in past years, IWC members condemned dangerous behavior that could endanger human life and pose environmental risks to sensitive Antarctic ecosystems.

Japan's special permit for scientific whaling in the North Pacific during 2009 authorized the lethal take of 100 sei whales (*Balaenoptera borealis*), 220 common minke whales, 50 Bryde's whales (*Balaenoptera edeni*), and 10 sperm whales (*Physeter macrocephalus*). The taking of common minke whales has prompted conservation concerns because some of the whales being taken are from a stock (the J stock) that has been reduced in numbers by whaling and bycatch in Japanese and Korean fisheries. The catch of common minke whales from the J stock is also part of Japan's proposed coastal whaling and is an additional concern. The number of whales caught in the North Pacific by Japan under its special permit during 2009 is provided in Table V-1.

The issue of scientific whaling remains controversial within the IWC. Several nations, including the United States, believe that much of the research now being done could be accomplished using non-lethal alternatives. Over the years this has prompted the IWC to adopt several resolutions calling on members to refrain from scientific whaling in the Southern Ocean Sanctuary and to permit scientific research involving the killing of whales only when it involves critically important research needs that cannot be addressed using other means. Noting that Japan had more than doubled its authorized take of Antarctic minke whales and added fin whales and humpback whales to its list of targeted species, the IWC, at its 2007 meeting, passed a resolution calling on Japan to suspend indefinitely the lethal aspects of its research

program in the Southern Ocean Sanctuary. At its 2008 and 2009 meetings, several countries on both sides of the issue reiterated their positions with respect to the need for and value of lethal scientific whaling and have highlighted this as one of the key issues to address in the discussion on the future of the IWC.

Australia, one of the countries opposing lethal research whaling, announced at the 2009 IWC meeting the creation of the Southern Ocean Research Partnership, an initiative to pursue non-lethal research on whale stocks in this area. In support of this program, Australia made a voluntary contribution of 500,000 AUD (Australian dollars) to the IWC. The primary focus of the planned research will be the large whale species managed by the IWC, but the program also will investigate other species that occur in Antarctic waters, including killer whales. Australia hoped that this effort would serve as a template for other regional non-lethal research efforts.

Coastal Whaling

Japan considers small-type coastal whaling to be similar to aboriginal subsistence whaling and, for the past two decades, has sought IWC approval of such whaling. Several other countries, including the United States, consider small-type whaling in Japan to be essentially commercial whaling.

At the 2007 IWC meeting, Japan proposed a schedule amendment that sought authorization for a catch of common minke whales from the Okhotsk Sea/West Pacific stock. Japan did not specify a number in its proposal because it was willing to negotiate a number that would be acceptable to the IWC. Further, Japan indicated that it was willing to reduce its scientific whaling program quota by the number of minke whales being taken from this stock, such that the total take would remain unchanged. Subsequent discussion indicated a lack of support for the proposal and no vote was taken.

Japan again raised the issue of small-type coastal whaling at the 2008 and 2009 IWC meetings, noting the economic hardship faced by its former whaling communities. At each of these meetings, Japan indicated its willingness to pursue this issue in the context of the discussions of the future of the IWC rather than to seek a vote on a specific proposal.

Whale Sanctuaries

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

The proposed creation of a South Atlantic Sanctuary was again placed on the IWC's agenda at the 2009 meeting. However, the proponents of the sanctuary opted not to seek a schedule amendment pending consideration of the matter as part of the discussions of the future of the IWC.

Status of Whale Stocks

The IWC and its Scientific Committee routinely review the status of whale stocks. At the 2009 meeting, members received new information on Antarctic minke whales, North Pacific common minke whales, Southern Hemisphere humpback whales, Southern Hemisphere blue whales (*Balaenoptera musculus*), and a number of small stocks of bowhead, right (*Eubalaena* spp.), and gray whales. The Scientific Committee concluded its assessment of eastern Africa humpback whales and reported that these whales had recovered to more than 65 percent of their pre-exploitation abundance. The Scientific Committee also reported evidence of increases in other whale stocks, including other stocks of humpback whales and certain stocks of blue and Southern Hemisphere right whales although the report cau-

tioned that these stocks remain at much-reduced numbers compared with their pre-whaling status.

As in other recent years, the IWC gave special attention to the status of the western North Pacific stock of gray whales, which numbers about 130 animals. The Scientific Committee noted that the survival of this population remains in doubt due to threats from oil and gas development off Sakhalin Island in Russia and entrapment in fishing gear in Japanese waters. It welcomed the results of a range-wide workshop sponsored by the International Union for Conservation of Nature (IUCN) in 2008 concerning this stock and endorsed the workshop recommendations, particularly the recommendation to develop a conservation plan. (See additional discussion of this stock elsewhere in this chapter.)

The IWC also noted that the North Atlantic stock of right whales (*Eubalaena glacialis*) numbers about 300 animals and continues to be threatened by ship strikes and entanglement in fishing gear. As in past years, the IWC stressed the urgent need for action to reduce anthropogenic mortality of this stock to zero as soon as possible. (See Chapter IV for further discussion of issues concerning this stock.)

Small Cetaceans

Although parties to the IWC have differing views as to the organization's legal authority to manage small cetaceans, many countries continue to cooperate to address issues involving these species, particularly within the IWC Scientific Committee. At its 2009 meeting, the Scientific Committee undertook a review of the status of common dolphins (*Delphinus delphis* and *D. capensis*). The committee noted that, because of uncertainty over the taxonomy and population structure of these dolphins and the lack of reliable abundance estimates, it is difficult to assess the status of populations in many areas. Nevertheless, the participants in the review expressed concern regarding the status of common dolphins in the Mediterranean, catches of common dolphins in Peru, and possibly unsustainable fisheries bycatch in the eastern North Atlantic.

Other issues concerning small cetaceans discussed by the Scientific Committee or raised during the plenary session of the IWC included (1) the precarious situation of the vaquita (*Phocoena sinus*)

(discussed elsewhere in this chapter), (2) high levels of fisheries bycatch of harbor porpoises (*Phocoena phocoena*) in Dutch waters and the Baltic Sea, (3) excessive take of narwhals (*Monodon monoceros*) in Greenland, (4) the unsustainability of live captures of bottlenose dolphins (*Tursiops aduncus*) in the Solomon Islands, (5) bycatch and directed takes of Dall's porpoises (*Phocoenoides dalli*) in Japan, (6) illegal catches of small cetaceans, such as humpback (*Sousa chinensis*), spinner (*Stenella longirostris*), and bottlenose dolphins off Madagascar, (7) take levels of the boto (*Inia geoffrensis*) in Brazil, Colombia, Peru, and Venezuela, and (8) the take of finless porpoises (*Neophocaena phocaenoides*) in the Korean Strait.

Climate Disruption

In 1980 the IWC adopted its first resolution regarding the impact of environmental changes on whales. Since then, it has continued to focus attention on the issue. An IWC workshop entitled Cetaceans and Climate Change was held in Siena, Italy, from 21–25 February 2009. The terms of reference for the workshop were to bring together and enhance collaborations among experts in cetacean biology, modeling marine ecosystems, and climate change, as well as to review the current understanding and to improve conservation outcomes for cetaceans under climate change scenarios described in the Intergovernmental Panel on Climate Change Fourth Assessment Report (IPCC 2007). The workshop divided into three working groups: Arctic, Southern Ocean and Small Cetaceans. The final report of the workshop included specific research recommendations from each working group as well as overarching recommendations for modeling approaches, especially related to whale conservation in the Southern Ocean (International Whaling Commission 2010).

Participants concluded that, in the Arctic, studies can contrast populations of the same species inhabiting regions differentially affected by climate disruption. In specific Arctic regions, trophic comparisons can be made between cetacean species that occupy different trophic levels and, where long-term sighting records exist, distribution shifts of particular populations can be examined for corresponding shifts in ecosystem parameters linked to climate change. The

results of this workshop prompted the IWC to adopt a resolution at its 2009 meeting calling for expanded international efforts to address this issue, exhorting member governments to take urgent action to reduce the rate and extent of climate change, prompting parties to incorporate climate change into their conservation and management plans and directing the IWC Scientific Committee to continue to assess the impact of environmental change on cetaceans.

Venue for 2010 Meeting

In 2009 the parties agreed to hold the 2010 meeting of the IWC and its committees in Agadir, Morocco. The Commission will meet from 22–25 June 2010.

Arctic Council

The Arctic Council is actively engaged in planning and coordinating research and monitoring efforts in the Arctic. The Conservation of Arctic Flora and Fauna Working Group is charged with monitoring trends in Arctic biodiversity through its Circumpolar Biodiversity Monitoring Program. The program's Marine Expert Monitoring Group met in January and November 2009 to develop a draft pan-Arctic integrated monitoring plan for marine mammals. This will form part of the Circumpolar Biodiversity Monitoring Program's comprehensive Arctic biodiversity monitoring plan for the major Arctic biomes, including marine, coastal, freshwater, terrestrial vegetation, and terrestrial fauna. The research and monitoring framework developed in the 2007 Workshop on Monitoring Arctic Marine Mammals held in Valencia, Spain (see Chapter VI, The Changing Arctic, Monitoring Arctic Marine Mammals) will help guide this program and accordingly was introduced at the January 2009 Marine Expert Monitoring Group workshop. The first draft of the marine integrated monitoring plan is to be ready for review in 2010, with Arctic Council endorsement and implantation to follow in 2010–2011.

The Arctic Council's Cryosphere Project: Snow, Water, Ice and Permafrost in the Arctic was established in 2008 as a follow-up to the 2005 Arctic Climate Assessment. The project is managed by the Council's Arctic Monitoring and Assessment Pro-

gram in collaboration with a number of other sponsoring organizations (International Arctic Science Committee, World Climate Research Program and Cryosphere Project, International Polar Year International Program Office, and International Arctic Social Sciences Association). The goal is to assess current scientific information on climate-driven changes in the Arctic ice, snow, and permafrost that have potentially far-reaching implications for both the Arctic and the earth as a whole. The work began in 2009 and is to be completed in 2010 for presentation to the Arctic Council in spring 2011. The final report will describe social, biological, and ecological consequences of changes in the Arctic cryosphere.

The Arctic Council's Working Group on Protection of the Marine Environment published the Arctic Marine Shipping Assessment in 2009. This assessment, described in detail in Chapter VI, presents recommendations on how to mitigate the potential impact of increases in Arctic marine shipping on marine mammals and Native peoples as seasonal ice cover diminishes.

Antarctic Issues

The highly productive waters of the Southern Ocean encircling the continent of Antarctica are the seasonal or year-round home to a number of marine mammal species. The pinnipeds breeding and feeding in the Antarctic and sub-Antarctic include the crabeater seal (*Lobodon carcinophagus*), Weddell seal (*Leptonychotes weddellii*), leopard seal (*Hydrurga leptonyx*), Ross seal (*Ommatophoca rossii*), elephant seal (*Mirounga leonina*), Antarctic fur seal (*Arctocephalus gazella*), and sub-Antarctic fur seal (*A. tropicalis*) (Figure V-1). Five species of baleen whale, including the blue, fin, sei, humpback, and Antarctic minke, migrate to the high-latitude Southern Ocean and Antarctic margins to feed on the vast seasonal abundance of prey, primarily Antarctic krill (*Euphausia superba*). A sixth, the southern right whale (*Eubalaena australis*), forages on the continental shelf near South Georgia on the northern fringe of the Southern Ocean. Several toothed whales, or odontocetes, also occur in the region, with the sperm whale and Arnoux' beaked whale (*Berardius arnuxii*) feeding on squid, and different ecological types of killer whales (*Orci-*



Figure V-1. Crabeater seals are one of six pinniped species that breed and feed in Antarctic and sub-Antarctic waters. (Photo courtesy of David Ainley, H.T. Harvey and Associates)

nus orca) preying on either fish or marine mammals (Figure V-2) (Pitman and Ensor 2003, Pitman et al. 2007). Other odontocetes occurring in the Southern Ocean include the long-finned pilot whale (*Globicephala melas*), southern bottlenose whale (*Hyperoodon planifrons*), hourglass dolphin (*Lagenorhynchus cruciger*), and spectacled porpoise (*Phocoena dioptrica*) (Boyd 2009, Goodall 2009).

Adaptation to Climate Disruption

Portions of Antarctica, in particular the western Antarctic Peninsula, are changing rapidly with pro-



Figure V-2. Two killer whale ecotypes—fish-eating and marine mammal-eating—are found in Antarctic waters. (Photo courtesy of David Ainley, H.T. Harvey and Associates)

found reductions in terrestrial ice sheets and ice shelves, glacier retreat, diminished seasonal duration of sea ice, and warming of surface and circumpolar deep waters (Clarke et al. 2007, Ducklow et al. 2007, Stammerjohn et al. 2008, Tynan and Russell 2008, Forcada and Trathan 2009). From the Antarctic Peninsula to South Georgia, these physical changes are having ecological consequences for Antarctic krill and, therefore, for the many species that depend on them (e.g., marine mammals, seabirds, penguins [Fraser and Hoffman 2003, Forcada and Trathan 2009]). Marine mammal responses will vary according to their different life histories, their level of dependence on ice and ice-associated prey (Nicol et al. 2008, Siniff et al. 2008), and their ability to adapt to changes in the availability of prey (Nicol et al. 2008). Ice-associated species such as crabeater and Weddell seals may be affected by the loss of prey and reduction in suitable breeding habitat. The elephant seal and Antarctic fur seal are ice-tolerant species that do not depend on ice, and they may expand their ranges with the seasonal reduction of sea ice (Siniff et al. 2008). Large baleen whales may respond to changes in prey abundance and distribution by searching over larger areas and for longer times. However, scientists predict long-term declines in overall krill abundance and areas of suitable krill habitat as the Antarctic Convergence is pushed closer to the Antarctic continent by warming (Nicol et al. 2008). As in the Arctic, scientists do not expect baleen whales to respond in a uniform manner, and the extent to which they will be able to adapt is uncertain (Moore and Huntington 2008).

Tourism

Ship-based tourism in Antarctica is concentrated primarily around the Antarctic Peninsula and in the Scotia Sea. Tourism increased steadily over the past two decades until it peaked at 46,265 visitors in the 2007–2008 Antarctic tourism season. In the 2008–2009 season 37,858 visitors came to Antarctica by ship, a 16 percent decline attributed to the global recession. Of these visitors, 10,652 traveled aboard

cruise-only vessels that do not land passengers in the Antarctic Treaty area. Ships did land 26,933 passengers in Antarctica in 2008–2009, the majority (25,452) in the Antarctic Peninsula area (International Association of Antarctica Tour Operators 2009). The Antarctic Treaty establishes requirements for tourism operators and tourists entering the Antarctic Treaty region in “Guidance for Those Organizing and Conducting Tourism and Non-governmental Activities in the Antarctic: Recommendation XVII-1,” adopted at the Antarctic Treaty Meeting, Kyoto 1994 (International Association of Antarctica Tour Operators 2007). More than 100 shipping companies and outfitters that bring tourists to Antarctica are members of the International Association of Antarctica Tour Operators and have committed to following those guidelines as well as additional procedures and guidelines established by the association to ensure that ship-based tourism activities in the Antarctic are safe and environmentally safe.

The rise in Antarctic tourism, which depends primarily on vessels, raises concerns about the safety of passengers in Antarctic seas, the consequences of marine accidents and spillage of oil and other pollutants for the marine and coastal environment (Antarctic and Southern Ocean Coalition 2008a), and the impact of tourists disembarking in large numbers on the fragile coastal ecosystems and unique wildlife of Antarctica (Antarctic and Southern Ocean Coalition 2008b).

The Antarctic Treaty System

The Antarctic Treaty of 1959 established that Antarctica shall be used for peaceful purposes only, enshrined the ongoing freedom of scientific investigation in Antarctica, and provided the framework for cooperation toward that end. The parties to the treaty agree to exchange scientific observations and results from Antarctic research and to make them freely available. The Antarctic Treaty system includes the treaty itself and a number of separate agreements, including the Convention for the Conservation of Antarctic Seals, the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), and the Protocol on Environmental Protection to the Antarctic Treaty. The Protocol on Environmental Protection designates Antarctica as a reserve devoted

to peace and science and commits treaty parties to comprehensive protection of Antarctica’s environment and dependent and associated ecosystems (Jatko and Penhale 1999). CCAMLR establishes three principles to guide conservation of Antarctic marine resources: (1) prevention of population decrease below that which ensures stable recruitment of harvested species; (2) maintenance of the ecological relationships among harvested, dependent, and related species; and (3) prevention of changes or minimization of risks of ecosystem changes. Among other things, CCAMLR promotes assessment of the status of krill and species dependent upon krill, including marine mammals, regulates the harvest of Patagonian toothfish (*Dissostichus* spp.), and fosters ecosystem monitoring to detect changes in critical ecosystem components (Figure V-3).

The International Polar Year

The 2007–2008 International Polar Year was a large-scale scientific program involving thousands of scientists and more than 200 projects focused on biological, physical, and social research in the Arctic and Antarctic regions. This was the fourth in a series of International Polar Years, the first of which took place in 1882–1883 (<http://ipy.arcticportal.org/about-ipy/ipy-history>). The founding principle of the Polar Years is that an indepth understanding of the polar regions requires a coordinated international



Figure V-3. A Weddell seal prepares to enjoy an Antarctic toothfish. (Photo courtesy of Jessica Meir, Scripps Institution of Oceanography)

research effort. The National Science Foundation was the lead federal agency for organizing U.S. International Polar Year research efforts in 2007–2008. The goals set out by the National Research Council were to understand physical, geological, chemical, human, and biological drivers of environmental change; how these drivers relate to climate; and how they affect ecosystems and link to global processes. The Foundation awarded more than \$347 million to 445 projects led by principal investigators at 169 U.S. institutions. U.S.-funded investigators collaborated with scientists from 28 countries (http://www.nsf.gov/od/opp/ipy/awds_lists/2010_awds/ipy_intro.jsp).

32nd Antarctic Treaty Consultative Meeting and 50th Anniversary of the Treaty

The 28 signatories to the Antarctic Treaty held their 32nd Antarctic Treaty Consultative Meeting in Baltimore, Maryland, from 6 to 17 April 2009. A ministerial session, convened by U.S. Secretary of State Hillary Clinton on 6 April 2009, was the first-ever joint meeting of the Antarctic Treaty parties and the members of the Arctic Council (Canada, Denmark/Greenland/Faroe Islands, Finland, Iceland, Norway, Sweden, Russia, and the United States). The joint session was convened to commemorate the 50th anniversary of the signing of the Antarctic Treaty in 1959 and to focus on polar science and the International Polar Year. Three of the many items discussed at the meeting are particularly relevant to marine mammal conservation and the health of the Antarctic marine environment, as follows.

Pollution from Ships: The Antarctic Treaty Consultative Meeting made progress toward greater protection of the Antarctic marine environment from pollution from ships. The International Convention for the Prevention of Pollution from Ships (referred to as MARPOL) under the International Maritime Organization defines certain sea areas as “special areas” in which, “for technical reasons relating to their oceanographical and ecological condition and to their sea traffic, the adoption of special mandatory methods for the prevention of sea pollution is required.” Under the Convention, these special areas are provided a higher level of protection than other areas of the sea. More specifically, the Convention

prohibits vessel discharges of noxious substances in the special Antarctic area recognized under MARPOL (i.e., the Antarctic Treaty area south of 60° S latitude).

At the Antarctic Treaty Consultative Meeting, the United States proposed to expand the area of MARPOL discharge protection to encompass the full ecological extent of Antarctic waters, pushing the northern limits of protection to the Antarctic Convergence. The Antarctic Convergence is formed where cold Antarctic waters meet warmer waters to the north (Figure V-4). It acts as an effective biological barrier, and the Southern Ocean is therefore substantially a closed ecosystem (<http://www.ccamlr.org/pu/e/gen-intro.htm>). Although CCAMLR itself extends to the Antarctic Convergence, the Antarctic Treaty and MARPOL designations do not. Discussion of the proposal led to a resolution that parties to the Antarctic Treaty should enhance protection of the entire Antarctic marine ecosystem, seek the views of the CCAMLR parties on the idea, and consider the issue again at the next Antarctic Treaty Consultative Meeting. In October 2009 CCAMLR discussed



Figure V-4. The Antarctic Convergence is an important oceanographic boundary zone between warm water to the north and Antarctic cold water masses to the south. (Map by Philippe Rekacewicz, UNEP/GRID-Arendal; see http://maps.grida.no/go/graphic/the_antarctic_convergence)

this matter but did not formulate a reply to the Antarctic Treaty parties.

Managing Tourism Impacts in Antarctica: At the Antarctic Treaty Consultative Meeting, parties agreed to several steps to improve understanding of tourism impacts on the Antarctic environment and to strengthen measures to manage them. The parties adopted general principles aimed at minimizing environmental impacts and maximizing the safety of operations. They requested that experts scheduled to meet in late 2009 review (1) trends and projections for shipborne tourism in the Antarctic Treaty area, including maritime accidents, (2) developments related to Antarctic ship-borne tourism in the area, (3) maritime safety in the Antarctic (including prevention of maritime accidents, ship design, and construction of vessels), (4) safe vessel operation, (5) hydrography and charting, and (6) maritime search and rescue.

The United States also proposed a measure that prohibited ships carrying more than 500 passengers from landing tourists and limited the number of passengers that could be landed at any one time to 100. The United States also proposed a requirement for passenger vessels to carry sufficient and suitable lifeboats for Antarctic conditions. The parties supported efforts at the International Maritime Organization to develop requirements regarding vessel design, construction, manning, and equipment, including survival craft and lifesaving equipment for ships operating in Antarctic waters. They also encouraged the International Maritime Organization to complete the Guidelines for Ships Operating in Polar Waters.

Climate Disruption: The declaration of the 6 April 2009 ministerial meeting recognized that the 2007–2008 International Polar Year occurred against “a backdrop of rapid and significant climate and environmental change in the polar regions” and acknowledged “the unique scientific importance of the polar regions, both as actors and barometers of these changes, which are vital to the functioning of the earth’s terrestrial, biological, climate, ocean and atmospheric systems.” Among other recommendations, the ministers encouraged the development of coordinated research and scientific observations at both poles to compare the current dynamics of polar

areas and their contributions to the Earth’s processes and changes. They recommended that governments continue their support for efforts initiated during the International Polar Year to create and link observational systems to improve the modeling and prediction of climate change on both regional and temporal scales (<http://www.state.gov/g/oes/rls/other/2009/121340.htm>). The parties also recommended a meeting of experts to discuss key changes in climate and their consequences and implications for management and governance of the Antarctic region.

Convention on International Trade in Endangered Species of Wild Fauna and Flora

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is the primary international framework for ensuring that international trade in animals and plants is not detrimental to their survival. The Convention entered into force in 1975. Currently 175 countries have signed and ratified the agreement. Member countries hold a Conference of the Parties approximately every third year, the last one being in 2007. The Fish and Wildlife Service is the lead agency for implementing the Convention in the United States, although it coordinates closely with the National Marine Fisheries Service on species under that agency’s jurisdiction. Under CITES, species are classified into three appendices depending on their conservation status, and trade in them is regulated accordingly. Appendix I includes those species considered to be threatened with extinction and that are or may be affected by trade. Appendix II includes species that are not necessarily threatened with extinction but could become so unless trade in them is strictly controlled. Appendix II also may include species if they or their products in trade are so similar in appearance to a protected species that the two could be confused. Appendix III includes species that any party identifies as being subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation and for which that party needs the cooperation of other parties to control trade. Additions and deletions of species listed on

Appendices I and II require concurrence by two-thirds of the parties voting on a listing proposal. Any party within the range of a species may place that species on Appendix III unilaterally. Member countries may propose adding or deleting species from the appendices or transferring species from one appendix to another before any of the triennial meetings.

During 2009 CITES was planning its Fifteenth Conference of Parties, to be held in March 2010. The U.S. Fish and Wildlife Service leads U.S. preparation for these meetings, and on 13 July 2009 the Service published a *Federal Register* notice (74 Fed. Reg. 33460) seeking public input on possible resolutions, decisions, and agenda items to be proposed by the United States. Among other things, the public proposed moving the narwhal and the polar bear from CITES' Appendix II to Appendix I and the walrus from Appendix III to Appendix II. The Commission commented on these matters in a 23 September 2009 letter to the Service.

Narwhal (*Monodon monoceros*)

With regard to the proposal to move the narwhal from Appendix II to Appendix I, the Commission

noted that the species is hunted for food and ivory and that it lives in an environment undergoing rapid change from global warming (Figure V-5). The International Union for Conservation of Nature (IUCN) lists the narwhal as “near threatened,” primarily because of potentially excessive removals by hunters in Greenland and parts of Canada, the two countries where hunting occurs. Much of the concern regarding the narwhal's status has focused on West Greenland and East Greenland stocks, which were previously poorly known and thought to be depleted and small, respectively.

This is not the first time that parties to CITES have raised concerns regarding the regulation of international trade in narwhal ivory. At Canada's request, the species initially was included in Appendix III but was moved to Appendix II at the 1979 Conference of the Parties. In 1984 West Germany proposed moving the narwhal to Appendix I, but that proposal was rejected at the meeting in 1985. In 1995 the CITES Animals Committee reviewed trade of narwhal ivory to identify problems with CITES' implementation for this heavily traded product. At the 2004 CITES conference, the parties decided to review narwhal trade again, but the narwhal subse-



Figure V-5. The narwhal is currently hunted in Greenland and parts of Canada for both food and the long, straight tusk found only on males. Animals here were observed in the Canadian Arctic waters of Admiralty Inlet, Baffin Island, in August 2005. (Photo courtesy of Kristin Laidre, University of Washington)

quently was removed from the list of species to be reviewed based on information submitted by Canada and Greenland at the July 2006 meeting of the Animals Committee. The committee's rationale was that parties to the convention were implementing the elements of CITES Article IV pertaining to non-detriment findings and that further review was not warranted.

In its 23 September 2009 letter to the Service, the Commission referenced new information that indicated that the conservation status of some narwhal stocks was better than previously believed. During its 17–20 February 2009 meeting, a joint working group of the North Atlantic Marine Mammal Commission's Scientific Committee and the Canada-Greenland Joint Commission on the Conservation and Management of Narwhal and Beluga reviewed new data on narwhal stock structure, movements, behavior, abundance, population dynamics, and reductions by hunting. The results indicate that the narwhal consists of multiple stocks, although some intermingling may occur. Aerial surveys in 2006 to 2008 indicate that abundance of narwhals on the wintering ground in West Greenland was 7,815 (95 percent confidence interval: 4,375–13,964). The narwhal stocks in two summering grounds in northwestern Greenland numbered about 8,447 (95 percent confidence interval: 5,224–13,658) (Inglefield Breeding) and 6,235 (95 percent confidence interval: 2,541–17,052) (Melville Bay). Narwhal abundance in East Greenland was about 6,583 (95 percent confidence interval: 2,541–17,052). The new estimates are substantially higher than those derived from previous surveys and have relieved some of the concerns about over-exploitation raised in previous joint meetings and other forums (e.g., the International Whaling Commission's Scientific Committee). The information also provided a basis for new recommendations on sustainable harvest levels for stocks in East and West Greenland. The joint meeting also reviewed abundance estimates for all Canadian High Arctic summering areas, reporting that the range of narwhals there is vast and that, at present, the number of narwhals using those areas might total 60,000 or more (Richard et al. 2010).

Given these new stock assessment results, the recent CITES review, and the responses of narwhal

range states to that review, the Marine Mammal Commission believed that the current CITES Appendix II listing provides the narwhal sufficient protection from the potential adverse effects of international trade. It therefore recommended that the Fish and Wildlife Service not propose moving the narwhal to Appendix I, and the United States did not submit a proposal to do so.

Although the Commission's letter did not recommend moving the narwhal to Appendix I, it emphasized that the narwhal range states must continue to monitor closely the status of those narwhal stocks subject to hunting in Canada and Greenland and to track and report information on the international trade in narwhal ivory. The Commission encouraged the Fish and Wildlife Service and the National Marine Fisheries Service to take steps within CITES and other international forums to ensure that such monitoring takes place and that the results are reported in an open and timely manner.

Polar Bear (*Ursus maritimus*)

In June 2009 the IUCN Polar Bear Specialist Group met and concluded that of the 19 populations of polar bears, eight are declining, three are stable, one is currently increasing, and data are not sufficient to assess current trends for the remaining seven. The Specialist Group also reported that the population of polar bears in Baffin Bay, which is shared by Greenland and Canada, may be suffering from significant habitat change and substantial over-exploitation. In addition, the Chukchi Sea population, which is shared by the United States and Russia, is declining due to illegal hunting in Russia and the highest rates of sea ice loss in the Arctic. The group recommended that both of those populations be reassessed and that removal rates be adjusted in accordance with current population estimates.

In its 13 July 2009 *Federal Register* notice, the Fish and Wildlife Service solicited comments as to whether it should submit a proposal to move the polar bear from Appendix II to Appendix I because of the effects of trade and the predicted effects of climate disruption. In its 23 September 2009 letter to the Service, the Marine Mammal Commission recommended that the Service not propose to move the polar bear to CITES Appendix I. Although the Com-

mission concurred that the polar bear is a threatened species and warrants careful protection, it suggested that harvests from most polar bear populations and the resulting international trade in polar bear parts are reasonably well regulated and do not currently constitute a threat to the species. The Agreement on the Conservation of Polar Bears, which entered into force in 1976, limits the purposes for which polar bears may be taken. Among other things the agreement allows polar bears to be taken for scientific, sport, conservation, and subsistence purposes. In general, commercial hunting and use of skins is prohibited throughout its range. The Commission's view also was based on its belief that allowance for some regulated hunting provided a means for controlling the actual take of polar bears as well as benefitting the subsistence communities where such hunts occur. The Commission asserted that continued and improved monitoring and management are needed for all polar bear populations and, absent such improvements, an Appendix I listing should be reconsidered in the future. In particular, CITES reviews should be updated regularly to monitor the effects of trade and other threats (e.g., habitat loss from climate disruption). For the time being, however, the Commission concluded that the current Appendix II listing provides sufficient control and monitoring of the trade in polar bear specimens.

The Fish and Wildlife Service analyzed the factors that led to the listing of the polar bear under the Endangered Species Act and found that overharvesting does not threaten the polar bear throughout all or a significant portion of its range. The Service also concurred that continued efforts are necessary to ensure that hunting or other forms of removal do not exceed sustainable levels. However, on 14 October 2009 the United States submitted a proposal to transfer the polar bear from CITES Appendix II to Appendix I at the upcoming conference. The proposal noted that Article II of the Convention indicates that Appendix I shall include all species that are threatened with extinction and that are or may be affected by trade. The proposal also stated that the polar bear is threatened with extinction in accordance with the biological criteria set forth in CITES' Conference Resolution 9.24. In addition, the proposal noted that countries have been and are engaged in active trad-

ing of polar bear parts, most of which are from wild bears. From 1992 through 2006, approximately 31,294 polar bear items (an average of 2,086 items annually) were exported or re-exported around the world, with 73 countries reporting polar bear imports. Finally, the proposal reviewed the predicted effects of receding sea ice habitat and concluded that the decrease in suitable habitat will exacerbate all other potential threats to the polar bear, "including, but not limited to, utilization and trade, disease or predation, contaminants, ecotourism, and shipping." In its proposal, the United States indicated that a precautionary approach that includes listing the polar bear in Appendix I is necessary to ensure that commercial trade does not compound the threats posed to the species by loss of habitat.

Walrus (*Odobenus rosmarus*)

In its *Federal Register* notice, the Fish and Wildlife Service also solicited comments on whether it should submit a proposal to move the walrus to CITES Appendix II at the upcoming conference. The proposal was based on concerns related to the effects of trade in walrus parts and the ongoing and predicted effects of climate disruption on walrus populations.

In its letter of response, the Commission recommended that the Service proceed with its proposal. The Commission noted that the 2008 IUCN Red List assessment found that the abundance and trends of the Atlantic and Pacific walrus subspecies are poorly known and considered data-deficient. The number of Atlantic walruses has been estimated at 18,000 to 20,000, but the reliability of that estimate is unknown. The subspecies' long-term trend also is unknown. Some regional populations are thought to be in decline, and others may be increasing (Lowry et al. 2008).

Pacific walruses were subject to low levels of commercial hunting from the mid-seventeenth century until 1867, when cycles of intensive commercial exploitation began following the U.S. purchase of Alaska from Russia. By the end of the 1870s, American whalers are believed to have reduced the population of Pacific walruses by half. At that point, scarcity of the animals and the declining price of walrus oil led to a 20-year hiatus in commercial hunt-

ing, and the population was able to recover to some extent. Around the turn of the century, commercial hunting for ivory and hides resumed, reaching a maximum level in about 1920 and declining thereafter. However, while the United States was implementing conservation measures, the Soviet Union mounted a major commercial hunt in the 1930s, and by the mid-1950s the population was again reduced by perhaps half. Abundance estimates for the Pacific walrus population in the mid-1950s were between 50,000 and 100,000 animals. Thereafter, both the Soviet Union and the state of Alaska put protective measures in place intended to restore the Pacific walrus population, and its numbers increased during the 1960s and 1970s (Fay et al. 1989). Minimum population estimates derived from aerial surveys conducted at five-year intervals from 1975 to 1990 were in the range of 200,000 to 250,000 animals. However, because estimation methods varied during that period, the estimates cannot be compared and do not provide a basis for judging recent trends in the Pacific walrus population (Allen and Angliss 2010).

The Fish and Wildlife Service has since been seeking a better means to assess the Pacific walrus population, and in 2006 it attempted a joint survey effort with Russian collaborators. The survey was confounded by weather and was unable to cover all the areas included in the original survey plan. The first reported results were summarized in a 29 May 2009 draft stock assessment report (Allen and Angliss 2010). The report included an estimate of 21,610 individuals with a 95 percent confidence interval of 8,453 to 45,439 individuals (see Chapter IV, Species of Special Concern). However, the reported estimate was known to be negatively biased because it did not include corrections for animals in the water or animals in walrus habitat that was not surveyed. By the end of 2009 the Service had not published its final analysis of the 2006 survey or a final stock assessment for the Pacific walrus. The Commission's recommendation to the Fish and Wildlife Service to propose moving the walrus to Appendix II was based in part on the great uncertainty regarding the species' abundance and trends.

The Commission's recommendation also reflected the fact that the Fish and Wildlife Service was reviewing information relative to listing the

Pacific walrus under the Endangered Species Act. The Center for Biological Diversity had petitioned the Service to initiate such a listing, and on 10 September 2009 the Service announced (74 Fed. Reg. 46548) that the petition presented substantial scientific or commercial information indicating that a listing may be warranted and that it would conduct the required status review. That conclusion was based on the present or threatened destruction, modification, or curtailment of Pacific walrus habitat or range due to disruption change, the inadequacy of existing regulatory mechanisms to address climate change, and the possible impact of other natural or anthropogenic factors.

The Commission's recommendation also was based on the observation that Pacific walrus appear to be more dependent on sea ice and therefore may be more affected by climate disruption than Atlantic walrus. Observations to date regarding the detrimental effects of climate disruption on Pacific walrus were briefly described in the Service's draft stock assessment report. Diminishing ice cover in the Bering Sea in winter and spring and reduced summer sea ice in the Chukchi Sea are expected to affect critical aspects of walrus life history and therefore also the population's resilience. The loss of ice habitat will impede their access to important foraging grounds and require them to haul out on land where they are vulnerable to predation and disturbance by human activities. Alaska Natives and scientists observed major changes in walrus feeding, haul-out patterns, and survival in 2007 and 2009, indicating that climate disruption has already begun to affect the population.

Regarding trade, the Marine Mammal Protection Act allows harvesting of Pacific walrus by Alaska Natives for subsistence purposes and to make and sell traditional handicraft items. International trade primarily involves walrus parts and derivatives, including tusks, ivory jewelry and carvings, and bone carvings. The Service's *Federal Register* notice noted that more than 16,000 individual specimens of walrus ivory were exported from or imported into the United States in 2008.

The IUCN Red List assessment states, "[a] history of poor international cooperation, crude population monitoring methods and delayed management

responses has led to speculation that future management actions in response to population declines of Pacific walrus may not be taken soon enough to be effective” (Lowry et al. 2008). The Commission stated in its letter that observations of changing distribution, animal condition, and juvenile mortality suggest that serious declines are occurring, but neither the Fish and Wildlife Service nor any scientific body has been able to describe or predict population declines reliably for walrus in any portion of their circumpolar range. The Commission summarized its views by noting that the responsible agencies are confronted with a situation that is clouded by great uncertainty, where all the available information indicates that the walrus is at considerable risk, and where subsistence harvests are supporting significant trade in walrus parts and products. For these reasons, the Marine Mammal Commission recommended that the Fish and Wildlife Service propose that the walrus be moved to CITES Appendix II. Despite that recommendation, the United States did not submit such a proposal for the Fifteenth Conference of the Parties.

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.” Many marine mammal species



Figure V-6. Based on recent studies, scientists have concluded that the vaquita has become too rare to monitor effectively through visual surveys and now recommend passive acoustic monitoring to assess population trends. (Photo courtesy of Chris Johnson, earthOCEAN)

and populations elsewhere in the world face major conservation challenges. Some species are in danger of extinction in the immediate future and others are being extirpated in large parts of their range. This report highlights some of the non-U.S. species and populations at greatest risk and identifies issues that must be addressed to conserve them. No attempt has been made to treat the subject comprehensively. The species and populations described here are only a sample of those for which significant new information became available to the Commission during 2009.

Vaquita (*Phocoena sinus*)

Assuming that the baiji, or Yangtze River dolphin, is extinct, the vaquita is the world’s smallest and most endangered cetacean species (Figure V-6). It occurs only in the waters of the upper Gulf of California (Norris and McFarland 1958). Based on data from 1997 and a subsequent increase in the number of artisanal fishing boats Jaramillo-Legorreta et al. (2007) projected that the population might have declined to 150 vaquitas by 2007. The primary threat to the vaquita is incidental mortality in gillnet fisheries. Fishermen in the upper Gulf set gillnets to catch a number of species, but the primary target is shrimp, which is sold almost entirely to U.S. markets.

To date, the primary measure aimed at reducing bycatch has been the establishment of no-fishing areas. In 1993 the Mexican government created the Upper Gulf of California and Colorado River Delta Biosphere Reserve and banned gillnet fishing in a core area near the mouth of the Colorado River. That core area did not encompass all known vaquita habitat, and in 2005 the government created an additional refuge area to protect the central part of the vaquita’s range. In 2007 the Mexican government initiated development of a formal recovery plan for the species with emphasis on bycatch reduction and increased enforcement. In 2008 the government adopted the Action Plan for the Conservation of the Species Vaquita under Mexico’s Conservation Program for Species at Risk (Programa de Conservación de Especies en Riesgo) (SEMARNAT 2008) and directed about \$5 million (U.S. dollars) to enforcement and other activities to ensure that fishermen were not fishing in the vaquita refuge.

A report by Rojas-Bracho et al. (2006), a compilation of past meetings of the vaquita international recovery team (available on the Commission's Web site at <http://mmc.gov/reports/workshop/>), and previous Commission annual reports summarize the history of vaquita conservation efforts and describe the elements of the vaquita recovery plan and its initial year of implementation in 2008.

Monitoring and assessment: Long-term monitoring of vaquita abundance is necessary to document trends in the population and determine if conservation interventions are sufficient to ensure recovery. In 2009 much of the monitoring-related effort was focused on analysis of data from a 2008 survey sponsored jointly by Mexico and the United States that also involved scientists from the United Kingdom, Japan, Canada, Germany, Switzerland, and Australia. The survey used multiple vessels and visual, acoustic, and photographic methods to collect data on vaquita abundance, distribution, and habitat. At the end of 2009 the scientists still were analyzing their data, but preliminary results suggested a 2008 population of about 245 individuals (with large uncertainty about that estimate [T. Gerrodette, pers. comm.]).

The scientists used those preliminary results to assess whether current measures are sufficient to halt the decline and allow the vaquita to recover (Gerrodette and Rojas-Bracho 2009). The assessment took into account conversions to gear other than gill-nets and buyouts of gear to reduce fishing effort, and evaluated three scenarios involving closed areas. The first scenario evaluated the efficacy of the areas currently closed to fishing, the second evaluated closure of nearly all areas where vaquitas were detected visually or acoustically during the survey, and the third evaluated closure of the entire range of the species based on all detection and stranding records over the past 30 years. The scientists used a Bayesian model to estimate the probability of population growth after 10 years in each of these scenarios.

While analyses were still in progress at the end of 2009, the most significant preliminary finding is that population growth is not likely (less than 10 percent chance) under the current protection measures (the first scenario). Population growth is more likely (35 percent) under the second scenario and

very likely (>99 percent) under the third scenario. Because of the vaquita's low abundance and highly endangered status, the scientists concluded that full protection throughout the species' range is essential to ensure recovery.

Future monitoring: The 2008 survey provided a wealth of information on how best to detect vaquitas, which are generally elusive in their behavior, and the relative merits of different monitoring approaches and technologies. The scientists involved in the survey met again on 19–23 October 2009 in Ensenada, Mexico, to develop a future monitoring plan based on their observations in 2008 (Rojas-Bracho et al. 2009). They reviewed the efficacy of three acoustic survey methods used in 2008, including stationary acoustic gear deployed from anchored vessels, towed acoustic arrays, temporary buoys supporting autonomous acoustic recorders, and visual surveys (Taylor et al. 2008). Based on their review, they concluded that vaquitas have become too rare to be monitored effectively using visual surveys or passive acoustic arrays towed by a single vessel. Instead, they recommended a large fixed array of passive acoustic monitoring devices as the most effective technology for monitoring trends in the vaquita population.

The participants based their recommendation on the need to detect both a catastrophic decline and smaller, natural population fluctuation in a reasonable management time frame. Their goals were to detect a decline in abundance of 10 percent a year within three years, a decline of 5 percent a year within five years, and an increase of 4 percent a year within five years. However, statistical analysis of the precision required to achieve those levels of detection for small populations immediately ruled out the possibility of detecting a 10 percent decline within three years. Even meeting the two lesser goals requires an unprecedented, but feasible, level of sampling precision.

The workshop participants recommended that large-scale monitoring of the vaquita refuge begin in August 2010 with the deployment of 48 acoustic monitoring devices moored below the surface and 14 deployed on perimeter buoys marking the refuge. They designed a sampling grid for deploying the stationary hydrophones to match the shape of the refuge and the location of the existing perimeter

buoys. They recommended that this array be deployed annually through 2015.

The participants laid out an ambitious implementation schedule for the proposed monitoring program, calling for pilot studies on mooring design and deployment to start immediately and for full deployment of the array in fall 2010. They estimated that monitoring from 2010 through 2015 would cost a total of \$1.3 million, including extra start-up costs and regular monitoring thereafter. At the end of 2009 the Mexican government and several private foundations and non-governmental organizations had pledged some funds to implement this monitoring strategy.

As developed, the acoustic monitoring plan would cover only the vaquita refuge. Workshop participants concluded that towed hydrophone arrays might be used to detect vaquitas outside the refuge, but no plans to do so had been completed at the end of 2009.

Other management efforts: The main challenge for recovering the vaquita is eliminating bycatch in gillnets. In addition to area closures, two additional approaches are being used to prevent bycatch: the purchase of gillnet gear from the fishermen to reduce fishing effort and the development of alternative, safe gear to replace gillnets (Figure V-7).



Figure V-7. Vaquitas in the Gulf of California continue to be taken as bycatch in gillnets targeting sharks and other fish. (Photograph by Flip Nicklin, Minden Pictures)

In 2009 Mexico directed a total of about \$5 million (all amounts in U.S. dollars) toward vaquita recovery efforts (Rojas-Bracho and Fueyo 2010). The government used about \$2 million to encourage fishermen to switch from gillnets to trap or longline gear and \$660,000 to purchase gear to encourage fishermen to switch to other economic activities (e.g., tourism, service industries). Sixty-three fishermen changed to gear that does not put vaquitas at risk of bycatch, and 18 applied to the buyout program.

Mexico also invested \$600,000 in the development of an alternative shrimp net in a program led by Mexico's National Institute of Fisheries (Instituto Nacional de Pesca or INAPESCA). Forty-four fishermen participated in a one-year program to test various net configurations. Unfortunately, progress on the experiment was hampered by a poor shrimp season in 2009, and the effectiveness of the most promising net could not be evaluated. At the end of 2009 further tests were planned for the 2010 shrimp season (INAPESCA 2010).

The United States has sought to facilitate the development of alternative gear types, and experts from the National Marine Fisheries Service's Southeast Fisheries Science Center have helped evaluate possible gear configurations and participated in a gear development and training workshop sponsored

by the joint Canada, Mexico, and U.S. Commission on Environmental Cooperation. Those experts identified some significant concerns with the prototype alternative trawl net being used by INAPESCA, including its high cost and the excessive strength of the materials used. They have expressed concern that the prototype trawl net would be difficult to break free from any obstructions encountered while towing, hard to repair, and expensive to replace if damaged or lost. They conducted towing tests on one of the experimental nets and suggested modifications to

improve the likelihood of catching shrimp using this net behind the small fishing boats, or pangas, used in the gulf fishery. They also built and tested another net to be sent to Mexico for further evaluation. At the end of 2009 the future of this gear-development effort was uncertain.

In addition to the efforts described, the Mexican government paid fishermen \$1.7 million not to fish in the vaquita refuge. As a result, the refuge has been almost free of gillnet and trawl fishing for two seasons, and fishing effort has declined overall. Due to the historic development of the artisanal fisheries, records of the number of registered pangas and permits are incomplete; in addition, until recently there was a substantial amount of fishing by unregistered boats. The number of registered pangas engaged in gillnet fisheries was estimated to be over 830 in 2007, and 242 boats had been permanently removed through the Action Plan for the Conservation of the Species Vaquita by the end of 2009 (L. Rojas-Bracho, pers. comm.).

Enforcement: Strong enforcement of area closures is essential to recovery efforts. In 2008 the enforcement arm (La Procuraduría Federal de Protección al Ambiente [PROFEPA]) of the Ministry of Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales [SEMARNAT]), and the Mexican navy spent \$1.8 million and deployed 48 people, eight boats, an interceptor aircraft, two larger ships, and a helicopter to enforce closures of certain fishing areas. During the fishing season the government also conducted overflights to monitor the overall level of fishing effort in the larger biosphere reserve (Rojas-Bracho and Fueyo 2010).

Funding and future recovery efforts: The Mexican government continued its commitment to vaquita conservation despite the 2009 economic recession. It provided resources for enforcement, compensated fishermen for not fishing in the refuge, and continued its buyout and gear-conversion programs. These and other actions are evidence of a strong commitment on the part of the Mexican government to recover the vaquita, despite the many other challenges that country faces. Continuation of these actions, together with robust monitoring of the population, will be necessary for the foreseeable future if Mexico is to be successful in this endeavor.

The United States has a vital role to play in this conservation effort because it is the primary market for shrimp targeted in the fishery that entangles vaquitas.

Western North Pacific Population of Gray Whales (*Eschrichtius robustus*)

The two extant populations of gray whales occur in the North Pacific Ocean. The western population is found in summer primarily off the northeastern coast of Sakhalin Island, Russia, and is listed as critically endangered by IUCN. It is genetically distinct from the eastern population, which is found off the west coasts of Mexico, the United States, and Canada and the northeastern coast of Russia. In the mid-1990s research and monitoring efforts were initiated to assess the western population and address threats from ongoing and planned oil and gas activities off Sakhalin Island (Figure V-8). The Commission's 2007 and 2008 annual reports provided detailed



Figure V-8. A western gray whale begins its dive near offshore oil and gas platforms off Sakhalin Island. (Photo courtesy of David W. Weller, National Marine Fisheries Service)

information on western gray whales and the work of IUCN's Western Gray Whale Advisory Panel (see <http://www.iucn.org/wgwap/>).

Population Status in 2009: The most recent assessment indicated that the non-calf population size in 2008 was 130 whales (95 percent confidence limits 120–142). From 2005 to 2007 five female gray whales died in fishing gear in Japanese waters, raising concern about the population's ability to tolerate such losses. During the two-year period from 2008 to 2009 one additional whale, a male born in 2005, washed ashore near Chaivo Lagoon, Sakhalin. Investigators

were not able to determine the cause of death for that whale.

Seismic Survey: Sakhalin Energy postponed a planned 2009 seismic survey to 2010 in response to a recommendation by the advisory panel. The panel had worked closely with the company to develop a robust monitoring and mitigation plan for 2009 but then recommended a delay in seismic surveys based on uncertainties regarding whale distribution and behavior observed in 2008 and activities planned by other energy companies in the area for 2009. The panel suggested that Sakhalin Energy's seismic survey should be postponed for at least a year, pending information on the distribution and abundance of whales in 2009. The panel indicated that it would consider the survey in 2010 if observations from 2009 reduced the uncertainty and allayed the concerns arising from the observations in 2008. Sakhalin Energy felt that the survey could have been conducted safely in 2009 based on the agreed monitoring and mitigation plan but accepted the panel's recommendation to postpone the survey until 2010.

At its April 2009 meeting, the panel also emphasized the importance of a moratorium on all industrial activities in the region that might be expected to adversely affect western gray whales. For any particular activity, the moratorium should persist until adequate mitigation measures have been developed and their efficacy has been independently verified.

The advisory panel reviewed information on the 2009 distribution and density of gray whales in the Sakhalin feeding area during its December 2009 meeting. The results suggested that the numbers of whales present off Sakhalin in summer 2009 were similar to what had been observed before 2008. Therefore, Sakhalin Energy signaled its intention to proceed with planning for a seismic survey in 2010, on the understanding that the panel would have the chance to evaluate final results of the 2009 field season and further advise the company on elements of the monitoring and mitigation plan at its April 2010 meeting.

Satellite Tagging: At their respective meetings over the past several years, the advisory panel and the IWC Scientific Committee have discussed satellite telemetry as a way to investigate the migratory routes and breeding habitat of western

gray whales. The value of such telemetry was emphasized at an IUCN-sponsored western gray whale "range-wide" workshop in 2008 (IUCN 2008, see http://cmsdata.iucn.org/downloads/tokyo_workshop_report.pdf). Telemetry has been used with numerous species and is a useful tool for studying the distribution, movements, and behavior of large whales. One major concern, however, is that satellite telemetry requires instruments to be attached to the whales, and the attachment methods can cause unintended harm. Over time, tagging technology has improved and the current state of the art involves thin, cylindrical instruments that are shot or injected through the whale's skin into the blubber, fascia, and muscle layers. Such application can cause wounds that lead to infection, local necrosis, and potentially more serious health effects. The Marine Mammal Commission and National Marine Fisheries Service sponsored a Large Whale Tagging Workshop in 2005, which made recommendations on tagging technology and protocols for large whales. The results of that workshop were incorporated into a broader report sponsored by the Commission and IUCN (Weller 2008).

In 2009 the IWC, IUCN, various U.S. and Russian scientists, and the two main sponsors—Sakhalin Energy and ExxonMobil—initiated a program to evaluate technology and techniques that could be used to tag western gray whales safely in 2010. Between 1 September and 1 December 2009 researchers from Oregon State University tagged 18 eastern gray whales off Oregon and California to evaluate the performance of different tags and assess the significance of wounds incurred at the tag sites on the whales' bodies (Mate et al. 2010). At the end of 2009 they were continuing the tagging program and planning related activities for 2010.

Southern Right Whales (*Eubalaena australis*)

Between 2003 and 2009 mortality of southern right whales was exceptionally high on the population's calving/nursery grounds at Península Valdés, Argentina (Uhart et al. 2008, 2009, Chirife et al. 2010). In 2003 a consortium of non-governmental organizations initiated the Southern Right Whale Health Monitoring Program to monitor right whale

strandings and investigate the causes.

The monitoring program recorded 366 right whale deaths from 2003 to 2009 (Table V-2 and Figure V-9). Of these, 91 percent were calves less than four months of age. In 2003, 31 whales stranded, 29 of them calves. In 2004 only 13 dead whales were recorded, all calves. In 2005, seven adult whales died, more than had been recorded in a single year since monitoring was initiated in the area in the early 1970s. In the same year, 36 calves and 4 juveniles died for a total of 47 deaths. In 2006, the total number of documented strandings was only 18 whales (16 calves, one juvenile, and one adult). In 2007, 83 whale deaths were documented, 77 of them calves. Of these, at least 61 (including 60 calves) occurred in a span

of 10 weeks. In 2008, 95 whales are known to have died. Of these, 81 were found in a period of 10 weeks. Finally, in 2009, 79 dead right whales (including 72 calves) were documented, of which 38 (including 35 calves) stranded during a three-week period. These records indicate that strandings peaked between 2007 and 2009, when a total of 257 whales is known to have died, 238 of which were calves.

Table V-2. Number and age categories of dead whales recorded at Peninsula Valdes since 2003. Source: Southern Right Whale Health Monitoring Program.

	2003	2004	2005	2006	2007	2008	2009	Total	Percentage
Calves	29	13	36	16	77	89	73	333	91
Juveniles	1	0	4	1	1	0	0	7	2
Adults	1	0	7	1	5	3	5	22	6
Unknown	0	0	0	0	0	3	1	4	1
Total	31	13	47	18	83	95	79	366	100



Figure V-9. Giant petrels feed on the carcass of an adult southern right whale at Península Valdés, Argentina. (Photo courtesy of the Southern Right Whale Health Monitoring Program)

The implications of this spike in mortality are unclear. The most recent abundance estimates for this population were 2,577 in 1977 and 3,346 in 2000. Demographic data indicate that the population in this region was increasing at a rate of between 6.8 and 7.6 percent a year from the early 1970s to 2000 (Cooke et al. 2001, 2003), but the rate of increase has not been estimated for the period since 2003.

Information gathered to date has not been sufficient to determine the cause or causes of the elevated mortality levels. The whales use two major nursery areas, one of them in Golfo San José and the other in Golfo Nuevo. Most of the mortality has been in Golfo Nuevo. The peak timing of deaths has differed among years, and the ages of the dead calves have varied with no discernible pattern. Of a total of 366 right whale deaths (including 333 calves) between 2003 and 2009, none of the carcasses had ropes, nets, or other visible evidence of entanglement in fishing gear. Blunt-force trauma (from boat strikes or other sources) as evidenced by internal injury was a possible cause of death for one calf in 2003 and one in 2009, and in 2003 a third calf with equally spaced cuts on the tail stock is suspected of having been struck by a vessel. However, the majority of animals were already decomposed when examined, confounding determination of cause of death. Toxic algal blooms have been suggested as a possible cause and were documented in 2009, but they did not coincide with recorded deaths. Blooms and deaths did coincide in 2007 and 2008, but tissues from stranded animals tested negative for paralytic and amnesic shellfish biotoxins. Tissue analysis for trace metals and persistent organic pollutants also did not indicate chemical pollution as a likely factor in the deaths (Chirife et al. 2010).

At its annual meeting in June 2009, the Scientific Committee of the International Whaling Commission reviewed data on recent right whale deaths at Peninsula Valdés and recommended that a workshop be held in 2011 to review possible causes, consider the impact on the population, and identify research needs. By August 2009 it became clear that another year of high mortality was under way, and the workshop organizers decided that the meeting should be held in the first quarter of 2010. The Marine Mammal Commission provided funding for the

Southern Right Whale Health Monitoring Program in 2008 and 2009 and anticipated providing support for the 2010 meeting.

Irrawaddy Dolphins (*Orcaella brevirostris*) in the Mekong River

The International Union for Conservation of Nature (IUCN) lists the freshwater population of Irrawaddy dolphins in the Mekong River as critically endangered (Smith and Beasley 2004) (Figure V-10). The number of animals in this population is uncertain. Beasley et al. (2007) estimated abundance in April 2005 as 127 (95 percent confidence interval of 108–146) whereas Dove et al. (2008) estimated it in May 2007 as only 71 (95 percent confidence interval of 66–86). Regardless of how fast and extreme the decline may have been, it is clear that this population is very small and that known mortality levels in recent years are unsustainable (Beasley et al. 2009). Between August 2003 and August 2008, 82 dead dolphins were reported, of which 57 (70 percent) were judged to be less than one year old (Dove 2009). Many of the dead dolphins, particularly the adults, are known or suspected to have died from entanglement in gillnets, but the cause of the high proportion of the calf deaths remains uncertain.

Conservation efforts along the Mekong River take place in the larger context of extensive water



Figure V-10. An Irrawaddy dolphin from the critically endangered Mekong River population. (Photo courtesy of Isabel Beasley, Wildlife Conservation Society)

development both in Cambodia and upstream in the Lao People's Democratic Republic. Several hydroelectric dam projects are underway or in the planning stages, and pollution and over-fishing are all having a significant impact on the river basin and the species and ecosystems it supports. Socioeconomic concerns and the importance of the river as a source of protein and income are important factors when working with fishermen and local communities to conserve the Mekong River population of Irrawaddy dolphins.

In October 2009 WWF-Cambodia and the Cambodian government convened a workshop to review existing information on the population's decline and to develop a recovery plan. The workshop, held in Phnom Penh, Cambodia, involved a small group of invited international experts, several of whom received support from the Marine Mammal Commission. Participants met with WWF researchers and Cambodian government officials and visited the Mekong River to observe the situation firsthand. After examining photographs of live and dead animals, examining two frozen dolphin carcasses, and reviewing necropsy reports, the expert group concluded that, despite an official ban on gillnetting, most of the recent human-caused mortality of dolphins in the Mekong was likely due to entanglement in fishing gear. It concluded that conservation efforts should focus on eliminating gillnets in the core habitat of the dolphins—the 200 km stretch of the Mekong River between the town of Kratie and the Cambodian border with Lao People's Democratic Republic—while also calling for continued and additional efforts to explore the causes of dolphin deaths, especially those of calves.

A gillnet ban is supposed to have been in effect since 2006 in the nine deep-pool areas where dolphins are found most often and in river stretches that they occupy between these pools. However, representatives of the Cambodian fishery agency and local residents informed workshop participants that gillnet fishing continues in the river between pools, possibly because whatever enforcement efforts exist are concentrated at the deep pools. Workshop participants also learned that, although all nine deep-pool areas are apparently well monitored during daytime hours, monitoring is not carried out at night when illegal gillnet fishing may occur.

Given the small size of the Mekong River population and the high level of observed mortality, the participants concluded that the population will certainly go extinct in the near future without urgent conservation actions. They identified a series of research and conservation needs and emphasized that management and research actions must focus on the most probable sources of mortality because of the urgency of the situation and the limited resources available to address dolphin conservation in Cambodia. The group's first three recommendations were aimed at developing a clearer picture of the population from research conducted over the past decade, identifying the cause or causes of mortality, and increasing enforcement of the existing gillnet ban. More specifically, the group recommended that—

- all past and present data from photo-identification and mortality monitoring studies be compiled so that appropriate analyses can be conducted for conservation management, including a prediction of how many years remain before this population could go extinct without a significant reduction in human-caused mortality;
- all available photographs of dead dolphins in the Mekong River be examined by experts experienced in determining signs of bycatch on stranded or salvaged carcasses of small cetaceans; and
- night patrols be implemented immediately to enforce the ban on gillnet fishing in the nine deep-pool areas where the dolphins are most frequently found. Patrols in interpool areas also are desirable although they may not always be feasible and safe, especially at low water levels, due to the presence of rocks and rapids.

The participants noted that promotional material distributed throughout the country indicates that Irrawaddy dolphin conservation in the Mekong River is a national priority and called on authorities to make every effort to ensure the population's survival, in particular through eliminating gillnetting in critical areas. They emphasized that effective implementation of gillnet regulations requires extensive public outreach as well as systematic patrols. During dolphin surveys and patrols, fishing gear also should be assessed to help estimate the density of such gear throughout the range of Mekong River dolphins. They further recommended that a fisheries expert be

contracted to create an inventory of all fishing gear used in the region and evaluate whether other fishing methods are entangling dolphins or otherwise killing or injuring them. In addition, the existing monitoring network should be modified to emphasize thorough, on-site examination and photography of animals (see Read and Murray 2000, Barco and Touhey 2006) as soon as possible after carcasses are found. In general, the experts emphasized the importance of having WWF-Cambodia work even more closely than it already does with the Cambodian Fisheries Administration and the Commission on Dolphin Conservation and Ecotourism Development, the rationale being that “[o]nly through such cooperation and collaboration will it be possible to improve understanding of mortality and stress factors in a short period of time and to begin managing the human activities that are contributing to the population’s rapid decline.”

Long-term conservation measures also will be needed, and workshop participants recommended that Cambodia formally adopt fishery laws and regulations protecting Irrawaddy dolphins in the Mekong River. With regard to long-term research, the participants urged that the current photo-identification study be strengthened and surveys carried out annually, with an emphasis on the use of the data to estimate abundance and survivorship, describe movements, and monitor scars and disfigurements as indicators of interactions with fisheries. They also recommended a larger systematic program for monitoring fishing practices and fish catches throughout the river segment from Kratie to the Cambodian border with the Lao People’s Democratic Republic. In addition, the workshop participants noted that any future plans likely to cause major habitat problems, such as the construction of dams, must be evaluated and adjusted to prevent further decline of the dolphin population.

In December 2009 WWF-Cambodia, several participants from the workshop, and the Marine Mammal Commission began work on a data-sharing protocol to facilitate cooperative analyses by past and current dolphin researchers. The protocol will allow researchers to combine their photo-identification data from 1994, 2001–2005, and 2007–2009. The combined dataset will then be available for

various analyses with the aim of achieving a better understanding of the population size and trends over time and learning more about the animals’ life history, behavior, and causes of mortality. At the end of 2009 additional arrangements were being made to share photographs of dead dolphins in the Mekong River with independent experts who can help interpret scars, wounds, and other features that may point to causes of injury, mortality, and population decline.

Other Asian Freshwater Cetaceans

Freshwater cetaceans (including five dolphin species and a porpoise) are among the world’s most threatened mammals (Reeves et al. 2000, 2003; Jefferson and Smith 2002). Four of the six currently recognized cetacean species with freshwater populations occur in Asia, and all of these populations are endangered or critically endangered according to the IUCN Red List. These animals have declined dramatically in numbers and range, especially in Asia. The threats are diverse, longstanding, and difficult to assess and manage. As indicated previously for the Irrawaddy river dolphin in the Mekong River, bycatch (entanglement or entrapment, usually leading to death) in fishing gear is the most serious and immediate problem for most populations, and gillnets are the greatest cause of human-induced mortality. Freshwater cetaceans also are vulnerable to habitat modification and degradation (e.g., noise, chemical pollution, dams), and they compete with humans for fish. Vessel strikes, underwater explosions, electrocution (in electro-fishing), and entrapment in water management structures, notably irrigation canals, also can cause injury or death. Some of these factors kill animals outright, and others impair their health or undermine their reproductive capabilities and social behavior.

Unlike coastal and pelagic cetaceans, many freshwater species live in environments where the very availability of water can be in doubt. All freshwater cetaceans require adequate water flow and water quality within their range. These are the basic elements of suitable habitat that the animals need to support their physical health, mobility, and ability to forage efficiently and find prey. In freshwater (and estuarine) ecosystems, unlike in coastal or oceanic

systems, such basic elements are finite and may be completely regulated, despoiled, or entirely destroyed by human activities. The constricted nature of riverine habitat, and the inescapable need to share that habitat with humans, increases the vulnerability of these animals to bycatch in fisheries, overfishing of their prey, disturbance by noise, and being struck or displaced by vessels.

Although most of the identified threats to freshwater cetaceans are widespread in Asian river systems, and most freshwater cetacean populations face multiple threats, the types and intensity of human activities differ between different rivers. Nonetheless, in all cases human impacts on river systems and on freshwater cetaceans are significant. In some cases the operative or limiting threats are obvious (e.g., bycatch, entrapment in canals), while in others it is not clear if one threat is having more impact than another, or if population declines are a result of the cumulative effects of several factors.

Establishment of Protected Areas: While freshwater cetaceans range widely in all river systems they inhabit, they tend to be found more often in certain areas (Hua et al. 1989, Smith 1993, Leatherwood et al. 2000, Martin et al. 2004, Krieb and Budiono 2005, Beasley et al. 2007). The management of essential habitat (e.g., for foraging, calving, and nursing) within a protected-area framework can be an effective tool for conservation. Scientists, managers, and conservationists have sought to establish protected areas for freshwater cetaceans in most of the range states; those efforts have been successful in some areas and are still in the planning or development stage in others.

Protected-area development involves a suite of challenges. Examples include defining and mapping an area, establishing its regulatory or legal status, controlling human activities within it, reducing detrimental impacts from external activities and processes, setting up and supporting appropriate levels of public education and law enforcement, developing and maintaining community acceptance and support, managing critical ecosystem elements, and monitoring the effectiveness of management interventions.

Aquatic protected areas are particularly vulnerable to impacts from activities outside their

boundaries, usually upstream (e.g., water flow, water quality, regional and national land use and water policies) but also downstream (e.g., population fragmentation and interference with spawning migrations of fish prey caused by dams and other water-regulation structures). Given the flowing nature of rivers, the effectiveness of a protected area in a river segment is likely to depend to a large extent on large-scale environmental management at the national and often international level. Indeed, the long-term viability of freshwater cetacean populations ultimately depends on wise management of entire ecosystems and watersheds. Watershed management, especially in upstream areas, is essential for limiting sedimentation from agriculture, forestry, and land conversion, avoiding excessive water removal and dramatic changes in flow regimes, maintaining essential geomorphic features in cetacean habitats, and controlling effluents and chemical pollution from agriculture, industry, industrial transport, and human settlements.

Review of Conservation Status: A 2005 workshop in Phnom Penh, Cambodia, focused specifically on freshwater populations of Irrawaddy dolphins. The results emphasized that protected areas and core conservation zones within the ranges of freshwater cetaceans will play an important role in their conservation. Participants concluded that the design of these areas must be based on sound biological knowledge of the populations they are intended to protect, and stressed the need for strong and appropriate management structures to realize intended conservation benefits (Smith et al. 2007).

In October 2009 the Marine Mammal Commission helped sponsor a workshop on Establishing Protected Areas for Asian Freshwater Cetaceans. The workshop took place in Samarinda, East Kalimantan, Indonesia, and provided an opportunity for exchange of knowledge and experience related to freshwater cetaceans in established or planned protected areas in Asian rivers. The focus was on seven Asian countries: Indonesia, China, Cambodia, Bangladesh, Myanmar, India, and Pakistan. The workshop was attended by about 115 local and international participants from governments, non-governmental organizations, and academic institutions.

Workshop participants reported on the status of Asian freshwater populations, summarized as follows.

- After inhabiting China’s Yangtze River for an estimated 20 million years, the baiji, or Yangtze River dolphin, *Lipotes vexillifer*, appears to have been driven to extinction within the past few decades by the impacts of human activities (Turvey et al. 2007).
- The Yangtze River finless porpoise, *Neophocaena asiaorientalis*, also is endangered with an estimated population of about 1,800 (Zhao et al. 2008).
- The Ganges River dolphin, or susu, *Platanista gangetica gangetica*, is listed as endangered, numbers in the thousands, and is found in Bangladesh, India, and Nepal in the Ganges/Brahmaputra/Megna and Karnaphuli/Sangu river systems and in the Sundarbans delta (Smith et al. 2004).
- The Indus River dolphin, or bhulan, *Platanista gangetica minor*, listed as endangered, is found primarily in the Indus River of Pakistan (numbering perhaps 1,500 to 2,000 according to a 2006 survey) with a small subpopulation of a few individuals persisting in the Beas River in Punjab, India (Behera et al. 2008).
- The Irrawaddy dolphin, *Orcaella brevirostris*, is a coastal marine, estuarine, and freshwater species with very small populations in three major Asian river systems, the Mahakam of Indonesia (2007 estimate of 87 individuals with a 95 percent confidence interval of 75 to 105), the Ayeyarwady of Myanmar (72 individuals counted in 2004, 32 in 2007–2008, and 56 in 2008–2009), and the Mekong of Cambodia and

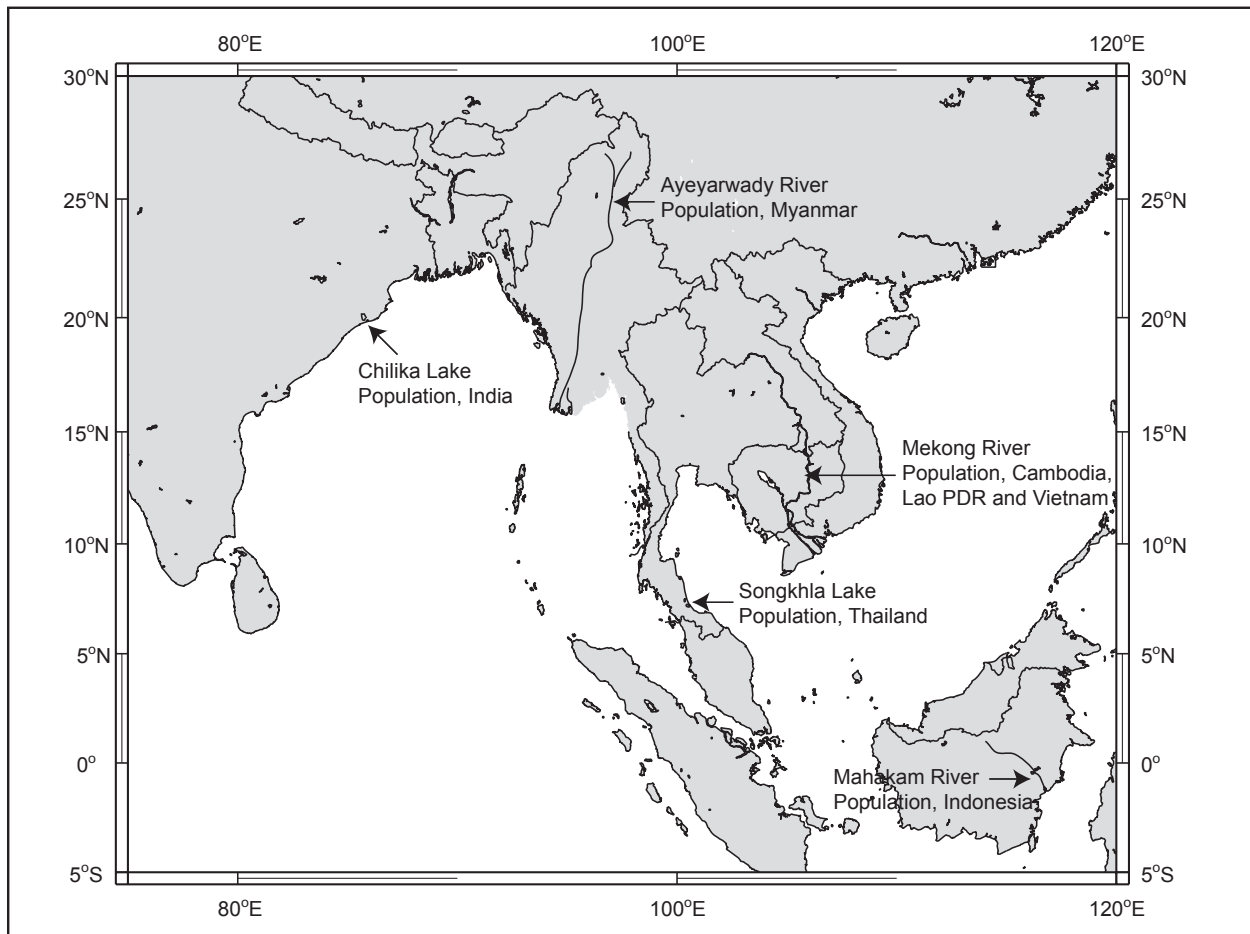


Figure V-11. The map of Irrawaddy dolphin distribution.

Lao People's Democratic Republic (2007 estimate of 71 individuals with a 95 percent confidence interval of 66 to 86) (Figure V-11). All freshwater populations of Irrawaddy dolphins are listed as critically endangered by the IUCN. Additional isolated populations inhabit the brackish waters of Chilika Lagoon, eastern India (2006, 109–112 individuals), and Songkhla Lake, eastern Thailand (no recent estimate but probably only a few left) (Figure V-12).

The Samarinda workshop was the latest in a series of international meetings on freshwater cetaceans that began with a workshop in Wuhan, China, in 1986 to consider the so-called platanistoid river dolphins (*Platanista* and *Lipotes* as well as the Ama-



Figure V-12. A 74-km stretch of the Ayeyarwady River in Myanmar has been designated as a protected area to safeguard a unique culture of cooperative fishing between Irrawaddy dolphins and cast-net fishermen. Destructive fishing using electric shock, gillnets, dynamite, and poison is the main threat to these freshwater dolphins. (Photo courtesy of Wildlife Conservation Society Myanmar Program)

zon dolphin or boto, *Inia geoffrensis*, and the franciscana, *Pontoporia blainvillei*) (Perrin et al. 1989). Numerous recommendations concerning research and conservation of Asian river dolphins and Yangtze finless porpoises have been made since 1986, including several referring to the need for more effective protected areas. For example, at its second meeting in 1997 in Rajendrapur, Bangladesh, the Asian River Dolphin Committee developed guidelines for the management of such protected areas (Smith and Reeves 2000). Those guidelines still appear relevant and can be summarized as follows:

- Encourage local people to participate in planning and management;
- Ensure that any exploitation of aquatic and riparian resources is sustainable and benefits local people;
- Prohibit and enforce regulations restricting the use of non-selective fishing methods, including gillnets, rolling hooks, explosives, poisons, and electricity;
- Implement environmental education programs, highlighting aquatic species and explaining the rationale for having the protected area;
- Ensure enforcement of laws and regulations protecting the cetaceans (and other fauna) for which the protected area was created;
- Monitor water quality and enforce legal standards; and
- Control the use of motorized vessels, even for enforcement and monitoring activities, as they can be hazardous for cetaceans and other aquatic fauna.

The Samarinda workshop was designed to (1) evaluate progress made toward implementing the recommendations of previous workshops, (2) update the recommendations in light of new experience and knowledge, and (3) strengthen efforts for providing meaningful protection to Asian freshwater cetaceans and their habitat. The workshop report had not been completed by the end of 2009.

Indian Ocean Cetacean Symposium

In July 2009 the Republic of Maldives hosted an Indian Ocean Cetacean Symposium to review research, management, and conservation efforts for cetaceans in the Indian Ocean. The symposium

marked the 30th anniversary of the declaration of the Indian Ocean Sanctuary by the International Whaling Commission in 1979. Initially the sanctuary was established for 10 years, but it was subsequently extended twice. It includes the entirety of the Indian Ocean south to 55° S latitude and prohibits commercial whaling of large whales, including both common and Antarctic minke whales.

At the symposium, 60 scientists and conservationists reported on pelagic and coastal cetacean populations in the Indian Ocean. They described cetacean population structure, distribution, and conservation status and discussed recommendations for increasing the scientific, management, and governmental attention to the conservation of cetaceans in the Indian Ocean.

Blue and Humpback Whales: Presentations on large whales focused primarily on blue whale and humpback whale populations, which were seriously diminished by illegal catches by Soviet whalers in the Indian Ocean, especially during the 1960s

(Mikhalev 1997, 2000). Several speakers reported on blue whale populations in various regions of the Indian Ocean (Figure V-13). The species is found year-round off India and Sri Lanka. In addition, whaling records and scientific observations have documented a small but distinct population in the northern Indian Ocean (*B. m. indica*) between the Arabian Sea and the coasts of Sri Lanka and India (Mikhalev 2000). This population has a restricted range and breeds six months out of phase with populations farther south. Pygmy blue whales (*B. m. breviceauda*) occur in the southern Indian Ocean. Mikhalev (2000) reported that Soviet fleets illegally took 1,294 blue whales during 1963–1966 in the northern and central Indian Ocean, mainly off the Seychelles and the Maldives, in the Gulf of Aden, and west of southern India and Sri Lanka.

Farther east in the southeastern Indian Ocean, scientists used satellite-linked instruments to tag blue whales and track their fall migration from waters off southwestern Australia northward to the deep inter-island channels in the Indonesian Archipelago, through the Savu Sea, and into the Banda Sea. The whales passed through Indonesia’s recently declared Savu Sea National Marine Park and the Alor District Marine Protected Area and into the center of the area of high marine biodiversity known as the Coral Triangle. The Alor District Marine Protected Area was established, in part, to protect blue whales and the 16 other cetacean species that occur in these near-shore but deep sea passages. All of these observations suggest considerable population structure for blue whales in the Indian Ocean. Further investigation of that structure using genetic analysis will undoubtedly have important implications for the conservation of blue whales in the ocean basin.

Humpback whales in the Indian Ocean also exhibit considerable population structure. At least three populations migrate from the southwestern Indian Ocean (off Madagascar, the Comoros Islands, and Mozambique) to Antarctica to feed, and a small fourth population occurs year-round in the Arabian Sea. Genetic studies indicate a relatively high degree of mixing among the first three populations but little to no mixing with the fourth (Pomilla et al. 2006, Rosenbaum et al. 2006). DNA evidence suggests that the Arabian Sea population diverged from the other



Figure V-13. Both large and small cetaceans are found in the Indian Ocean, including the blue whale, *above*, and spinner dolphin, *below*. (Photos courtesy of R. Charles Anderson)



three populations about 57,000 years ago. Despite their Southern Hemisphere origins, Arabian Sea humpbacks live north of the equator and follow a Northern Hemisphere breeding cycle. Illegal Soviet whaling took 238 humpbacks in the Arabian Sea in November 1966 (Mikhalev 1997), and the current abundance estimate of this population (82 with a 95 percent confidence interval of 60 to 111), as determined by photographic mark-recapture studies, led the International Union for Conservation of Nature (IUCN) to list it as endangered in 2008 (Minton et al. 2008). At present, the primary threat to humpback whales in the Arabian Sea is entanglement in fishing gear. Scarring indicative of entanglement was observed on 30 to 40 percent of living whales encountered off Oman, and nine entangled live whales were documented between 2000 and 2009. Eight of those entangled whales were successfully disentangled.

Small Cetaceans, Bycatch, Exploitation, and Tourism: Small cetaceans in the Indian Ocean face a variety of human-related threats, including bycatch, intentional catch, and habitat degradation. Presentations at the symposium focused on coastal dolphin species, including bottlenose dolphins (*Tursiops aduncus* and *Tursiops truncatus*), spinner dolphins (*Stenella longirostris*) (Figure V-11), and two putative species of humpback dolphin (*Sousa plumbea* and *Sousa chinensis*).

Gillnets are the primary cause of bycatch of coastal dolphins, and some level of bycatch occurs in virtually all countries bordering the Indian Ocean. Participants from Tanzania, Pakistan, Madagascar, India, Sri Lanka, Bangladesh, Thailand, South Africa, Mozambique, and Myanmar described gillnet bycatch in their waters. For example, gillnets in the coastal waters off India incidentally take 19 cetacean species. However, gillnets are not the only source of bycatch, and in South Africa shark nets deployed to protect swimmers also take coastal dolphins. The Maldives is the only country in this region where bycatch is not reported as a problem. There authorities have banned most forms of fishing with nets, including gillnets and purse seines, and tuna are caught using traditional pole and line gear.

Cetaceans also are taken intentionally in many parts of the Indian Ocean region. Nets, harpoons,

and drive fisheries are used to obtain meat for use as bait, human consumption, and other purposes. Pakistanis, for example, hunt humpback dolphins, use their oil to coat their boats, and hang fins and flukes cut off captured dolphins on their vessels as good luck charms and to signify the prowess of the captain. A study in southwestern Madagascar documented an extensive drive fishery for small dolphins, including spinner, bottlenose, and humpback dolphins. Direct taking of spinner dolphins and other small cetaceans with hand harpoons became common in Sri Lanka after bycatch led to a demand for dolphin meat. The workshop issued a strong call for all fishing nations to reduce both bycatch and directed catch of Indian Ocean cetaceans to the lowest levels possible.

In several Indian Ocean countries, local or international non-governmental organizations (principally the latter) have initiated programs to collect local knowledge of cetaceans and fishing practices, build awareness within fishing communities of cetaceans and the threats facing them, and encourage action to reduce bycatch and make fisheries sustainable. Because many local communities depend on fishery resources, fishermen are key to addressing fishing-related threats to cetaceans.

Tourism operators have initiated or established whale- or dolphin-watching enterprises in several countries. Workshop participants agreed that such programs generally can benefit cetacean conservation through increased public awareness of the animals and a realization of their potential economic value. However, development of guidelines and regulations is important to ensure that such ventures do not disturb or drive away the very animals tourists are paying to watch. Participants from Mauritius described an ongoing study to determine if the presence of a dolphin-watching operation in three coastal bays is reducing the use of those bays by resting spinner dolphins.

Conservation Authorities and Commitments: Workshop participants also discussed the international agreements that commit Indian Ocean governments to conserve marine mammals and marine biodiversity. As mentioned previously, the Indian Ocean Sanctuary established by the International Whaling Commission applies only to the large whales. That commission's scientific and conserva-

tion committees discuss small cetaceans, including those in the Indian Ocean, but the role of the IWC in conserving small cetaceans is not clear. The countries bordering the Indian Ocean have made commitments under the United Nations Convention on the Law of the Sea, Compliance Agreements, the United Nations Food and Agriculture Organization's Code of Conduct on Responsible Fishing, and the United Nations Highly Migratory and Straddling Stocks Agreement to conserve highly migratory species (a category that includes most cetaceans) and to manage fisheries for prey species in such a manner as not to impede the biological productivity of dependent species. Those countries also can promote cetacean conservation by implementing the Convention on the Conservation of Migratory Species of Wild Animals and fostering regional agreements to that end. All Indian Ocean nations are parties to the Convention on Biological Diversity, which in 2002 committed to a significant reduction in the rate of biodiversity loss at the global, regional, and national levels by 2010.

Finally, workshop participants adopted the Lankafinolu (Maldives) Declaration, which, among other things, calls for the IWC to ensure the continuation of the Indian Ocean Sanctuary in perpetuity, stresses the importance of improved education and awareness for the conservation of cetaceans and sustainable use of marine ecosystems, and encourages all fishing nations that have bycatch and directed catch of Indian Ocean cetaceans to determine the scale of those catches and to reduce them to minimal levels. The declaration further urges companies using seismic surveys for offshore oil and gas exploration and production (and the countries in which they operate) to adopt international best practices to minimize the impact on cetaceans, and supports the wider adoption of responsible whale- and dolphin-watching guidelines and regulations for the long-term benefit of both cetaceans and humans. The declaration calls for nations to meet their international commitments and encourages Indian Ocean countries, in collaboration with the IWC and other relevant organizations, to develop an agreed action plan to improve conservation outcomes for cetaceans in the Indian Ocean Sanctuary.

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Chapter VI

THE CHANGING ARCTIC

The polar regions, the Arctic and Antarctic, may be changing more rapidly than any other place on earth. Sea ice is a dominant feature of both regions, and climate disruption is causing profound changes in the seasonal formation and breakup of the ice. The changes are in part a function of “polar amplification.” The sun disproportionately heats the tropical regions of the earth, but oceanographic and atmospheric currents transport that heat toward the poles. Climate disruption is adding to that heating effect by diminishing the amount of polar ice, which reflects a portion of the sun’s energy back into space. As the ice recedes, more of the sun’s energy is being absorbed into the Arctic and Antarctic environments, leading to further warming.

The Arctic Research and Policy Act of 1984 defines the Arctic to include “all United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering and Chukchi Seas; and the Aleutian chain.” It therefore includes multiple ecosystems ranging from those considered relatively simple, such as those within the Arctic Ocean, to those that are substantially more complex, such as the Bering Sea. Seven marine mammal species occur almost exclusively in Arctic regions, including the polar bear (*Ursus maritimus*), walrus (*Odobenus rosmarus*), bowhead whale (*Balaena mysticetus*), beluga whale (*Delphinapterus leucas*), narwhal (*Monodon monocerus*), ringed seal (*Pusa hispida*), and bearded seal (*Erignathus barbatus*). A substantial number of other marine mammals migrate seasonally to the Arctic or include the Arctic as part of their range, including the gray whale (*Eschrichtius robustus*), humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), common minke whale (*Balaenoptera acutorostrata*), North Pacific right whale (*Eubalaena japonica*), killer whale (*Orcinus orca*), Dall’s porpoise (*Phocoenoides dalli*), Steller sea lion (*Eumetopias jubatus*), northern

fur seals (*Callorhinus ursinus*), spotted seal (*Phoca largha*), harbor seal (*Phoca vitulina*), harp seal (*Pagophilus groenlandica*), hooded seal (*Cystophora cristata*), ribbon seal (*Histiophoca fasciata*), and sea otter (*Enhydra lutris*). Some Arctic marine mammal species have been studied intensely and are relatively well understood (e.g., bowhead whales), whereas others have been the subject of relatively little study and are poorly understood (e.g., ribbon seals).

Some marine mammals may benefit from the changes that occur with climate disruption. For example, the loss of ice may increase foraging opportunities for gray whales. However, other marine mammals use ice as a resting platform, for giving birth, as foraging habitat, and as a refuge from predators, and they may not be able to adapt to the loss of ice. For those marine mammals, overall effects may range from relatively minor to extirpation throughout large portions of their range. Indeed, some marine mammals may be at risk of extinction from the physical and biological changes likely to occur in the Arctic environment in the foreseeable future.

The risks to Arctic marine mammals from climate disruption will be exacerbated by increasing human use as the region becomes more accessible and more suitable for human activities. Those changes

will include increased commercial shipping, commercial fishing, oil and gas exploration and development, development of other natural resources, tourism, military activities, and coastal development. Those activities pose a number of risks, including habitat degradation and loss, ship strikes, operational and ecological fishery interactions, contamination, noise, and direct taking.

Disruption of the Arctic climate also will have profound effects on Alaska Natives who live along the northern and western coasts of Alaska and depend on a subsistence-based culture that has sustained them for thousands of years. They may be affected directly by changes in the physical conditions (e.g., the loss of ice makes it more difficult and dangerous to hunt marine mammals for subsistence), biological conditions (e.g., declines in marine mammal populations or shifts in their distribution may make them less available to hunters), and social conditions (e.g., increasing development of oil and gas, fishing, shipping, or other industrial activities may outweigh Alaska Native concerns as they attempt to maintain their subsistence cultures).

In recent years the pace of development in the Arctic has quickened, and every indication is that it will continue to do so. This chapter provides a brief

review of recent activities in the Arctic pertaining to oil and gas exploration and development, commercial shipping and fishing, and efforts to develop strategies to monitor the status of Arctic marine mammals as their environment changes.

Arctic Oil and Gas

The Outer Continental Shelf Lands Act of 1953 establishes the statutory framework for management of oil and gas exploration and development in U.S. marine waters. Section 18 of the Act directs the Secretary of the Interior to prepare, periodically revise, and maintain an oil and gas leasing program for that purpose. The Secretary is to “select the timing and location of leasing, to the maximum extent practicable, so as to obtain a proper balance between the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone.” The leasing program involves several stages, including the development of a five-year program plan as well as planning for specific lease sales. The Minerals Management Service is required to conduct environmental reviews at each stage of the leasing process, providing an opportunity for public review and comment (Figure VI-1).

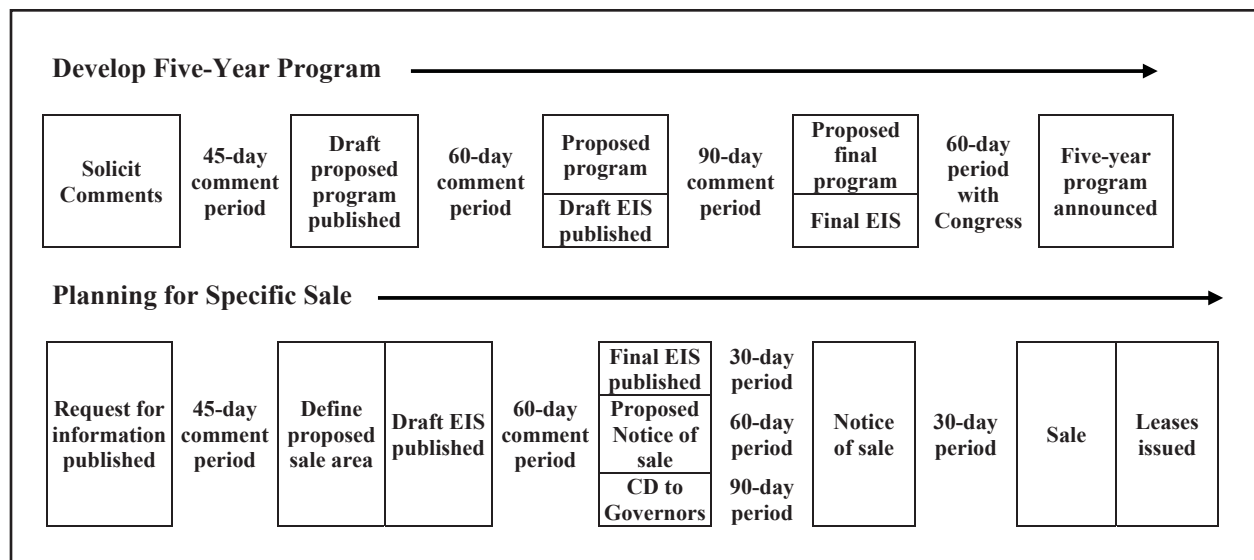


Figure VI-1. Outer continental shelf leasing process; CD = consistency determination, EIS = environmental impact statement. (Source: Bureau of Ocean Energy, Management, Regulation, and Enforcement; http://boemre.gov/5-year/PDFs/LeasingProcessSteps_Diagram0209.pdf)

The 2007–2012 Leasing Program in the Arctic

In the late 1960s the Department of the Interior's Minerals Management Service began issuing permits to conduct geophysical surveys for oil and gas under the Beaufort and Chukchi Seas. By 2009 the oil and gas industry had obtained a total of 675 active leases in the Alaska region, 487 of which were in the Chukchi Sea and 186 in the Beaufort Sea. The remaining two sites were in Cook Inlet (Minerals Management Service 2009). Active leases are essentially contracts between the government and industry for specific lease sites that are in some stage of exploration, development, production, or decommissioning.

At the beginning of 2008 the Minerals Management Service was starting its second year of the 2007–2012 leasing program, and oil and gas production was a matter of great concern because of increasing fuel and environmental costs from burning fossil fuels (i.e., climate disruption). The price of a gallon of gasoline (all grades combined) rose from a monthly average of about \$1.00 in 1999 to \$4.11 in July of 2008. It then dropped precipitously to \$1.75 by December 2008 (http://tonto.eia.doe.gov/dnav/pet/hist/mg_tt_usw.htm), creating a highly variable environment for energy planning. Nevertheless, the overall trend in oil and gas prices was the impetus for new energy-related initiatives, including exploration for new oil and gas reserves and greater consideration of renewable energy sources.

In 2008 Alaska accounted for about 15 percent of all offshore oil and gas production. The Minerals Management Service has divided the outer continental shelf around Alaska into 15 planning areas (Figure VI-2). The Service planned six lease sales in the U.S. Arctic as part of the 2007–2012 leasing program, including sales 193, 212, and 221 in the Chukchi Sea, 209 and 217 in the Beaufort Sea, and 214 in the North Aleutian Basin (southeast

Bering Sea). On 6 February 2008 the Service completed sale 193 in the Chukchi Sea. The Service anticipated that the sale would lead to survey efforts in the Chukchi region through 2010, with exploratory drilling to commence in 2011 or later.

On 8 April 2008 the Service published a notice of intent to prepare an environmental impact statement for sale 214 in the North Aleutian Basin (73 Fed. Reg. 19095) and sought comments on the sale. The Marine Mammal Commission responded on 7 July 2008, noting that, although it did not usually comment on notices of intent, it would do so in this case because of the area's biological richness (including marine mammals, fishes, and seabirds), the large-scale fishing operations that occur in or adjacent to the area, and the extensive use of marine resources in the surrounding area for subsistence purposes. The Commission emphasized that the environmental impact statement would need to include a description of (1) the biological and ecological richness and potential vulnerability of the southeastern Bering Sea ecosystem; (2) the harsh physical conditions, which would pose significant challenges to the construction and maintenance of oil platforms, vessels, and pipelines; (3) the expected increase in other

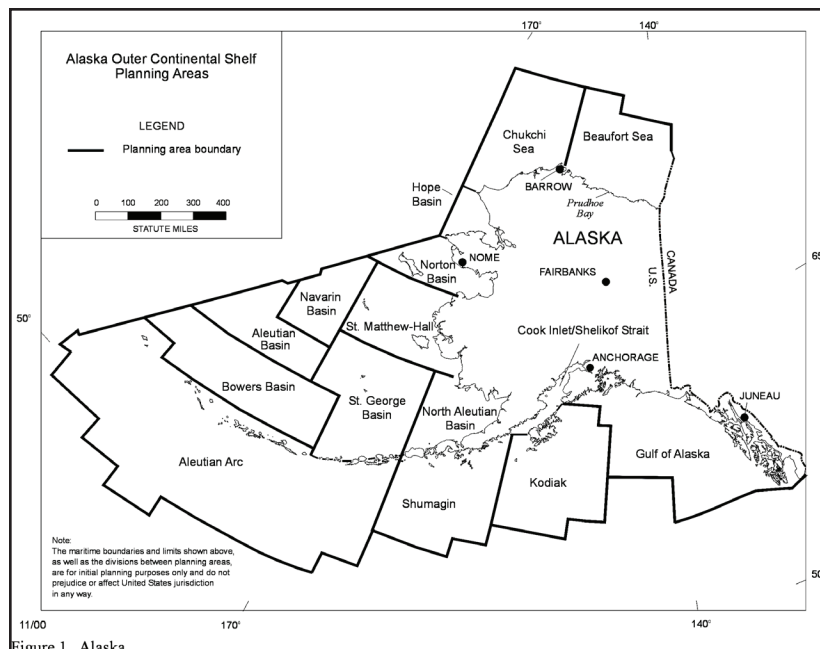


Figure 1. Alaska

Figure VI-2. Alaska's continental shelf is divided into 15 planning areas for purpose of offshore oil and gas lease sales. (Source: Bureau of Ocean Energy Management, Regulation, and Enforcement)

human activity in that region (e.g., commercial shipping with the opening of Arctic sea lanes); (4) the risk factors associated with oil and gas development in the marine environment; (5) the compounding effects of climate disruption in this region; and (6) the cumulative effects of all of these factors.

In addition, in June and July 2008 the Marine Mammal Commission sent four letters to the National Marine Fisheries Service regarding incidental harassment authorizations for oil exploration and development projects off Alaska's North Slope. The Commission's recommendations included implementing more robust mitigation and monitoring measures, evaluating the effectiveness of those measures, halting activities if a marine mammal is seriously injured or killed and the injury or death could be attributed to proposed activities, and assessing the cumulative effects of these activities.

With regard to the last point, the Commission has on numerous occasions recommended to the National Marine Fisheries Service, Fish and Wildlife Service, and Minerals Management Service that those agencies work with the oil and gas industry to develop comprehensive assessment and monitoring programs that will provide a better basis for detecting long-term, cumulative effects from increasing oil and gas activity. Indeed, this is an ongoing process, and the Services and industry have sought to improve their monitoring efforts. In 2006 the Minerals Management Service completed a review of the effects of seismic activities on marine mammals. That review led to a permitting process and a marine mammal observing and reporting program that is overseen jointly by the Minerals Management Service and the National Marine Fisheries Service. In addition, on 7 February 2007 the Minerals Management Service issued a Notice to Lessors and Operators <http://www.gomr.boemre.gov/homepg/regulate/regs/ntls/2007NTLs/07-g02.pdf> stipulating monitoring and mitigation requirements for seismic survey (airgun) operations. Those requirements include measures such as posting observers to detect marine mammals visually, ramping up sound sources at the onset of a survey and after periods when airguns have been off, and shutdown criteria when near marine mammals. The oil and gas industry also has made important efforts to monitor their impacts,

for example, at the Northstar production site off the North Slope of Alaska. However, the efficacy of these measures is questionable, and the Commission has called repeatedly for performance studies to determine their effectiveness. In addition, most of the mitigation and monitoring efforts to date are aimed largely at detecting and minimizing direct, short-term interactions with marine mammals, and further efforts are needed to address indirect, long-term effects that may accrue from multiple surveys (e.g., abandonment of habitat).

The 2010–2015 Leasing Program

In 2008 President Bush responded to the energy crisis by removing the moratorium on offshore oil and gas exploration. That action made available areas not incorporated into the 2007–2012 leasing program. With that in mind, on 1 August 2008 the Minerals Management Service issued a notice of intent to prepare a new five-year lease plan spanning the period from 2010 to 2015 and covering the entire U.S. outer continental shelf (73 Fed. Reg. 45065). The Service indicated that the new plan would be part of the federal government's actions to address the domestic energy situation and that it was necessary because of energy demands and because oil would remain the primary fuel for transportation for decades to come "even with aggressive efforts and government policies to encourage the development of alternative fuels, more efficient engines, and increasingly effective conservation measures." The Service therefore sought comments on the development of a new five-year leasing program.

The Commission responded on 15 September 2008, recommending that the Service work with the Department of Energy to initiate a new five-year oil and gas leasing program to supersede the current program and conduct the environmental analyses needed to guide the public and decision-makers regarding the new program, including—

- a projection of the country's long-term energy needs based on expected population growth and economic expansion;
- a description of all existing and potential sources of energy and trends in the development of those sources;

- alternative approaches for meeting projected needs, including conservation, and the potential environmental impacts associated with those alternatives; and
- a significant large-scale program aimed at reducing per capita energy demand, achieving greater efficiency in ongoing energy use, developing alternative energy sources, and reducing greenhouse gas production.

The Commission also recommended in the same letter that the Service establish buffer zones prohibiting oil and gas activity around sensitive areas and develop a set of standards for information to be obtained before initiation of new energy-related operations, in consultation with the National Marine Fisheries Service, the Fish and Wildlife Service, and the Commission. Standards should address baseline information needed to assess the environmental effects of oil and gas development, particularly cumulative effects, and the implementation of effective mitigation measures. The Service should ensure that these information standards are met before new energy-related operations are initiated in the Arctic or elsewhere.

To support its recommendations, the Commission noted that the United States has faced an impending energy crisis for decades but neither has responded with adequate foresight and commitment to address the crisis in its earlier stages nor shown the foresight to reduce our national dependence on hydrocarbons and minimize the production of greenhouse gases. The Commission pointed out that records of the production and use of oil and gas since the enactment of the Outer Continental Shelf Lands Act in 1953 can be used to characterize historical patterns in oil and gas production and use, as do similar records for other energy sources. Those historical records, combined with anticipated population and economic growth, should be sufficient to project future patterns and potential consequences of continuing with a “business as usual” approach. The Commission stated that a thoughtful and farsighted plan is needed to move the nation beyond efforts simply to find the next oil field. If left unchanged, the current course would have a number of undesirable consequences, including the acceleration of

climate disruption and its multitude of adverse effects.

On 16 January 2009 the Minerals Management Service issued a Draft Proposed 5-Year Outer Continental Shelf Oil and Gas Leasing Program for 2010–2015. Again, the purpose of the new program was to consider and implement adjustments deemed necessary to respond to the energy crisis. The Service sought comments on the draft plan and four specific questions, paraphrased as follows.

- Should the plan include buffer zones (i.e., areas where certain activities are prohibited or restricted)? If so, how large should they be? What criteria should be used for determining them (e.g., visual impacts, infrastructure)? Should they be uniform in all new areas or vary by area according to issues of concern and/or technical constraints?
- Should the plan exclude specific areas/subareas because they are particularly sensitive or because oil and gas activities may conflict significantly, in area, with other uses for which the area/subarea might be better suited (e.g., alternative energy)?
- What policies and programs should the Minerals Management Service, Congress, and the Administration consider relative to outer continental shelf revenue sharing?
- For those areas proposed for leasing consideration in the Southern California Planning Area, when deciding the next steps in the five-year program preparation, should the Minerals Management Service include a requirement for mandatory unitization to potentially limit the number of structures in one or more of these areas?

The Obama Administration began on 20 January 2009 and on 10 February the new Secretary of the Interior announced that he would extend the comment period for the 2010–2015 draft proposed program by 180 days.

On 30 March 2009 the Marine Mammal Commission submitted comments on the Minerals Management Service’s draft Environmental Impact Statement for Beaufort Sea and Chukchi Sea Planning Areas Oil and Gas Lease Sales 209, 212, 217, and 221 (73 Fed. Reg. 77835). The Commission rec-

ommended that the Service revise its impact statement by—

- adding an alternative that contrasts the potential costs and benefits of coastal and offshore development and defers development in the entire coastal region under consideration;
- providing a comprehensive description of the key risks associated with oil and gas development under Arctic marine conditions, the measures required to address those risks, the efficacy of existing measures, and means for improving those measures when they do not meet their objective;
- describing the frequency and proprietary nature of the seismic studies conducted over the continental shelf areas of the Beaufort and Chukchi Seas and evaluating whether the frequency and intensity of such studies could be reduced by making results available to all oil companies or developing other mechanisms to reduce their frequency and intensity while still meeting the companies' needs for seismic information;
- including an indepth review of the pertinent literature to ensure inclusion of all salient reports pertaining to the species or species groups that may be affected;
- providing a more comprehensive and quantitative assessment of cumulative effects taking into account the limitations of the proposed mitigation measures; and
- expanding its tables of impact to include worst-case scenarios, the probability of their occurrence, and the potential consequences should they occur.

On 17 April 2009 the U.S. Court of Appeals for the D.C. Circuit ruled on two lawsuits regarding the 2007–2012 leasing program, which was still in effect as the Service was considering its new 2010–2015 program. In separate suits, the Center for Biological Diversity and the Native Village of Point Hope, Alaska Wilderness League, and Pacific Environment sued the Service in 2007, arguing that the environmental review conducted for the 2007–2012 leasing program had not fully considered the environmental sensitivity and productivity of the outer continental shelf and had limited its sensitivity assessment to

effects of oil spills along the shoreline. The lawsuits were consolidated, and in its 2009 ruling the court vacated and remanded the 2007–2012 leasing program, directing the Secretary of the Interior to revise the agency's environmental sensitivity analysis to include offshore areas. In July 2009 the court clarified that the remand pertained only to the Beaufort, Chukchi, and Bering (North Aleutian Basin) Seas and not other planning areas identified in the 2007–2012 leasing plan, such as the Gulf of Mexico. As of the end of 2009 the Department of the Interior was still conducting its analysis.

On 15 September 2009 the Marine Mammal Commission responded to the Minerals Management Service's proposed rule and a request for comments regarding the use of safety and environmental management systems for all outer continental shelf oil and gas operations (74 Fed. Reg. 28639), including the Arctic. Safety and environmental management systems are a common means of analyzing hazards, training personnel, establishing operational procedures and safe work practices, developing emergency response plans, investigating accidents, changing equipment and procedures after an accident, and auditing and recordkeeping. They are used to promote safe and environmentally sound operations in a variety of industries and federal, state, and local governments. For the oil and gas industry, these systems often are based on the American Petroleum Institute's Recommended Practice for Development of a Safety and Environmental Management Program for Offshore Operations and Facilities. The Commission recommended that the Service proceed with its plan to require safety and environmental management systems for all oil and gas operations on the outer continental shelf. Such systems are particularly important in the Arctic, where responses are limited by harsh environmental conditions and accidents would threaten the subsistence cultures of coastal Alaska Native communities. At the end of 2009 the Service had not yet acted on the Commission's recommendation.

On 21 September 2009 the Marine Mammal Commission responded to the Minerals Management Service's Request for Comments on the Draft Proposed Five-Year Outer Continental Shelf Oil and Gas Leasing Program for 2010–2015, and Notice of

Intent to Prepare an Environmental Impact Statement for the Proposed Five-Year Program (74 Fed. Reg. 3631). The Commission recommended that the Service—

- establish buffer zones prohibiting oil and gas production on and around sensitive areas based on existing local, state, and federal marine protected areas, national monuments, essential fish habitats, designated critical habitats for rare, depleted, endangered, or otherwise protected species, and biological “hotspots” or areas of particular biological richness;
 - base buffer zones or areas given special protection using a set of minimal considerations;
 - review the inventory of marine protected areas found on the Web site of the Department of Commerce’s National Marine Protected Areas Center (<http://mpa.gov/>) as one source of information regarding sites that may warrant special protection and work closely with the National Marine Fisheries Service and Fish and Wildlife Service to take advantage of their expertise in identifying areas that may warrant special protection;
 - work with the Department of Energy to integrate its new five-year oil and gas leasing plan into a long-term energy conservation plan. The integrated version should include (a) a projection of the country’s long-term energy needs based on expected population growth and economic expansion; (b) a description of all existing and potential sources of energy and trends in the development of those sources; (c) alternative approaches for meeting projected needs, including conservation, and the potential environmental impacts associated with those alternatives; and (d) a significant large-scale program aimed at reducing per capita energy demand, achieving greater efficiency in ongoing energy use, developing alternate energy sources, and reducing greenhouse gas production; and
 - in consultation with the National Marine Fisheries Service, Fish and Wildlife Service, and Marine Mammal Commission, develop a set of standards for information to be obtained before the initiation of new energy-related operations.
- The Commission also suggested the following criteria for establishing buffer zones or zones of special protection:
- the location of proposed oil and gas operations and interdependent and interrelated activities (e.g., platforms, pipelines, seismic studies, vessel and aircraft traffic, support infrastructure);
 - the area vulnerable to potential “downstream” effects of an accident based on coastal features, depth, winds, tides, currents, storms, and other physical features of the environment (i.e., spilled oil may be dispersed by winds, waves, or currents and affect areas far removed from drilling sites or pipelines);
 - any particularly vulnerable habitat that occurs in the identified sensitive areas and that requires special protection;
 - any particularly vulnerable species that occur in the identified sensitive areas and that require special protection;
 - the capacity of the responsible companies and agencies to respond to all potential hazards, such as platform blowouts, pipeline leaks or ruptures, and vessel accidents (i.e., operations should not be planned in the absence of suitable response capability) in the conditions that occur in the proposed areas (e.g., marine areas that are covered with ice in winter);
 - the availability of baseline information for the proposed areas of operation (i.e., operations should not be considered for such areas until suitable baseline information has been collected on the important biological features);
 - the potential environmental consequences of an accident (e.g., the complete or partial loss of a protected biological resource) and the environment’s capacity for restoring itself; and
 - the potential economic consequences if the environment is unable to provide essential services (e.g., habitat to support the biological community of the affected ecosystem, clean water, subsistence, recreation, fisheries).
- At the end of 2009 the Commission remained concerned about oil and gas development in the Arctic and the potential effect on marine mammals, marine ecosystems, and the Alaska Native commu-

nities that depend on Arctic marine ecosystems for subsistence purposes.

Arctic Marine Shipping Assessment

The 2009 Arctic Marine Shipping Assessment considered current and future Arctic marine activity with a focus on marine safety and environmental protection (<http://pame.is/amsa/amsa-2009-report>; Arctic Council 2009). The assessment was conducted by the Arctic Council’s Protection of the Arctic Marine Environment working group during the five-year period. The Arctic Council, which is a high-level intergovernmental forum to promote coordination and cooperation among the Arctic states, decided to conduct the assessment following the 2004 release of its Arctic Climate Ice Assessment and Arctic Marine Strategic Plan. The former reported on the

rapid and severe climate disruption ongoing in the Arctic and found that “reduced sea ice is very likely to increase marine transport and access to resources” in the Arctic. The latter presented the Council’s strategic goals for protecting the Arctic marine environment and called specifically for a comprehensive assessment of marine shipping and generally for an ecosystem-based approach to Arctic management.

The shipping assessment focuses on the presence and use of vessels in the Arctic Ocean, their potential impact on humans and the Arctic marine environment, and their requirements for support (see Figure VI-3). It also considers the future of Arctic navigation, indigenous marine use, Arctic marine incidents, environmental impacts, marine infrastructure, Arctic marine technology, and the future of the northern sea route and adjacent seas. In addition, it includes a comprehensive survey of the number of ships that

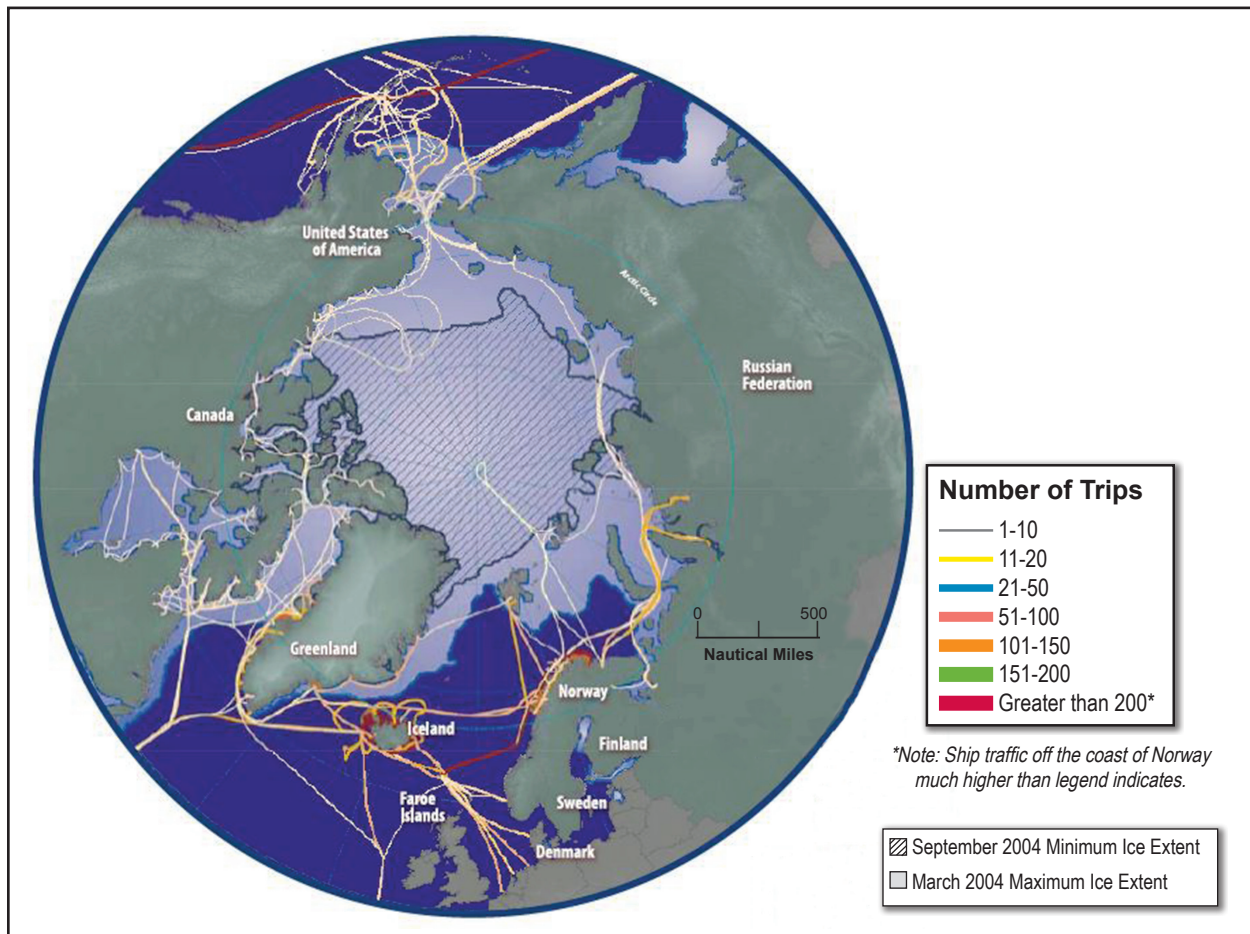


Figure VI-3. Shipping traffic in the Arctic during the Arctic Marine Assessment survey year 2004. (Courtesy of Arctic Council, Protection of the Arctic Marine Environment Working Group)

Arctic Marine Shipping Assessment: Environmental Considerations and Impacts

- (1) From an environmental point of view, Arctic shipping poses a threat to the region's unique ecosystems. This threat can be effectively mitigated through careful planning and effective regulation in areas of high risk.
- (2) Release of oil into the Arctic marine environment, either through accidental release or illegal discharge, is the most significant threat from shipping activity.
- (3) Ship strikes of whales and other marine mammals are of concern in areas where shipping routes coincide with seasonal migration and areas of aggregation.
- (4) The introduction of invasive species into the Arctic marine environment from shipping can occur and the risk may be enhanced due to changing climate, possibly making conditions more favorable to some species. The most risk exists where a transfer of organisms from ecosystems of similar latitudes and conditions can occur. Of particular future concern is the transfer of organisms across the Arctic Ocean from the North Pacific to the North Atlantic or vice versa.
- (5) There are certain areas in the Arctic region that are of heightened ecological significance, many of which will be at risk from current and/or increased shipping. Many of these areas are located in geographically restrictive locations or chokepoints where much shipping activity also occurs, such as the Bering Strait, Hudson Strait, Lancaster Sound, Pechora Sea, and the Kara Port.
- (6) Migratory marine mammals such as bowhead, beluga, narwhal, and walrus have wintering areas in the southern extent of the sea ice and spring migration routes into the Arctic through systems of leads and polynyas also used by many seabirds, ducks and other marine birds during spring migration. These migration corridors correspond broadly to the current main shipping routes and travel through geographic chokepoints.
- (7) The black carbon emitted from shipping in the Arctic could have a significant regional impact by accelerating ice melt.
- (8) Ship emissions including greenhouse gases, nitrogen oxides, sulfur oxides, and particulate matter may have negative effects on the Arctic environment and will increase in the Arctic region proportionately with increased shipping activity. Effective reduction of ship emissions can be achieved through the application of feasible and best-available technologies, through air emissions reduction techniques and, most importantly, through effective implementation of relevant International Maritime Organization regulations.
- (9) Sound is of vital biological importance to marine mammals and anthropogenic noise produced through shipping and other vessel activity can have various adverse effects on Arctic species.
- (10) Subarctic seas support some of the richest fisheries in the world in the Bering Sea and the Barents Sea. These two areas are also the location of the heaviest shipping traffic now occurring in the Arctic region. A potential accidental spill of oil or other hazardous and noxious substances in these areas could have large economic, social, and environmental impacts.
- (11) Environmental effects on marine mammals, seabirds, and fisheries from ship-sourced disturbances, noise, or potential accidental/illegal release of oil and other hazardous and noxious substances may impact culturally and economically significant subsistence harvests of these animals.
- (12) The most immediate impact of climate change in the Arctic will be the reduction of summer sea ice, longer open-water seasons in the fall, and the reduction of the year-round presence of multi-year ice. These changes may have far-reaching implications for Arctic ecosystems and will also result in the lengthening of the current shipping season. Shipping in the future may be occurring much later into the fall and possibly earlier in the spring, thereby increasing the possibility of interaction between migrating and calving species and ships.

Source: Arctic Council 2009

have used the Arctic in recent years, which provides a baseline for comparison with future activity.

The shipping assessment was based in part on the possibility, if not probability, that the Arctic Ocean would be ice-free for at least a short period in summer as early as 2015. As ice continues to recede, access and navigation undoubtedly will increase. Ice will still be present in winter months and will continue to present an obstacle to marine operations in fall and spring. Current marine use largely involves movements to and from specific Arctic destinations, whereas future use also will involve the use of the Arctic as a passageway between non-Arctic destinations. Extraction of Arctic natural resources (e.g., hydrocarbons, hard minerals, and fisheries) likely will exert a strong influence on future shipping patterns, but the manner in which these industries develop will depend on government regulations, cooperation among Arctic states, oil prices, global trade patterns, and the manner in which climate disruption is manifested in the Arctic.

Natural resource industries, and the transportation systems used to support them (e.g., shipping), pose a number of environmental risks to Arctic marine ecosystems (see accompanying box on environmental considerations and impacts). The shipping assessment discusses accidental release or illegal discharge of oil as the most significant threat to the Arctic marine environment and associated Arctic communities. Increased vessel traffic also will increase the risk to marine mammals from ship strikes and degradation or loss of their migratory, foraging, and reproductive habitats. Vessel noise is known to affect the behavior of some marine mammals from distances of tens of kilometers. Such effects, either individually or cumulatively, also may negatively affect the culturally and economically significant subsistence harvests of these animals by Alaska Natives.

Based on its findings, the Arctic Council makes a number of recommendations pertinent to marine mammals, including that the Arctic states—

- identify areas of heightened ecological and cultural significance in light of changing climate conditions and increasing multiple marine uses and, where appropriate, encourage implementation of measures to protect these areas from the impact of Arctic marine shipping;
- explore the need for internationally designated areas for the purpose of environmental protection in regions of the Arctic Ocean, taking into account the special characteristics of the Arctic marine environment;
- consider ratification of the International Maritime Organization's International Convention for the Control and Management of Ships Ballast Water and Sediments as soon as practical and also assess the risk of introducing invasive species through ballast water and other means so that adequate prevention measures can be implemented in waters under their jurisdiction;
- enhance cooperation in the field of oil spill prevention and, in collaboration with industry, support research and technology transfer to prevent release of oil into Arctic waters; and
- engage with relevant international organizations to further assess the effects on marine mammals from ship noise, disturbance, and strikes in Arctic waters, and, where needed, work with the



Figure VI-4. Fishing boats made up almost half of the total vessels that reported operating in the Arctic in 2004. (Photo courtesy of Arctic Council, Protection of the Arctic Marine Environment Working Group)

International Maritime Organization in developing and implementing mitigation strategies.

Fishery Management in the Opening Arctic

Climate disruption is warming the Arctic and causing a marked reduction in the seasonal extent of sea ice. This recession of ice is opening the Arctic to increasing human activity, including the possibility of new commercial fisheries (see Figure VI-4). As Arctic ice recedes and its waters warm, stocks that are considered typical of sub-Arctic regions, such as pollock, Pacific cod, and salmon, are increasing in numbers and biomass, creating potential targets for commercial fishing. Because the trophic dynamics of Arctic marine ecosystems are relatively simple and because those ecosystems already are undergoing significant change resulting from climate disruption, the possible introduction of commercial fisheries could create considerable challenges and have a significant impact, not only on the fished stocks and their habitat but also on other Arctic species, such as marine mammals, that depend on Arctic marine habitat and resources. Commercial fishing also could affect the Alaska Native communities that have depended on their subsistence-based cultures for thousands of years.

In 2009 the North Pacific Fishery Management Council recommended and the National Marine Fisheries Service approved a new Arctic Fishery Management Plan (North Pacific Fishery Management Council 2009) to establish a framework for sustainable management of future commercial fishing in the U.S. Exclusive Economic Zone (EEZ) of the Chukchi and Beaufort Seas. The plan was implemented through a final rule issued by the National Marine Fisheries Service on 3 November 2009 (74 Fed. Reg. 56734). The Council based the plan on a “precautionary, ecosystem-based approach to fisheries management” and the Service approved it to prevent unregulated commercial fishing potential from having adverse effects on the Arctic marine environment. The plan prohibits commercial fishing in the “Arctic Management Area” until such time as new information allows for authorization of a sustainable commercial fishery consistent with the Magnuson-Stevens Fishery Conservation and Management Act.

The Arctic Management Area encompasses all marine waters in the U.S. EEZ of the Chukchi and Beaufort Seas from 3 nmi off the Alaska coast, northward 200 nmi offshore, westward to the U.S.-Russia maritime boundary line, and eastward to the U.S.-Canada maritime boundary as claimed by the United States. The plan governs commercial fishing for all stocks of fish, including finfish, shellfish, and other marine living resources, except commercial fishing for Pacific salmon and Pacific halibut, which are managed under other authorities. The commercial harvest of Pacific salmon in the Arctic is managed under the Fisheries Management Plan for Salmon Fisheries in the EEZ off the coast of Alaska, which prohibits commercial fishing in the Arctic Management Area. Pacific halibut is managed under the guidance of the International Pacific Halibut Commission, under which the United States also does not allow harvest of Pacific halibut in the Arctic Management Area. The Council’s plan does not regulate subsistence or recreational fishing or Arctic fisheries managed by the state of Alaska, nor does it regulate harvest of marine mammals and birds.

The Council describes the plan as “an ecosystem-based management policy that proactively applies judicious and responsible fisheries management practices, based on sound scientific research and analysis, to ensure the sustainability of fishery resources, to prevent unregulated or poorly regulated commercial fishing, and to protect associated ecosystems for the benefit of current users and future generations.” In part, the Council developed the plan to recognize and protect the ecosystem and the communities that depend on it for subsistence.

The plan establishes a process and specific criteria for removing the prohibition on commercial harvest for any proposed target species. Authorization of commercial fishing on a target species in the Arctic Management Area will be considered by the Council upon receipt of a petition from the public or a recommendation from the Service or the state of Alaska. The Council then will initiate a planning process to evaluate the information in the petition and other information concerning the proposed target fishery. Initiating a fishery would require amending the fisheries management plan to ensure that conservation of the fished resource, minimize the impact

Table VI-1. Current abundance and trends of Arctic marine mammal species and stocks except for ringed seals, bearded seals, and walruses, whose stock structure is unknown (Simpkins 2009)

Species	Stock	Abundance	Year	Trend
Bowhead whale	Bering/Chukchi/Beaufort Seas	10,500	2001	increasing
	E. Canada-W. Greenland	6,300	2002-2004	increasing
	Spitsbergen	unknown	—	unknown
	Okhotsk Sea	<400	1979	unknown
Beluga whale	Cook Inlet	380	2007	stable
	Eastern Bering Sea	18,100	2000	unknown
	Bristol Bay	3,300	2005	increasing
	Eastern Chukchi Sea	3,700	1989-1991	unknown
	Eastern Beaufort Sea	39,300	1992	unknown
	Foxe Basin	1,000	1983	unknown
	Western Hudson Bay	57,300	2004	unknown
	Southern Hudson Bay	1,300	1987	unknown
	James Bay	4,000	2004	unknown
	St. Lawrence River	1,200	2005	stable
	Eastern Hudson Bay	4,300	2004	declining
	Ungava Bay	<50	2007	unknown
	Cumberland Sound	1,500	1999	increasing
	E. High Arctic-Baffin Bay	21,200	1996	stable
	West Greenland	7,900	1998-1999	unknown
	3 stocks in Okhotsk Sea	18-20,000	1987	unknown
	11 additional stocks	unknown	—	unknown
Narwhal	Canadian High Arctic	>60,000	2002-2004	unknown
	Northern Hudson Bay	3,500	2000	unknown
	West Greenland	2,000	1998-1999	unknown
	East Greenland	>1,000	1980-1984	unknown
Ringed seal ^a	Arctic subspecies	~2.5 million	1970s	unknown
	Baltic Sea subspecies	5,000-8,000	1990s	mixed
	Lake Saimaa subspecies	280	2005	increasing
	Lake Ladoga subspecies	3,000-5,000	2001	unknown
	Okhotsk Sea subspecies	>800,000	1971	unknown
Bearded seal ^b	Bering-Chukchi Seas	250-300,000	1970s	unknown
	Canadian waters	190,000	1958-1979	unknown
	Atlantic and Russian Arctic	unknown	—	unknown
	Okhotsk Sea	200-250,000	1968-1969	unknown
Walrus ^c	Bering-Chukchi Seas	~201,000	1990	unknown
	Atlantic subspecies	18-20,000	2006	mixed
	Laptev Sea	4,000-5,000	1982	unknown
	Other regions	unknown	—	unknown
Polar bear ^d	Chukchi Sea	2,000	1993	unknown
	Southern Beaufort Sea	1,500	2006	declining
	Northern Beaufort Sea	1,200	1986	stable
	Viscount Melville Sound	220	1992	increasing
	McClintock Channel	280	2000	increasing
	Norwegian Bay	190	1998	declining
	Lancaster Sound	2,500	1998	stable
	Gulf of Boothia	1,500	2000	stable
	Foxe Basin	2,200	1994	stable
	Western Hudson Bay	940	2004	declining
	Southern Hudson Bay	1,000	1988	stable
	Baffin Bay	2,100	1998	declining
	Davis Strait	1,700	2004	unknown
	Kane Basin	160	1998	declining
Barents Sea	2,700	2004	unknown	
Laptev Sea	4,000-5,000	1993	unknown	
3 other stocks	unknown	—	unknown	

^a Ringed seal stock structure unknown; information summarized for five recognized subspecies.^b Bearded seal stock structure unknown; information summarized for geographic regions.^c Walrus stock structure unknown; information summarized for Atlantic subspecies and geographic regions for Pacific subspecies.^d Recent analysis of genetic, ecological and life history data from Canadian polar bears suggests that their stock structure may need to be revised. ³⁸

on other users in the area, comply with the Magnuson-Stevens Fishery Conservation and Management Act and its national standards and other applicable laws, and derive net positive benefits.

Monitoring Arctic Marine Mammals

Seven marine mammal species occur year-round in the Arctic: the bowhead whale, beluga whale, narwhal, ringed seal, bearded seal, walrus, and polar bear (Table VI-1). Ongoing and predicted climate-related changes in the Arctic are having and will continue to have severe impacts on some of those species, including alteration or loss of essential habitat, changes in the structure of Arctic food webs, introduction of novel diseases, and increased interaction with human activities. Describing the full extent of those impacts will be difficult because, at present, scientists do not know the status of many Arctic marine mammal populations and do not have the resources to undertake the comprehensive studies needed to detect significant changes in their distribution and abundance. With few exceptions, previous assessments of Arctic marine mammals have focused primarily on their population dynamics and have achieved only limited success (Simpkins et al. 2009).

In March 2007 the Marine Mammal Commission and the Fish and Wildlife Service convened an international workshop in Valencia, Spain, to develop a monitoring framework for Arctic marine mammals and thereby promote their conservation in the face of climate disruption. Participants came from the scientific and Arctic indigenous communities and provided expertise on the biology and ecology of marine mammals, Arctic oceanography and climate, sea ice, marine mammal health, subsistence harvesting, bio-sampling networks, and monitoring techniques. The workshop report was published on 16 April 2009 by the Arctic Council's Conservation of

Arctic Flora and Fauna Working Group as part of its Circumpolar Biodiversity Monitoring Program (Simpkins et al. 2009).

The framework developed at the workshop emphasized the need to assess not only the population dynamics of any particular marine mammal stock but also the factors affecting the stock (e.g., loss of ice habitat from Arctic warming) and the mechanisms by which such effects occur (e.g., decreased predation, decline in physical condition, reduced reproduction and survival). Participants developed a conceptual model for that framework to illustrate the complex nature of monitoring requirements (Figure VI-5) and listed the various monitoring tools needed to implement a comprehensive monitoring plan. They also emphasized the need for development of integrated regional or species-based monitoring plans highlighting multidisciplinary studies and partnerships. The participants recommended that Arctic nations convene international expert monitoring groups and charge these groups with identifying specific research and monitoring needs and coordinating

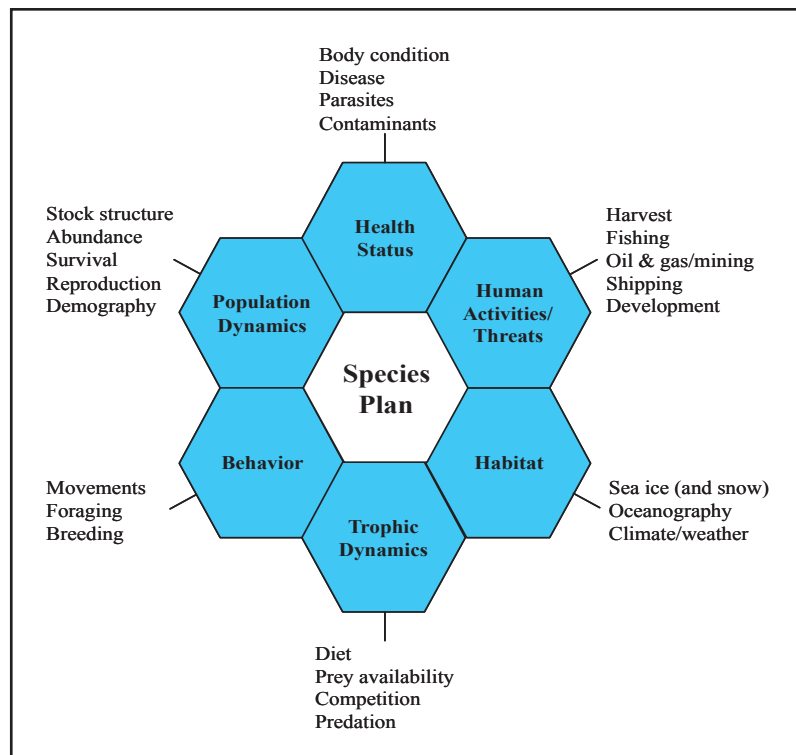


Figure VI-5. A conceptual model to illustrate the complex nature of monitoring requirements for wildlife populations. (Source: Simpkins et al. 2009)

Table VI-2. Key monitoring parameters and tools for assessing the status of Arctic marine mammal populations. Based primarily on ringed seals and belugas, these parameters generally are expected to pertain to all Arctic marine mammal species.

Key Parameters	Primary Monitoring Tools
Population Dynamics	
Population structure	Genetic analyses (biological samples from remote biopsies, live captures, subsistence harvest ^L , strandings ^L , ice entrapments) Distribution and movements (surveys, satellite tagging, local observations)
Abundance and trends	Visual surveys (aerial, boat-based, shore-based) Infrared or multispectral surveys (aerial, remote-sensing ^P) Mark-recapture methods (tagging, tattooing, branding, photo-ID)
Survival and reproductive rates	Biological samples (e.g., reproductive tracts; harvested ^L , stranded ^L , entrapped animals) Mark-recapture methods Demography from surveys (for species with visually distinct sex and age classes)
Behavior	
Migration and distribution	Remote tracking (VHF and satellite-linked tags) Local observations (villages ^L , research stations)
Foraging	Remote tracking
Breeding	Local observations Passive acoustic monitoring (for vocal species) Genetic analyses (biological samples from remote biopsies, live captures, subsistence harvest, strandings, ice entrapments)
Health Status	
Body condition	Morphometry (captured, harvested ^L , stranded ^L , entrapped animals) Photogrammetry (i.e., remote morphometry)
Diseases and parasites	Necropsies ^V (harvested ^L , stranded ^L , entrapped animals) Analyses of tissue samples ^C (biopsies, live captures, harvested ^L , stranded ^L , entrapped animals)
Contaminants	Analyses of tissue samples ^C (biopsies, live captures, harvested ^L , stranded ^L , entrapped animals)
Habitat	
Sea ice (extent, thickness, concentration, duration)	Remote sensing ^P (e.g., AVHRR, microwave) Local observations (villages ^L , research stations)
Snow (depth, duration) [primarily for ringed seals]	Local observations (villages ^L , research stations) Remote sensing ^P (microwave?)
Primary production (amount, location, bloom timing)	Oceanographic cruises ^B Local observations (villages ^L , research stations) Remote sensing ^B (chlorophyll)
Trophic Dynamics	
Prey availability and quality	Diet (stomach samples ^L , fatty acids, stable isotopes) Prey abundance and distribution (pelagic and benthic prey surveys ^B)
Competition (Arctic or invasive species)	Surveys of competitors ^B Studies of behavior of competitors
Predation	Surveys of predators (e.g., killer whales, polar bears) Studies of behavior of predators
Human Activities	
Subsistence harvest	Harvest monitoring programs (government or local ^L)
Coastal development, fishing, shipping, oil and gas/mining operations, tourism, military activities	Continual assessment of new activities and potential or observed impacts on Arctic marine mammals ^L

Superscripts indicate the need for partnerships with experts outside of typical marine mammal research fields: B=biological oceanographers and fisheries biologists, C=contaminants monitoring groups (e.g., AMAP), I=industries and industry monitoring groups, L=local subsistence hunters or local monitoring networks, P=physical oceanographers and sea ice scientists, V=veterinarians and wildlife epidemiologists. (Source: Simpkins et al. 2009)

efforts across the Arctic. They recommended the following areas for collaborative research, monitoring, and planning efforts: (1) developing comprehensive, species-specific monitoring plans; (2) establishing research priorities; (3) developing data collection and data sharing protocols; (4) promoting research partnerships; and (5) clarifying funding needs, identifying potential funding sources, and developing funding proposals.

In 2009 the Arctic Council was engaged in planning and coordinating research and monitoring efforts. The Conservation of Arctic Flora and Fauna Working Group is focused on monitoring trends in Arctic biodiversity through its Circumpolar Biodiversity Monitoring Program. The research and monitoring framework developed in the Valencia workshop was intended to support that program and, accordingly, was introduced at a January 2009 meeting of the program's Marine Expert Monitoring Group Workshop that was charged with developing an integrated, pan-Arctic marine biodiversity monitoring plan.

Arctic Report Card

To provide the most up-to-date information about the status of Arctic wildlife, the Arctic Research Program of the National Oceanic and Atmospheric Administration and the Circumpolar Biodiversity Monitoring Program of the Arctic Council's Conservation of Arctic Flora and Fauna Working Group complete an annual Arctic Report Card. The report card provides timely environmental information on the state of the Arctic relative to historical time series records (Richter-Menge and Overland 2009). An international team of scientists prepares the report card, which is peer-reviewed by topical experts of

the Climate Experts Group of the Arctic Council. The intended audience includes scientists, students, teachers, decision makers, and the general public interested in the Arctic environment and associated science. The 2009 Arctic Report Card for Marine Mammals (Simpkins 2009; Table VI-2) summarized current knowledge regarding abundance and trends of the seven marine mammal species present in the Arctic year-round. Most of those species are associated with sea ice and all seven are top predators within Arctic marine ecosystems.

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Chapter VII

RESEARCH PROGRAM

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

Workshops and Planning Meetings

During 2009 the Commissioners, members of the Committee of Scientific Advisors on Marine Mammals, and Commission staff helped to organize and participated in meetings and workshops on a variety of topics, including—

- marine mammal research, management, and conservation efforts in the Pacific Islands region at the Commission's 2009 annual meeting;
- external program reviews of the Protected Resources Division and the U.S. Antarctic Marine Living Resources Program of the Southwest Fisheries Science Center, National Marine Fisheries Service;
- research and management issues related to the effects of naval operations on marine mammals and marine ecosystems;
- research supported by the Office of Naval Research's Marine Mammals and Biological Oceanography Program;
- mechanisms for integrating environmental analyses required by the Marine Mammal Protection Act, Endangered Species Act, and National Environmental Policy Act;
- establishment of protected areas for river dolphins in seven Asian countries and identification of ways to improve conservation and management;
- declining populations of Irrawaddy dolphins inhabiting the Mekong River in Cambodia, and an ad hoc meeting in Phnom Penh with government agencies and World Wildlife Fund-Cambodia representatives to discuss potential conservation measures;
- research, conservation, and management of dugongs in and near Bazaruto National Park, Mozambique, including development of a dugong management plan and procedures for implementation;
- development of an expert group to guide implementation of the Marine Mammal Action Plan in the Wider Caribbean Region;
- creation of a Dominican Republic Marine Mammal Commission, discussed at the Global Foundation for Democracy and Development Conference;
- stranding response training, building response capacity, and coordinating response efforts in the Dutch-speaking Caribbean islands;

- the Arctic Council’s Circumpolar Biodiversity Monitoring Plan, discussed at a meeting convened by the Committee on Arctic Fauna and Flora;
 - impacts of an ice-diminishing Arctic on naval and maritime operations, discussed at the third international symposium on this topic, held at the U.S. Naval Academy;
 - progress on various Arctic research topics, discussed at the annual meeting of the U.S. Arctic Research Commission;
 - current marine research in Alaska, discussed at the Alaska Marine Science Symposium;
 - results of policy-relevant research conducted during the Fourth International Polar Year, discussed in a meeting convened by the Inland Northwest Research Alliance;
 - the status of northern Québec beluga populations, discussed in a meeting of a Canadian Department of Fisheries and Oceans peer review group;
 - the status of shared stocks of narwhals and beluga whales, discussed in a joint meeting of the North Atlantic Marine Mammal Commission Scientific Committee Working Group on the Population Status of the Narwhal and Beluga in the North Atlantic and the Canada-Greenland Joint Commission on Conservation and Management of Narwhal and Beluga Scientific Working Group;
 - cumulative impacts of sound and other anthropogenic risk factors on marine mammals, discussed in an international workshop convened by Okeanos;
 - assessment of cumulative impacts, thresholds, and trade-offs among ecosystem services, discussed in a workshop convened by Resilience Alliance;
 - policies and efforts to assess and mitigate the effects of anthropogenic sound on marine life, discussed in an intergovernmental conference for NATO member nations;
 - detection, classification, and localization of marine mammals using passive acoustics and application of recently developed signal processing techniques to specific case studies;
 - application of current technology for acoustic monitoring of marine mammals and underwater sound, particularly during offshore exploration and resource extraction;
 - modeling population-level consequences of acoustic disturbance of marine mammals;
 - the state of marine mammal tagging technology, with emphasis on attachment methods, discussed in a workshop convened by the Office of Naval Research;
 - the effects of aquaculture operations and other human activities on harbor seals in Drake’s Estero, Point Reyes National Seashore, California;
 - the future of commercial whaling discussed at the 61st Annual Meeting of the International Whaling Commission (see Chapter V);
 - the status of cetaceans in the Indian Ocean, discussed in the Indian Ocean Cetacean Symposium;
 - the contribution of protected areas to sirenian conservation around the world, discussed at the Society for Conservation Biology’s International Marine Conservation Congress and 2nd International Marine Protected Areas Conference;
 - the value of marine protected areas for marine mammal conservation, discussed at the First International Conference on Marine Mammal Protected Areas;
 - the latest developments in marine mammal research worldwide, discussed at the Society for Marine Mammalogy’s 18th Biennial Conference on the Biology of Marine Mammals.
- In addition, Commission staff attended or participated in meetings of several interagency committees, teams, and working groups focused on issues of concern for marine mammals, including—
- recovery teams and other endangered species management teams, including those for Hawaiian monk seals, North Atlantic right whales, and Florida manatees;
 - Atlantic large whale, bottlenose dolphin, and false killer whale take reduction teams;
 - scientific review groups convened under the Marine Mammal Protection Act to review annual updates of stock assessments and marine mammal–fishery interactions;

- Joint Subcommittee on Ocean Science and Technology and its interagency working groups on ocean observations; harmful algal blooms, hypoxia and human health; and ocean partnerships, including an ad hoc subgroup on biodiversity;
- Ocean Research and Resources Advisory Panel;
- interagency task force convened by the Interagency Committee on Ocean Science and Resource Management Integration and the Joint Subcommittee on Ocean Science and Technology on Anthropogenic Sound and the Marine Environment;
- Interagency Coordinating Group on Acoustics;
- U.S. Arctic Policy Group, chaired by the Department of State;
- Interagency Marine Debris Coordinating Committee;
- Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve Advisory Council;
- the Scientific Working Group on Marine Mammal Unusual Mortality Events, and
- the North Pacific Research Board Science Panel.

Commission-Sponsored Research Projects

The Marine Mammal Commission supports research to further the purposes of the Marine Mammal Protection Act. Research ideas originate from within the Commission, from unsolicited proposals submitted by scientists outside the Commission, and from responses to Commission requests for proposals. Since it was established in 1972, the Commission has funded more than 1,000 projects ranging in amounts from several hundred dollars to \$150,000. Final reports of most Commission-sponsored studies are available from the National Technical Information Service or directly from the Commission.

In 2009 the Commission collaborated with the National Fish and Wildlife Foundation to issue a request for proposals on the following five research and conservation topics: (1) marine mammals and climate change in the Arctic Ocean and Bering Sea; (2) calibration of new methods for surveying marine

mammals; (3) alternative observer coverage for marine mammal species at high risk from fishery interactions; (4) building capacity for marine mammal research and conservation in the Caribbean Region; and (5) assessment and conservation of sire-nians. A total of 179 preproposals were submitted (33 for the first topic, 46 for the second, 20 for the third, 32 for the fourth, and 46 for the fifth, with two not specifying any category). The Committee of Scientific Advisors on Marine Mammals and Commission staff reviewed all preproposals and solicited full proposals for 18 of the proposed projects. Of these, the Commission selected for funding one or two proposals per topic, as specified here. The seven proposals finally selected for funding totaled nearly \$465,000.

In addition, the Commission awarded 19 other grants totaling approximately \$378,000. One of these was made to the Society for Marine Mammalogy to support graduate student travel to the 18th Biennial Conference on the Biology of Marine Mammals, convened in Québec City, Canada. Another award contributed toward publication costs for Right Whale News, a quarterly newsletter distributed electronically to people interested in efforts to study and conserve the North Atlantic right whale and its habitats. The following are summaries of projects funded in 2009.

Passive acoustic assessment of marine mammals and ocean noise levels in the Greenland Sea and Fram Strait: A pilot study (Oregon State University, Hatfield Marine Science Center, Newport, Oregon)

The Arctic is one of the most rapidly changing environments on Earth, and it likely will be the site of escalating noise levels as sea ice recedes and shipping activity increases. The Marine Mammal Acoustics Group of Oregon State University's Cooperative Institute for Marine Resources Studies deployed two recorders for passive acoustic monitoring in the Greenland Sea and Fram Strait in June 2009. The purpose of the recorders was to obtain baseline information on ambient noise and the occurrence of two endangered cetacean species, the fin whale (*Balaenoptera physalus*) and the North Atlantic right whale (*Eubalaena glacialis*). The recorders detected

fin whale calls year-round on both the northern and southern hydrophones and right whales during summer months on the southern hydrophone. The grant provided support to analyze the pilot study data, estimate current noise levels, and provide a basis for assessing long-term changes in the ambient sound field and marine mammal ecology as climate change alters the Arctic marine environment.

Populations of Hector's dolphins in time and space (Oregon State University, Corvallis, Oregon)

Small or subdivided populations of coastal dolphins, such as Hector's (*Cephalorhynchus hectori*) and Maui's (*C. h. maui*) dolphins, pose significant assessment challenges. Systematic sighting surveys often result in few observations and may require independent methods for estimating associated parameters. Mark-recapture methods using photo-identification of natural markings may be problematic because individual animals may be difficult to distinguish (only 15 percent of Hector's dolphins have markings), distinguishing features may be lost over time, and the likelihood of capture may vary by individual. Sighting surveys and mark-recapture studies also operate at different temporal and spatial scales: sighting surveys characterize the number of individuals or groups and their spatial distribution within a defined study area at a specific time, whereas mark-recapture studies typically estimate abundance of a relatively discrete population, the boundaries of which may be difficult to define. In this study, the investigators proposed to compare results from two sighting surveys (boat-based and aerial), two mark-recapture methods (photo-identification and biopsy-based genotyping), and genetic studies of effective population size (using microsatellites for single-sample linkage disequilibrium models). The investigators examined the relative precision of these five methods and biases in the absolute size of estimates, cost-effectiveness of the methods and the potential for combining methods to correct for biases and reduce uncertainty in estimating abundance of Hector's dolphins. The resulting calibration will help address one of the highest research priorities of the New Zealand Threat Management Plan for Hector's and Maui's dolphins and will have important impli-

cations for future surveys of many other small populations scattered throughout the world's oceans.

Risks and impacts of crab fishing gear on minke whales (Mingan Island Cetacean Study, Inc., Longue-Pointe-de-Mingan, Québec, Canada)

Minke whales (*Balaenoptera acutorostrata*) often inhabit coastal areas where they are likely to encounter fishing gear, including gillnets and crab traps with associated buoy ropes. Few studies have focused on entanglement of minke whales in fishing gear or the consequences of injuries incurred. The investigators aimed to improve understanding of the interactions between minke whales and crab fishing gear in coastal waters by conducting in-situ experiments to test the whales' visual and acoustic responses to the presence of such gear. The study also may provide insights into alternative designs for crab fishing gear that could decrease the occurrence of minke whale entanglements. The study was planned for the Mingan Archipelago in the Gulf of Saint Lawrence, where large numbers of minke whales feed on aggregations of spawning capelin during summer. The investigators planned to use underwater cameras and hydrophones to investigate the whales' responses to existing crab traps. The study also planned to test the whales' responses to various configurations of "dummy" ropes and buoys to provide insight as to how minke whales become entangled and the ways in which crab fishing ropes and buoys affect their foraging activities.

Acoustically observing the Hawaii longline fishery (Scripps Institution of Oceanography, University of California San Diego, La Jolla, California)

A number of cetacean species interact with longline fisheries throughout the world's oceans. Such interactions may result in hooking or entanglement-related injury or death, threaten the long-term viability of affected marine mammal populations, and affect the operations and economic viability of the fisheries involved. From 2003 to 2007 observers for the Hawaii-based deep-set longline fishery for tuna documented unsustainable levels of false killer whale mortality and serious injury from such interac-

tions. The study was proposed to investigate false killer whale interactions with longline gear and evaluate the utility of monitoring the fishery acoustically. Scripps Institution of Oceanography will fabricate the acoustic recorders and deliver them to the Pacific Islands Fisheries Science Center of the National Marine Fisheries Service. The Center will conduct a two-year pilot project with the longline fishery. The study objectives are to detect acoustically the occurrence of false killer whales and other cetaceans and investigate whether their presence and activity are correlated with specific sounds generated by fishery operations, such as setting and hauling the longlines. The study seeks to determine if the whales' acoustic behavior changes during encounters with gear and whether acoustic signals can be used to determine when a whale is hooked or entangled. The Center will compare the acoustic data with events documented by fishery observers and vessel crews, report on acoustic detection rate and behavior of false killer whales near fishing gear, and investigate the feasibility of expanding these efforts within Hawaiian or American Samoan fleets to increase monitoring capability.

Improving capacity in the Wider Caribbean Region (United Nations Environment Programme, Caribbean Environment Programme, Kingston, Jamaica)

In 2008 the parties to the Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region (Cartagena Convention) and the Specially Protected Areas and Wildlife (SPA) Protocol adopted an action plan to promote marine mammal conservation, as all species inhabiting the region are listed as threatened or endangered in Annex II of the SPAW Protocol. The action plan identifies priority measures to be implemented within five years to address issues ranging from habitat degradation to interactions with fisheries and the ecotourism (i.e., marine mammal watching) industry. The investigators will convene a regional, bilingual workshop for countries, non-governmental organizations, and tourism operators to discuss best practices and develop a regional code of conduct. The goal is to create a responsible and sustainable marine mammal ecotourism industry.

The investigators also will design and implement an online database to compile and analyze information on the distribution, status, and threats to marine mammals in the Wider Caribbean Region and identify areas of importance for marine mammal protection and conservation.

Dugongs of the Bazaruto Archipelago, Central Mozambique (Centre for Dolphin Studies, Nelson Mandela Metropolitan University, Plettenberg Bay, South Africa)

Dugong (*Dugong dugon*) populations in the southwestern Indian Ocean are highly fragmented and declining rapidly due to destruction of seagrass habitat and bycatch in fishing nets and traps. Recent surveys indicate that the Bazaruto Archipelago dugong population off Mozambique is the largest along the East African coast. However, this population numbers in the low hundreds and may be the last viable dugong population remaining in the western Indian Ocean. Nonetheless, gillnetting and direct hunting may be causing dugong mortality at an unsustainable rate. The main goal of this project is to generate an accurate estimate of the bycatch mortality rate for this population based on a "rapid bycatch assessment." The investigators will use the results to inform local fishermen regarding conservation of marine resources and alternative livelihood education and training programs. The investigators also will consider the potential impact of other anthropogenic factors including degradation of water quality; noise and disturbance from increasing vessel traffic; and contaminants, noise, and disturbance from hydrocarbon prospecting and production. The resulting information will be incorporated into a dugong management plan, and the investigators will seek to establish a long-term dugong and habitat monitoring program for the Bazaruto Archipelago.

Status and conservation of the West African manatee (Wildlife Trust, Inc., St. Petersburg, Florida)

The range of the West African manatee (*Trichechus senegalensis*) spans 21 countries, but it is one of the least-studied marine mammal species in the world. Its current abundance and population structure are not known, and the impact of habitat

destruction and hunting is expected to be severe but is poorly documented. The objectives of this two-year project were to (1) identify collaborators from every country in which the West African manatee occurs; (2) continue building a regional network for manatee research; (3) train collaborators in field research techniques; (4) assist with development of research plans tailored to specific countries or areas; and (5) collect samples from manatees in the majority of countries throughout the species' range and conduct genetic analyses to determine population structure. The investigator also will provide educational materials in French and English to the regional network for campaigns to raise awareness of the species and conservation efforts and will publish the results in the scientific literature and disseminate it to the pertinent governments.

Vaquita.tv: A science communication initiative using educational multimedia to promote vaquita conservation (EarthOCEAN Media Pty. Ltd., Albert Park, Victoria, Australia)

Conservation of the critically endangered vaquita will depend heavily on education and outreach efforts to inform and engage the Mexican communities at the northern end of the Gulf of California and to promote alternative fishing gear or alternative socioeconomic livelihoods. Fishermen from San Felipe, Puerto Penasco, and El Golfo de Santa Clara targeted totoaba (*Totoaba macdonaldi*) historically but were forced to switch to other species as totoaba became overfished and eventually endangered. These fishermen now set gillnets for shrimp, chano, curvina, mackerels, sharks, and rays. Unfortunately, vaquita become entangled in the gillnets and drown. The goals of this project were to provide scientific information to the fishermen and communities in the northern Gulf of California and promote methods for conserving the vaquita while also serving the communities and fishermen and their socioeconomic needs. The investigator is collating photographs, videos, interviews with scientists and stakeholders, scientific publications, news articles, fact sheets, teachers' guides, and maps and blogs to produce a

science-based, bilingual (Spanish and English) interactive Web site that tells the story of the vaquita. The Web site content focuses on three themes: science, conservation, and the community. Content was taken from government institutions, non-governmental organizations, and various members of the local community to ensure that information is presented in a balanced manner and represents the concerns of groups in the region. The investigator also produced a bilingual educational DVD, based on interviews and videos on the Web site, for distribution to fishermen and community members who may have limited access to the Internet. The investigator also created a brief educational booklet, based on content of the Web site's fact sheets and teachers' guides, to be printed in Spanish and distributed throughout local schools. At the end of 2009 the investigator expected to complete the Web site (<http://vaquita.tv>) in early 2010.

Analyses of acoustic data from Vaquita Expedition 2008 (National Marine Fisheries Service, Silver Spring, Maryland)

The vaquita (*Phocoena sinus*) is the world's smallest cetacean and one of four *Phocoena* species. It numbers approximately 150 to 250 individuals and is critically endangered. It occurs only in the northern Gulf of California, where its numbers have been decimated by entanglement in fishing gear, primarily artisanal gillnets. In 2008 the National Oceanic and Atmospheric Administration partnered with the Marine Mammal Research and Conservation Coordination Branch of Mexico's National Institute of Ecology (La Coordinación de Investigación y Conservación de Mamíferos Marinos, Instituto Nacional de Ecología) to co-sponsor a vaquita research cruise. The purpose of the research was to better describe the vaquita's status by producing a more precise and accurate estimate of its abundance and a more up-to-date description of its distribution. The investigators used autonomous passive acoustic methods to detect vaquita presence. The Commission provided support to analyze the collected acoustic data. Those analyses were still under way at the end of 2009.

Freshwater cetaceans as flagship species for integrated river conservation management (Yayasan Konservasi RASI [Conservation Foundation for Rare Aquatic Species of Indonesia], Samarinda, East Kalimantan, Indonesia)

The Marine Mammal Commission provided partial support for this workshop, convened in October 2009 in Samarinda, East Kalimantan, Indonesia. The workshop focused on the Yangtze River finless porpoise (*Neophocaena phocaenoides asiaorientalis*), Irrawaddy dolphin (*Orcaella brevirostris*), susu or Ganges River dolphin (*Platanista gangetica gangetica*), and the bhulan or Indus River dolphin (*Platanista gangetica minor*). The Irrawaddy dolphin occurs in the Mahakam River of Indonesia, the Ayeyarwady River of Myanmar, and the Mekong River of Cambodia and Lao People's Democratic Republic. The Ganges River dolphin is found in the Ganges/Brahmaputra/Megna and Karnaphuli/Sangu river systems of India, Bangladesh, and Nepal. The Indus River dolphin occurs primarily in the Indus River in Pakistan, with a small sub-population in the Beas River, Punjab, India. The International Union for Conservation of Nature lists each of these as endangered or critically endangered, largely as a result of bycatch in gillnet fisheries and habitat degradation. The workshop enabled scientists, policy-makers, and non-governmental organizations from Indonesia, Bangladesh, Cambodia, China, India, Myanmar, and Pakistan to exchange information with one another and international experts on biodiversity conservation and sustainable community development in freshwater protected areas. Workshop objectives were to evaluate the effectiveness of existing protected riverine habitats in conserving freshwater cetaceans and other species, identify ways to improve protected area management, and develop guidance for improving protection in habitat that lacks official protected status.

Conservation and management of the Indus River dolphin (Downstream Research Group, Macon, Georgia)

The Indus River dolphin is listed as endangered on the IUCN Red List because of a large, range-wide decline, habitat fragmentation by dams and barrages,

and major threats to its survival, including pollution and water diversion. During the past 70 years, 19 barrages, 3 high dams and 12 inter-river link canals have been constructed in the Indus River system, dramatically altering the species' habitat. The first comprehensive status assessment of Indus River dolphins, conducted in 2001, found that the majority of animals now inhabit approximately 700 linear kilometers of the river; this represents an 80 percent reduction in range since the 1870s. Ten subpopulations formerly present in the upper reaches of the Indus River and its tributaries have been extirpated during the past 100 years, and the remaining dolphins are concentrated in areas of the Indus River with sufficient year-round water flow (more than 2,000 cubic feet per second). Little basic information is available regarding population trends and habitat use, but loss of habitat appears to be the most significant threat to the species' survival. Over the past three years, the principal investigator has collected data to help address vital management questions, and the purpose of this grant was to support analyses of these data and production of papers in the peer-reviewed literature. Manuscripts will focus on Indus River dolphin (1) abundance and population trends, (2) broad-scale habitat use, (3) fine-scale habitat preferences during the low-water season, (4) habitat fragmentation, factors affecting movement, and the relationship to range decline, (5) genetics and molecular differentiation in geographically isolated populations, and (6) conservation priorities and suggestions for designing and managing protected areas. Results will be presented to Pakistan's federal and provincial governments to inform decisions pertaining to Indus River dolphin conservation and Pakistan's water policies.

Indian Ocean Cetacean Symposium 2009 (Marine Research Centre, Malé, Republic of Maldives)

In 1979 the International Whaling Commission designated the Indian Ocean a whale sanctuary, banning commercial whaling of large whales and orcas. In 2009 the Maldives Marine Research Center convened a symposium to provide a forum for sharing the results of research on cetaceans in the Indian Ocean. The Marine Mammal Commission contrib-

uted funding for invitational travel to allow attendance by regional scientists. The symposium represented the first formal opportunity for scientists to present their findings in a regional context, and involved 60 scientists and conservationists from 22 countries. The symposium highlighted conservation threats facing large and small cetaceans and promoted research and conservation partnerships. The *Journal of Cetacean Research and Management* will publish a special issue of peer-reviewed papers presented at the symposium. Attendees adopted the Lankanfinolhu (Maldives) Declaration, which, among other things, declares their concerns about the declining health of Indian Ocean ecosystems, continued bycatch of small cetaceans in the fishing gear of many nations, and the directed catch of small cetaceans. Participants used the declaration to encourage Indian Ocean states to develop a collective action plan to improve conservation of cetaceans in the sanctuary and to announce the formation of a steering committee to consider and initiate such a plan.

Improving the contribution of marine and other protected areas to the conservation of sirenians (Sirenian International, Inc., Fredericksburg, Virginia)

All four existing sirenian species are classified on the IUCN Red List at least as “vulnerable” to extinction on a global scale, with some populations being “endangered” or “critically endangered” at regional scales, because of habitat loss, degradation, and human exploitation. Because sirenians inhabit coastal, estuarine, and riverine environments, marine and other aquatic protected areas offer one conservation approach adopted by many countries. However, many of these protected areas exist in name only, without measurably improving species’ conservation. To provide a forum for sirenian scientists and conservationists from around the world to evaluate the effectiveness of various protected areas and identify the features that have proven beneficial to sirenian conservation efforts, the investigators convened a workshop on 21–24 May 2009 at the International Marine Conservation Congress, George Mason University, Fairfax, Virginia. The goal of the workshop was to enhance the theoretical framework for planning marine

protected areas in developing countries. This grant provided partial support for the workshop to facilitate attendance by and contributions from sirenian researchers in developing countries throughout the world.

The first study of the diversity, distribution, and abundance of cetaceans in Guatemala’s Exclusive Economic Zone in the Pacific Ocean (Dr. Ester Quintana-Rizzo, Guatemala City, Guatemala)

With the permission of the Guatemalan government, the Southwest Fisheries Science Center of the National Marine Fisheries Service conducted 11 shipboard surveys over a 21-year period in Guatemala’s Exclusive Economic Zone in the Pacific Ocean. The purpose of the surveys was to obtain information on cetacean diversity, distribution, abundance, and habitat associations in that area. The investigator had drafted a comprehensive report (in Spanish), entitled “Primer estudio sobre la diversidad, distribución y abundancia de cetáceos en la zona económica exclusiva del Océano Pacífico de Guatemala,” to make the survey results available to the Guatemalan Government and other interested citizens. The Marine Mammal Commission provided support to print 200 copies of the report for distribution.

Southern Caribbean marine mammal stranding response training workshop (Southern Caribbean Cetacean Network, Willemstad, Curacao, Netherlands Antilles)

The United Nations Environment Programme’s Specially Protected Areas and Wildlife Protocol is part of the Cartagena Convention for the protection and development of the marine environment in the Wider Caribbean Region. As part of this protocol, the United Nations Environment Programme recently adopted an action plan to promote marine mammal conservation in the region. The plan identifies priority actions, one of which is organizing regional training workshops to build capacity for responding to strandings and unusual mortality events. The Eastern Caribbean Cetacean Network convened an English-language stranding response training workshop in Trinidad in 2005, and workshops for the French and

Spanish-speaking Caribbean islands are scheduled for 2010. The Marine Mammal Commission provided support to convene a stranding response training workshop for the Dutch-speaking islands in the northeastern (St. Maarten, St. Eustatius, Saba) and southern (Aruba, Bonaire, Curacao) Caribbean. The workshop was held in Curacao in November 2009 and was modeled after the eastern Caribbean workshop, with the same curriculum and trainers. Objectives of the workshop included optimizing stranding responses and establishing a well-defined response system for the involved agencies and organizations on each island, ensuring use of standardized techniques and protocols for collecting and storing marine mammal specimens, and linking with other regional networks to improve research coordination.

Second International Conference on the Effects of Noise on Aquatic Life (University of Maryland, College Park, Maryland)

The First Conference on the Effects of Noise on Aquatic Life was convened in Denmark in 2007. It brought together about 250 scientists, industry representatives, and regulators from more than 20 countries to explore the potential impact of underwater sound on aquatic animals and discuss ways to address those impacts. The Marine Mammal Commission agreed to support the second conference, to be held in Ireland in 2010, which will focus on the current state of knowledge on underwater sound and its effects on aquatic animals, and scientific standards for regulating and mitigating such effects. The second conference will consider sound sources ranging from bioacoustic communication to ships, various types of sonar, acoustic deterrent devices, wind farms, explosions, seismic exploration, and offshore construction. In addition to oral and poster presentations, the conference will include working group sessions to allow participants to discuss topics such as risk analysis, approaches to analyzing behavioral responses to high-energy acoustic sources, cumulative and long-term effects of acoustic exposure combined with other stressors, and international regulatory issues.

An Ocean Infrastructure Strategy for U.S. Ocean Research in 2030 (National Academy of Sciences, Ocean Studies Board, Washington, DC)

The National Research Council of the National Academies of Science is initiating a study on the types of infrastructure and technology that will be necessary for the United States to be at the forefront of ocean science in the next 20 years. The Council is assembling an expert committee to anticipate major research questions for ocean science in 2030 and describe categories of infrastructure needed to answer those questions. The committee will not make recommendations for investments in specific facilities or technology. Instead, it will provide advice on criteria and processes for prioritizing upgrades to existing facilities and the development of new infrastructure, taking into consideration factors such as constraints on acquisition and operation of research platforms, partnerships with other nations or industry, and the ability to address diverse scientific endeavors. The final recommendations will guide federal agencies in maximizing the value of their infrastructure investments. The Marine Mammal Commission and several other federal agencies are cosponsoring this study.

A review of false killer whales in Hawaiian waters: Biology, status, and risk factors (Cascadia Research Collective, Olympia, Washington)

In 2002 the National Marine Fisheries Service surveyed the U.S. Exclusive Economic Zone surrounding the Hawaiian Islands to obtain population estimates for the 18 odontocete species known to occur in those waters. Of these, the Pacific Islands region stock of false killer whales (*Pseudorca crassidens*) has the lowest estimated population size and is the only marine mammal stock in Hawaiian waters considered “strategic” under the Marine Mammal Protection Act but not listed under the Endangered Species Act. Rates of false killer whale bycatch in the offshore longline fishery have exceeded the stock’s potential biological removal level since data first became available in 2000. Bycatch also may occur in nearshore kaka or shortline fisheries that

deploy similar gear, but these fisheries are not monitored by observers. In addition to bycatch, potential conservation threats to this species include accumulation of persistent organic pollutants and limited prey availability because of competition with commercial fisheries. The objective of this grant was to compile available information, both published and unpublished, on the status of and risk factors to the insular and offshore populations of false killer whales in Hawaiian waters. The review described what is known about false killer whale biology, population size, structure, ranges and trends, social organization and group structure, diet and foraging ecology, and conservation threats. The review also identified deficiencies with regard to available data and potential research initiatives to address these limitations. This review has been made available to management agencies to provide necessary background information for the National Marine Fisheries Service and for a take reduction team planned for 2010.

Investigating the trophic ecology and niche partitioning of two top predators of the western Antarctic Peninsula, the southern elephant seal and crabeater seal: Insights from bulk tissue and compound-specific stable isotope analyses (University of California, Santa Cruz, California)

Southern elephant seals (*Mirounga leonina*) and crabeater seals (*Lobodon carcinophaga*) are top predators that inhabit the Southern Ocean and use adjacent but distinct habitats around the western Antarctic Peninsula. Southern elephant seals consume mid-trophic-level prey including copepods, mesopelagic fish, and squid; less mobile crabeater seals primarily consume Antarctic krill, the dominant species of the southern food web in the seasonal pack ice. Given the relatively short trophic webs in the Southern Ocean and the capacity of top predators to respond to ecosystem variation, along with the rapid rate of ocean warming occurring in this region, these two predators provide an opportunity for comparative foraging studies in two different ecosystems. The investigators will analyze stable isotopes of carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) in whiskers and blood serum from each species. Isotope ratios in blood provide short-term (days to weeks prior to sample

collection) information, while metabolically slower tissues such as whiskers provide information about trophic pathways and feeding ecology on the time scale of several months to years. Results should yield insights into temporal variation in prey availability, changes in composition at the base of the food web, and niche overlap between the two species. The investigators also will compare the results of the stable isotope analyses with tracking and diving data to assess the effectiveness of the approach for describing migratory movements of elephant and crabeater seals in the Southern Ocean.

The Antarctic Treaty Summit: Science-policy interactions in international governance (University of California, Santa Barbara, California)

The Antarctic Treaty Summit was convened in Washington, DC, from 30 November through 3 December 2009 to commemorate the 50th anniversary of the signing of the Antarctic Treaty. The treaty has provided a foundation for international cooperation in managing nearly 10 percent of the Earth “for peaceful purposes only ... on the basis of freedom of scientific investigation in Antarctica as applied during the International Geophysical Year.” Conference participants, including scientists, legislators, administrators, educators, economists, historians and others, discussed factors that have contributed to the Antarctic Treaty’s resilience and successes. They also reviewed and analyzed lessons emanating from the treaty that are relevant to cooperative governance and management of marine ecosystems generally. The Marine Mammal Commission provided a grant to support production and distribution of the meeting’s final report.

Building partnerships for long-term ecological monitoring of marine mammals in the Galapagos Islands and in other marine reserves in Ecuador (Texas A&M University, College Station, Texas)

The United Nations Educational, Scientific and Cultural Organization recognized the Galapagos Islands as a World Heritage Site in 1978 because of the diversity and uniqueness of its terrestrial and marine biological communities. In 1986 Ecuador’s

Ministry of the Environment designated as a marine reserve 70,000 km² of ocean surrounding the islands. In the early 1990s the area was declared a whale sanctuary and in 1998 it was given further protection as a marine protected area. In 2008 Ecuador extended similar protections to waters adjacent to the mainland by designating new marine protected areas, including the Galera–San Francisco Marine Reserve and the Puntilla de Santa Elena Wildlife Production Reserve, which are important feeding and breeding grounds for humpback, sperm, orca, and pilot whales. In that same year the Instituto Oceanográfico de la Armada del Ecuador initiated research collaborations with marine mammal scientists from the U.S. National Marine Fisheries Service’s Southeast Fisheries Science Center and with oceanographers and biologists from Texas A&M University. The investigators then sought assistance from the Marine Mammal Commission to design and develop a plan for an integrated assessment of the physical, chemical, and biological dynamics of the marine ecosystems of the Galapagos Islands and Ecuadorian mainland. The investigator will meet with representatives from relevant government agencies in the United States and Ecuador, conservation organizations already involved in Ecuadorian and Galapagos initiatives, and expert scientists to develop a long-term ecological research plan. The plan will prioritize marine mammal research including that focusing on population and habitat assessment, movement and behavior patterns, and trophic ecology.

Pilot whale tagging in the southern Caribbean (Southern Caribbean Cetacean Network, Willemstad, Curacao, Netherlands Antilles)

The Southern Caribbean Cetacean Network was established in early 2009 with the mission of providing appropriate marine mammal stranding response and improving research on marine mammals in the wild. The network rescued a stranded pilot whale on the island of Curacao on 14 July 2009. The whale responded positively to treatment and rehabilitation, and when release of the whale appeared to be possible, the network applied to the Marine Mammal Commission for funding to prepare for the release. Investigators planned to attach a satellite-linked tag to the whale and guide the whale to a pod of wild

pilot whales in the hope that it would join them. The plan also called for the attachment of a second tag to one of the whales in the wild pod to learn more about their behavior and movements. During the single attempt to carry out the plan, the captive pilot whale maintained a distance from the wild pod and was eventually returned to the captive setting.

Transient killer whale predation in southeastern Alaska (Dena Matkin, Gustavus, Alaska)

The Marine Mammal Commission provided a grant to continue a valuable long-term time series on transient killer whales in Glacier Bay and Icy Strait in southeastern Alaska. Since 1987 scientists have collected data on these whales and their feeding ecology, behavior, and movements. Individual whales are identified using photographs that are shared with other researchers to maintain catalogs of killer whales in Prince William Sound, Alaska, and throughout southeastern Alaska and British Columbia, Canada. The goal of the study is to understand the role of these top-level predators in eastern North Pacific ecosystems.

Partnership with *Conservation* magazine (Society for Conservation Biology, Washington, DC)

The Marine Mammal Commission is partnering with the Society for Conservation Biology to help support *Conservation* magazine, a quarterly publication that explores key environmental and conservation issues from a perspective that reaches beyond individual disciplines. Features in *Conservation* include “Journal Watch,” which highlights and summarizes ground-breaking research from select publications in more than 50 top scientific journals; “Features,” in-depth investigations of particular issues that are presented in a manner atypical of the mainstream environmental press; and “Innovations,” which highlights creative ideas and new technologies that may offer solutions to conservation problems. *Conservation* is dedicated to publishing stories that present the results of scientific research in an accessible and interesting way to elevate thinking about environmental issues and promote novel and thoughtful conservation efforts.

Survey of Federally Funded Marine Mammal Research

From 1974 to 2000 the Marine Mammal Commission conducted an annual survey of federally funded marine mammal research and studies. The survey provided information on the species, geographic regions, and research topics and issues investigated, as well as the supporting and performing agencies, offices, and organizations. In 2006 and 2007 the Commission created a relational database for these funding data and analyzed funding trends between 1980 and 2000; these efforts informed the process of designing a data collection system to reinitiate the survey. In 2008 the Commission consulted with representatives of other federal agencies and then worked with Washington Consulting Government Services, formerly a subsidiary of Alion Science and Technology, to develop a Web-based survey form and data collection system.

During 2009 the Commission worked with selected federal agencies to test the survey and prepare it for online operation. The survey will be initiated in 2010, with the Commission requesting information from federal departments and agencies that conducted or supported research on marine mammals and their habitats during fiscal year 2009. The Commission anticipates issuing a similar data request early in 2011 for projects funded during fiscal year 2010 and subsequently plans to conduct the survey on an annual basis. The survey will enable the Commission and other federal agencies to track federal investment in marine mammal science, identify trends in funding, detect duplicate research efforts, prevent unnecessary spending, evaluate the effectiveness and cost-effectiveness of marine mammal research and conservation efforts, and monitor the government's success in meeting the goals of the Marine Mammal Protection Act.

Analyses of Cumulative Effects on Marine Mammals

Despite the many successes of the Marine Mammal Protection Act, a number of stocks have declined or failed to recover since protection began in the 1970s. The western population of Steller sea lions (*Eumetopias jubatus*), the North Atlantic right whale (*Eu-*

balaena glacialis), and the Hawaiian monk seal (*Monachus schauinslandi*) are prominent examples. Investigations into the causes of those declines have revealed multiple natural and human-related factors that, either individually or cumulatively, may have significant influence on the status of, or pose potential risks to, those marine mammals. In its fullest sense, the term “cumulative effects” can be broadly defined as the combined individual and interactive effects of all ecosystem variables (natural and anthropogenic) upon the survival and reproductive success of individuals within a given stock or population.

The President's 2009 Interim Framework for Effective Marine Spatial Planning (Interagency Ocean Policy Task Force 2009) highlighted the importance of cumulative effects when it noted that—

Recent scientific and ocean policy assessments have demonstrated that a fundamental change in our current management system is required to achieve the long-term health of our ocean, coasts, and Great Lakes in order to sustain the services and benefits they provide to society. The present way we manage these areas cannot properly account for cumulative effects, sustain multiple ecosystem services, and holistically and explicitly evaluate the tradeoffs associated with proposed alternative human uses.

Analyses of cumulative effects are required explicitly under the National Environmental Policy Act and the Endangered Species Act. Indeed, the Council on Environmental Quality provides guidelines for such analyses (<http://ceq.hss.doe.gov/nepa/ccenepa/ccenepa.htm>) under the National Environmental Policy Act. In a scientific context, the definition of cumulative effects just noted implies a correspondingly complex, multivariate model of the population dynamics of the organism and its interactions with its environment. A variety of statistical approaches is available to assess cumulative effects, ranging from more standard multivariate statistics to Bayesian analyses and ecosystem-based modeling exercises. However, because of the amount of data required and complexity involved, assessing the reliability of these approaches remains a

formidable challenge, and much of the work to date on cumulative effects has been hypothetical. Although these approaches are slowly being integrated into management efforts, they often lack a sound empirical foundation and their reliability is still an open question.

In recent years, analysts have devoted increasing attention to cumulative effects because of their importance to management of natural systems where multiple factors are at play and cannot be controlled. EcoPath with EcoSim (see <http://www.ecopath.org/>) may be the best known of ecosystem models, but other software packages also are available (e.g., EASy; Tsontos and Kiefer 2003). More recently, Crain et al. (2008) reviewed studies with multiple stressors to assess the nature of their interactions, and Halpern et al. (2009) developed an analysis of cumulative effects in a spatially explicit context.

The State of Cumulative Effects Analyses in 2009

In 2009 the National Center for Ecosystem Analysis and Synthesis (NCEAS) conducted a broad, spatially oriented analysis of cumulative effects by mapping human activity within the California Current Large Marine Ecosystem (Halpern et al. 2009). The purpose of the exercise was to determine likely areas of high and low anthropogenic stress on the environment. The study illustrates one process for assessing generally the cumulative effects of a wide range of human activities by incorporating them into a single spatial framework. However, it does not provide a method for quantifying the actual stress on any particular taxon of interest.

In August 2009 Okeanos sponsored a workshop entitled “Assessing the cumulative impacts of underwater noise with other anthropogenic stressors on marine mammals: from ideas to action” (Wright 2009). The workshop produced a conceptual model of such cumulative effects and two letters to the Administration emphasizing the importance of managing the cumulative effects of noise. Following the workshop, Okeanos began a case study using an empirical dataset and modeling the cumulative effects of sound on the western population of North Pacific gray whales (*Eschrichtius robustus*). This effort was ongoing at the end of 2009.

In late 2009 the Office of Naval Research, working with the University of California at Santa Barbara, initiated a series of workshops to create a risk model for marine mammal populations. The model is under development and is intended to be an expansion of a heuristic effects model created during a study by the National Research Council (2005) on the population consequences of acoustic disturbance (also referred to as the PCAD model; see Chapter VIII). The initial analysis will use northern and southern elephant seals (*Mirounga angustirostris* and *M. leonina*), for which many behavioral, physiological, foraging, and reproductive functions are well studied. Over the next 24 months, additional analyses are planned for bottlenose dolphin (*Tursiops truncatus*) populations in Doubtful Sound (New Zealand), Sarasota Bay (Florida), and Shark Bay (Australia), as well as North Atlantic right whales, and beaked whales (Ziphiidae). Although this effort is not specifically targeted at assessing cumulative effects, it will advance such assessments if successful in quantifying the transfer of disturbance impacts from individual changes in behavior to population-level effects. The science program staff at the Commission is participating in this ongoing effort.

Cumulative Effects and Stock Assessment Reports

Finally, it is worth noting that cumulative effects are an integral part of stock assessments, although they are generally not recognized as such. The stock assessment framework established under section 117 of the Marine Mammal Protection Act uses the concept of potential biological removal as a means of assessing when human-related serious injury or mortality of a marine mammal stock exceeds a level that allows its recovery to or maintenance within its optimum sustainable population level. A stock’s potential biological removal level is an estimate of 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. Section 117 requires comparing a stock’s potential biological removal level with its annual human-caused mortality and serious injury and using that comparison as a basis for determining whether or not a stock should

be considered strategic for the purposes of take reduction efforts. At present, the National Marine Fisheries Service and the Fish and Wildlife Service do not use a consistent means of presenting such information in their stock assessment reports or incorporating such information into their management strategies. The National Marine Fisheries Service has described the need to do so in its plans for improving stock assessments (National Marine Fisheries Service 2004), but progress in that direction has been slow, largely because of lack of resources to collect the information required for such analyses. With the growing emphasis on ecosystem-based management plans, adequate assessment of cumulative effects will become increasingly important. The complex costs and benefits of ecosystem-based management will require a more comprehensive assessment not only of species interactions within an ecosystem but of cumulative costs and benefits accruing from a range of human activities and dynamic ecosystem changes as well.

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Chapter VIII

MARINE MAMMAL HEALTH AND STRANDING RESPONSE

The 1992 amendments to the Marine Mammal Protection Act called for a Marine Mammal Health and Stranding Response Program. The action was largely in response to the stranding of hundreds of bottlenose dolphins (*Tursiops truncatus*) along the U.S. Atlantic coast in 1987 and 1988. The National Marine Fisheries Service subsequently established the program for the purposes of (1) facilitating the collection and dissemination of reference data on the health of marine mammals and health trends of marine mammal populations in the wild; (2) correlating the health of marine mammals and marine mammal populations in the wild with available data on physical, chemical, and biological environmental parameters; and (3) coordinating effective responses to unusual mortality events by establishing a process in the Department of Commerce in accordance with section 404 of the Act.

The 1992 amendments also directed the Secretary of Commerce to—

- establish an expert working group, the Working Group on Marine Mammal Unusual Mortality Events, to provide advice on measures necessary to better detect and respond appropriately to future unusual mortality events involving marine mammals,
- develop a contingency plan for guiding responses to such events,
- establish a fund to compensate people for certain costs incurred in responding to unusual mortality events,
- 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.

Marine Mammal Health and Stranding Response Program

On 16 March 2007 the National Marine Fisheries Service published a notice of availability of a draft programmatic environmental impact statement for its health and stranding program. The draft statement described four proposed actions:

- issuance of final guidance for *Policies and Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release*;
- issuance of a new Endangered Species Act/Marine Mammal Protection Act permit to authorize the program to take marine mammals while responding to stranding events involving endangered marine mammal species, disentangling marine mammals from fishing gear and marine debris, conducting bio-monitoring projects, and importing and exporting marine mammal tissue samples;
- continuation of current program operations, including response, rehabilitation, release, and

research activities involving marine mammals, as well as renewal and authorization of stranding agreements and other Service activities referenced in the draft statement; and

- continuation of the John H. Prescott Marine Mammal Rescue Assistance Grant Program.

The draft programmatic statement evaluated three alternatives—no action, status quo, and preferred—based on six key considerations. Under the preferred alternative, the National Marine Fisheries Service would—

- establish stranding agreement criteria and develop a new stranding agreement template;
- recommend that carcasses of chemically euthanized animals be transported offsite for disposal;
- issue new stranding authorizations, continue to authorize rehabilitation activities, and implement new standards for rehabilitation facilities;
- issue new stranding agreements, continue release activities, and implement final release criteria;
- continue the current activities of the disentanglement network on the East Coast but modify those on the West Coast, and implement disentanglement guidelines and training prerequisites; and

- issue a new Endangered Species Act/Marine Mammal Protection Act permit to include current and future biomonitoring and research activities.

On 30 May 2007 the Marine Mammal Commission wrote to the National Marine Fisheries Service, commending the program for developing the draft programmatic environmental impact statement, coordinating responses to stranding events nationwide, providing care for stranded marine mammals, and examining carcasses and collecting tissue samples to assess possible causes of morbidity and mortality. The Commission noted, however, that certain issues in the draft statement warranted more discussion and other important issues not addressed warranted inclusion. The Commission’s comments are covered in detail in the Commission’s 2007 annual report and are not repeated here. The final programmatic analysis had not been released at the end of 2009 but is expected in 2010.

Unusual Mortality Events

An unusual mortality event is defined under the Marine Mammal Protection Act as “a stranding that is unexpected; involves a significant die-off of any

marine mammal population; and demands immediate response.”

In 2009 the National Marine Fisheries Service and the Fish and Wildlife Service consulted the Working Group on Marine Mammal Unusual Mortality Events in response to four events involving dolphin mortality in the Gulf of Mexico in March, dolphin mortality along the Virginia coast in April–June, unusual levels of pinniped mortality on the West Coast in June–August, and walrus mortality in August–September. The National Marine Fisheries Service also consulted the working group regarding a 2008 event involving California har-

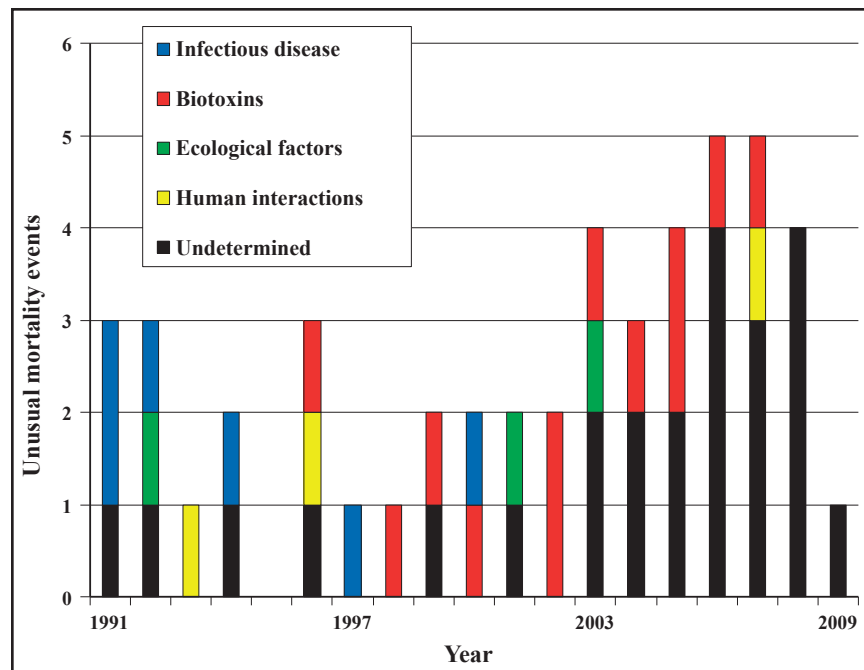


Figure VIII-1. Number of new marine mammal unusual mortality events per year by cause, 1991–2009 (Source: Gulland 2006, unpublished data)

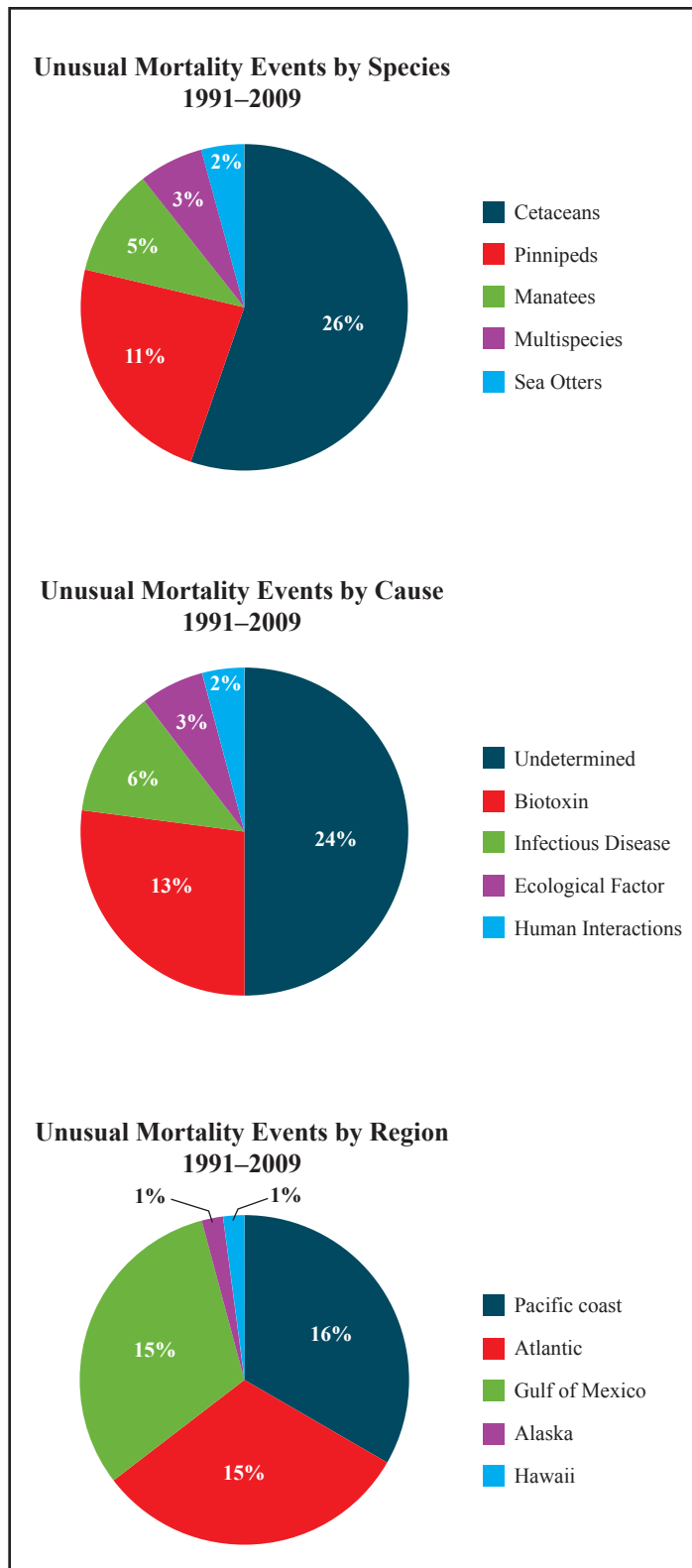


Figure 8-2. Unusual mortality events by species, cause, and region (Source: Gulland 2006 unpublished data)

bor porpoise (*Phocoena phocoena*). The working group recommended that the Service retroactively declare a “new” event for the unusual California harbor porpoise mortality in 2008 and declare a new event for Virginia bottlenose dolphins in 2009. Accounts of all 11 current events follow, beginning with the new events declared in 2009. The Office of Protected Resources in the National Marine Fisheries Service administers the unusual mortality event program, including events involving species managed by the Fish and Wildlife Service, and posts reports on these events on its Web site (<http://www.nmfs.noaa.gov/pr/health/mmume/>). Managing stranding responses is difficult, particularly when large numbers of strandings occur over a short period of time, the cause or causes are not readily apparent, a variety of analyses must be conducted, and response management requires coordination of numerous response organizations and laboratories. The numbers reported here should be considered approximate, provisional, and contingent on a final update and verification by the Service.

New Unusual Mortality Event in 2009

Virginia Bottlenose Dolphins: Between 21 April and June 2009 the National Marine Fisheries Service received reports of more than 41 dead, stranded bottlenose dolphins along the Virginia coast. Of these, 34 were found in May, and many were in an advanced state of decomposition. The Service declared the strandings to be an unusual mortality event on 1 July 2009 because the number of strandings was high relative to observations in previous years. The working group recommended that several actions be taken: stomach content analyses to identify prey and test for biotoxins; genetic analyses to determine stock identity; cytology, microbial, viral and bacterial/fungal screening on pericardial fluid and cerebral spinal fluid; ocean current hind-casting to determine the origin of the carcasses; review of active fisheries operating



Figure VIII-3. A severely emaciated sea lion. (Photo courtesy of Frances Gulland, The Marine Mammal Center)



Figure VIII-4. An elephant seal tightly entangled in fishing net. (Photo courtesy of The Marine Mammal Center)

in the mid-Atlantic area; vessel or aerial surveys 10+ km from shore to locate additional carcasses floating offshore; and investigation of environmental parameters including changes in water temperature, shifts in prey species, and presence of harmful algal blooms. The investigation was ongoing at the end of 2009.

Retroactively Declared “New” Event from 2008

California Harbor Porpoises:

Between May and November 2008 a total of 74 harbor porpoises died in the waters off northern and central California. The highest number of strandings occurred in August when a total of 24 carcasses were reported. The National Marine Fisheries Service consulted the working group on 16 December 2008. The group acknowledged that the mortalities were greater than normal but did not consider them “unusual” as defined by established criteria (<http://www.nmfs.noaa.gov/pr/health/mmume/criteria.htm>) because the strandings occurred over a relatively prolonged period and appeared to result from neonatal mortality and interspecies aggression. However, by March 2009 the Service was able to provide the working group with a more thorough review of stranding numbers including baseline information. The working group recommended that the Service declare this an unusual mortality event based on its concern that the large number of strandings might reflect the influence of a number of concurrent but unrelated events (e.g., interspecies aggression, infectious agents, neonatal mortality, domoic acid exposure, fisheries interactions) that could have raised the overall numbers. The working group also recommended that the Service and the stranding network collaborate with the required ocean observing network and other researchers to pinpoint etiology

in as many cases as possible, taking into account environmental factors such as changes in prey distribution and the probability of encounters with bottlenose dolphins. At the end of 2009 full necropsies had been completed for 34 animals and partial necropsies for 13 animals, and the investigation was ongoing.

Mortality Events Declared in 2008

Indian River Lagoon Dolphins in Florida:

From 3 May through August 2008 at least 40 bottlenose dolphins died in Florida's Indian River Lagoon. The National Marine Fisheries Service declared this an unusual mortality event on 1 August 2008 because of the high mortality of males and calves. The investigating team determined that six deaths were caused by human interactions: four involved ingestion of recreational fishing gear or trash and two involved entanglement in fishing gear. Potential causes for the remaining deaths include contaminants, biotoxins (e.g., brevetoxins, saxitoxins), or an infectious agent. Moderate blooms of the dinoflagellate *Pyrodinium* occurred in the area but peaked in mid-July after the first dolphin deaths. In addition, tests for harmful algal bloom toxicity were negative, although the on-site investigators did not consider the evidence conclusive. On 14 July 2009 the on-site coordinator requested closure of this event. The Service concurred and declared the event over on 17 July 2009.

This was the second unusual mortality event for this species in this location since 2001.

Mid-Atlantic Offshore Delphinids: Between 1 January and 26 April 2008 at least 31 common dolphins (*Delphinus delphis*) and 4 female Atlantic white-sided dolphins (*Lagenorhynchus acutus*) stranded along the Atlantic coast from New Jersey to North Carolina. Fourteen were known to be alive when they stranded, but responders euthanized all 14 because of their poor condition. The National Marine Fisheries Service declared the strandings to be an unusual mortality event on 8 April 2008 because the number of strandings was high relative to observations in previous years. Scientists performed necropsies on 23 of the 35 carcasses. Biotoxin tests were negative for samples from five carcasses. The Service declared the event over on 6 August 2008, but the investigation was ongoing at the end of 2009, pending contaminant analyses, histopathology, and evaluation of potentially relevant environmental parameters for the mid-Atlantic region, such as water



Figure VIII-5. Volunteers assist in the release of two mass-stranded white-sided dolphins. (Photo courtesy of IFAW Marine Mammal Rescue and Research)

temperature, changes in fishery effort, and changes in prey availability.

Bottlenose Dolphins in Texas: Between February and March 2008 at least 129 bottlenose dolphins and one melon-headed whale (*Peponocephala electra*) stranded along the Texas coast, with the majority of strandings in Galveston and Jefferson Counties. Investigators suspect that most, if not all, of the bottlenose dolphins were from the coastal stock although they have not conducted the genetic analyses needed to confirm that assumption. Water samples contained okadaic acid, and on 7 March 2008 officials in Texas closed some bays to shellfish harvesting because of the presence of *Dinophysis* sp., a toxic alga that causes diarrhetic shellfish poisoning in humans. On 20 March 2008 the National Marine Fisheries Service declared the dolphin deaths to be an unusual mortality event. Responders conducted necropsies on 39 carcasses. Tests for algal biotoxins from 11 dolphins revealed low levels of okadaic acid and domoic acid from toxic plankton in the feces and stomach contents in three dolphins. The limited evidence suggests that a harmful algal bloom caused this event, as well as a 2007 event involving 64 bottlenose dolphins in the same area and season. However, at the end of 2009 the stranding network was still conducting the investigation, and the Service had not officially closed the event.

Mortality Events Declared before 2008

Guadalupe Fur Seals in Oregon and Washington: On 16 November 2007 the Service declared an unusual mortality event for Guadalupe fur seals (*Arctocephalus townsendi*) based on the stranding of 19 seals on the beaches of Oregon and Washington in June through November 2007. Four additional fur seals stranded in 2008. The Guadalupe fur seal is listed as threatened under the Endangered Species Act and depleted under the Marine Mammal Protection Act. Guadalupe fur seals breed almost exclusively on Guadalupe Island, Mexico, but forage more widely in waters west of Mexico and California. Approximately six stranded Guadalupe fur seals are recorded each year in southern California, but in 2007 more than three times as many animals also stranded in Oregon and Washington, where only one stranded individual, a yearling, had been reported in previous

years. An additional live stranding in Homer, Alaska, and two other live strandings in northern California were not included in the official tally for the unusual mortality event but may be related to the Oregon-Washington strandings. The Alaska SeaLife Center, Seward, Alaska, and the Marine Mammal Center, Sausalito, California, successfully rehabilitated three live-stranded fur seals and released them back into the wild in southern California in late 2007. One animal that stranded alive in Oregon Shores, Washington, was not considered suitable for release back into the wild and is housed at SeaWorld in San Diego. Investigators conducted detailed external and internal examinations on 11 of the 23 stranded Guadalupe fur seals and suspect that malnutrition caused these strandings. In fact, the animals involved were well north of their usual range during a 2006–2007 El Niño event that likely reduced prey availability. Protozoan infections from *Toxoplasma gondii* and/or *Sarcocystis neurona* also could have contributed to the poor condition and eventual stranding of some or all of the animals. Tests for biotoxins were negative. The working group considered this event closed in April 2009, but the Service had not finalized the event report at the end of 2009.

Blue Whales along the Southern Coast of California: On 11 October 2007 the Service declared an unusual mortality event based on observations of three dead blue whales (*Balaenoptera musculus*) floating near the Channel Islands off southern California. Later the working group added a fourth dead blue whale found on the coast of San Miguel Island, one of the Channel Islands. All four carcasses exhibited injuries indicative of a vessel strike. Investigators determined that the distribution of krill (the primary food of blue whales) was closer to the surface and farther east than in previous years, which may have caused the whales to spend more time near the surface and shift their distribution closer to designated shipping lanes, where they were more vulnerable to a vessel strike. Shortly after the whales were discovered, the Port of Los Angeles, U.S. Coast Guard, and National Marine Fisheries Service issued various notices to warn mariners of the presence of the whales in or near shipping lanes. More recently, the Channel Islands National Marine Sanctuary Advisory Council recommended that the National Marine Fisheries



Figure VIII-6. A mass stranding of common dolphins off Wellfleet, Massachusetts, in April 2009 (Photo courtesy of IFAW Marine Mammal Research and Rescue).

Service and the U.S. Coast Guard issue such warnings as soon as blue whales are seen in the Santa Barbara Channel. On 26 June 2008 the Coast Guard issued another notice warning mariners of the need for caution when blue or other whales might be feeding or traveling through the area in summer and early fall. The investigation was completed in 2009, and at the end of the year the investigation team was preparing a manuscript about the event for peer-review publication in 2010 (Berman-Kowalewski et al. 2010).

Cetaceans in California: Between April 2007 and September 2008 at least 51 common dolphins, 31 harbor porpoises, 5 bottlenose dolphins, 4 gray whales (*Eschrichtius robustus*), 2 sperm whales (*Physeter macrocephalus*), 1 minke whale (*Balaenoptera acutorostrata*), 1 Risso's dolphin (*Grampus griseus*), and one unidentified small cetacean stranded along the California coast. Investigators attribute most of these strandings to domoic acid, a toxin that is produced by diatoms of the genus *Pseudo-nitzschia* and that causes amnesic shellfish poisoning in humans. However, 5 of the 51 common dolphins had gunshot wounds. Since the 1990s domoic acid has caused the death and stranding of many cetaceans and pinnipeds along the California coast. Pinniped strandings presenting evidence of domoic acid toxicity are now categorized by the Service as “repeat events.” Similar cetacean mass-stranding events were documented in 2002, 2003,

2007, and 2008. These events are referred to as repeat events for bureaucratic reasons—that is, to avoid consuming the limited resources available for responding to unusual and more novel mortality events. However, the Commission has argued that they still should be considered unusual inasmuch as they are indicative of a disturbed ecosystem. Whether classified as unusual mortality events or repeat events, they are important biological and ecological phenomena indicative of marine ecosystems under stress. For that reason, responders should continue to investigate and document these events.

Harbor Porpoises in the Pacific

Northwest: In 2006 at least 64 harbor porpoises stranded along the coasts of Oregon and Washington. On 3 November 2006 the Service declared these strandings an unusual mortality event beginning on 11 January 2006. In 2007 another 50 porpoises stranded, bringing the total to 114. The number of adult and subadult strandings was similar to that in previous years, but the number of calf and yearling strandings increased greatly during 2006 and 2007. During that period, responders found only six of the stranded porpoises alive. They released four back to the sea and euthanized the other two for humane reasons. Investigators conducted detailed postmortem examinations of 82 porpoises. They found evidence of accidents and traumas, including interactions with fishing gear, in about one-fourth of the animals examined. For about one-third, the investigators found evidence of nutritional stress, toxicity, and a variety of symptoms indicative of disease or parasite infestation. The investigators have not determined cause of death for the remaining animals but are analyzing tissue samples for biotoxins and evidence of infectious disease. The investigators also are examining potentially relevant environmental data, such as sea-surface temperatures and currents. The number of reported strandings could have increased as a result of a number of factors, including population growth, a shift in population density or distribution, disease, and an increase in public awareness and reporting.



Figure VIII-7. Volunteers come to the aid of pilot whales in this 2002 mass stranding. (Photo courtesy of IFAW Marine Mammal Rescue and Research)

In 2008 the working group recommended that the Service declare this event over and the Service did so in 2009. The investigators continued their analyses and preparation of the final report throughout 2009.

Humpback Whales along the Atlantic Coast: Between 1 January 2006 and 31 December 2007 scientists documented 48 deaths of humpback whales (*Megaptera novaeangliae*) along the Atlantic coast: 46 in U.S. waters, 1 in Canadian waters, and 1 in waters off Bermuda. Twenty-nine were found floating at sea, making sampling difficult. Responders conducted full or partial necropsies on 16 carcasses. Eight showed signs of entanglement in fishing gear, and six showed signs of a vessel strike. One calf appeared to have died from starvation, possibly after becoming separated from its mother. Responders sampled four carcasses for biotoxins. One tested positive for domoic acid and another for saxitoxin, but the detected levels likely were too low to have caused mortality. In July 2008 the working group recommended that the Service declare this event over

and the Service did so in 2009. The investigators continued their analyses and preparation of the final report throughout 2009.

Alaska Sea Otters: As described in the Commission's 2007 annual report, the frequency of sea otter (*Enhydra lutris*) strandings in south-central Alaska began to increase in 2000, or perhaps earlier, and by the summer of 2006 the rate exceeded one stranding per day in Cook Inlet's Kachemak Bay. Until 2006 the annual number of strandings ranged from 16 to 67. On 24 August 2006 the Service declared an unusual mortality event. From 2006 to 2008 the annual number of strandings has been between 99 and 111. The total strandings reported in 2002 through 2008 were 449. Some of the increase in 2006–2008 may reflect increased effort to find and recover dead and stranded animals, particularly in the more populated areas near Homer and around Kachemak Bay. However, the age and gender of the dead animals and early necropsy findings suggest that the increase in mortality was not the result of greater effort alone. Prime-age adult males composed

an unexpectedly large proportion of the carcasses. By the end of 2009 responders had recovered more than 336 carcasses and conducted partial or full necropsies on 304 of them, including 64 cases for which final histopathology reports have been completed. The investigating team found evidence of vegetative endocarditis and signs of sepsis in 52 percent of the 64 cases that were subjected to full histopathological exams. The team found the bacteria *Streptococcus bovis* complex or *Streptococcus infantarius* subsp. *coli* in these cases. Most of the stranded otters were from the south-central Alaska stock, particularly Kachemak Bay, but about 10 percent were from the southwest stock, which is listed as threatened under the Endangered Species Act. The working group considered this event to be ongoing at the end of 2009 and the investigation team continued to work on and monitor the unusual mortality event.

Updates on an Unusual Mortality Event Closed in 2008

Pinnipeds in the Northeastern United States:

In 2006 more than 1,100 pinnipeds, mostly subadult and adult gray seals (*Halichoerus grypus*) and harbor seals (*Phoca vitulina*), stranded along the northeastern U.S. coast. The number of strandings was considerably greater than the average from previous years (about 230, mostly pups), and the Service declared an unusual mortality event. Early investigations revealed evidence of morbillivirus in a few stranded animals, which led to concern that this virus might cause a large die-off as it did in northern Europe when approximately 20,000 seals died in 1988 and 2002. In 2006 investigators took samples and conducted tests for morbillivirus, herpes virus, *Brucella*, leptospirosis, avian flu, biotoxins and chemical contaminants. In 2007 the number of strandings was lower than average, but sampling and testing for morbillivirus continued because of concern about a pandemic. In total, investigators

tested samples from 853 individuals, most of which were harbor seals because historical records indicate gray seals are not as vulnerable to morbillivirus. Results from the analyses indicated that a small portion of the seals tested positive for phocine distemper virus, and further studies have since been conducted to investigate the prevalence of that virus in the stranded animals collected during the unusual mortality event. Recent increases in gray and harbor seal populations from the Gulf of Maine south to Cape Cod complicate the interpretation of this event. Many of the animals involved were sub-adults or adults, suggesting that the cause was not a simple function of population growth. Although humpback whale strandings along the Atlantic coast overlapped this event in space and time, the existing evidence does not indicate a link between them. In June 2008 the Service concluded that the event occurred between 20 April 2006 and 31 October 2007 and therefore declared the unusual mortality event to be over. At the end of 2009 investigators were preparing the event report.

Prescott Grant Program

The Marine Mammal Rescue Assistance Act of 2000 amended Title IV of the Marine Mammal Protection



Figure VIII-8. Volunteers work with staff from the International Fund for Animal Welfare in an attempt to extricate a dolphin from the mud. (Photo courtesy of IFAW Marine Mammal Rescue and Research)

Act and instructed the Secretaries of Commerce and the Interior to conduct a competitive grant program to be known as the John H. Prescott Marine Mammal Rescue Assistance Grant Program. The program, which is subject to the availability of appropriations, provides financial awards for participants of marine mammal stranding networks to carry out critical activities including recovery and treatment of stranded marine mammals, collection of data from living and dead stranded marine mammals, and payment of operational costs directly related to those activities. Awards may not exceed \$100,000 and may extend no longer than three years. An applicant may receive no more than two awards per annual competition.

The National Marine Fisheries Service administers the grant program for species under its management jurisdiction. 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 2009 technical and merit review panels evaluated 84 eligible proposals and selected 43 for funding. The National Marine Fisheries Service distributed \$3.7 million among those 43 projects and three additional grants to the National Fish and Wildlife Foundation for use in emergencies. In July 2009 the National Marine Fisheries Service solicited proposals for grants to be awarded in fiscal year 2010 and received 76 proposals.

Marine Mammal Rescue Assistance Bill of 2009

During the year, both the House of Representatives and the Senate gave consideration to the Marine Mammal Rescue Assistance Bill of 2009. The Senate version of the bill is the more comprehensive. It would expand the scope of the John H. Prescott Marine Mammal Rescue Assistance Grant Program to include entangled as well as stranded marine mammals. The bill also would rename the program as the John H. Prescott Marine Mammal Rescue and Response Funding Program and would authorize appropriations to the program for fiscal years 2010 to 2014. It also would establish in the U.S. Treasury

an interest-bearing fund entitled the John H. Prescott Marine Mammal Rescue and Rapid Response Fund and allow the Secretary of the Treasury to solicit, accept, receive, hold, administer, and use gifts, devises, and bequests for marine mammal stranding and entanglement responses. In addition, the bill would amend funding provisions to authorize advance payments under contracts or other mechanisms to support property, services, supplies, salaries, and travel costs involved in responding to an entangled or stranded marine mammal. The bill would add stranding or entangling events requiring emergency assistance to the program's duties and would authorize carrying out the program through grants, cooperative agreements, contracts, or other arrangements. The bill would define the terms "entanglement" and "emergency assistance," and it would broaden the sources and allowed uses of amounts in the Marine Mammal Unusual Mortality Event Fund. Finally the bill would change the limit for an individual project to \$200,000 for any 12-month period.

The House of Representatives passed its version of the bill on 2 March 2009. On 6 August 2009 the Committee on Commerce, Science, and Transportation reported the bill to the full Senate without amendment and filed report No. 111-70. At the end of 2009 the bill had not yet been considered by the full Senate.

Office of Naval Research Stress and Immune Response Research

In some cases, the factors that cause marine mammals to strand are readily apparent, whereas in others those factors and their biological significance are difficult to diagnose and evaluate. Examples of the former include entanglement in marine debris or fishing gear and ship strikes. Examples of the latter include exposure to contaminants, biotoxins, human-generated sound, and climate change, and marine mammals may exhibit a range of responses to such factors. At one end of the spectrum, the effect or their response may involve only slight alterations in physiology and/or behavior that have no effect on their ability to reproduce or survive and therefore could be considered biologically insignificant. In contrast, an intermediate effect or response could be

described as one having the potential to cause a measurable decrease in their probability of reproducing or surviving and therefore could be biologically significant. Finally, a third category of effect or response would be one considered more or less certain to affect reproduction and survival and therefore almost certainly biologically significant. Determining where to draw the line between these types of effects or responses has proven to be a great challenge but is often at the heart of debates about the potential effects of human activities on marine mammals.

In 2005 the National Research Council published a report entitled “Marine Mammal Populations and Ocean Noise: Determining When Noise Causes Biologically Significant Effects” (National Research Council 2005). The report presents a heuristic model that illustrates how an interaction may lead to a significant consequence at both individual and population levels (Figure VIII-9). The potential effects of a risk factor (sound, in the case of this report) cascade from changes in behavior to life functions to vital rates and, ultimately, to population status. The panel that prepared the report provided a number of recommendations to help investigate the relationships involved. One of those recommendations was to develop, validate, and calibrate the use of glucocorticoid and other serum hormone concentrations to assess stress in various marine mammal species, age classes, and conditions. Glucocorticoids were identified for this research because they appear to moderate or influence the relationship between changes in behavior and reproduction or survival.

In November 2009 the Office of Naval Research held a workshop on “The Effects of Stress on Marine Mammals Exposed to Sound.” The workshop brought together experts in stress research to discuss stress physiology as it applies to marine mammals, identify key research areas for investigating the stress response in marine mammals, and create a plan for linking stress response with potential population-level effects. Workshop participants discussed (1) the importance of context (i.e., the physiological state of the animal experiencing stress); (2) the need for

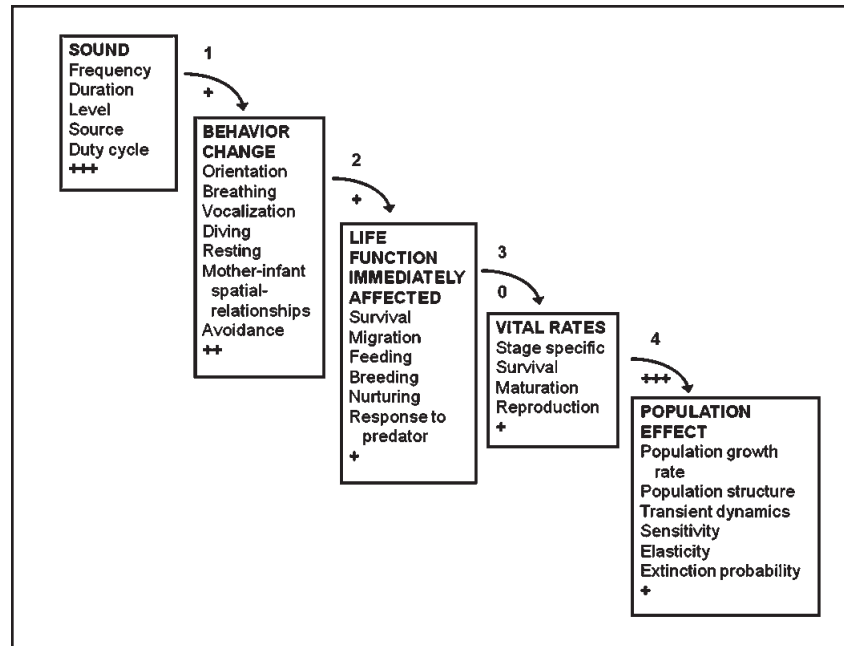


Figure VIII-9. The conceptual Population Consequences of Acoustic Disturbance model describes several stages required to relate acoustic disturbance to effects on a marine mammal population. Five groups of variables are of interest, and transfer functions specify the relationships between the variables listed, for example, how sounds of a given frequency affect the vocalization rate of a given species of marine mammal under specified conditions. Each box lists variables with observable features (sound, behavior change, life function affected, vital rates, and population effect). In most cases, the causal mechanisms of responses are not known. For example, survival is included as one of the life functions that could be affected to account for situations such as the beaked whale strandings, in which it is generally agreed that exposure to sound leads to death. The causal steps between reception of sound and death are by no means known or agreed on, but the result is clear. The “+” signs at the bottom of the boxes indicate how well the variables can be measured. The indicators between boxes show how well the “black box” nature of the transfer functions is understood; these indicators scale from “+++” (well known and easily observed) to “0” (unknown). (From NRC 2005)

means to assess stress levels based on skin rather than blood samples, various biomarkers (i.e., biological indicators of stress level) and/or physiological measures such as heart rate; (3) the importance of studies using captive animals; and (4) the utility of a diagnostic library. At the end of 2009 the Office of Naval Research was compiling a report on the workshop.

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Chapter IX

MARINE MAMMAL-FISHERY INTERACTIONS

Marine mammals and fisheries interact in many ways throughout the world's oceans. Operational interactions (often referred to as "direct") include bycatch of marine mammals in fishing gear, entanglement in active or discarded fishing gear, depredation of fish catch (marine mammals taking bait or catch from the gear), and measures to harass marine mammals to protect gear and catch (Northridge and Hofman 1999). Ecological (i.e., "indirect") interactions include competition for prey or changes to ecosystem trophic structure brought about by the removal of fish from the ecosystem. The Marine Mammal Protection Act and the Magnuson-Stevens Fishery Conservation and Management Act contain provisions authorizing regulations to minimize the interactions between fisheries and marine mammals, and the Endangered Species Act also applies in cases involving threatened or endangered marine mammals.

Each year operational fishery interactions result in the deaths of thousands of marine mammals in U.S. fisheries and in the hundreds of thousands worldwide (Read et al. 2006, Read 2008). In addition, fisheries for wild stocks have more or less peaked, and aquaculture is expected to increase significantly in the coming decades (FAO 2009). This will undoubtedly be a source of direct interactions, particularly with pinnipeds. The ecological effects of fishing may be equally or more severe, but they have received less attention in fishery management, given the difficulties in understanding complex marine habitats and food webs. Developments in ecosystem-based and adaptive management should promote better assessment and management of ecological fishery interactions. All of the interactions, operational and ecological, can reasonably be expected to increase in the foreseeable future as marine mammal populations recover from previous states of depletion and human populations continue to grow, thereby increasing demand for seafood and coastal habitat.

This chapter describes efforts taken during 2009 to improve stock assessments and the data on fishery interactions needed to make informed management decisions about those stocks. It also describes the activities of take reduction teams created to address

incidental mortality and serious injury of marine mammals in fisheries and the implementation of new provisions related to international marine mammal bycatch and illegal, unreported, and unregulated fishing.

Stock Assessments and Fishery Interactions

The Marine Mammal Protection Act establishes a regime for assessing and reducing the incidental take of marine mammals in commercial fisheries. The Act requires federal resource agencies to (a) assess the status of all marine mammal stocks in U.S. waters, (b) monitor the incidental take of marine mammals by commercial fishing operations, (c) classify fisheries based on their relative level of incidental take, and (d) implement fishery management measures or take reduction plans to address situations where incidental take is not sustainable.

The Marine Mammal Protection Act requires the National Marine Fisheries Service and the Fish and Wildlife Service to prepare and periodically update marine mammal stock assessment reports for each stock occurring in U.S. waters under their respective jurisdictions.¹ Within each stock assessment report,

the Services describe the geographic range of the stock and estimates of the stock's minimum population size, population trend, current and maximum net productivity rates, and potential biological removal level (PBR).² This level is calculated based on the stock's minimum population estimate, maximum net productivity rate, and a recovery factor that is designed to provide additional protection based on the relative status of the stocks and account for uncertainties other than those related to the abundance estimate. Each stock assessment report is also required to describe commercial fisheries that interact with the stock and to estimate human-caused mortality and serious injury of the stock. Finally, each report is required to categorize each stock as strategic or not strategic. Stocks that are listed as threatened or endangered under the Endangered Species Act or depleted under the Marine Mammal Protection Act are considered to be strategic by default. Other stocks are categorized as strategic if the estimate of human-caused mortality and serious injury for the stock exceeds its PBR level.

On 11 June 2009 the National Marine Fisheries Service published its proposed List of Fisheries for 2010 (74 Fed. Reg. 27739). Among other things, the Service proposed to (1) list the Hawaii shortline fishery as category II, (2) reclassify the American Samoa longline fishery from category III to category II, (3) reclassify the California pelagic longline fishery from category II to category III, (4) place the spiny lobster component of the category III California spiny lobster, coonstripe shrimp, rock crab, and tanner crab pot/trap fishery into category II, and (5) add the Gulf of Maine/Bay of Fundy harbor porpoise stock to the list of species or stocks incidentally killed or injured in the northeast bottom trawl fishery. By letter of 10 August 2009, the Marine Mammal Commission concurred with the proposed changes and recommended that the Service also (a) classify the Alaska southeast salmon purse seine fishery as category II, (b) reclassify the Gulf of Alaska sablefish longline fishery from category III to category II, (c) reclassify all currently

recognized West Coast trap and pot fisheries (i.e., those off Washington and Oregon as well as those off California) as category II, (d) develop and implement expanded monitoring programs for the California halibut, white seabass, and other species set gillnet fishery (3.5-in mesh) and the California yellowtail, barracuda, and white seabass drift gillnet fisheries (mesh size ≥ 3.5 in and < 14 in), (e) revise the published List of Fisheries to accurately reflect the number of active state and federally permitted vessels and participants in the northeast and mid-Atlantic fisheries, and (f) continue to designate the Gulf of Maine/Bay of Fundy harbor porpoise as the reason for classifying the mid-Atlantic gillnet fishery as a category I fishery until the Service has more definitive information indicating that the number of removals is below 50 percent of the stock's PBR level.

In its letter, the Marine Mammal Commission also reiterated several recommendations regarding past Lists of Fisheries that have yet to be adopted. Specifically, the Commission again recommended that the Service (1) develop and implement the research and monitoring programs needed to manage high-seas fisheries in a manner consistent with the requirements of the Marine Mammal Protection Act and the High Seas Driftnet Fishing Moratorium Protection Act, (2) expedite its investigation of bottlenose dolphin stock structure in the Gulf of Mexico, (3) expand its efforts to collect reliable information on serious injury and mortality rates of marine mammals incidental to Gulf of Mexico fisheries, (4) reevaluate the classification of Gulf of Mexico fisheries as information becomes available, and (5) indicate the level of observer coverage for each fishery as part of the List of Fisheries. This last step is essential for evaluating the reliability of take estimates, which, as just described, are the basis for categorizing fisheries.

In addition to the proposed changes, the Service also requested comments on whether the 1995 conclusion to exempt tribal fisheries from the List of

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

² PBR is an estimate of the number of individuals that could be taken as a result of human activities while still allowing the stock to recover to or remain at its optimum sustainable population size.

Fisheries should be changed due to *Anderson v. Evans*. In response, the Commission recommended that the Service (1) include tribal fisheries on the List of Fisheries, (2) revise its regulations implementing section 118 (e.g., 50 C.F.R. § 229.1(d)) to clarify that treaty tribal fisheries are subject to the requirements of the Marine Mammal Protection Act, including section 118, and (3) begin working with the affected tribes to integrate the registration process with existing licensing or permitting systems if it appears that some tribal fisheries will be listed as category I or category II fisheries. The Commission also recommended that the Service notify all treaty tribes believed to be engaged in hunting that any directed taking of marine mammals requires authorization under the Marine Mammal Protection Act and incorporate into the applicable stock assessment reports language similar to that included in the Fish and Wildlife Service's stock assessment report for the Washington stock of sea otters to clarify that, in accordance with the ruling in *Anderson v. Evans*, any such taking requires authorization under the Marine Mammal Protection Act.

On 26 June 2009 the National Marine Fisheries Service announced that its draft stock assessment reports were available for review (74 Fed. Reg. 30527). On 24 September 2009 the Commission provided comments, recommending that the Service—

- work with the Commission to complete a review of stock assessment efforts to date;
- review its national observer program to identify gaps and determine the resources that are needed to (1) observe all fisheries that do or may interact directly with marine mammals and (2) provide reasonably accurate and precise estimates of serious injury and mortality levels;
- work with federal and state fisheries management agencies and the industry to develop a funding strategy that will support adequate observer programs for collecting data on incidental mortality and serious injury of marine mammals and other protected species;
- identify all transboundary stocks that are subject to partial assessment and develop a strategy to provide complete assessments, whether by expanding surveys and observation programs or working in conjunction with foreign or interna-

tional marine resource or fishery management organizations;

- (a) list as “unknown” the potential biological removal level for all beaked whale stocks for which there is a reasonable basis for concern that they are being taken in fisheries or by other human activities and (b) respond to any evidence of such take with a review and development of mitigation measures as needed; and
- develop and implement a systematic approach for integrating all human-related risk factors into stock assessment reports.

The Commission also provided comments by region on each stock assessment report. To improve stock assessment efforts in the Atlantic and Gulf of Mexico, the Commission recommended that the National Marine Fisheries Service—

- expedite its proposed rule to implement and enforce the needed protective measures for the Gulf of Maine/Bay of Fundy harbor porpoise stock;
- estimate the take rate for the Canadian east coast stock of minke whales using a Poisson distribution and then use existing data to calculate the level of observer coverage needed to generate take estimates with acceptably small confidence intervals;
- conduct and report the necessary surveys to update stock assessment reports for northwest Atlantic pinnipeds; and
- improve stock assessments for bottlenose dolphins in both the Atlantic and the Gulf of Mexico by conducting the research needed to describe their stock structure, provide more accurate and precise estimates of the abundance and trends of the various stocks, and provide more accurate and precise estimates of the level of dolphin serious injury and mortality in the fisheries and from other human activities in these regions.

To improve stock assessment efforts in the Alaska region, the Commission recommended that the National Marine Fisheries Service—

- proceed with formal recognition of 12 stocks of harbor seals in Alaska and then proceed with the necessary research and management of those stocks, as required by the Marine Mammal Protection Act;

- continue to seek the additional support needed to develop and implement an ice seal research and management strategy that is commensurate with the grave threats that they face; and
- work with the Minerals Management Service to ensure that funding for research on the eastern stock of North Pacific right whales is incorporated into the Administration's fiscal year 2011 budget.

Finally, to improve stock assessment efforts in the Pacific, the Commission recommended that the National Marine Fisheries Service—

- investigate the possible sources of fishery-related harbor porpoise mortality from central California to the Washington coast and place observers on vessels in fisheries that may be taking harbor porpoises to more accurately estimate the total bycatch;
- convene a take reduction team to address longline fishery interactions with the Hawaii pelagic stock of false killer whales; and
- build the needed capacity in the Pacific Islands Fisheries Science Center and Regional Office to assess and manage the many cetacean stocks in the Pacific that have heretofore been given far from adequate attention.

Although the National Marine Fisheries Service has taken many steps to improve the marine mammal stock assessment process, the Marine Mammal Commission believes that for many stocks those assessments are not satisfying the intent of the 1994 amendments to the Marine Mammal Protection Act. The Commission made its opinion known in several letters to the National Marine Fisheries Service (dated 21 September 2009 and 24 September 2009) and to the Fish and Wildlife Service (dated 10 September 2009 and 18 September 2009), each of which highlighted how Congress's intent to promote informed decision-making to protect and conserve marine mammals affected by human activities remains unfulfilled. In the Commission's opinion, the Services cannot achieve that goal without adequate data on stock status, trends, and mortality. To date, the necessary data have not been collected for many stocks and are outdated and unreliable for others. These shortcomings are exacerbated by inconsistency across regions in ways of dealing with the

resulting uncertainty. The Commission understands that stock assessments are particularly difficult for marine mammals in remote areas and with certain natural history traits (e.g., ice-breeding seals and deep-diving pelagic species). Nonetheless, in the absence of essential stock assessment information, the Service is at risk of forming inappropriate conclusions that place marine mammal stocks, and the ecosystems of which they are a part, at unnecessary risk. In the Commission's opinion, these and other problems suggest that the stock assessment framework incorporated in the 1994 amendments to the Act is ripe for review to determine how well it is working overall and to identify and address the most important shortcomings.

Take Reduction Teams

Section 118 of the Marine Mammal Protection Act (16 U.S.C. 1387) directs the National Marine Fisheries Service to prepare take reduction plans for each strategic marine mammal stock interacting with a category I or category II fishery. Such plans also may be developed when a category I fishery causes a high level of mortality and serious injury involving one or more non-strategic marine mammal stocks. Individual take reduction plans often address multiple marine mammal stocks and fisheries with similar or related incidental take problems. In accordance with the Act, the goals of a take reduction plan are to (1) reduce serious injury and mortality to less than the potential biological removal level within six months of the plan's implementation date and (2) reduce serious injury and mortality to insignificant levels approaching a zero rate within five years. That insignificance threshold is defined by the Service as less than 10 percent of the potential biological removal level (69 Fed. Reg. 43338).

The Service uses take reduction teams to develop recommendations for measures to be included in take reduction plans and to monitor the implementation of plans until the Service has determined that the goals have been met. Team members include representatives of relevant fisheries, conservation groups, the academic community, fishery management organizations, and the involved federal and state agencies. A representative of the Marine Mammal Commission

participates on most of the teams. The Service has convened eight take reduction teams since enactment of the 1994 amendments to the Marine Mammal Protection Act. The Atlantic offshore cetacean team was disbanded after regulatory action largely eliminated takes by the fisheries of concern. In 2007 the Gulf of Maine harbor porpoise team and mid-Atlantic harbor porpoise team were merged to form a single harbor porpoise team. Thus, six teams were in place during 2009 (Table IX-1).

stocks' population size or mortality level to calculate the extent of incidental take. Given available marine mammal stock assessment and take data, the report identified 30 stocks that have met Marine Mammal Protection Act requirements for establishing a take reduction team and determined that the Service has established six teams that cover 16 of those stocks. The report further noted that the Service has had limited success in meeting the deadlines for establishing teams, developing draft take reduction plans, and

Table IX-1. Take reduction teams established under the Marine Mammal Protection Act in place in 2009

Take Reduction Team	Date Established	Team Focus
Atlantic large whale	1996	Take of right, humpback, and fin whales in various Atlantic coast trap and gillnet fisheries for lobster, crabs, conchs/whelks, groundfish, monkfish, sharks, hagfish, and other finfish
Pacific offshore cetacean	1996	Take of short-finned pilot, sperm, pygmy sperm, humpback, and beaked (Cuvier's, Baird's, and <i>Mesoplodon</i> spp.) whales in Pacific drift gillnet fisheries for sharks and swordfish
Harbor porpoise	1996/1997	Take of harbor porpoises in various Atlantic coast set gillnet fisheries for groundfish (e.g., haddock, cod, and flounder), coastal finfish, spiny dogfish, and monkfish
Bottlenose dolphin	2001	Take of bottlenose dolphins in various mid-Atlantic set gillnet, trap, seine, and pound net fisheries for coastal finfish, dogfish, and crabs
Atlantic pelagic longline	2005	Take of long- and short-finned pilot whales and Risso's dolphins in Atlantic coast pelagic longlines for swordfish, sharks, and tuna
Atlantic trawl gear	2006	Take of long-finned and short-finned pilot whales, common dolphins, and white-sided dolphins in Atlantic coast trawl nets for various finfish, squid, and shellfish

Government Accountability Office Review

As described in detail in the Commission's annual report for 2008, the Government Accountability Office conducted a review of take reduction efforts and published its report, "National Marine Fisheries Service: Improvements Are Needed in the Federal Process Used to Protect Marine Mammals from Commercial Fishing," in December 2008 (<http://www.gao.gov/new.items/d0978.pdf>). The report found that limited data currently make it difficult for the Service to determine which marine mammal stocks meet the statutory requirements for establishing take reduction teams. The report observed that, for most stocks, the agency was relying on incomplete, outdated, or imprecise data on

publishing proposed and final plans and regulations to implement them. Finally, the report concluded that the Service lacks a comprehensive strategy for assessing the effectiveness of take reduction plans and regulations that have been implemented. It noted that the agency has taken some steps to define goals, monitor compliance, and assess whether the goals have been met, but shortcomings in its approach and limitations in its performance data weaken its ability to assess the success of its take reduction regulations.

To address these shortcomings, the Government Accountability Office suggested that Congress consider the following actions:

- direct the National Marine Fisheries Service to report on major data, resource, or other limita-

tions that make it difficult for the agency to accurately determine which marine mammals meet the statutory requirements for establishing take reduction teams, establish teams for stocks that meet these requirements, and meet the statutory deadlines for take reduction teams;

- amend the statutory requirements for establishing a take reduction team to stipulate that not only must a marine mammal stock be strategic and interacting with a Category I or II fishery but that the fishery with which the marine mammal stock interacts causes at least occasional incidental mortality or serious injury of that particular marine mammal stock; and
- amend the Marine Mammal Protection Act to ensure that its deadlines give the Service adequate time to publish proposed and final take reduction plans and implementing regulations while meeting all the requirements of the federal rulemaking process.

The Government Accountability Office further recommended that the Service “develop a comprehensive strategy for assessing the effectiveness of each take reduction plan and implementing regulations, including, among other things, establishing appropriate goals and steps for comprehensively monitoring and analyzing rates of compliance with take reduction measures.” On 4 May 2009 the Service finalized a “Statement of Actions Taken” in response to the report, in which it stated its agreement with the recommendations of the Government Accountability Office and expressed its intent to comprehensively assess the take reduction process by periodically reviewing the work of all teams and determining the plans’ effectiveness in reducing incidental mortality and serious injuries of marine mammals. The Service worked with each team, as necessary and appropriate based on team status and needs, to monitor plan compliance and develop appropriate performance measures and criteria for assessing plan success. Those activities were under way at the end of 2009 and were expected to be completed in 2010.

Team Activities During 2009

The following is a discussion of the teams that were active in 2009, with the exception of the Atlan-

tic Large Whale Take Reduction Team. That team is discussed in the right whale section in Chapter IV, Species of Special Concern.

Pacific Offshore Cetacean Take Reduction

Team: The Service first convened this team in February 1996 to reduce serious injuries and deaths of several marine mammal stocks incidental to the California/Oregon thresher shark/swordfish drift gillnet fishery. The strategic stocks of concern at that time included short-finned pilot whales (*Globicephala macrorhynchus*), sperm whales (*Physeter macrocephalus*), pygmy sperm whales (*Kogia breviceps*), humpback whales (*Megaptera novaeangliae*), and beaked whales (Cuvier’s, Baird’s, and *Mesoplodon* spp.). The Service implemented the team’s recommended take reduction measures in October 1997, and by June 1998 the Service found that the team had achieved its six-month goal of reducing bycatch to below the potential biological removal level for all strategic stocks.

Since then, the team has met periodically to monitor mortality and serious injury rates and recommend any needed regulatory adjustments. The most recent team meeting was 27–28 May 2009 in Moss Landing, California, during which the team reached consensus on a set of recommendations to the Service. First, based on the draft 2009 Stock Assessment Report (Carretta et al. 2009), the team found that it had achieved take reduction goals for all species taken except short-finned pilot whales. Because of one observed death of a short-finned pilot whale in 2003, the mean annual mortality and serious injury estimate of short-finned pilot whales was 1.0 for the years 2002 to 2006. As a result, the estimated take exceeded the potential biological removal level, which was calculated as 0.98 for this stock. However, the Service indicated that no further action was warranted because the take rate would be recalculated (to zero) in 2010 based on the years 2004 to 2008 when no takes occurred.

The team also reviewed the status of the long-beaked common dolphin stock. Although the fishery had reduced mortality and serious injury of long-beaked common dolphins to below 10 percent of the potential biological removal level, total annual average mortality and serious injury of long-beaked common dolphins in all fisheries combined exceeded that

level. Therefore, the team determined that the long-term goal had been met for all stocks except long-beaked common dolphins. The team found that regular meetings were no longer necessary and the team should be reconvened only if (1) the five-year average annual mortality and serious injury of a strategic stock exceeds the significance threshold, (2) observer coverage decreased to below 10 percent, (3) new information becomes available on opening or changing the size of the northern closure area, or (4) new information becomes available on an alternative pinger frequency or new technology to reduce mortality or serious injury.

To ensure progress toward the goal of continuing to reduce mortality and serious injury of marine mammals, the team also recommended (1) mandatory deployment of 36-ft net buoy extenders, (2) mandatory use of pingers, (3) voluntary permit reduction programs, (4) continuation of annual skipper education workshops, (5) increased boardings of unobserved vessels to monitor compliance, (6) alternate means of reporting set locations for unobserved vessels, (7) continuation of observer data collection programs, at a minimum of 20 percent coverage, and (8) continuation of marine mammal abundance surveys at least every three years. Finally, the team recommended a set of metrics to evaluate the plan's effectiveness, including goal attainment, appropriate enforcement and full compliance levels, and observer coverage of at least 20 percent. The metrics were based on the recommendations in the Government Accountability Office report on take reduction team effectiveness.

Harbor Porpoise Take Reduction Team: This team is charged with reducing the incidental take of harbor porpoises (*Phocoena phocoena*) from the Gulf of Maine/Bay of Fundy population (hereafter referred to as the Gulf of Maine harbor porpoise population). These porpoises migrate seasonally along the U.S. East Coast and are taken in U.S. waters by various gillnet fisheries operating from the Canadian border south to Cape Hatteras, North Carolina. In the early 1990s two take reduction teams were convened to address this issue, but the Service suspended team meetings in the late 1990s after bycatch levels fell below the stock's potential biological removal level. By 2007 bycatch had increased above that level, and

the Service reconvened the team. Based on currently available information, the Gulf of Maine harbor porpoise population is estimated to number about 89,000 porpoises, and its calculated potential biological removal level is estimated at 703 porpoises per year (Waring et al. 2009).

From 2003 to 2007 the average annual fishing-related mortality of harbor porpoises from the Gulf of Maine stock was 860. That number includes an estimated 45 porpoises taken in Canadian gillnet fisheries, but the Canadians have not monitored their bycatch since the late 1990s and the number of takes in Canadian waters is uncertain. In 2007 the estimated bycatch in U.S. waters alone totaled 453 porpoises (including 395 from the northeast sink gillnet fishery and 58 from the mid-Atlantic gillnet fishery).

The increase in bycatch levels in the mid-2000s prompted the Service to reestablish the team to address poor compliance with bycatch reduction measures and a shift in fishing effort to waters outside management areas where bycatch measures had been imposed. The team met once in December 2007 and again by conference call in January 2008 to review information on bycatch levels. During those meetings, the team recommended that the Gulf of Maine Harbor Porpoise Take Reduction Plan and associated regulations be revised. The team recommended increased enforcement and fisheries outreach efforts and expansion of the system of management areas in which seasonal fishing closures and gear requirements apply. For management areas off New England, those recommended gear requirements include the use of pingers, which are small electronic devices that emit pulses of sound at set frequencies to deter porpoises from approaching nets. In waters between New York and North Carolina, the recommended requirements include restrictions on net twine diameter, the number of nets per vessel, the length of soak times (i.e., the amount of time nets can stay in the water), and the use of tie-downs to reduce the height of nets between float and lead lines. To speed compliance, the team also recommended a set of "consequence" measures that would become effective immediately if certain take reduction goals were not achieved.

During 2008 and 2009 the Service worked on developing the regulations and associated review documents to revise the take reduction plan, and on

21 July 2009 it published a proposed rule (74 Fed. Reg. 36058) based on the team's recommended regulatory and non-regulatory measures. In the New England region, the proposed rule would expand the seasonal effective times and geographic extent of several management areas requiring the use of pingers. For the mid-Atlantic region, the proposed rule would modify certain gear restrictions and establish a new management area off New Jersey in which more stringent gear restrictions and a seasonal closure period would apply. The proposed rule also identified specific target bycatch rates for management areas within two sub-regions (i.e., 0.023 porpoise per metric ton of fishery landings for management areas south of Massachusetts and Rhode Island and 0.031 porpoise per metric ton of landings for management areas off eastern New England). The proposed rule would trigger seasonal closures for all gillnet fishing within specific areas if bycatch exceeds those target rates for two consecutive fishing seasons.

On 20 August 2009 the Marine Mammal Commission provided comments to the Service on its proposed rule. The Commission commended both the team and the Service for its efforts to address the increased take of harbor porpoise and recommended that the Service adopt the measures in the proposed rule, provided certain additional points were addressed. First, the Commission recommended that the Service base bycatch estimates on all regional fisheries that seriously injure or kill harbor porpoises. In this regard, the Commission noted that harbor porpoise also are taken in the northeast trawl net fishery, for which data are available to estimate bycatch levels, and in the Bay of Fundy groundfish sink gillnet fishery in Canada.

Second, to address harbor porpoise takes in Canada, the Commission further recommended that the Service consult with its Canadian counterparts on the need to resume an observer program to assess harbor porpoise bycatch in the sink gillnet fishery.

Third, the Commission recommended that the Service codify the "western Gulf of Maine closure area" that had been established as part of a fishery management plan developed pursuant to the regulations for the Harbor Porpoise Take Reduction Plan. The team recommended permanent closure of this area to reduce harbor porpoise take and to prevent

fishery managers from modifying the closure in the future. Initially, the Service rejected the closure claiming that the New England Fishery Management Council was not currently considering modifications to the closure provision and that approximately half of the closure area would be subject to pinger requirements if it were eliminated. The Commission found this line of reasoning faulty, given the length of time the Service requires to adopt regulations and the fact that the closure afforded far more protection for harbor porpoise than the fallback position of requiring the use of pingers in half the closure area.

Finally, to monitor the effectiveness of pingers in preventing harbor porpoise bycatch, the Commission recommended that the Service either (1) provide pinger detection devices to observers working in areas where pingers are required to determine if pingers are functioning properly or (2) provide observers with extra pingers that could be used to replace the two pingers nearest the location of any porpoise that is caught in a net so that the pingers in use at the time of the take could be collected for later testing.

At the end of 2009 the Service had not yet published final rules for revising the Harbor Porpoise Take Reduction Plan and expected to do so early in 2010.

Bottlenose Dolphin Take Reduction Team: In the late 1990s the Service estimated that gillnet, seine, trap, and pound net fisheries along the Atlantic coast were taking more than 200 bottlenose dolphins annually between New York and the central Florida coast. The Service convened this team in 2001 and adopted a Bottlenose Dolphin Take Reduction Plan in 2006 to reduce those takes. Efforts to develop the plan had been hampered by uncertainty as to the structure, range, movement patterns, and abundance of the various dolphin stocks involved. As a result, apportioning takes to presumed stocks required several assumptions while stock structure was being further investigated. In 2009 results from satellite tagging, photo-identification, and genetic studies provided the Service sufficient information to conclude that coastal bottlenose dolphins comprise at least nine estuarine dolphin stocks between the Florida Keys and New York, as well as two migratory stocks in open Atlantic waters (Table IX-2).

Table IX-2. Identified bottlenose dolphin stocks along the U.S. Atlantic coast (Waring et al. 2009)

Stock	Minimum Abundance	Potential Biological Removal Level
Western North Atlantic offshore	70,775	566
Western North Atlantic coastal morphotype	Undetermined	Undetermined
Northern North Carolina estuarine system	Undetermined	Undetermined
Southern North Carolina estuarine system	Undetermined	Undetermined
Charleston estuarine system	Undetermined	Undetermined
Northern Georgia/southern South Carolina estuarine system	Undetermined	Undetermined
Southern Georgia estuarine system	Undetermined	Undetermined
Jacksonville estuarine system	Undetermined	Undetermined
Indian River Lagoon estuarine system	Undetermined	Undetermined
Biscayne Bay	Undetermined	Undetermined
Florida Bay	447	4.5

In March 2009 the Service held a teleconference of team members to consider the implications of the new stock structure and other information on needs for revising the Bottlenose Dolphin Take Reduction Plan. On 9–11 September 2009 the Service convened an additional team meeting to discuss recent bycatch information. At that time, the Service advised the team that it lacked information on the abundance and potential biological removal levels for the newly identified stocks. However, the Service also informed the team that recent data on bycatch and the status of the various stocks indicated that takes of the northern North Carolina estuarine stock were most likely at or above the stock's potential biological removal level. Information on this stock's movement patterns also indicates that at least some dolphins move north along the Virginia coast to the lower Chesapeake Bay where the pound net fishery is known to take at least some dolphins. For that reason, the pound net fishery may be responsible for taking at least some dolphins from the northern North Carolina estuarine stock.

During its September meeting, the team reviewed information on the pound net fishery and concluded that a measure restricting the height of leader nets would be a useful mitigation measure for dolphins and turtles. Based on information on the occurrence of dolphins in Virginia waters, the team recommended that the Bottlenose Dolphin Take Reduction Plan be revised to include regulations consistent with

those established within two sea turtle regulatory areas inside the mouth of the Chesapeake, as well as all state waters seaward of the Chesapeake Bay Bridge-Tunnel across the mouth of the Chesapeake and along the state's Atlantic coast. The team recommended that the revisions apply year-round and that inspection and certification requirements be consistent with those required under regulations to protect turtles.

The team also identified research priorities including (1) genetic or photo-identification studies to determine the stock of bottlenose dolphins taken in fisheries or found stranded with net marks; (2) new abundance estimates for each bottlenose dolphin stock covered under the plan to ensure that their respective potential biological removal levels are accurate; and (3) studies of the distribution of the northern North Carolina estuarine stock in (a) Pamlico Sound in summer using biopsy samples for genetic analyses and (b) ocean waters where this and other stocks overlap and the source stock for dolphins taken in fisheries is uncertain.

Among other matters, the team also recommended that the Service—

- increase observer efforts to obtain photos of dolphin dorsal fins and biopsies of any dolphins taken in fisheries to help identify the stocks from which they were taken, and if possible, to collect the entire carcass of any dead dolphins;

- increase observer coverage of the inshore Spanish mackerel fishery in Pamlico Sound;
- collect additional information on the blue crab pot/trap fishery and encourage states to develop programs for retrieving derelict pots and traps;
- coordinate federal and state enforcement efforts, particularly with regard to the Virginia pound net fishery; and
- continue outreach and education efforts with the fisheries, particularly the Virginia pound net fishery.

Atlantic Pelagic Longline Take Reduction

Team: This team is charged principally with reducing the incidental take of short-finned and long-finned pilot whales (*Globicephala macrorhynchus* and *G. melas*) and Risso's dolphins (*Grampus griseus*) by longline vessels fishing for tuna and swordfish in U.S. waters along the Atlantic and Gulf of Mexico coasts and in the Caribbean region. Because the two species of pilot whales are virtually indistinguishable even by trained observers and because their ranges overlap off the Atlantic coast between New York and North Carolina, neither survey scientists nor fishermen can distinguish them by eye in the field. The Service has therefore combined the two species into a single pilot whale complex for management purposes. The highest rates of marine mammal bycatch in this fishery have involved pilot whales taken along the Atlantic coast, principally between Cape Cod and South Carolina. In 2007, the most recent year for which bycatch rates have been fully analyzed, the estimated take of pilot whales in the pelagic longline fishery off the Atlantic coast was 57 whales (zero mortalities and 57 serious injuries), representing a substantial decline from the 2006 estimate of 185 whales (16 mortalities and 169 serious injuries) and well below the average annual mortality rate over the most recent five-year period (i.e., 2003–2007) of 110 whales (Waring et al. 2009).

The team provided recommendations to the Service in June 2006 and, based on those recommendations, the Service published proposed regulations in June 2008 (73 Fed. Reg. 35623). The proposed regulations called for (1) establishing a research area along the continental shelf off northern North Carolina where longline vessels would be required to report plans for trips 48 hours in advance of leaving port

and carry observers if requested to do so, (2) limiting the length of deployed longlines to no more than 20 nm (37 km), and (3) requiring that all longline vessels fishing off the Atlantic coast post placards in the wheelhouse and work area describing marine mammal handling and release guidelines. The purpose of the research area, which includes areas where bycatch rates had been greatest, would be to gather additional data on fishery interactions with pilot whales and other species taken. On 22 September 2008 the Commission provided comments on the proposed rule to the Service, recommending that it increase funding for research on distinguishing the two pilot whale species and their stock structure, expand observer coverage on longline vessels in the Atlantic region to resolve uncertainties about the accuracy of calculated bycatch estimates, and revise the proposed regulations to require that the information placards be posted on all U.S. longline vessels fishing for Atlantic tuna and swordfish, not just those off the Atlantic seaboard.

On 19 May 2009 the Service adopted final rules (74 Fed. Reg. 23349) for the Atlantic Pelagic Longline Take Reduction Plan as initially proposed in 2008. In doing so, the Service noted that it would attempt to increase observer coverage in the Atlantic pelagic longline fishery to between 12 and 15 percent to the extent that funding allowed. It also noted that it would pursue research priorities identified in the plan as funding permitted, particularly (1) studies on species with serious injury and mortality levels closest to or exceeding potential biological removal levels, (2) research to evaluate effects of implemented management measures, and (3) research on species-specific abundance, mortality, and post-hooking survivorship. With regard to the Commission's recommendation for requiring posting of placards aboard all longline vessels fishing for Atlantic tuna and swordfish, the Service noted that it had rejected the recommendation because its proposed measure covered the area of highest bycatch.

The team did not meet in 2009, but the Service has planned a teleconference in 2010 to update team members on progress and results concerning implementation of the new take reduction plan.

Atlantic Trawl Gear Take Reduction Team: This team is charged with reducing incidental takes of short-finned and long-finned pilot whales, Atlan-

tic white-sided dolphins (*Lagenorhynchus acutus*), and short-beaked common dolphins (*Delphinus delphis*) in various mid-water and bottom trawl fisheries along the U.S. Atlantic coast. The team was convened in 2006 and an Atlantic Trawl Gear Take Reduction Strategy was adopted by the Service in 2008. Based on data available in 2009, all of the marine mammal stocks subject to incidental take in these fisheries were below their calculated potential biological removal level (Waring et al. 2009) but above their long-range zero mortality rate goal.

The team did not meet in 2009, but during the year the Service, in cooperation with Garden State Seafood Association, developed a guide for trawl net fishermen on reducing marine mammal incidental takes. The team also was advised that in 2010 the Service plans to conduct a mid-winter pilot whale biopsy sampling study in the mid-Atlantic region. Pilot whales have been the species of greatest concern in these fisheries, and incidental take rates are currently estimated at about two-thirds of the calculated potential biological removal level for the combined long-finned and short-finned species group. The planned study will take place in the times and areas where pilot whale bycatch rates have been highest, and it is intended to resolve uncertainty concerning the allocation of incidental takes of these species in this region where their ranges overlap.

The Tuna-Dolphin Issue

Schools of large yellowfin tuna (greater than 25 kg, or 55 lbs) tend to associate with dolphin schools in the eastern tropical Pacific Ocean (an area of 18.1 million km² or 5 million mi² between southern California, Chile, and Hawaii). For decades, fishermen have deployed large purse seine nets around dolphin schools to catch the tuna swimming below. Despite fishermen's efforts to release the dolphins unharmed, some dolphins trapped in the nets are killed or injured. Estimated dolphin mortality in the early years of the fishery, the 1960s, was in the hundreds of thousands per year (Wade 1995), resulting in the sharp reduction of several dolphin stocks. Efforts to reduce this incidental mortality have been a primary focus of the Marine Mammal Protection Act and international agreements governing the eastern tropical Pacific

tuna fishery. Direct incidental mortality from international fisheries now averages fewer than 2,000 dolphins annually as a result of measures taken under these regimes and the adoption of certain fishing practices such as the backdown procedure (during which the back portion of the net is lowered to allow encircled dolphins to escape) and the use of fish-aggregating devices (which attract tuna independent of dolphins, allowing fishing without encircling dolphins). Nevertheless, at least two dolphin stocks that had been heavily affected by the fishery—the northeastern offshore spotted dolphin (*Stenella attenuata*) and the eastern spinner dolphin (*Stenella longirostris*)—remain depleted.

The Eastern Tropical Pacific Tuna Fishery

The eastern tropical Pacific tuna fishery, once dominated by U.S. vessels, is now primarily conducted by foreign fleets. As such, efforts to minimize the impact on dolphin stocks affected by the fishery are largely addressed in international forums, including the Inter-American Tropical Tuna Commission, and associated international agreements. The United States has been active in these forums and has enacted domestic legislation to implement the agreements and link access to the substantial U.S. tuna market to compliance with those agreements. In addition, the United States has mandated standards for labeling tuna (imported and domestic) as “dolphin-safe,” reflecting the preferences of U.S. consumers.

In 1980 the foreign fleet had about 80 large purse seine vessels (those vessels with a capacity of 400 short tons/363 metric tons or greater [Sakagawa 1991]). Since then, overall fleet capacity and the number of sets on dolphins increased. This growth prompted the Inter-American Tropical Tuna Commission to adopt a resolution in 2002 capping the size of the international fleet and establishing a vessel registration requirement. Its registry of vessels licensed to participate (<http://www.iattc.org/VesselRegister/VesselList.aspx?List=AcPS&Lang=ENG>) now includes about 155 large purse seine vessels. Of those, two large purse seine vessels are listed for the United States (compared with more than 110 in the 1970s, before the registry existed), and no U.S. vessel has intentionally set on dolphins since 1994. Although some accidental marine mammal deaths

may occur when purse seine nets are deployed on schools of tuna that are not associated with large schools of dolphins (the most recent such mortality by a U.S. vessel occurred in 2002), none was reported in 2009 in conjunction with U.S. fishing operations.

The annual number of sets on dolphins in the eastern tropical Pacific tuna fishery peaked at 13,760 in 2003 and remained at about 12,000 for the next two years before dropping to about 9,000. Fishermen made an estimated 10,910 sets on dolphins in the eastern tropical Pacific in 2009 (Inter-American Tropical Tuna Commission staff, pers. comm.). The number of sets on dolphins made over the past three decades is shown in Figure IX-1. The decline in the number of sets in 2006 and 2007, coupled with the low reported incidental mortality rate (about 0.1 dolphin per set), resulted in record low numbers of reported dolphin deaths (fewer than 900) incidental to the fishery in those years.³ Estimated dolphin mortality increased to 1,169 dolphins in 2008 and 1,239 in 2009, which nevertheless remains considerably below the aggregate dolphin mortality limit of 5,000 per year allowed under the Agreement on the International Dolphin Conservation Program (see following discussion). Although this level of mortality does not appear to be biologically significant to the affected dolphin stocks, possible unreported mortality and stress from 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, the general increase in the number of sets on dolphins over the last several decades remains a cause for concern. The estimated annual kill of dolphins incidental to the eastern tropical Pacific purse seine tuna fishery since enactment of the Marine Mammal Protection Act is listed in Table IX-3.

Parties to the Inter-American Tropical Tuna Commission also have become concerned about the

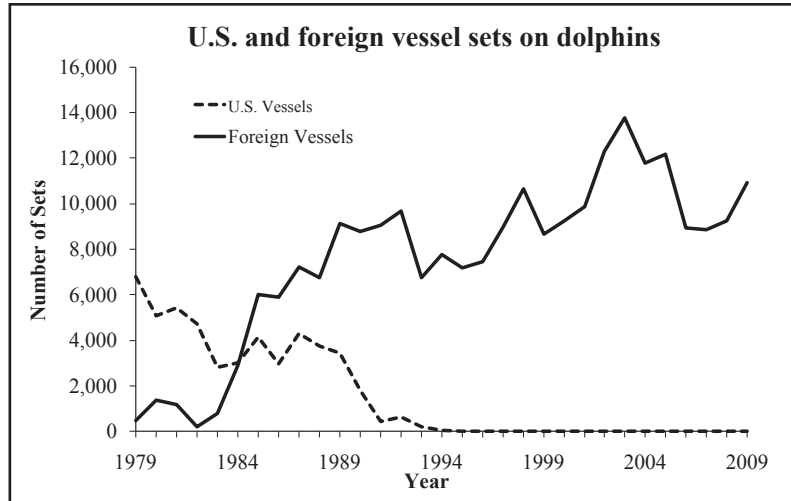


Figure IX-1. Sets on dolphins by U.S. and foreign fleets, 1979–2009.

potential for vessels less than 400 short tons in capacity to set on dolphin schools. Historically, international management organizations thought that vessels of less than 400 short tons carrying capacity could not successfully set on dolphins; therefore, only vessels above that threshold have been subject to dolphin-safe labeling and observer requirements. However, according to the Inter-American Tropical Tuna Commission, vessels smaller than 400 short tons have made approximately 300 sets on dolphins since 1987. In response to this concern, parties to the Agreement on the International Dolphin Conservation Program adopted a resolution in 2002 specifying that any vessel of 400 short tons or less carrying capacity identified as having intentionally set its nets on dolphins will be required to carry an observer on subsequent fishing trips. In 2009 the Inter-American Tropical Tuna Commission adopted a resolution to continue the observer requirement for each trip made by a vessel greater than 400 short tons. Moreover, the 2004 Consolidated Appropriations Act (Pub. L. 108-447), which funded the U.S. National Marine Fisheries Service's 2005 tuna-dolphin program, 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

³ Information on estimated number of sets on fish associated with dolphins, and mortality of dolphins caused by the fishery, are available from the Inter-American Tropical Tuna Commission's Web site on the Agreement on the International Dolphin Conservation Program (<http://www.iattc.org/DolphinSafeENG.htm>).

Table IX-3. Estimated incidental kill¹ of dolphins in the tuna purse seine fishery in the eastern tropical Pacific Ocean, 1972–2009

Year	U.S. Vessels	Non-U.S. Vessels	Year	U.S. Vessels	Non-U.S. Vessels
1972	368,600	55,078	1991	1,002	26,290
1973	206,697	58,276	1992	439	15,111
1974	147,437	27,245	1993	115	3,601
1975	166,645	27,812	1994	105	4,096
1976	108,740	19,482	1995	0	3,274
1977	25,452	25,901	1996	0	2,547
1978	19,366	11,147	1997	0	3,005
1979	17,938	3,488	1998	0	1,852
1980	15,305	16,665	1999	24	1,348
1981	18,780	17,199	2000	0	1,636
1982	23,267	5,837	2001	0	2,140
1983	8,513	4,980	2002	0	1,499
1984	17,732	22,980	2003	0	1,492
1985	19,205	39,642	2004	0	1,469
1986	20,692	112,482	2005	0	1,151
1987	13,992	85,185	2006	0	886
1988	19,712	61,881	2007	0	838
1989	12,643	84,403	2008	0	1,169
1990	5,083	47,448	2009	0	1,239 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.

tons are known to engage in this practice.” This provision has yet to be implemented. The Commission’s annual report for calendar year 2008 provides a more thorough history of this topic.

The International Dolphin Conservation Program Act

In 1995 representatives of the United States and 11 other nations signed the Declaration of Panama, stating their intentions to make binding some of the voluntary steps taken to reduce incidental dolphin mortality in the tuna fishery. The formal international agreement envisioned under the Declaration of Panama, the Agreement on the International Dolphin Conservation Program, entered into force in February 1999. As part of its implementation of that agreement, the United States committed to seek changes in U.S. law, among other things, to open its market

to all tuna caught in compliance with the agreement, whether caught by setting on dolphins or not, and to redefine dolphin-safe tuna to include tuna caught in the eastern tropical Pacific by a purse seine vessel in a set in which no dolphin deaths were observed. However, in the International Dolphin Conservation Program Act (Pub. L. 105-42), the legislation enacted in 1997 in advance of the final agreement, Congress directed that the dolphin-safe label could be used only if the Service determined, after completing a specified research program, that chase and encirclement—even when no observed dolphin deaths occur—do not have a significant adverse impact on any depleted dolphin stock. In 2002 the Service issued a finding of no significant adverse impact, which would have allowed the dolphin-safe label to be applied consistent with the agreement. Before that change could be implemented, the underlying finding

was invalidated by reviewing district and appellate courts in *Earth Island Institute v. Hogarth*. As a result, tuna marketed in the United States can be labeled as being dolphin-safe only if no dolphins were killed or seriously injured during the sets in which the tuna were caught and if none of the tuna were caught on a trip in which purse seine nets were intentionally set on dolphins. More information on the background of this issue is available in the Commission's previous annual reports.

In addition to the mandated research on the effects of chase and encirclement on dolphin stocks, the National Marine Fisheries Service has made a commitment to continue to monitor the status of dolphin stocks in the eastern tropical Pacific by conducting periodic abundance surveys. The Service had been planning to conduct dolphin and ecosystem assessment research cruises in the eastern tropical Pacific during 2009. However, the Service wrote to the Marine Mammal Commission on 16 April 2009 explaining that, because of funding constraints, it intended to postpone the cruises until 2010. The Commission replied by letter of 1 June 2009, noting that recent analyses (Gerrodette et al. 2008) had determined that the northern offshore stock of spotted dolphins appeared to be growing and that the most recent abundance estimate of the eastern spinner dolphin is substantially higher than previous estimates. In contrast, these analyses indicated a possible declining trend for the western/southern offshore stock of spotted dolphins. In light of the preliminary nature of these findings, the Commission stressed the need to substantiate them through additional research. Although the Commission recognized the budgetary limitations that necessitated postponement of the research cruises, the Commission believed that carrying them out in 2010 should be given high funding priority. In the Commission's view, these cruises provide important insight into large-scale oceanographic processes and are one of the best examples of an ecosystem-based approach to fisheries management.

Regulatory Revisions

The National Marine Fisheries Service published interim regulations to implement the International Dolphin Conservation Program Act in January 2000. These were superseded by final regulations published

by the Service on 13 September 2004. On 11 July 2008 the Service published a proposed rule to revise those regulations to update and clarify certain provisions and to reflect resolutions adopted by the Inter-American Tropical Tuna Commission and the parties to the Agreement on the International Dolphin Conservation Program. The Commission submitted comments on those proposed regulatory changes on 11 August 2008. The Commission recommended that the Service decline to adopt a proposed change in the definition of the term "tuna product" that would specify that the term applies only to a product processed for retail sale and intended for human consumption. The Commission pointed out that the proposed definition would be inconsistent with the legislative history of the term and its statutory definition. Specifically, the legislative report that accompanied the House bill that led to adoption of the enacted definition stated the intent to include pet food within the scope of that definition.

The proposed rule also included a provision that would specify the types of high-intensity floodlights that must be carried by U.S. vessels that are issued a dolphin mortality limit. Although the Commission agreed with including such a provision in the regulations to enable fishermen to address unanticipated problems, it also thought that the Service should clarify that the availability of this equipment in no way changes the prohibition set forth in the Marine Mammal Protection Act and elsewhere in the Service's regulations on making sundown sets or initiating sets at night.

In addition, noting that the International Dolphin Conservation Program Act draws a distinction between large purse seine vessels (greater than 400 short tons) and those thought to be of a size or type not capable of setting on dolphins, the Commission believed the proposed rulemaking provided an appropriate opportunity for the Service to revise its regulations to provide more precise standards for making this distinction. In particular, the Commission called the Service's attention to the directive set forth in the Consolidated Appropriations Act, 2005 (Pub. L. 108-447) that it revise downward the standard for distinguishing these two categories of vessels from the current threshold of 400 short tons carrying capacity. Finally, the Commission identified certain provisions

of the Act that no longer were applicable and recommended that they be deleted.

On 13 January 2009 the Service issued a final rule (74 Fed. Reg. 1607) to implement revisions to the regulations for this fishery. Consistent with the Commission's recommendation, the Service retracted its proposal to redefine the term "tuna product" in a manner that would limit it to products processed and sold for human consumption; therefore, the definition of the term would remain unchanged in the regulations (50 C.F.R. § 216.3). Regarding the Commission's recommendation to revise downward the 400 short-ton threshold for distinguishing large vessels from small vessels (i.e., those not capable of setting on dolphins), the Service declined to follow the Commission's recommendation. The Service responded that such a change would not be within the scope of the rulemaking, described studies under way to collect information on characteristics that make a vessel capable of setting on dolphins so that it could determine meaningful thresholds, and noted that—for international purposes—revised definitions of large and small vessels would need to be approved by the parties to the Agreement on the International Dolphin Conservation Program. Regarding the Commission's recommendation on floodlight requirements, the Service concurred that the requirements would not alter the prohibition on making sundown sets. The Service also deleted a series of provisions that were no longer applicable, as recommended. The final rule became effective on 12 February 2009.

World Trade Organization Consultation

On 24 October 2008 Mexico contacted the World Trade Organization to initiate consultations with the United States to resolve alleged violations of the Marrakesh Agreement Establishing the World Trade Organization. Mexico identified three measures that it considers to be inconsistent with U.S. obligations under that agreement: the Dolphin Protection Consumer Information Act, the dolphin-safe labeling requirements of the Marine Mammal Protection Act, and the ruling in *Earth Island Institute v. Hogarth* relating to those standards. Mexico alleges that such measures prohibit the labeling of its tuna as being dolphin safe even though the tuna are harvested in ways that comply with the dolphin-safe standard

established by the Inter-American Tropical Tuna Commission. Mexico believes its tuna products are accorded less-favorable treatment than like products of the United States and other countries and that those differences are not based on an existing international standard. Mexico therefore contends that the U.S. measures present an unnecessary obstacle to trade and are inconsistent with the General Agreement on Tariffs and Trade.

On 9 March 2009 Mexico requested that the World Trade Organization establish a panel concerning U.S. limitations on the use of a dolphin-safe label. In response, the Office of the U.S. Trade Representative stated that, as a responding party to Mexico's request to the World Trade Organization, it had a right to request that the North American Free Trade Agreement serve as the forum for resolving this dispute, and it invoked this provision (Article 2005(4) of the North American Free Trade Agreement) on 24 March 2009. Nevertheless, at its meeting on 20 April 2009 the World Trade Organization's Dispute Settlement Body responded to Mexico's request and established a panel (members to be named later), with the following countries declaring an interest in the case as third parties: Argentina, Australia, Brazil, Canada, China, Ecuador, the European Union, Guatemala, Japan, Korea, New Zealand, Chinese Taipei, Thailand, Turkey, and Venezuela. Then, because Mexico did not move its dolphin-safe labeling dispute to the North American Free Trade Agreement, on 5 November 2009 the Office of the U.S. Trade Representative requested dispute settlement consultations with Mexico under the North American Free Trade Agreement. Mexico continued to pursue a World Trade Organization settlement process, and on 2 December 2009 Mexico requested the Director-General to determine the composition of the panel. The Director-General composed a three-member panel on 14 December 2009. As of the end of 2009 the United States and Mexico continued to uphold differing interpretations of how this dispute should be resolved.

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. An affirmative finding is made for a five-year period but is subject to annual review to determine whether the exporting country is continuing to meet its obligations under the International Dolphin Conservation Program (see 50 C.F.R. § 216.24(f)(8)) and as a member of the Inter-American Tropical Tuna Commission. In 2005 the Service issued affirmative findings for Ecuador, Mexico, and Spain, granting them access to the U.S. market through 31 March 2010, and it issued an affirmative finding for El Salvador in 2008, allowing access until 31 March 2013. On 13 August 2009 the Service found that each of those countries had met the Marine Mammal Protection Act's requirements to have its affirmative finding renewed for another year; thus, those affirmative findings remain in place. In 2009 embargoes remained in place for Belize, Bolivia, Colombia, Guatemala, Honduras, Nicaragua, Panama, Peru, Vanuatu, and Venezuela, all of which have vessels fishing for tuna in the eastern tropical Pacific Ocean but have not secured an affirmative finding. Tuna embargoes also are to be imposed against nations that import yellowfin tuna originating from harvesting countries on the U.S. embargo list to prevent nations from gaining access to the U.S. market by shipping through a second or intermediary nation. Currently, no embargoes are in place for any intermediary nation.

Fish Imports to the United States

When it enacted the Marine Mammal Protection Act in 1972, Congress recognized the importance of promoting marine mammal conservation beyond U.S. waters. Section 101(a)(2) of the Marine Mammal Protection Act directs the Secretary of the Treasury to “ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of United States standards.” Subparagraph (A) of that provision further directs the Secretary of Commerce to “insist on reasonable proof from the government of any nation from which fish

or fish products will be exported to the United States of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the United States.” Although these requirements have been included in the Act since its enactment, the National Marine Fisheries Service has yet to promulgate implementing regulations other than those pertaining to importation of yellowfin tuna from the eastern tropical Pacific tuna purse seine fishery (see previous section in this chapter).

In 2008 the Center for Biological Diversity and the Turtle Island Restoration Network submitted a petition to the Departments of Homeland Security, the Treasury, and Commerce requesting that those departments initiate rulemaking to implement their non-discretionary duties under section 101(a)(2) of the Act as they pertain to imports of swordfish from other countries. The petitioners made a compelling case that swordfish fisheries in various countries that export fish to the United States are causing significant mortality and serious injury of marine mammals, and they sought a ban on the importation of swordfish and swordfish products from those countries that do not meet U.S. standards.

On 15 December 2008 the Service published a *Federal Register* notice (73 Fed. Reg. 75988) announcing receipt of the petition and requesting comments on the petition in general and specifically on how it should define “United States standards” for purposes of applying section 101(a)(2) of the Act. Although the Service published this notice as a precursor to an envisioned rulemaking, the underlying statutory provisions arguably supply sufficient guidance for the Service to act on the swordfish petition absent the issuance of general regulations identifying the applicable U.S. standards. For example, section 2 of the Act calls for maintaining the health and stability of the marine ecosystem and recovering marine mammal populations to and maintaining them at optimum sustainable population levels. Section 103(a) specifies that authorized marine mammal take levels not be to the disadvantage of the affected species and stocks.

The Act also includes standards specific to the taking of marine mammals in commercial fisheries that could be applied. For example, section 118(f)

requires prompt agency action to reduce take levels for all U.S. commercial fisheries in which incidental mortality and serious injury of marine mammals exceed the potential biological removal level of any affected stock. Section 118(b)(1) further requires that commercial fisheries reduce incidental mortality and serious injury of marine mammals to insignificant levels approaching a zero rate. Other potentially applicable standards are set forth in fishery management plans developed under the Magnuson-Stevens Fishery Conservation and Management Act.

On 29 January 2009 the Marine Mammal Commission provided comments and recommendations to the Service regarding U.S. standards and other actions for implementing section 101(a)(2) of the Act. It recommended that the Service adopt both quantitative standards, such as whether the fisheries are exceeding the potential biological removal levels of the affected marine mammal stocks, and performance standards, such as whether a foreign fishery has adopted fishing practices (e.g., prohibition of certain gear types) or other measures to reduce marine mammal bycatch. It also recommended that the Service take immediate steps to obtain the information required under section 101(a)(2)(A) from all countries that export swordfish to the United States, whether directly or as an intermediate exporter, and work with other appropriate federal agencies to ban swordfish imports from any country that fails to provide reasonable proof that the fishing technology in use does not result in the incidental kill or serious injury of marine mammals in excess of U.S. standards. Finally, given the requirement that countries exporting fish and fish products to the United States provide reasonable proof that measures in foreign fisheries achieve the intended effect of protecting marine mammals from excessive injury and mortality, the Commission recommended that the Service require nations wishing to export swordfish or swordfish products to the United States to submit information on the methods and effectiveness of fishery monitoring and enforcement activities and consider that information in making determinations under section 102(a)(2).

The Service did not take further action on the swordfish petition during 2009. However, informal discussions between the Service and the Commission

during 2009 indicated that the Service was preparing and intended to publish in 2010 an advance notice of proposed rulemaking to solicit comments on possible regulations for identifying more specifically the standards applicable under section 101(a)(2) of the Act and establishing implementing procedures.

Illegal, Unregulated, and Unreported Fishing and Bycatch

In 2007 Congress reauthorized the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (P.L. 109-479), strengthening it with new authorities for combating illegal, unreported, and unregulated (IUU) fishing and bycatch of protected living marine resources (i.e., marine mammals, sea turtles, sharks, and non-target protected species of fish). Title IV of the Act directs the Secretary of Commerce to define IUU to include fishing activities that violate international conservation and management measures, including bycatch reduction measures, required under agreements to which the United States is a party.

Title IV also authorizes the Secretary to facilitate IUU information sharing, participate in international monitoring and surveillance programs, and promote international registries of IUU fishing vessels. It also directs the Secretary to identify nations with fishing vessels engaged in IUU fishing or fishing that results in the bycatch of protected living marine resources and to consult with those nations to facilitate action against those vessels. For nations listed because of bycatch of protected living marine resources, the Act directs the Secretary to seek to initiate or update any international agreements for conserving such species, in addition to nation-to-nation consultations and assistance.

Finally, Title IV also authorizes a secretarial certification procedure for verifying whether any corrective actions were implemented to facilitate trade among nations and vessels that cease or prevent IUU fishing and bycatch of protected living marine resources. Every two years, the Secretary must provide a report to Congress that includes the status of international fish stocks, a list of nations with IUU fishing vessels or vessels whose actions result in the bycatch of protected living marine resources, an

assessment of corrective measures taken against those vessels, and other international actions taken by the Secretary to combat IUU fishing.

In January 2009 the Secretary of Commerce issued the first report on IUU fishing and protected species bycatch entitled “Implementation of Title IV of the Magnuson-Stevens Fishery Conservation and Management Act of 2006.” The report identified France, Italy, Libya, Panama, the People’s Republic of China, and Tunisia as having IUU fishing vessels in 2007 and 2008. The report did not identify any nations as having issues with bycatch of protected living marine resources. The listings were based mainly on information received from agencies and regional fisheries management organizations and through public comment, and they represent a subset of all initially identified nations that the Secretary might have listed. Certain nations identified in the public comment process either successfully refuted their listing or the Secretary found that they did not satisfy the technical requirements of Title IV.

Despite the brevity of the lists, the report noted that the Secretary was undertaking bilateral and multilateral steps to decrease and halt IUU fishing and bycatch of protected living marine resources, such as initiating studies to identify those nations most at risk of protected living marine resource bycatch based on fishing practices and the distribution of protected species. The report also indicated that the Secretary intends to maintain and enhance assistance (especially in the area of observer training and timely reporting) to countries with potential bycatch issues.

On behalf of the Secretary, the National Marine Fisheries Service also took steps to implement the provisions of Title IV. On 14 January 2009 the Service issued a proposed rule (74 Fed. Reg. 2019) to implement the identification and certification procedures called for in the reauthorization act. In the proposed rule, the Service explained its intent to develop a transparent identification procedure that relied on verifiable information from a range of government and non-governmental sources. It proposed an in-depth process for bilateral consultations with identified nations to verify the information, analyze national and international regulatory obligations and determine comparability with U.S. measures, and

implement corrective actions. If that process resulted in a finding that formal listing was appropriate, the Service would undertake additional consultations with the listed nation to facilitate a halt to its IUU and bycatch activities and, as needed, seek to amend any international agreements to which the United States is a party to facilitate additional species protection measures. Within 90 days of a nation being formally identified, the Secretary would make a certification determination, a positive certification indicating that the nation had taken appropriate corrective measures and a negative certification indicating that the nation had failed to do so. Nations receiving a negative certification could face loss of port privileges, prohibitions on importing to the United States, and/or other measures recommended as appropriate by the Secretaries of Commerce and State. When certification cannot be made in time, the Service proposed alternative procedures for allowing shipments of products from listed nations on a shipment-by-shipment basis as long as the Service can verify that the vessel or shipment in question has not engaged in IUU fishing or bycatch of protected species. Between March and May 2009, the Service conducted six public hearings around the nation on its proposed procedures.

On 14 May 2009 the Marine Mammal Commission provided comments on this proposed rule. The Commission recommended that, in the final rule, the Service should first describe the U.S. standards that will be used in analyzing other nations’ regulations when determining if the measures are comparable. Second, the Service should establish deadlines for notification, consultation, and certification findings with respect to protected species bycatch. Third, the Service should prompt protective actions in international forums to require data on fishery interactions, stock status, bycatch estimates, and implementation of bycatch mitigation measures. Fourth, the Service should provide greater detail on the types of information it will require from other nations and the standards it will use to evaluate them. Fifth, the Service should establish procedures, including public notice and comment periods at key stages, to allow any interested party to provide pertinent information. Finally, the Commission recommended that the Service defer implementation of alternative certification

procedures until appropriate monitoring and verification procedures have been adopted, with real-time tracking and documentation of products obtained in compliance with bycatch reduction provisions.

The final rule for implementing the IUU and bycatch vessel identification and certification procedures had not been published by the close of 2009.

Following passage of the reauthorization act in 2007, Congress turned its attention to addressing additional legislative authorities that would help the United States work domestically and internationally to combat IUU fishing and bycatch of protected living marine resources only in cases where bycatch reduction measures have been adopted and implemented. In 2009 the House of Representatives and the Senate introduced bills to clarify, harmonize, and strengthen existing authorities to address these issues.

On 13 February 2009 Representative Bordallo and 15 co-sponsors introduced the “Illegal, Unreported, and Unregulated Fishing Enforcement Act of 2009” (H.R. 1080). This bill would streamline U.S. implementing legislation for international fishing agreements, making them consistent with the enforcement provisions of the Magnuson-Stevens Act and adding new enforcement authorities to facilitate more efficient and effective efforts in combating IUU fishing. It would authorize the United States to develop a list of vessels engaged in IUU fishing or bycatch of protected species and impose sanctions against negatively certified nations. It also would require development of a list of nations that fail to follow conservation measures of international organizations to which the United States is a party or that fail to address IUU fishing. Because the legal definition of IUU fishing includes fishing that violates bycatch reduction measures, all of the bill’s IUU provisions (unless otherwise noted) would be applicable to bycatch of protected living marine resources. This bill also contains several other provisions to update international fisheries implementing legislation. The House passed H.R. 1080 on 22 September 2009 and it was referred to the Senate.

The Senate introduced a companion bill on 10 December 2009. This bill, the “International Fisheries Stewardship and Enforcement Act of 2009” (S. 2870), was introduced by Senators Inouye, Snowe,

Begich, and Murkowski. The Senate bill includes many provisions that parallel the language in the House bill, especially regarding the harmonization and streamlining of the international agreement implementing legislation and addition of enforcement authorities. The Senate bill also would authorize vessel lists and appropriate sanctions for IUU fishing and bycatch of protected living marine resources. It contains several additional provisions, including authorization of an International Fisheries Enforcement Program to coordinate and strengthen inter-agency and intergovernmental efforts as well as implementing language for the Antigua Convention. By the end of the year, the Senate Commerce Committee had not taken additional action on S. 2870 or the House bill.

Pinniped-Fisheries Interactions: Bonneville Dam

Certain seal and sea lion populations in U.S. waters have increased substantially since passage of the Marine Mammal Protection Act. Reports of seal and sea lion interactions with commercial fisheries and protected stocks of salmon also have increased, especially on the West Coast of the United States. To address concerns about predation on depleted salmonid stocks, Congress added section 120 to the Marine Mammal Protection Act in 1994. Section 120 allows states to apply to the Secretary of Commerce to obtain authority for lethal taking of individually identifiable pinnipeds that are having a significant negative impact on the decline or recovery of salmonid fishery stocks. These fish stocks must either be (1) listed under the Endangered Species Act, (2) approaching threatened or endangered status, or (3) migrating through the Ballard Locks at Seattle, Washington. Section 120 requires the National Marine Fisheries Service to review a state’s application and, if the application contains sufficient information, establish a pinniped-fishery interaction task force. The task force evaluates the situation, determines whether the pinnipeds are having a significant negative impact on the decline or recovery of the particular fish stocks, and provides recommendations regarding research and management needs.

Application and Establishment of a Task Force

In recent years, increased numbers of pinnipeds have been observed at Bonneville Dam where some individual animals have learned to take advantage of the artificial situation created by the dam to prey on spring runs of adult salmonids as they are slowed before passing upstream through fish ladders. In 1997 the Oregon Department of Fish and Wildlife, with support from the National Marine Fisheries Service and the state of Washington, began capturing and marking California sea lions near the mouth of the Columbia River at Astoria so that they could monitor sea lion movements and behavior. Since 2002 the Army Corps of Engineers' Fisheries Field Unit has assessed the presence and abundance of pinnipeds in the Bonneville Dam tailrace during spring months and has recorded observations of pinnipeds consuming salmonids.

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

On 5 December 2006 the states of Washington, Oregon, and Idaho submitted an application to the National Marine Fisheries Service seeking authorization for lethal taking of California sea lions at Bonneville Dam and urging the Service to form a task force to consider that request. The application contended that predation by California sea lions is having a significant impact on the recovery of eight different Pacific salmon and steelhead stocks listed as threatened or endangered under the Endangered

Species Act. The states sought authority to remove by lethal means up to 1 percent of the potential biological removal level for California sea lions (about 85 animals per year) between 1 January and 30 June for an unspecified number of years. The states also sought authority to remove any California sea lion seen above navigation marker 85, about five miles downstream from Bonneville Dam. Finally, the states sought authority to remove individually marked sea lions known to have fed on salmonids at Bonneville Dam whenever and wherever they occur.

The Service published a notice in the *Federal Register* on 30 January 2007 (72 Fed. Reg. 4239) announcing receipt of the application and finding that the application presented sufficient evidence to warrant establishing a pinniped-fishery interaction task force. The notice requested comments on the application, solicited additional information concerning the presence and behavior of California sea lions in the vicinity of Bonneville Dam and elsewhere in the Columbia River, and sought recommendations for potential members of the task force.

The Service subsequently established a task force, which met three times in 2007. All but one task force member recommended that lethal removals be authorized under certain circumstances. That member thought that the information available to the task force failed to demonstrate that predation on salmonid stocks by pinnipeds was having a significant effect when compared with "much higher rates of take that [the Service] itself allows for fisheries and other extractive users" and cast doubt on whether removing up to 85 sea lions per year would provide any appreciable benefit to the fish stocks or would merely create a vacated foraging niche for other sea lions to exploit.

The Commission commented on the states' application, the task force's recommendations, and the environmental assessment prepared by the National Marine Fisheries Service on its proposed issuance of lethal taking authority. Those comments are summarized in the Commission's annual report for 2008.

Issuance of the Authorization

The National Marine Fisheries Service issued a pinniped removal authorization to Oregon and Washington on 17 March 2008. The authorization is valid

until 30 June 2012, at which time the Service may extend it for an additional five years.

The authorization allows the lethal removal of individually identifiable California sea lions that are having a significant negative impact on endangered and threatened salmonids, subject to certain terms and conditions. Sea lions subject to removal must be individually distinguishable either by unique natural markings or applied features such as brands. Those sea lions that meet one of the following criteria are to be placed on a list of animals eligible for removal: (1) the sea lion was observed eating salmonids in the area below Bonneville Dam at any time between 1 January and 31 May, (2) the sea lion was observed in the area below Bonneville Dam on a total of any five days (whether in a single year or over multiple years), or (3) the sea lion was sighted in the area below Bonneville Dam after having been subject to active non-lethal deterrence efforts. At the time the authorization was issued, 61 sea lions were identified as meeting these criteria. The authorization sets an annual limit on the number of lethal removals allowed at 85 sea lions, although this number may fluctuate in subsequent years as population estimates and the potential biological removal level change.

The Service also conditioned the authorization to require the states to establish an animal care committee composed of qualified veterinarians and biologists to provide advice on protocols for capturing, holding, and euthanizing predatory sea lions. Sea lions identified for lethal removal that are captured in traps must be held for at least 48 hours before being euthanized while the states determine whether a facility approved by the Service for permanently maintaining the animals in captivity is available. Free-ranging sea lions included on the list of animals approved for lethal removal may be shot by a qualified marksman if they are hauled out at certain locations or when they are in the water within 50 feet of the dam's power houses or the concrete apron below the dam. As practicable, the states are required to retrieve the carcasses of all sea lions that are shot. The carcasses or tissues from them are to be made available for use in scientific research or for educational purposes.

The states are required to develop and implement a monitoring plan and to submit an annual monitoring report to the Service by 1 November of each year.

After the third year of sea lion removals (i.e., in June 2011), the Service and the states will conduct a review to determine whether the predation rate on salmonids has decreased to below 1 percent of the observed fish passage at the dam. If so, no lethal removals will be authorized in the following year.

As discussed in the litigation section following, because of a pending lawsuit, no intentional lethal removals were carried out during 2008. Seven sea lions listed as eligible for removal were captured for placement at public display facilities. However, one of these died while under anesthesia during health screening prior to transfer to a facility. In addition, six other animals (four California sea lions and two Steller sea lions) died after having been trapped unintentionally, likely related to organ failure associated with stress and heat prostration. These included one sea lion identified as eligible for lethal removal. Following that trapping incident, the states consulted with their animal care committee and revised the trapping and monitoring protocols to avoid similar problems in the future. No similar events occurred in 2009.

Activities in 2009

Fish and wildlife officials from Oregon and Washington submitted their second annual report under the authorization to the Service on 4 November 2009. The states continued to engage in non-lethal deterrence during the period when most predation occurs (between 1 January and 15 May). Measures employed in 2009 included placing sea lion barriers in fish passage entrances, hazing sea lions below the dam using seal bombs, cracker shells, rubber buckshot, and chase boats, and deploying underwater deterrent devices. As in the past, these deterrent measures prompted short-term changes in sea lion behavior but were determined by the states to be unsuccessful at controlling predation of salmonids generally. The states also continued to mark and trap sea lions in the vicinity of the dam. In 2009 the states captured a total of 21 California sea lions. Of these, 4 were transferred for permanent maintenance at public display facilities, 11 were euthanized, and 6 that had not previously been identified for removal were marked, outfitted with acoustic transmitters, and released. Although the Service authorized the

use of firearms to remove predatory sea lions, no sea lions were shot during 2009.

The number of California sea lions in the vicinity of Bonneville Dam declined in 2009 as compared with other recent years, both in terms of the maximum number of animals present at any one time and in the average number present per day from January through May. In contrast, the number of Steller sea lions observed at the dam followed a recent trend, increasing substantially over numbers present in 2008. In fact, both the peak and average number of Steller sea lions observed at the dam in 2009 came close to equaling the number of California sea lions. The number of salmonids consumed by Steller sea lions correspondingly increased in 2009, although Steller sea lions reportedly consume more sturgeon than salmonids.

Oregon and Washington reported that fish consumption at the dam during 2009 was the highest on record. Using observer data and extrapolations to account for times when observers were not present, the report indicates that an estimated 4,489 salmonids likely were consumed by pinnipeds near the dam, with 4,014 of those attributable to California sea lions and 475 to Steller sea lions. However, because of high fish passage in 2009, the percentage of fish being taken by pinnipeds was lower than in other recent years. The Army Corps of Engineers (Stansell et al. 2009) estimated that pinnipeds consumed 2.4 percent of the salmonids at the dam, as compared with 2.9

percent in 2008 and 4.2 percent in 2007. Data on the size of fish runs, the number of salmonids consumed, the predation rate per sea lion, and the percentage of fish taken by sea lions for the past several years are presented in Table IX-4.

The report from the states expressed concern over recent increases in predation of salmonids by Steller sea lions, noting that state agencies do not have sufficient resources to respond to this emerging issue. Moreover, because Steller sea lions are listed under the Endangered Species Act, lethal removal cannot be authorized under section 120 of the Marine Mammal Protection Act, leaving non-lethal deterrent measures as the only available alternative. Oregon and Washington also noted that in 2008 a small number of California sea lions were observed preying on fall-run salmonids. This phenomenon recurred in 2009, with several sea lions present near the dam in autumn 2009, at least one of which was on the list of sea lions eligible for removal. The states recommended that it was best to deal with this developing problem while only a small number of animals is involved.

The National Marine Fisheries Service responded to the Oregon and Washington resource agencies in a 9 December 2009 letter. The Service shared the states' concern about the growing presence of sea lions at the dam in the fall and encouraged the agencies to work with the Corps of Engineers to continue observations at that time of the year and to estimate predation of fall-run salmonids to the extent possible.

Table IX-4. Consumption of adult (including jacks) salmonids by California and Steller sea lions at Bonneville Dam from 1 January through 31 May 2002 to 2009

Year	Bonneville Dam Salmonid Passage (1 Jan – 31 May)	California sea lions			Steller sea lions		
		Expanded Salmonid Consumption	Salmonid Consumption Per Capita	% of Run (1 Jan – 31 May)	Estimated Salmonid Consumption	Salmonid Consumption Per Capita	% of Run (1 Jan – 31 May)
2002	284,733	1,010	33.7	0.4%	0	0	0.0 %
2003	217,185	2,329	22.4	1.1%	0	0	0.0 %
2004	186,804	3,516	35.1	1.9%	13	7	0.0 %
2005	82,006	2,904	35.9	3.4%	16	4	0.0 %
2006	105,063	2,944	40.9	2.7%	76	8	0.1 %
2007	88,474	3,846	54.2	4.2%	13	1	0.0 %
2008	147,543	4,294	52.4	2.8%	176	10	0.1 %
2009	186,060	4,014	74.3	2.1%	475	18	0.3 %

With respect to the increasing numbers of Steller sea lions observed below the dam, the Service recommended that the states continue to use the non-lethal deterrents authorized by applicable regulations. The Service appended to its letter a cumulative list of the California sea lions that it had determined met the criteria for lethal removal. The list included 87 individually identifiable sea lions, including 10 that had been transferred to display facilities, 1 that had died in a trap, 1 that died from anesthesia, and 11 that had been euthanized by lethal injection.

The Service plans to reconvene the pinniped-fishery interaction task force in 2010 to review the implementation and effectiveness of the efforts to reduce predation of salmonids at Bonneville Dam.

Litigation

On 24 March 2008, the same day that the Service published notice of the authorization in the *Federal Register* (73 Fed. Reg. 15483), the Humane Society of the United States and other organizations filed a lawsuit challenging that action. The plaintiffs alleged violations of the Marine Mammal Protection Act, the National Environmental Policy Act, and the Administrative Procedure Act. Under the authorization, lethal removal could have begun on 4 April 2008. This prompted the plaintiffs to file a motion for a preliminary injunction seeking to prevent any removals while the court considered the merits of their claims. To avoid the need for emergency review by the court, the parties entered into an agreement delaying any lethal removals until 18 April so that the court would have time to consider the preliminary injunction motion on an expedited schedule. In the meantime, the states could engage in trapping and marking sea lions and in non-lethal relocation of some individuals.

The U.S. District Court for the District of Oregon denied the request for a preliminary injunction on 16 April 2008, prompting the plaintiffs to seek an emergency stay of the ruling pending appeal. The Ninth Circuit Court of Appeals issued a stay on 23 April. The appellate court agreed with the lower court that the likelihood of success on the merits of the case tipped somewhat in favor of the plaintiffs but, in contrast to the district court, found that the balance of likely harm if the stay were not issued also weighed

in the plaintiffs' favor. The appellate court noted that, by definition, any lethal taking of sea lions would be irreparable. In addition, approval of a stay would affect only the 2008 salmon runs, which all parties to the litigation had agreed were expected to be unusually large. As had the lower court, the appellate court allowed non-lethal removals to go forward so that the states could trap problem sea lions and transfer them to zoos and aquaria that had offered to house them.

Meanwhile, the district court continued to consider the merits of the case. The court issued its opinion on 25 November 2008, finding in favor of the federal and state agencies named as defendants. The plaintiffs had contended that the Service's criteria for determining the significance of predation by sea lions under the Marine Mammal Protection Act was deficient because it failed to link the predation to an impact on the decline or recovery of salmonid stocks. The Service used the impact on the productivity of salmonids as a proxy for the decline or recovery of the stocks, and the court found that approach not contrary to the language of the Act. Although there is legislative history to support the view put forward by the plaintiffs, the court thought that the statutory provision was clear on its face and, hence, there was no need to consider that history to resolve any ambiguities. Because Congress had not defined more precisely what would constitute a significant negative impact on the salmonid stocks, the court believed that it was compelled to defer to the Service's interpretation as long as it was a reasonable one. The court also deferred to the agency's interpretation of the statute in formulating the criteria to be used to identify the individual sea lions contributing the most to predation at the dam.

The court determined that section 120 of the Marine Mammal Protection Act did not require the Service to use a quantitative standard to assess the significance of predation by sea lions. Rather, the court believed that the qualitative approach adopted by the Service was not an arbitrary or capricious application of the statute.

The plaintiffs also had noted that the take of salmonids by pinnipeds near Bonneville Dam is much smaller than takes from other sources that the Service has determined not to be significant under the National Environmental Policy Act and the

Endangered Species Act, and they argued that these takes likewise should be considered insignificant. The court, however, saw no incongruity in using different standards of significance under the different statutes. It therefore ruled that the Service was not obligated to discuss and explain how previous decisions about the impact to salmonids from fishing activities or operation of the dam reached under these other statutes are consistent with its decision under section 120 of the Marine Mammal Protection Act.

The court also rejected the plaintiffs' contention that the Service should have prepared an environmental impact statement rather than an environmental assessment. The plaintiffs argued that, if sea lion predation is considered to be significant for purposes of the Marine Mammal Protection Act, it should also be considered significant when assessing impacts under the National Environmental Policy Act. The court ruled, however, that the two statutes have entirely different foci and found it rational for the Service to conclude that the impact of sea lion predation meets the significance criteria of one act but not the other. In the court's view, the environmental assessment prepared by the Service adequately demonstrated that the sea lion population would not be adversely affected by the authorized removals while the salmonid stocks would likely benefit.

Unless reversed on appeal, or subject to a new stay pending appeal, the district court ruling cleared the way for lethal removals to go forward in 2009. The plaintiffs appealed the district court ruling to the Ninth Circuit Court of Appeals on 23 March 2009. Although the appellants sought a stay of the district court order pending review of their appeal, a separate panel of the appellate court on 26 February 2009 declined to reinstitute a stay on removing sea lions pending resolution of the case. The court of appeals heard arguments in the

case on 6 November 2009 and are expected to issue a ruling in 2010.

Harbor Seal–Human Interactions in Drake's Estero, California

Drake's Estero is an expansive estuary in Marin County on the Pacific coast of California, about 40 km (25 miles) northwest of San Francisco (Figure IX-2). The estero is located within Point Reyes National Seashore, which is managed by the U.S. National Park Service in concert with the California Department of Fish and Game and other state and federal agencies. For several years, central California has witnessed a debate about the potential effects of human activities on the harbor seal population in Drake's Estero, much of which has focused on the potential impact of a commercial aquaculture operation in the estero. The debate has been sparked, in large part, by controversy over whether the estero should be managed as a wilderness area.

Harbor seals inhabit nearshore and estuarine areas from Baja California to Alaska. They do not migrate extensively but on occasion may travel 300



Figure IX-2. Aerial view of Drake's Estero. (Photo courtesy of Robert Campbell/Chamois Moon)

to 500 km to find food (Herder 1986). The seals haul out year-round to rest, breed, and molt on sandbars, rocky outcrops, and islands along the coast and in bays and estuaries. Location and timing of seal haul-out patterns vary with a range of factors, including seal age and gender, reproductive condition, time of day, tide level, current direction, weather, season, year, occurrence of disease, presence of other wildlife, and human activities (Allen et al. 1984, Yochem et al. 1987, Suryan and Harvey 1999, Thompson et al. 2001, Grigg et al. 2004, Hayward et al. 2005, Seuront and Prinzivalli 2005).

Human activities prior to the mid-1900s substantially depleted harbor seals in California. Following passage of the Marine Mammal Protection Act in 1972, the population began to recover. The National Marine Fisheries Service's most recent stock assessment report for California harbor seals notes that "[n]et production rates appeared to be decreasing from 1982 to 1994 ... [and] the decrease in population growth rate has occurred at the same time as a decrease in human-caused mortality and may indicate that the population is approaching its environmental carrying capacity" (Caretta et al. 2008). The stock assessment report suggests that the current total California population is just over 34,000 seals.

About 20 percent of the California stock occurs in the Point Reyes area (Lowry et al. 2005). The number of seals hauled out in the estero generally is greatest during the spring/summer breeding and molting seasons. The maximum count in Drake's Estero is about 1,800 seals, and the estero population produces about 200 to 400 pups per year (National Park Service 2004).

Human-related Risk Factors

The number of harbor seals in Drake's Estero at any time also is a function of both natural and human-related risk factors. Human-related risk factors that may affect harbor

seals in the estero include, but are not limited to, the following.

Aquaculture: Since 1934 a variety of shellfish, including Pacific oysters, European flat oysters, Olympia oysters, Kumamoto oysters, Manila clams, purple-hinged rock scallops, and bay and sea mussels, have been cultured in or harvested from Drake's Estero. Currently, the Drake's Bay Oyster Company grows Pacific oysters and Manila clams. Pacific oysters are not known to spawn independently at the water temperatures heretofore characteristic of the estero. The company both produces oyster seed on site to reduce the chance of introducing non-native invasive species and uses additional seed from other hatcheries. The company also has plans to produce purple-hinged rock scallops and may seek permission to produce Olympia oysters in the future. Oyster production numbers, provided by the California Department of Fish and Game, are depicted in Figure IX-3 (National Research Council 2009).

Kayaks and Canoes: Drake's Estero is closed to all motorized boats except those of the Drake's Bay Oyster Company and, on occasion, those used for emergencies such as search and rescue. Kayaks and canoes may be used in most of the estero except between 1 March and 30 June, which is the peak pupping season for harbor seals. Although they gen-

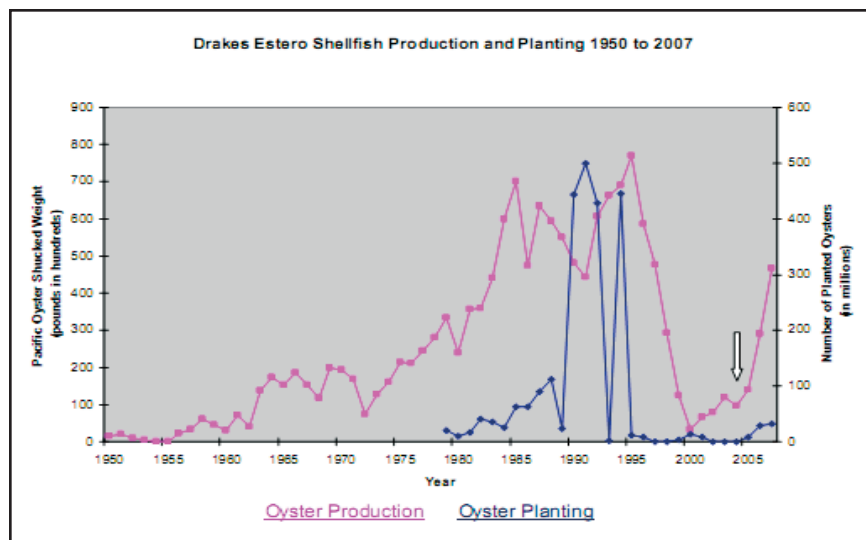


Figure IX-3. Oyster production numbers, provided by the California Department of Fish and Game. (National Research Council 2009)

erally are small and quiet, kayaks and canoes may disturb seals whether they are in the water or hauled out on land (Henry and Hammill 2001). National Park Service records confirm that kayaks and canoes are a source of harbor seal disturbance.

Hiking and Horseback Riding: Hikers and riders are allowed to use trails in Point Reyes National Seashore year-round. These visitors are known to use the estero beaches and can approach or access several of the harbor seal haul-out sites in the estero and adjacent areas such as Estero de Limantour and Drake's Beach. National Park Service records indicate that hikers and riders are a source of disturbance, and the National Park Service posts signs, provided by the National Marine Fisheries Service, citing regulations and providing guidance to prevent such disturbance.

Disease and Contaminants: Intermittent agricultural runoff may introduce contaminants or disease into the estero. No contaminant or disease-related effects on seals have been documented, and a detailed study of samples from the late 1980s did not find evidence of excessive contaminants in the estero (Anima 1991). However, to avoid contamination of its oysters, Drake's Bay Oyster Company monitors water quality in the arms of the estuary and adjusts its activities based on the potential for contamination from runoff. In 2008, 22 pups stranded and died of unknown causes on Drake's Beach (The Marine Mammal Center, unpubl. data), and potential effects of disease and/or contaminants have not been ruled out.

Various aspects of aquaculture operations in Drake's Estero have been reviewed at local (i.e., Marin County Board of Supervisors), state (i.e., California Coastal Commission), and federal (i.e., National Park Service, National Research Council) levels. In 2009 the National Research Council completed the most recent review, which focused on the effects of aquaculture on the various ecological elements of the estero. The report from that review stated that "Statistical analyses of Drakes Estero harbor seal count data during the breeding season suggest a possible relationship between mean counts at two of three subsites where seals haul out on sand bars in the upper estero and the combined signals from the 1998 El Niño and oyster production level."

The report also noted that no studies have determined whether short-term responses to disturbance have long-term population consequences for harbor seals. In conclusion, the report noted that review results highlight the need for a more detailed assessment of the extent to which different disturbance sources may impact harbor seals both on land and in the water.

Request for Commission Review and Commission Response

The National Park Service originally brought the Drake's Estero issue to the attention of the Marine Mammal Commission in May 2007. Independently, the National Park Service and a representative of the Drake's Bay Oyster Company periodically updated the Commission on the matter over the following two years. On 9 June 2009 the National Parks Conservation Association and Sierra Club wrote to the Marine Mammal Commission, requesting that the Commission review the findings of the 2009 National Research Council report to "clarify for the public and policy makers the extent of concern that exists from oyster operations on harbor seals, as well as ... applicable policies and use of the precautionary principle in management implementation."

The Commission responded on 1 July 2009, indicating that it would review the circumstances and their implications for harbor seal conservation. The Commission's decision was based on its belief that, within the context of its duties set forth in the Marine Mammal Protection Act, it may have a useful role to play in this situation.

The Commission agreed to conduct the review based on its primary concern that the harbor seals using the estero be protected from human activities in accordance with the Marine Mammal Protection Act. The Commission believes that protecting those harbor seals and their habitat will require ongoing vigilance by resource managers and those who engage in activities in or around the estero.

In conducting its review, the Commission indicated that it would solicit, consider, and seek to address the viewpoints of all stakeholders in a transparent and constructive manner but would maintain its focus on scientific issues involving potential effects on harbor seals. Specifically, the Commission

review would (1) use the best available scientific information regarding human impacts on harbor seals in the estero, (2) evaluate the strengths and weaknesses of those data, including information gaps, and (3) recommend research and management activities to reduce scientific uncertainty and ensure the protection of harbor seals and their habitat.

At the end of 2009 the Commission was finalizing the terms of reference for the review; organizing a panel of expert scientists in harbor seal biology, behavior, and statistics; and scheduling the review meeting at Point Reyes National Seashore, tentatively for late February 2010.

Recreational Fishery Interactions

Section (3)(16) of the Marine Mammal Protection Act defines the term “fishery” to mean “(A) one or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics; and (B) any fishing for such stocks.” Section 118 of the Act identifies representatives of “all commercial and recreational fisheries groups and gear types which incidentally take the species or stock” as potential members of take reduction teams. Nonetheless, with regard to marine mammal/fishery interactions, most management efforts in U.S. waters have focused on commercial rather than recreational fisheries. That being said, interactions between marine mammals and recreational fisheries are gaining more attention because they are leading to serious injury and mortality of the involved marine mammals (Wells and Scott 1994, Gorzelany 1998, Wells et al. 1998, Wells et al. 2008). Information on those interactions must be included in annual marine mammal stock assessment reports to ensure that they are comprehensive and provide the necessary basis for conserving the stock and managing the involved fisheries.

Marine mammals and recreational fisheries may interact in a number of ways. For example, in the Atlantic and Gulf of Mexico, Waring et al. (2009)

described bottlenose dolphin depredation on fishery catch, dolphin entanglement in gear and gear ingestion, and harassment of dolphins by fishermen, including shootings and throwing pipe bombs⁴ at depredating dolphins. Observations of the well-studied Sarasota Bay population indicate that interactions with recreational fisheries have contributed to the decline of that population since 2004 (Wells, pers. comm.). In addition, in Virginia in June 2009 researchers documented the first case of a bottlenose dolphin entangled in fishing twine marketed as having a 40-lb breaking strength, while being the same diameter as monofilament with a 14-lb breaking strength. The stronger line was wrapped around the dolphin’s dorsal fin, which was nearly severed, and the emaciated and weakened animal later died. This case suggests that modifications of recreational fishing gear may present new threats to marine mammals and new challenges to those seeking to minimize recreational fishing impacts on marine mammals.

The National Marine Fisheries Service provided additional information about bottlenose dolphin interactions, including those with recreational fisheries, at the September 2009 meeting of the Bottlenose Dolphin Take Reduction Team (the team’s scope encompasses the Atlantic coast stocks). The Service presented findings from a report entitled “Bottlenose Dolphin Strandings from New Jersey to Florida, January 2002–April 2009” (Byrd et al. 2009). The results indicated that stranding mortality from fishery interactions increased after 2006 and, for the first four months of 2009, represented more than 20 percent of the total strandings with evidence of human interactions in Florida. For the time period reviewed (January 2002 to April 2009), strandings associated with both the recreational hook/line fishery and gear consistent with hook/line fisheries accounted for 63 percent of all fishery interactions before the Bottlenose Dolphin Take Reduction Plan was implemented (January 2002 to May 2006) and 64 percent after implementation (June 2006 to April 2009).⁵ The majority of strandings in Florida have been concentrated in the Indian River Lagoon estuary system

⁴ NOAA Fisheries Service’s Office of Law Enforcement reported that in March 2009, a federal judge sentenced an individual to two years in prison, three years of supervised probation, and \$125 special assessment for directing pipe bombs at bottlenose dolphins.

⁵ Recreational fisheries and hook/line gear types are not regulated under the Bottlenose Dolphin Take Reduction Plan so it would not be expected that the plan would have an impact on stranding rates.

(Waring et al. 2009). From 2003 to 2007, 192 bottlenose dolphins stranded in that estuary system, 32 of which showed evidence of fishery interaction. Of these, seven appeared to involve gear consistent with a trap/pot fishery. The remaining 25 involved evidence of entanglement in, or ingestion of, monofilament line, hooks, or lures, all of which are used in recreational fisheries. Although it is not always possible to determine whether fishing gear caused a stranding, the evidence suggests a need for greater management of recreational fisheries. It also is worth noting that the stock assessment report (Waring et al. 2009) for the affected stock of bottlenose dolphins does not include an abundance estimate or an estimate of its potential biological removal level, which undermines any management effort to evaluate the effect of strandings related to recreational fisheries or the combined impact of commercial and recreational fisheries.

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Chapter X

MARINE MAMMALS AND ACOUSTICS

Human-generated sound in the ocean poses a risk to marine mammals and marine ecosystems. Despite intensive research, analysis, and debate, the nature and severity of that risk remain controversial. The controversy is exacerbated to various degrees by uncertainty with regard to the physics of sound in the oceans, the physiological effects of sound on marine mammals and other marine species, their behavioral responses to that sound, and the biological significance of those effects and responses.

The activities that introduce sound into the marine environment generally are considered vital to our nation's interests. Among other things, they support national and global transportation (i.e., commercial shipping), energy acquisition (e.g., oil and gas production and development of alternative energy sources), national security (e.g., Navy and Air Force exercises and use of sonar), coastal development (e.g., port development), and recreation (e.g., tourism). These activities, and the sound they generate, can reasonably be expected to increase in the foreseeable future given anticipated increases in the U.S. and world human population, particularly in coastal areas, and the growing demands for marine resources, goods, and spaces. The challenge, then, is to protect marine ecosystems, including marine mammals, without unnecessarily constraining those activities. Meeting that challenge requires investment by and cooperation of multiple agencies, both those involved in carrying out sound-generating activities and those responsible for regulation of those activities. Thus, the two main topics of this section of the Commission's annual report focus on recent research and management activities, with an emphasis on those taking place in 2009. For a more detailed review of current research and management topics related to sound-generating activities in the marine environment, one may wish to consult Marine Mammal Commission (2007), Southall et al. (2007), Bradley and Stern (2008), and Southall et al. (2009).

Research Activities

To date, much of the concern about human-generated sound in the marine environment has focused on the Navy's use of mid- and low-frequency active sonar for detecting submarines and, to a lesser degree, on the use of seismic airguns for geophysical research and oil and gas development. Commercial shipping has only recently begun to receive attention despite the fact that it is a major source of low-frequency sound in the oceans. That attention has focused on the mechanisms by which ships generate noise and potential noise-reduction measures.

In 2008 an Interagency Task Force on Anthropogenic Sound and the Marine Environment completed a review of ongoing and planned agency efforts and a prioritized list of anticipated information needs and gaps (Southall et al. 2009). The Interagency Committee on Ocean Science and Resource Management Integration reviewed the plan, which is entitled "Addressing the Effects of Human-Generated Sound on Marine Life: An Integrated Research Plan for U.S. Federal Agencies." The White House Council on Environmental Quality and Office of Management and Budget approved the report on 13 January 2009, and it can be found at <http://www.>

whitehouse.gov/administration/eop/ostp/nstc/oceans.

In 2009 the Navy, National Science Foundation, Minerals Management Service, and National Oceanic and Atmospheric Administration increased their investment in sound-related research. The increase reflects an effort by these agencies to understand and minimize the adverse effects of the sound generated by activities they conduct or regulate.

U.S. Navy

Between 2005 and 2009 the Navy funded in excess of \$100 million for environmental research, much of which was focused on potential effects of human-generated sound in the oceans and the means to monitor and mitigate such effects. In 2009 the Office of Naval Research supported basic and early stage applied research, including approximately \$14 million for studies of marine mammal hearing, physiological and behavioral responses to sound, computer models of acoustic effects on marine life, and novel technologies for monitoring marine mammal behavior, movements, and habitat use. The Navy's Environmental Readiness Division also provided support for marine mammal surveys in or near naval testing and training areas, development and maintenance of databases and models of marine mammal distribution, assessments of behavioral and physiological responses to sonar and explosives, and related topics. The Navy also continued development of its umbrella Integrated Comprehensive Monitoring Plan for testing and training exercises on all major Navy ranges. The purpose of that plan is to guide monitoring measures and assess their effectiveness. The Navy will develop individual plans for each range to take into account different environmental conditions, marine mammals at risk, and different naval exercises. Although such monitoring is viewed as an operational expense, it provides valuable information about marine mammal abundance, distribution, and behavior. Monitoring activities include such things as visual and passive acoustic surveys, tagging and tracking of species of interest at several locations, as well as literature reviews and assessments of mitigation methods. Results of monitoring activities are summarized in annual reports to the National Marine Fisheries Service as

part of the process for renewing authorization for exercises on the Navy ranges.

Minerals Management Service

The Minerals Management Service contributes more than \$4 million annually toward research related to marine mammals and sound. From 2002 to 2008 the Service directed extensive resources toward its Sperm Whale Seismic Study (also referred to as the SWSS study) in the Gulf of Mexico (Jochens et al. 2008). In 2009 the Service reduced research activity in the Gulf of Mexico but increased its research program in the Arctic and Bering Sea in preparation for anticipated offshore lease sales in the Bering, Beaufort, and Chukchi Seas. Representative investments included tagging and tracking of bowhead whales and ice seals; acoustic monitoring of several sites in the Bering Sea and Arctic Ocean; studies of the anatomy and hearing of the bowhead whale, walrus, and ice seals; assessment of polar bear populations; and studies of a very small and poorly understood population of North Pacific right whales.

Investment in research and conservation at the headquarters level also increased in 2009. In late 2008 the Service held a workshop on seismic survey mitigation measures and marine mammal observer reports. The intent of the workshop was to review observer reports from seismic surveys dating back to 2003 to evaluate mitigation measures and suggest ways that they could be improved. The results were still being evaluated in 2009, but the plan was to use those results to update the 2002 Notice to Lessees regarding the best available mitigation measures.

National Science Foundation

In 2009 the National Science Foundation directed about \$2 million to the study of potential sound effects from geophysical research sponsored by the Foundation. Marine geophysical research is used for a variety of purposes, including studies of the factors that lead to earthquakes, undersea landslides, and tsunamis. Among other things, the Foundation supports the R/V *Marcus G. Langseth*, its first seismic survey vessel, as part of the University–National Oceanographic Laboratory System research fleet.

The Foundation is using the R/V *Langseth* to characterize the sound fields produced by airgun

arrays and to develop and test passive acoustic monitoring and other marine mammal detection technologies. The Foundation also is archiving all visual and acoustic survey information collected during airgun activities and considering how to provide these data to resource management agencies and researchers to improve understanding of the abundance, distribution, and habitat use of protected marine species. The National Science Foundation also is participating in the National Oceanographic Partnership Program, which provides support for a variety of related research efforts, including the Ocean Biogeographic Information System's SEAMAP project; the Census of Marine Life's mammal, bird, and turtle data archival project; a project attempting to estimate the density of cetacean populations using passive acoustic fixed sensors (<http://www.creem.st-and.ac.uk/decaf/>); and a project to assess and ground-truth alternative survey methods, including those based on passive acoustic monitoring.

National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration supports a very modest program of research on human-generated sound and its environmental effects. In 2007 an expert panel convened by the agency reviewed physiological thresholds of risk from underwater sound and published its conclusions in the journal *Aquatic Mammals* (Southall et al. 2007). The agency has not yet adopted these guidelines or any other guidelines for human-generated underwater sound, preferring to review risk criteria on an action-by-action basis, starting with risk criteria proposed by the action proponent.

In 2009 the Acoustic Program Officer in the National Marine Fisheries Service's Office of Science and Technology left the agency, leav-

ing this position vacant at agency headquarters. The limited funds devoted to sound-related research apparently were dispersed among the agency's Northeast Fisheries Science Center (primarily for monitoring of right whales and pinnipeds) and the National Marine Mammal Laboratory (primarily for Arctic acoustic monitoring). At the end of 2009 the agency's plans for future investment in bioacoustic research were uncertain, but it was expected to fill its vacant bioacoustics position in 2010.

Multi-agency Efforts

The National Oceanographic Partnership Program enables agencies and non-government entities to pool resources on research projects of shared interest. Since 2000 the Navy, National Science Foundation, Minerals Management Service, National Oceanic and Atmospheric Administration, Sloan Foundation, and the Joint Industry Program have supported an annual research budget of about \$2.5 million through this program. The research has been directed toward projects such as development of prototype marine mammal databases, large-scale marine animal tagging, models of beaked whale hearing, and a library of marine animal sounds. The Navy, National Oceanic and Atmospheric Administration, and oil



Figure X-1. The R/V *Langseth* is supported by the National Science Foundation to conduct seismic surveys worldwide. (Photo courtesy of the Office of Marine Operations, Lamont-Doherty Earth Observatory. Columbia University)

industry also co-sponsored a multi-investigator effort to expose marine mammals experimentally to controlled sound sources to assess behavioral responses under systematically varied signal characteristics. This project, known as the Behavioral Response Study, was initiated at the Navy's Atlantic Undersea Test and Evaluation Center in the Bahamas in August–September of 2007 and was continued at that site in 2008. Blainville's beaked whales, pilot whales, sperm whales, and several species of dolphins regularly occur within the test range. In 2009 the study focused on locally abundant populations of beaked whales and pilot whales in the Alboran Sea (western Mediterranean Sea). In 2010 the program will move to the Southern California Bight, an area of rich species diversity and high abundance and a site of considerable Navy sonar training. Investigators will broaden the study to include several species of large baleen whales, multiple species of beaked whales, pilot whales, and possibly other species.

The Commission believes that this kind of carefully controlled study is essential to understanding possible sound effects on marine mammal behavior. It has supported such testing in the past and encourages additional testing at this and other sites in the future (Cox et al. 2006). Similar controlled exposure studies are being conducted by a coalition of U.S., Norwegian, Dutch, and British scientists in Norway. That program has focused on the effects of fish-finding sonar and other sound sources on herring, sperm whales, and killer whales. Australian scientists have proposed additional studies to evaluate the effects of seismic sounds on humpback whales. Such research should provide important insight into the behavioral effects of various anthropogenic sound sources on a wide range of marine mammal species and fishes.

Other Research

Private industry, universities, and foreign governments also have sponsored or conducted research on the effects of underwater sound on marine mammals. Such sponsors include the oil industry, foreign navies, and national or international environmental agencies (e.g., International Council for the Exploration of the Sea, European Science Commission, and the United Kingdom's Joint Nature Conservation Council).

The Joint Industry Program, a consortium of oil and gas companies, has supported studies to investigate the potential effects of airguns used in geophysical exploration (i.e., seismic studies), as well as other industry activities that produce sound, and to develop technologies to reduce noise and to monitor and mitigate potential effects. The program has an annual budget of about \$10 million and sponsored a review of its initial research investments in October 2008. (More information can be obtained from the program's Web site [<http://www.soundandmarinelife.org>]). In addition, individual oil and gas companies have invested in research and monitoring of potential effects, including the monitoring of gray whales in the nearshore waters off Sakhalin Island, Russia (<http://www.sakhalinenergy.com/en/>), where oil development is underway and expected to continue, and the monitoring of the potential effects caused by offshore drilling by the Northstar drilling installation in the Beaufort Sea. Finally, in 2007 in Nyborg, Denmark, a variety of agencies cosponsored an international conference reviewing current research on the effects of underwater sound. Proceedings from that meeting were published in a special issue of the journal *Bioacoustics* in 2008. A similar review is planned for late summer 2010 in Cork, Ireland.

In 2009 the Commission commented on eight proposed research activities on sound and marine mammals (Table X-1). Those comments are listed in Appendix A, and the comment letters can be found at http://mmc.gov/letters/letters_09.html.

Regulatory Activities

In 2009 the Commission reviewed 34 analyses pertaining to the effects of human-generated sound on the marine environment. For comparison, the number of reviews in 2008 was 94 (Table X-1). In large part, the decline reflected completion of most of the Navy's environmental analyses pertaining to its major test ranges and exercise areas, referred to as the Tactical Training Range Assessment Plan. At the end of 2009 the Navy had completed 10 of 14 related compliance and permitting processes. The four not completed were for the Gulf of Alaska Range Complex, Mariana Islands Range Complex, the Panama City Range Complex, and an added range near Coro-

nado (San Diego County, California) called the Silver Strand Range.

The Navy analyses were intended to include all sources of manmade sound. Low- and mid-frequency antisubmarine sonar and explosives use, such as ship-shock testing and bomb and gunnery exercises, continue to be of primary concern. Other high-frequency sonars used primarily for antisubmarine countermeasures and mine hunting also were analyzed, as well as small explosives use, helicopter dipping sonar, pingers, and the vessels themselves (both as sources of sound and as potential sources of collisions with whales).

In 2009 the Navy also began reporting the results of its activities as required under the letter of authorization issued in January 2009 for three of the Navy test and training ranges. The first reports were due at the end of 2009 or early January 2010 for the three largest range complexes that involve the greatest use of Navy mid-frequency sonar on the TAP ranges: the Atlantic Fleet Active Sonar Training Range, the Southern California Range Complex, and the Hawaii Range Complex. These reports begin a process of annual assessment of mitigation effectiveness, evaluation of risk model accuracy, and adaptive management changes as more information is gathered about potential sound-related effects.

The current five-year authorization will expire in 2014, and in 2009 the Navy initiated planning to complete environmental requirements and permitting requests for the 2014–2019 period. The Navy will issue a notice of intent in 2010 and is expected to consolidate the current 14 separate analyses into a smaller number of overarching analyses (approximately six). Those analyses will incorporate new mitigation and risk analysis procedures based on knowledge gained from the Navy's current research and monitoring activities and other sources.

Finally, the Commission's review of acoustics-related compliance documentation also declined as a result of decreased oil and gas leasing activities while the Department of the Interior reviewed its 5-year plan and associated schedule of lease sales. At the end of 2009 the revised 2007–2012 5-year plan was still in public review and revision. In 2009 the Commission also anticipated an increase in risk analyses related to alternative energy projects, but

those too were delayed. As a result, the Commission's review efforts were focused on such things as development of offshore ports for transport of liquified natural gas and seismic research activities by the National Science Foundation's R/V *Langseth*.

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Table X-1. Sound-related federal actions reviewed by the Marine Mammal Commission in 2009

Action Proponent	Proposed Action	MMPA Section	MMC Letter Sent	FR Notice Date	FR Notice/Docket Number
Air Force	Vandenberg Air Force Base: space vehicle and test flights	101(a)(5)(A)	5-Jan-09	19-Dec-08	73 FR 77577
Navy	Virginia Capes Range Complex: vessel movements and explosive/gunnery use	101(a)(5)(A)	12-Jan-09	12-Dec-08	73 FR 75631
Navy	Jacksonville Range Complex: vessel movements and explosive/gunnery use	101(a)(5)(A)	20-Jan-09	17-Dec-08	73 FR 76578
Navy	Undersea Warfare Training Range: installation and operation of range including vessel movements, non-explosive/inert gunnery use, and sonar operations	101(a)(5)(A) ANPR	20-Jan-09	19-Dec-08	73 FR 77631
Port of Anchorage	Port of Anchorage marine terminal redevelopment project	101(a)(5)(A) ANPR	20-Jan-09	18-Dec-08	73 FR 77013
CGGVeritas	Beaufort Sea marine geophysical and seismic survey	101(a)(5)(D)	20-Jan-09	19-Dec-08	73 FR 77623
Lamont-Doherty Earth Observatory	Southeast Asia marine geophysical and seismic survey	101(a)(5)(D)	22-Jan-09	22-Dec-08	73 FR 78294
Charles Grossman, Ph.D., Xavier University	Manatee passive listening and sound playback studies	Research	13-Feb-09	10-Dec-08	73 FR 75129
Navy	Gulf of Mexico Range Complex: vessel movements and explosive/gunnery use	DEIS/OEIS	16-Feb-09		
Navy	Northwest Training Range Complex: vessel movements, explosive/gunnery use, and sonar operations	DEIS/OEIS	17-Feb-09		
Navy	Mariana Islands Range Complex: vessel movements, explosive/gunnery use, and sonar operations	DEIS/OEIS	16-Mar-09		
Minerals Management Service	Beaufort Sea and Chukchi Sea Planning Areas Oil and Gas Lease Sales 209, 212, 217, and 221	DEIS	30-Mar-09		
Northeast Gateway Energy Bridge, L.L.C., and Algonquin Gas Transmission, L.L.C	Operation and maintenance of the Northeast Gateway liquid natural gas port facility and the associated pipeline in Massachusetts Bay	101(a)(5)(D)	3-Apr-09	6-Mar-09	74 FR 9801
Navy	Northwest Training Range Complex: vessel movements, explosive/gunnery use, and sonar operations	101(a)(5)(A) ANPR	9-Apr-09	11-Mar-09	74 FR 10557
Navy	Cherry Point Range Complex: vessel movements and explosive/gunnery use	101(a)(5)(A)	13-Apr-09	16-Mar-09	74 FR 11052
Navy	Mariana Islands Range Complex: vessel movements, explosive/gunnery use, and sonar operations	101(a)(5)(A) ANPR	17-Apr-09	18-Mar-09	74 FR 11530
Navy	San Nicolas Island: vehicle launch	101(a)(5)(A)	20-Apr-09	20-Mar-09	74 FR 11891
Air Force	Vandenberg Air Force Base: pinniped research including telemetry and hearing tests	Research	7-May-09	6-Apr-09	74 FR 15460
Peter Tyack, Ph.D., Woods Hole Oceanographic Institute	Cetacean playback and controlled sound exposure research	Research	12-May-09	8-Apr-09	74 FR 15940
Port of Anchorage	Port of Anchorage marine terminal redevelopment project	101(a)(5)(A)	26-May-09	23-Apr-09	74 FR 18492
Navy	Gulf of Mexico Range Complex: vessel movements and explosive/gunnery use	101(a)(5)(A) ANPR	28-May-09	28-Apr-09	74 FR 19205
Whitlow Au, Ph.D., University of Hawaii	Amend permit to conduct acoustic playback studies to investigate the effects of noise on the behavior of cetaceans around Hawaii and the effects of low-level sounds that might elicit mild alert responses	Research	29-May-09	16-Apr-09	74 FR 17635

Table X-1. Continued

Action proponent	Proposed action	MMPA section	MMC letter sent	FR notice date	FR notice/ docket number
Navy	Naval Surface Warfare Center Panama City Range Complex: vessel movements, explosive/gunnery use, and sonar operations	101(a)(5)(A)	3-Jun-09	30-Apr-09	74 FR 20156
Lamont-Doherty Earth Observatory	Northeast Pacific marine geophysical and seismic survey	101(a)(5)(D)	8-Jun-09	8-May-09	74 FR 21631
Neptune LNG, L.L.C.	Construction and operation of an offshore liquefied natural gas port in Massachusetts Bay	101(a)(5)(D)	8-Jun-09	8-May-09	74 FR 21648
Scripps Institution of Oceanography	Ocean-bottom seismograph deployment and a magnetic, bathymetric, and seismic survey off Oregon	101(a)(5)(D)	19-Jun-09	26-May-09	74 FR 24799
Shell Offshore, Inc., and Shell Gulf of Mexico, Inc.	Chukchi seismic survey	101(a)(5)(D)	6-Jul-09	1-Jun-09	74 FR 26217
Rice University	Northwest Atlantic seismic survey	101(a)(5)(D)	20-Jul-09	18-Jun-09	74 FR 28890
Navy	Naval Surface Warfare Center Keyport Range Complex: vessel movements, explosive/gunnery use, and sonar operations	101(a)(5)(A)	6-Aug-09	7-Jul-09	74 FR 32264
United Launch Alliance	S. Vandenburg Air Force Base: Delta IV/Evolved Expendable Launch Vehicle	101(a)(5)(D)	7-Aug-09	8-Jul-09	74 FR 32565
Navy	Gulf of Mexico Range Complex: vessel movements and explosive/gunnery use	101(a)(5)(A)	13-Aug-09	14-Jul-09	74 FR 33960
Navy	Northwest Training Range Complex-vessel movements, explosive/gunnery use, and sonar operations	101(a)(5)(A)	18-Aug-09	23-Jul-09	74 FR 33828
Coast Guard	Construct, operate, and remove at the end of its useful life a liquefied natural gas deepwater port facility in the Gulf of Mexico	FEIS	10-Sep-09		USCG-2007-28532
Army Corps of Engineers	Marine Corps Blount Island facility: blasting and dredging operations	101(a)(5)(D)	6-Oct-09	8-Sep-09	74 FR 46090
National Marine Fisheries Service, Science and Technology	Controlled sound exposure experiments on pinnipeds and cetaceans at Southern California Range Complex	Research	29-Oct-09	11-Sep-09	74 FR 46745
Colleen Reichmuth, Ph.D., University of California Santa Cruz	Psychological and physiological studies to evaluate the perceptual and cognitive capabilities of pinnipeds	Research	29-Oct-09	15-Sep-09	74 FR 47207
St. George Reef Lighthouse Preservation Society	Aircraft operations and restoration and maintenance work on the St. George Reef Light Station on Northwest Seal Rock off the coast of Culver City, California	101(a)(5)(D)	29-Oct-09	29-Sep-09	74 FR 49852
Air Force	Eglin Air Force Base: surface impacts of projectiles and small underwater detonations	101(a)(5)(D)	18-Nov-09	19-Oct-09	74 FR 53474
Navy	Mariana Islands Range Complex: vessel movements, explosive/gunnery use, and sonar operations	101(a)(5)(A)	19-Nov-09	20-Oct-09	74 FR 53796
Sonoma County Water Agency	Construction and maintenance of a lagoon outlet channel at the Russian River Estuary in Jenner, California	101(a)(5)(D)	14-Dec-09	12-Nov-09	74 FR 58248
Southeast Fisheries Science Center	Acoustic sampling during cetacean surveys in Atlantic, Gulf of Mexico, and Caribbean	Research	17-Dec-09	19-Oct-09	74 FR 53467
Natalija Lace, University of Southern Mississippi	Determine effects of underwater sounds on manatee sleep patterns	Research	17-Dec-09	9-Nov-09	74 FR 57702

Chapter XI

PERMITS AND AUTHORIZATIONS TO TAKE MARINE MAMMALS

The Marine Mammal Protection Act established 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 to attempt to harass, hunt, capture, or kill any marine mammal. The Act also allows certain exceptions, one of which provides for the issuance of permits by either the National Marine Fisheries Service or the Fish and Wildlife Service (depending on the species of marine mammal involved) to authorize 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. The Marine Mammal Commission is to review all permit applications except those issued for the importation of polar bear trophies from certain populations in Canada. However, under the Endangered Species Act, the Fish and Wildlife Service published a final rule on 15 May 2008 listing the polar bear as threatened throughout its range. Therefore, this species is considered depleted under the Marine Mammal Protection Act, and importing polar bear trophies from Canada is no longer allowed.

The Marine Mammal Protection Act also allows the National Marine Fisheries Service and the Fish and Wildlife Service to 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. The taking of marine mammals incidental to commercial fishing operations is authorized under separate provisions of the Marine Mammal Protection Act and is discussed in Chapter IX of this report.

Permit Applications

Permits for scientific research, public display, species enhancement, and photography all involve the same four-step review process: (1) individuals or organizations submit permit applications to either the National Marine Fisheries Service or the Fish and Wildlife Service; (2) the Service conducts an initial review, publishes a notice of receipt of the application in the *Federal Register* inviting public review and comment, and transmits the application to the Marine Mammal Commission; (3) the Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, reviews the application and transmits its recommendation to the Service; and (4) the Service takes final action after consideration of

comments and recommendations from the Commission and the public. If captive maintenance of animals is involved, the Service seeks the views of the Department of Agriculture's Animal and Plant Health Inspection Service on the adequacy of facilities, animal husbandry and care programs, and transportation arrangements.

Once a permit is issued, the responsible agency can amend it, provided that the proposed change meets the applicable statutory and regulatory requirements. Depending on the extent of the proposed change, an amendment may be subject to the same notice, review, and comment procedures as the original permit application. The Commission reviews proposed amendments to all permits except those considered under the National Marine Fisheries Ser-

vice's permit regulations to be of a minor nature (i.e., those that do not extend the duration of the research beyond 12 months, result in the taking of additional numbers or species of animals, increase the level of take or risk of adverse impact, or change or expand the location of the research).

During 2009 the Commission reviewed 37 permit applications submitted to the National Marine Fisheries Service and 19 submitted to the Fish and Wildlife Service. Of the applications received from the National Marine Fisheries Service, 33 were for scientific research, 1 was for commercial/educational photography, and 3 were for public display. Of applications received from the Fish and Wildlife Service, 11 were for scientific research and 8 were for public display. In addition, the Commission reviewed 15 permit amendment requests submitted to the two Services (11 to the National Marine Fisheries Service and 4 to the Fish and Wildlife Service). In general, both Services adopted the Commission's recommendations concerning these permit actions. The proposed activities, the Commission's recommendations, and the agencies' responses to the Commission's recommendations are summarized in Appendix A.

Institutional Animal Care and Use Committees

The Animal and Plant Health Inspection Service's (APHIS) regulations implementing the Animal Welfare Act require that facilities that use live animals for research or experimentation establish and use Institutional Animal Care and Use Committees (IACUCs) to review and approve their research protocols. During a 24 May 2006 meeting of National Marine Fisheries Service and Commission representatives, the Commission expressed concern about the failure of the Service's science centers to comply with APHIS' regulations in this regard. Some Service participants remained skeptical as to whether the IACUC requirements applied to their research activities and indicated that they intended to seek clarification from APHIS on that point. APHIS subsequently advised the National Marine Fisheries Service that the applicable regulations require it to establish and use IACUCs for its facilities that use live animals for research or experimentation, whether in captive

settings or field studies, if the research or experimentation involves invasive procedures or procedures that harm or materially alter the behavior of the animals being studied.

By letter of 17 January 2007 the Commission recommended that the National Marine Fisheries Service take immediate steps to resolve this issue and either take the necessary steps to establish IACUCs or provide the Commission with a detailed explanation as to why these requirements do not apply to the marine mammal research being conducted by the Service. The Commission further recommended that the Service's permit office refrain from issuing permits for research that is invasive or may harm or materially alter the behavior of marine mammals to applicants that have not satisfied the requirements of the Animal Welfare Act, including review and approval of such activities by an IACUC.

The Service subsequently advised the Commission that it planned to implement a new policy, to take effect on 1 October 2008, at which time all the Service's science centers would have one year to convene IACUCs, with the goal of having all research proposals and grants reviewed by 2010. The Commission wrote to the Service on 2 October 2008, expressing concern about the proposed pace of implementation and requesting a meeting with the responsible Service officials to clarify (1) the remaining steps to be taken, (2) whether any steps could be taken to expedite the process, and (3) what alternative arrangements might be available to provide the required oversight and review on an interim basis.

In November 2009 the Service advised the Commission that it would establish and implement regional IACUCs and that all science centers would be required to include the Service's IACUC assurance statement, signed by the regional IACUC chair, with all applications for scientific research on marine mammals. The Service stated that any application for permits or amendments to permits received after 31 December 2009 that did not include such an assurance statement would be returned to the applicant.

The Service continued to process and issue permits without IACUC review during 2009, and the Commission's comments and recommendations on these applications are discussed in Appendix A.

General Authorizations for Scientific Research

The 1994 amendments to the Marine Mammal Protection Act enable the National Marine Fisheries Service and the Fish and Wildlife Service to streamline authorization of research that involves taking by Level B harassment only (i.e., any act of pursuit, torment, or annoyance that has the potential to disturb but not injure a marine mammal or marine mammal stock). The Services have granted such authorizations to from 6 to 19 researchers each year. During 2009 the National Marine Fisheries Service issued 9 letters of confirmation under the general authorization, thereby alleviating delays associated with issuing permits. However, the general authorization does not apply to activities that may take endangered or threatened marine mammals, which remain subject to the additional permitting requirements of the Endangered Species Act. In its testimony before the House Natural 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. Such a proposal has yet to be included in the Marine Mammal Protection Act reauthorization bills submitted to Congress by the Secretary of Commerce and the Secretary of the Interior because the agencies believe that amending the Endangered Species Act would be a more appropriate way to implement such a change.

Incidental Take Authorizations

Section 101(a)(5) of the Marine Mammal Protection Act allows U.S. citizens to obtain authorization to unintentionally take small numbers of marine mammals incidental to activities other than commercial fishing when they meet certain conditions. Applicants can utilize this provision when the number of animals likely to be affected is “small” and the impact on the

size and productivity of the affected species or populations is likely to be negligible. This provision applies to the incidental taking of both depleted and non-depleted species and populations. All forms of incidental taking, including lethal taking, may be authorized under section 101(a)(5)(A). Section 101(a)(5)(D), added to the Act in 1994, provides a streamlined alternative to the rulemaking required to secure an incidental 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. Authorization for incidental taking by harassment under section 101(a)(5)(D) does not require that regulations be promulgated. Rather, within 45 days of receiving an application that otherwise satisfies the Act's requirements, 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. The Secretary may issue incidental harassment authorizations under section 101(a)(5)(D) for periods of up to one year. Both types of authorizations may be renewed.

During 2009 the Commission reviewed 30 requests for incidental take authorizations—15 under section 101(a)(5)(A) and 15 under section 101(a)(5)(D). The proposed activities, the Commission's recommendations, and the agencies' responses to the Commission's recommendations are summarized in Appendix A.

Appendix A

2009 MARINE MAMMAL COMMISSION RECOMMENDATIONS AND AGENCY RESPONSES

5 January

To: National Marine Fisheries Service

Issue: Application from the 30th Space Wing to take by harassment small numbers of four pinniped species incidental to space vehicle and test flight activities from Vandenberg Air Force Base, California, between 7 February 2009 and 6 February 2014

Recommendation: The Commission recommended that the Service extend the public comment period on the proposed rule for at least an additional 15 days or, alternatively, provide a post-promulgation comment period before the effective date of the rule. The Commission also recommended that the Service incorporate the proposed mitigation and monitoring activities and specify that the authorized activities be suspended, pending review, if it appears that the activities are causing marine mammal mortalities or injuries or are affecting the distribution, size, or productivity of the potentially affected pinniped populations. The Commission further recommended that the Service provide additional public notice and opportunity for comment before authorizing the taking of marine mammals by any new space vehicles or missiles that produce sound levels or frequencies significantly different from those currently described and require additional acoustic and biological monitoring when new space vehicles or missiles are launched to verify that the actual sound levels and responses of animals are as predicted.

Agency Response: The Service published the proposed rule on 6 February 2009. The Service responded that a 15-day comment period was adequate because the proposed regulations are nearly identical to regulations authorizing the applicant's previous activities, and there has been little public interest in the authorization process for these activities currently or in the past. The Service stated that the final rule requires that the monitoring methods must be reviewed, in cooperation with the Service, and, if necessary, the letter of authorization modified prior to conducting the next launch of the same vehicle if post-launch surveys determine that an injurious or lethal take of a marine mammal has occurred or that the distribution, size, or productivity of the potentially affected pinniped populations has been affected. The Service concurred with the Commission that a public comment period will be necessary if new space vehicles or missiles will produce sound levels or frequencies significantly different from those described in the authorization.

9 January

To: U.S. Fish and Wildlife Service

Issue: Application from the U.S. Geological Survey, National Wildlife Health Center to export to Canada frozen tissue samples from northern sea otters found dead or dying of natural causes along the coasts of Washington and Alaska for purposes of scientific research

Recommendation: The Commission recommended approval of the requested permit.

Agency Response: The Service issued the permit on 6 March 2009.

12 January

To: National Marine Fisheries Service

Issue: Application from the U.S. Navy to take marine mammals by harassment incidental to conducting military training activities in its Virginia Capes Range Complex in the western North Atlantic Ocean over a five-year period

Recommendation: The Commission recommended that the final rule require that, in all but emergency situations or where the need for realistic training requires greater speed or maneuverability, the Navy abide by the seasonal restrictions applicable to other vessels under the Service's ship-speed regulations to reduce the risk of ship collisions with right whales. The Commission also recommended that the Service work with the Navy to design studies to collect and analyze data necessary to characterize the risk of collisions with right whales by Navy vessels, explain and reconcile the differences between the Navy's and the National Marine Fisheries Service's estimates of maximum annual takes for the proposed exercises in the range complex, validate the effectiveness of monitoring and mitigation measures, preferably before beginning or in conjunction with the Navy operations subject to this incidental take authorization, and sponsor a peer review of existing risk analysis procedures and the interpretation and use of survey or other data in those analyses. The Commission further recommended that the Service include in the rule the number of lethal takes and takes by Level A harassment requested by the Navy, regularly confer with the Navy to monitor the actual number of such takes to ensure that they do not exceed the authorized number, and investigate jointly with the Navy any serious injury or death of an animal that could have resulted from the authorized Navy operations and determine the steps needed to avoid similar occurrences.

Agency Response: The Service published the final rule on 15 June 2009. The Service responded that its final rule on ship speed restriction regarding right whales does not apply to vessels operated by U.S. federal agencies, but that, for the proposed activities, the Navy has developed a series of mitigation measures that closely follow the Service's ship strike rule. The Service also stated that it will work with the Navy to develop more formal studies that would allow each agency to obtain the necessary data to characterize the risk of Navy vessel collisions with right whales and to take further steps to minimize the probability of a vessel strike. The Service further stated that it considers the risk analyses for naval activities and Marine Mammal Protection Act rulemaking to be appropriate, and that, if necessary, the Service and the Navy will coordinate at some future date to determine whether additional consideration of the risk analysis procedure is warranted. The Service noted that the final rule includes a requirement for the Navy to convene a monitoring workshop in 2011 in which the participants will be asked to review the Navy's monitoring plans and results and make recommendations to the Navy and the National Marine Fisheries Service on ways of improving the monitoring plans. The Service stated that it included the authorized numbers of marine mammal takes and the manner of take in the final rule and, in the event of a serious injury or mortality of a marine mammal, will work with the Navy to investigate the circumstances and steps needed to avoid similar occurrences.

16 January

To: Animal and Plant Health Inspection Service

Issue: Proposed addition of a new section 2.134 to the Animal and Plant Health Inspection Service's Animal Welfare Act regulations to require contingency planning and related training of personnel at research facilities and by dealers, exhibitors, intermediate handlers, and carriers

Recommendation: The Commission recommended that the proposed amendment be added to the regulations. The Commission further recommended that section 2.134 include a requirement that facilities maintaining marine mammals in open-ocean pens specify the arrangements that have been

made to identify and recapture animals if they escape or are lost during a natural disaster or other emergency situation. The Commission also recommended that the Service include a conforming revision to existing section 3.101(b) to require that the plans submitted under that provision include all information required under new section 2.134 and require that research facilities subject to the Institutional Animal Care and Use Committee requirements have those committees review their contingency plans.

Agency Response: The Service had not amended the regulations at year's end.

20 January

To: National Marine Fisheries Service

Issue: Application from the U.S. Navy to take six cetacean species incidental to conducting military training activities in its Jacksonville Range Complex for a five-year period

Recommendation: The Commission recommended that the Service defer promulgation of a final rule until the Service and/or the Navy has conducted an independent peer review of the methods used to derive marine mammal density estimates in the Navy's density estimation report. The Commission also recommended that the Service consult with the Navy regarding the possible need to expand the proposed authorization to include additional species that might be taken unexpectedly and a more realistic number of takes for species that occur in groups, revise the proposed rule to clarify that the authorized numbers of takes are annual limits that would be applicable over a five-year period, and require that the Navy abide by the restrictions specified in the Service's final rule implementing speed restrictions to reduce the risk of ship collisions with right whales in all but emergency situations or where the need for realistic training requires greater speed or maneuverability.

Agency Response: The Service published the final rule on 15 June 2009. The Service responded that it considers the density estimation report to have already been subjected to an independent review process. The Service adopted the Commission's recommendation to clarify that the authorized numbers of takes is an annual limit that would be applicable over a five-year period. It disagreed with the Commission's recommendation that the final rule require the Navy to abide by the Service's regulatory speed restrictions to reduce the risk of ship collisions with right whales because the restriction does not apply to vessels operated by U.S. federal agencies. The Service noted, however, that this exemption will not relieve the Navy of its obligations to consult under section 7 of the Endangered Species Act on how its activities may affect listed species.

20 January

To: National Marine Fisheries Service

Issue: Application and associated Draft Environmental Impact Statement/Overseas Environmental Impact Statement from the U.S. Navy to take marine mammals incidental to military training activities in the Undersea Warfare Training Range off the U.S. East Coast

Recommendation: The Commission recommended that the Service require the Navy to abide by the restrictions specified in the Service's final rule implementing speed restrictions to reduce the risk of ship collisions with right whales in all but emergency situations or where the need for realistic training requires greater speed or maneuverability, and to immediately suspend operations and consult with the Service if a marine mammal is seriously injured or killed and the injury or death could be the result of Navy operations. The Commission also recommended that the Service work with the Navy to sponsor a peer review of the Navy's density estimation process and use of existing data for the training range under consideration as well as at other sites in U.S. waters and devise studies to evaluate existing monitoring and mitigation measures.

Agency Response: No action had been taken as of the end of 2009.

20 January **To:** National Marine Fisheries Service

Issue: Application from CGG Veritas for authorization to take small numbers of ringed seals by harassment incidental to an on-ice marine geophysical and seismic survey in the U.S. Beaufort Sea to be carried out from 15 February to 31 May 2009

Recommendation: The Commission recommended that the Service issue the authorization, provided that (1) the proposed monitoring and mitigation measures are carried out as described, with the exception that the Service not accept monitoring by humans as an alternative to using trained dogs until it has been demonstrated that such monitoring is as effective as that carried out using dogs; and (2) operations be suspended immediately if a dead or seriously injured ringed seal is found in the vicinity of the operations and the death or injury could be attributable to the applicant's activities; and (3) if other species of marine mammals are observed in the vicinity of the survey, activities be suspended until the animals depart or the applicant has requested and received authorization to take such species.

Agency Response: On 9 February 2009 the Service received notice from Veritas withdrawing its application for the proposed action.

22 January **To:** National Marine Fisheries Service

Issue: Application from the Lamont-Doherty Earth Observatory seeking authorization to take small numbers of marine mammals by harassment incidental to a marine seismic survey in the South and East China Seas and the Philippines from late March to mid-July 2009

Recommendation: The Commission recommended that, before issuing the requested authorization, the Service provide additional justification for its preliminary determination that the planned monitoring program will be sufficient to detect, with a high level of confidence, all marine mammals within or entering the identified safety zones; clarify the qualifiers “when practical” and “when feasible” with respect to monitoring operations; clarify and describe the potential conditions that would render the use of passive acoustic monitoring impracticable for complementing the visual monitoring program. The Commission further recommended that the Service extend the monitoring period to at least one hour before initiation of seismic activities and at least one hour before the resumption of airgun activities after a power-down because of a marine mammal sighting within the safety zone; require that observations be made during all ramp-up procedures to gather the data needed to analyze and provide a report on their effectiveness as a mitigation measure; require the applicant to take all measures necessary to ensure that the proposed activities are not conducted near the Ryukyu Islands and Babuyan Islands during peak occurrence of the humpback whales in those areas; and describe the reasons why and the conditions under which the applicant would need to conduct surveys closer than 8 to 10 km off the coast of Taiwan where threatened Indo-Pacific humpback dolphins are more likely to be exposed to sound pressure levels greater than 160 dB re 1 μ Pa (rms).

Agency Response: The Service responded that it considers the planned visual and acoustic monitoring to be sufficient to detect, with reasonable certainty, most marine mammals within or entering identified safety radii. The Service stated that the term “feasible” in the context of the incidental harassment authorization is applicable only when the seismic system is not operating, and it considers the term “practicability” to include economic and technological feasibility. The Service considered the authorization's mitigation and monitoring measures to be complete to the fullest extent practicable, and that takings will be limited to harassment and will result in a negligible impact on the affected species or stocks of marine mammals. The Service noted that, in many cases, marine mammal observers are making observations during times when sonar is not being operated and will actually be observing the area prior to the 30-minute observation period. The Service further noted that the authorization requires the applicant to submit a draft and final report on all activities and monitoring results to the

Service's Office of Protected Resources within 90 days after the expiration of the authorization, and that it will post the report on its Web site.

23 January

To: National Marine Fisheries Service

Issue: The National Marine Fisheries Service's Policy and Guidance for Implementation of the Steller Sea Lion and Northern Fur Seal Research Permits and Grants Programs under the Preferred Alternative of the 2007 Final Programmatic EIS

Recommendation: The Commission expressed support for the initiative in principle but recommended that the document be strengthened by a clearer description of the role of the Permits Office in the recovery process for the Steller sea lion and northern fur seal, as well as other endangered, threatened, or depleted species. The Commission further recommended that the Service condition the permits to require researchers to identify and characterize potentially significant adverse effects of their studies and to coordinate studies to avoid unnecessary duplication and adverse effects; review permit applications to identify situations where proposed research might affect reproduction and, when that is the case, condition the permits to require the researchers to collect the information needed to evaluate such effects; convene and consult with independent implementation teams to advise the Service on all research matters related to Steller sea lions and northern fur seals; work with the Commission and other responsible agencies to develop a plan for integrating the analyses required under the National Environmental Policy Act and section 7 of the Endangered Species Act with the permit review process; and come into full compliance with the Institutional Animal Care and Use Committee requirements of the Animal Welfare Act and ensure that those requirements have been met as part of the Permit Office's review of all scientific research applications that involve the use of invasive procedures or procedures that might harm or materially alter the behavior of the subject animals.

Agency Response: The Service issued its Record of Decision for the final programmatic environmental impact statement on 10 August 2009.

29 January

To: National Marine Fisheries Service

Issue: Application from James Hain, Ph.D., to take annually up to 34 North Atlantic right whales, 50 humpback whales, 50 fin whales, and various numbers of several other marine mammal species by harassment during aerial and vessel surveys over a five-year period

Recommendation: The Commission recommended that authorization to take right whales be deferred until the Service resolves National Environmental Policy Act issues associated with its plans to reverse current policy requiring the completion of a programmatic environmental impact statement and the issuance of permits for research on right whales. The Commission recommended approval of activities involving species other than right whales, provided that the researchers take steps to minimize disturbance of the subject animals.

Agency Response: The Service was in the process of reviewing the request at the end of 2009.

29 January

To: National Marine Fisheries Service

Issue: Petition submitted to the Departments of Homeland Security, the Treasury, and Commerce from the Center for Biological Diversity and the Turtle Island Restoration Network seeking a ban on the importation of swordfish and swordfish products from certain countries under section 101(a)(2) of the Marine Mammal Protection Act

Recommendation: The Commission recommended that the Service apply section 101(a)(2) of the Marine Mammal Protection Act by adopting both quantitative standards and performance standards;

obtain the information required under section 101(a)(2)(A) from all countries that export swordfish to the United States and work with other appropriate federal agencies to ban swordfish imports from any country that fails to provide reasonable proof that the fishing technology in use does not result in the incidental kill or serious injury of marine mammals in excess of U.S. standards; apply the provisions of section 101(a)(2) to intermediary exporting nations by requiring those countries to provide documentation as to how swordfish or swordfish products they export to the United States were harvested and what impact those fisheries had on marine mammals; and require nations wishing to export swordfish or swordfish products to the United States to provide information on the methods and effectiveness of fishery monitoring and enforcement activities and consider that information in making determinations under section 102(a)(2).

Agency Response: At the end of 2009 the Service was in the process of developing a framework to implement section 101(a)(2).

6 February **To:** National Marine Fisheries Service

Issue: Application from SeaWorld, Inc., to amend a permit to increase the number of rehabilitated, non-releasable Guadalupe fur seals authorized to be maintained from one to two animals for scientific research and enhancement purposes and to renew the permit for an additional five years

Recommendation: The Commission recommended that the Service, in consultation with the Animal and Plant Health Inspection Service, be satisfied that the applicant's facilities for maintenance of the requested animals are adequate to provide for their health and well-being; deny the requested enhancement permit under the Marine Mammal Protection Act and instead authorize the maintenance of the subject animals under sections 109(h) and 112(c) of the Act; and authorize the public display of the animals incidental to their care and maintenance at the facility, provided that any such display is not detrimental to the well-being of the animals.

Agency Response: At the end of 2009 the Service had not acted on the amendment request.

12 February **To:** National Marine Fisheries Service

Issue: Application from Mark Baumgartner, Ph.D., to amend a permit to authorize the tagging of several species of large whales in the Atlantic, Pacific, and Arctic Oceans

Recommendation: The Commission recommended that authorization to take right whales be deferred until the Service resolves National Environmental Policy Act issues associated with its plans to reverse current policy requiring the completion of a programmatic environmental impact statement and the issuance of permits for research on right whales. The Commission recommended that the Service provide authorization for activities involving species other than right whales, provided, among other things, that the researchers take steps to minimize disturbance of the subject animals by exercising caution when approaching animals, particularly mother/calf pairs, and halt an approach if there is evidence that a whale may be injured in an unintended way, that mother/calf pairs may be separated for a prolonged period of time, or that a whale is exhibiting a marked change in behavior. The Commission further recommended that the Service ensure that the take tables in permit applications, amendment requests, and issued authorizations clearly indicate the number of animals that may be taken, the ways in which they may be taken, and the number of times that individual animals may be taken in each of those ways, and set the authorized take levels to take into account the estimated size of each stock and the impact that taking a large percentage of the animals in a stock, perhaps multiple times, might have on the stock.

Agency Response: Permit amended on 16 November 2009.

- 13 February **To:** National Science Foundation
- Issue:** Application from Ross D.E. MacPhee, Ph.D., to amend a permit under the Antarctic Conservation Act of 1978 to collect bones and teeth of marine mammals for destructive isotope analysis
- Recommendation:** The Commission recommended that the National Science Foundation issue the requested authorization only after it has confirmed that the National Marine Fisheries Service either has issued a permit under the Marine Mammal Protection Act to authorize the proposed activities or has determined that a permit is not required; and advise the permit holder of the possible need to obtain an authorization under the Convention on International Trade in Endangered Species of Wild Fauna and Flora and suggest that he consult with the Fish and Wildlife Service concerning the applicable requirements.
- Agency Response:** The Foundation issued a modification to the permit on 3 February 2009, prior to receipt of the Commission’s letter and prior to the stated deadline for submission of comments.
- 13 February **To:** National Science Foundation
- Issue:** Application from Robert Pitman to amend a permit under the Antarctic Conservation Act of 1978, to collect unidentified prey items (marine mammals and penguins) for identification using genetic analysis
- Recommendation:** The Commission recommended that the National Science Foundation defer authorization of the requested activities until it clarifies for the Commission and others whether the planned activities are authorized under a Marine Mammal Protection Act permit.
- Agency Response:** The Foundation issued a modification to the permit on 3 February 2009, prior to receipt of the Commission’s letter and prior to the stated deadline for submission of comments.
- 13 February **To:** Fish and Wildlife Service
- Issue:** Application from Charles Grossman, Ph.D., to renew a permit to continue research activities on captive manatees
- Recommendation:** The Commission recommended that the Service approve the requested activities, provided that the renewed permit specifies the number of animals being maintained at the Cincinnati Zoo and Columbus Zoo that may be used in the authorized research and the ways in which the animals may be taken. The Commission further recommended that the Service seek clarification from the applicant as to whether authorization is being sought to conduct passive listening and manatee vocalization playback studies on a to be determined number of manatees maintained at additional facilities, and if so, authorize expansion of the research to include manatees maintained at facilities other than the Cincinnati Zoo and the Columbus Zoo only after the Service has received specific information on the number and identities of the animals to be studied and the facilities at which they are being maintained and written approval of each facility’s Institutional Animal Care and Use Committee.
- Agency Response:** The Service issued the permit on 15 April 2009.
- 16 February **To:** Naval Facilities Engineering Command, Atlantic
- Issue:** U.S. Navy’s Draft Environmental Impact Statement/Overseas Environmental Impact Statement evaluating proposed activities in the Gulf of Mexico Range Complex

Recommendation: The Commission recommended that the Navy revise its DEIS to include a description of past and current activity levels to verify that the activity level proposed under the no-action alternative is consistent with the current level; incorporate a set of explicit and clear metrics that the public and decision-makers can use to make more informed judgments about the benefits and costs of various types and levels of activity; include an alternative involving a reduction in activity to ensure that decision-makers are both well informed and presented with a full range of alternatives; and limit the scope to those proposed activities that can be described in sufficient detail to provide a reliable basis for assessing benefits and costs. The Commission further recommended that the Navy subject its reviews of marine mammal density, distribution, behavior, and habitat use to scientific peer review; develop and implement a plan to validate the effectiveness of monitoring and mitigation measures before beginning, or in conjunction with, operations under the final environmental impact statement and anticipated issuance by the Service of an incidental harassment authorization; and implement a minimum 60-minute waiting period when deep-diving species (e.g., sperm and beaked whales) or species that cannot be identified by watchstanders are observed within or are about to enter a safety zone.

Agency Response: At the end of 2009 the Navy had not changed its use of the no-action alternative. It was in the process of developing an Integrated Comprehensive Monitoring Plan to improve its mitigation and monitoring capacity. To the Commission's knowledge, it had not submitted its use of density distribution, behavior, and habitat use to peer review. It also had not implemented a 60-minute waiting period when deep-diving species may have been present.

17 February

To: U.S. Fish and Wildlife Service

Issue: Proposed rule to designate critical habitat for the Southwest Alaska distinct population segment of northern sea otters

Recommendation: The Commission recommended that the Service adopt a final rule designating critical habitat boundaries for the Southwest Alaska sea otter distinct population segment that encompass all areas identified in the proposed rule, and either (a) expand the proposed seaward boundary from the 20-m to the 30-m isobath off all shoreline areas identified in the proposed rule or (b) explain why foraging areas between the 20-m and 30-m isobaths, which include habitat rich in a primary constituent element, do not warrant protection that would allow this sea otter population to recover.

Agency Response: The Service was expecting to publish the final rule designating critical habitat for the southwest Alaska distinct population segment of the northern sea otter in 2010.

17 February

To: Naval Facilities Engineering Command, Northwest

Issue: U.S. Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS) evaluating proposed activities in the Northwest Training Range Complex

Recommendation: The Commission recommended that the Navy revise its Northwest Training Range Complex DEIS to include the following: a description of past activity levels to verify that the activity level proposed under the no-action alternative is appropriate; a set of explicit and clear metrics that the public and decision-makers can use to make more informed judgments about the benefits and costs of various types and levels of activity; an alternative involving a reduction in activity to ensure that decision-makers are fully informed and presented with a full range of alternatives; and limiting the scope to those proposed activities that can be described in sufficient detail to provide a reliable basis for assessing benefits and costs. The Commission further recommended that the Navy subject its reviews of marine mammal density, distribution, behavior, and habitat use to scientific peer review and develop and implement a plan to validate the effectiveness of monitoring and mitigation

measures before beginning, or in conjunction with, operations under the final environmental impact statement and anticipated issuance by the Service of an incidental harassment authorization.

Agency Response: At the end of 2009 the Navy had not changed its use of the no-action alternative. It was in the process of developing an Integrated Comprehensive Monitoring Plan to improve its mitigation and monitoring capacity. To the Commission's knowledge, it had not submitted its use of density distribution, behavior, and habitat use to peer review. It also had not implemented a 60-minute waiting period when deep-diving species may have been present.

27 February **To:** National Marine Fisheries Service

Issue: Application from Niladri Basu, Ph.D., to import marine mammal samples for scientific research purposes

Recommendation: The Commission recommended approval of the requested permit provided that the Service determines that all samples to be imported were taken in accordance with the laws of the country of origin, and that the applicant is required to obtain all necessary permits under the Convention on International Trade in Endangered Species of Wild Fauna and Flora before importing the samples.

Agency Response: The Service had not yet issued the permit at the end of 2009.

27 February **To:** Fish and Wildlife Service

Issue: Application from University of Florida, College of Veterinary Medicine, to renew a permit to import marine mammal samples for scientific research purposes

Recommendation: The Commission recommended approval provided that the applicant be required to obtain all necessary permits under the Convention on International Trade in Endangered Species of Wild Fauna and Flora before importing or exporting any marine mammal parts; the applicant maintain detailed records indicating the source of each specimen and the circumstances under which it was collected; and that the applicant periodically provide reports to the Service sufficient to demonstrate that each specimen was taken in accordance with the laws of the country of origin, was not taken in violation of the Marine Mammal Protection Act or other applicable U.S. laws, and is being used only for bona fide scientific purposes.

Agency Response: The Service issued the permit on 15 April 2009 consistent with the Commission's recommendations.

13 March **To:** National Marine Fisheries Service

Issue: Application from Ann Zoidis to amend a permit to authorize the taking by harassment of up to 100 minke whales annually in Hawaiian waters to investigate the abundance, distribution, and behavior of the species

Recommendation: The Commission recommended approval of the requested amendment, provided that the conditions contained in the current permit remain in effect.

Agency Response: The amendment request was incorporated in a new permit application so no action was taken by the Service.

13 March **To:** National Marine Fisheries Service

Issue: Application from LGL Alaska Research Associates to amend its permit to authorize the taking by harassment of Cook Inlet beluga whales under the Endangered Species Act for a period of five years

Recommendation: The Commission recommended that the Service approve the requested permit amendment, provided that the Service ensure that the permit holder and other permit holders who might be carrying out research on beluga whales in Cook Inlet coordinate their activities and, as possible, share data to avoid unnecessary duplication of research and disturbance of animals.

Agency Response: The Service issued the permit on 28 May 2009 consistent with the Commission's recommendations.

16 March **To:** Mariana Islands Range Complex EIS

Issue: U.S. Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement evaluating proposed activities in the Mariana Islands Range Complex

Recommendation: The Commission recommended that the Navy revise its DEIS to provide a comprehensive description of past activity levels in the Mariana Islands Range Complex so that the reader can judge whether the activity types and levels proposed under the no-action alternative are consistent with past practices; incorporate a set of explicit metrics that the Navy, the public, and decision-makers can use to make informed judgments about various levels of readiness based on their benefits and costs; include an alternative involving a reduction in activity types and levels to ensure that decision-makers are fully informed and presented with a full range of alternatives; and limit its scope to those proposed activities that can be described in sufficient detail to provide a reliable basis for assessing benefits and costs. The Commission further recommended that the Navy subject its reviews of marine mammal density, distribution, behavior, and habitat use to scientific peer review and develop and implement a plan to evaluate the effectiveness of monitoring and mitigation measures before beginning, or in conjunction with, operations under the final environmental impact statement and anticipated issuance by the Service of an incidental harassment authorization.

Agency Response: At the end of 2009 the Navy had not changed its use of the no-action alternative. It was in the process of developing an Integrated Comprehensive Monitoring Plan to improve its mitigation and monitoring capacity. To the Commission's knowledge, it had not submitted its use of density distribution, behavior, and habitat use to peer review.

30 March **To:** Minerals Management Service

Issue: The draft environmental impact statement for Beaufort Sea and Chukchi Sea Planning Areas Oil and Gas Lease Sales 209, 212, 217, and 221

Recommendation: The Commission recommended that the Service revise its DEIS to add an alternative that contrasts the potential costs and benefits of coastal and offshore development and deferral of the entire coastal region under consideration; provide a comprehensive description of the key risks associated with oil and gas development under Arctic marine conditions, the measures required to address those risks, the efficacy of existing measures, and means for improving those measures when they fall short of their objective; describe the frequency and proprietary nature of the seismic studies conducted over the continental shelf areas of the Beaufort and Chukchi Seas and evaluate whether the frequency and intensity of such studies could be reduced by making results available to all oil companies or develop other mechanisms to reduce their frequency and intensity while still meeting the companies' needs for seismic information; include a species-by-species review of the pertinent

literature to ensure inclusion of all salient reports pertaining to the species or species groups that may be affected; provide a more comprehensive and quantitative assessment of cumulative effects taking into account the limitations of the proposed mitigation measures; and expand its tables of impact to include worst-case scenarios, the probability of their occurrence, and the potential consequences, should they occur.

Agency Response: At the end of 2009 the Service had moved forward with lease sales in the Beaufort and Chukchi Seas planning areas but was considering whether to implement a new five-year plan for lease sales on the outer continental shelf. To the Commission’s knowledge, the Service had not formally considered means for limiting the number of seismic surveys in the Chukchi and Beaufort Seas beyond the limits imposed by the standard review process. The Service also had not started full analysis of worse-case scenarios in its environmental analyses.

2 April

To: National Marine Fisheries Service

Issue: Application from the Southwest Fisheries Science Center to amend a permit to increase the number of short-beaked and long-beaked common dolphins that may be harassed during vessel and aerial surveys and by biopsy sampling

Recommendation: The Commission recommended that the Service defer issuance of the requested permit amendment until the applicant has established an Institutional Animal Care and Use Committee, consistent with the requirements of the Animal Welfare Act and the proposed research has been reviewed and approved by that committee. The Commission further recommended that, upon resolution of this issue, the Service approve the requested amendment, provided that the conditions currently contained in the permit remain in effect. The Commission also recommended that the Service ensure that the take tables in permit applications, amendment requests, and issued authorizations clearly indicate the number of animals that may be taken, the ways in which they may be taken, and the number of times that individual animals may be taken in all of those ways.

Agency Response: The Service issued the amended permit on 24 June 2009.

3 April

To: National Marine Fisheries Service

Issue: Application from Tetra Tech EC, Inc., on behalf of Northeast Gateway Energy Bridge, L.L.C., and Algonquin Gas Transmission, L.L.C., to take by harassment small numbers of various species of seals, toothed whales, and baleen whales including North Atlantic right whales, incidental to operating and maintaining the Northeast Gateway liquid natural gas port facility and the associated pipeline

Recommendation: The Commission recommended that the incidental harassment authorization be issued, provided that all marine mammal mitigation, monitoring, and reporting measures identified in the *Federal Register* notice are included in the authorization and retained in any regulations to govern the activities that the Service intends to issue when the incidental harassment authorization, if issued, expires; and that operations be suspended immediately if a dead or seriously injured right whale or other marine mammal is found in the vicinity of the operations and the death or injury could be attributable to the applicant’s activities.

Agency Response: The Service issued the authorization on 28 August 2009. The Service concurred with the Commission’s recommendation regarding suspension of activities, and extended the suspension requirement to any type of injury, not just serious injury, if it could be attributable to liquid natural gas activities.

7 April

To: Fish and Wildlife Service

Issue: Deaths of three sea otters surgically implanted with time-depth recorders and VHF tags under a permit issued to the Western Ecological Research Center, U.S. Geological Survey

Recommendation: The Commission recommended that the Service authorize resumption of the research, provided that the proposed modifications to the permit holder's research protocols are implemented. The Commission further recommended that the Service request that the permit holder explain why the proposed modified research protocol does not include the option of using intra-operatively a single-dose, broad-spectrum antibiotic that has a longer half-life than those currently used to provide additional protection from bacterial infection; and clarify what would constitute "excessive stress" as discussed in the proposed modified research protocol.

Agency Response: The Service sent a letter to the permittee concurring with the Commission's suggestions for resumption of work with the recommended changes in protocol.

8 April

To: National Marine Fisheries Service

Issue: Application from Karen Terio, D.V.M., Ph.D., to import samples from up to 200 individual cetaceans and pinnipeds (except walruses) from yet-to-be-determined locations outside the United States. All samples would be obtained from animals found dead of natural causes, taken by researchers operating under other permits or authorizations, or legally maintained in captivity outside the United States

Recommendation: The Commission recommended that the Service issue the requested permit, provided that the applicant be required to obtain all necessary permits under the Convention on International Trade in Endangered Species of Wild Fauna and Flora before importing or exporting any marine mammal parts; maintain detailed records indicating the source of each specimen and the circumstances under which it was collected; and provide reports to the Service demonstrating that each specimen was taken in accordance with the laws of the country of origin, was not taken in violation of the Marine Mammal Protection Act or other applicable U.S. laws, and is being used only for bona fide scientific purposes.

Agency Response: The Service issued the permit on 17 July 2009 consistent with the Commission's recommendations.

10 April

To: Department of State

Issue: Recovery of the vaquita

Recommendation: The Commission recommended that the Department of State direct \$30 million from the Department of State's budget for energy and the environment to recover the vaquita. The Commission noted that the United States needs to act decisively to help Mexico secure the survival of the vaquita and that an investment by the Department of State would go a long way toward ensuring the species' recovery, protecting the region's biodiversity, and sustaining the northern Gulf of California ecosystem and the local communities that depend on it.

Agency Response: The State Department responded by saying that, although it is unable to provide the funding that the Commission requested at the time, it is ready and willing to contribute in other ways.

10 April

To: National Marine Fisheries Service

Issue: Application from the U.S. Navy for a letter of authorization to take marine mammals incidental to military readiness training operations in the Northwest Training Range Complex off Washington, Oregon, and northern California over a five-year period

Recommendation: The Commission recommended that, if the Service proceeds with issuance of a proposed rule, it require the Navy to conduct an external peer review of its marine mammal density estimates, the data upon which those estimates are based, and the manner in which those data were used for that purpose; provide additional details concerning its Integrated Comprehensive Monitoring Program, including an estimated time frame for its implementation; develop and implement a plan to evaluate the effectiveness of monitoring and mitigation measures before beginning or in conjunction with conducting operations covered by the proposed incidental take authorization; and suspend an activity if a marine mammal is seriously injured or killed and the injury or death could be associated with the Navy's activities. The Commission further recommended that the Navy be required to submit annual reports providing full documentation of methods, results, and interpretation pertaining to all monitoring tasks and the dates and locations of operations, marine mammal sightings, and estimates of the number and nature of potential takes of marine mammals by harassment or in other ways; and work with the Service to develop a database for storing original records of marine mammal interactions.

Agency Response: The Service published the proposed rule on 13 July 2009. The proposed rule required, among other things, that the Navy, in cooperation with the Service convene a monitoring workshop in 2011 to review monitoring results from the previous two years pursuant to the rule, as well as monitoring results from other Navy rules and Letters of Authorization. The proposed rule also required that the Service be notified immediately or as soon as clearance procedures allow if an injured, stranded, or dead marine mammal is found during or shortly after, and in the vicinity of, any Navy training exercise utilizing mid-frequency active sonar, high-frequency active sonar, or underwater explosive detonations.

13 April

To: National Science Foundation

Issue: Application from Cindy Lee Van Dover for an amendment of an Antarctic Conservation Act permit to export to Antarctica vertebrae from a North Atlantic right whale for scientific research purposes and to re-import the bones into the United States upon completion of the field study

Recommendation: The Commission recommended that the National Science Foundation defer issuing the requested authorization pending additional information from the applicant, including (1) a detailed description of the objectives of the research, including why it is necessary to use wood and North Atlantic right whale vertebrae—neither indigenous to Antarctica—for the proposed project; (2) an analysis of the potential for any disease or health risk associated with importing or exporting non-indigenous species to or from Antarctica; and (3) the location and depths at which the substrate (wood and whale vertebrae) would be placed. The Commission further recommended that the National Science Foundation consider issuance of the requested authorization only after it has confirmed with the National Marine Fisheries Service that the permit holder has obtained all necessary authorizations for the planned activities under the Marine Mammal Protection Act and the Endangered Species Act; consult with the National Marine Fisheries Service to determine whether having different permit holders under the applicable statutes creates operational or legal problems and, if so, adopt appropriate policies to ensure consistency in applicants across the various permits; and advise the permit holder of the need to obtain an authorization under the Convention on International Trade in Endangered Species of Wild Fauna and Flora to export or import right whale bones from or to the United States and suggest that she consult with the Fish and Wildlife Service concerning the applicable requirements.

Agency Response: The Foundation issued a modification to the permit on 4 December 2009.

13 April **To:** U.S. Fish and Wildlife Service

Issue: Application from the Alaska Museum of Natural History to acquire for purposes of public display a northern sea otter skeleton obtained as a carcass from waters near Homer, Alaska

Recommendation: The Commission recommended that the Service and the National Marine Fisheries Service, in consultation with the Commission, work together to resolve their interpretations of the public display provisions of the Marine Mammal Protection Act, and, in the meantime, the Service defer consideration of this and other public display permit applications seeking authority to display dead marine mammals or their parts and pursue other means of authorizing this display under the Act and the Service's implementing regulations.

Agency Response: The Service issued the permit on 15 May 2009.

13 April **To:** National Marine Fisheries Service

Issue: Application from the U.S. Navy to take marine mammals incidental to military readiness training operations in the Cherry Point Range Complex off the coasts of North and South Carolina from 29 May 2009 through 28 May 2014

Recommendation: The Commission noted that the Service initially provided an exceptionally short public comment period for its proposed rule, and recommended that the Service adopt a policy to provide a 60-day comment period for all proposed regulations issued under section 101(a)(5)(A). With regard to the content of the proposed rule, the Commission recommended that the Service require the Navy to conduct an external peer review of its marine mammal density estimates, including the data upon which those estimates are based and the manner in which those data are collected and used; revise its explosive ordnance exposure analysis to provide a more realistic assessment of potential occurrences and outcomes of explosions; complete its Integrated Comprehensive Monitoring Program plan and make the plan available to the Commission and other interested parties for review prior to its implementation; develop and implement a plan to evaluate the effectiveness of monitoring and mitigation measures before beginning or in conjunction with conducting operations covered by the proposed incidental take authorization; reconcile the discrepancy between proposed sections on the use of marine mammal observers and specify the circumstances under which marine mammal observers would not be required aboard Navy platforms; describe the alternative measures that the Navy would take to monitor for the presence of marine mammals when marine mammal observers are not being used; and suspend or halt an activity if a marine mammal is seriously injured or killed and the injury or death could be associated with the activity. The Commission also recommended that the Service work with the Navy to develop a database for storing original records of Navy interactions with marine mammals.

Agency Response: The Service published the final rule on 15 June 2009. The Service responded that it considered a 28-day public comment period to be reasonable, because there is no prescribed minimum time frame for public comment on proposed rules in the Administrative Procedures Act or section 101(a)(5)(A) of the Marine Mammal Protection Act. The Service also responded that it considers that the density estimates, including the data upon which those estimates are based and the manner in which those are collected and used, has already gone through an independent review process (i.e., review with the Service's Science Center technical staff and scientists with the University of St. Andrews, Scotland Centre for Environmental and Ecological Modeling). The Service stated that the Navy's training events schedule depends on weather, international events, and requirements of the Fleet Response Training Plan, and it is not possible to plan discrete events five years in advance. The Service stated that, assuming that the Navy's training activities are evenly distributed over four seasons brings a more realistic view in analyzing the impacts over the years. The Service stated that it does not believe it would be feasible for the Navy to complete the Integrated Comprehensive Monitoring Plan

prior to the end of 2009, but that components of the Plan have already been factored into a number of final rules for Navy actions. The Service stated that over the course of the 5-year rule, it will evaluate the Navy's training activities annually to validate the effectiveness of the measures. In addition, with the implementation of the Plan by the end of 2009 and the planned Monitoring Workshop in 2011, the Service will work with the Navy to further improve its monitoring and mitigation plans for its future activities. The Service stated that, regardless of whether marine mammal observers are present, the shipboard lookouts would implement the mitigation measures identified in the rule. The Service stated that if there is clear evidence that a marine mammal has been injured or killed as a result of the proposed Navy training activities, the activities shall be immediately suspended and the situation immediately reported. The Service stated that there is currently no plan to develop a database for storing original records of Navy interactions with marine mammals due to limited resources, but the Service will consider the recommendation when adequate resources are available.

17 April

To: National Marine Fisheries Service

Issue: Application from the U.S. Navy for authorization to take marine mammals incidental to military readiness training operations in the Mariana Islands Range Complex in the western Pacific Ocean over a five-year period

Recommendation: The Commission recommended that the Service and the Navy ensure that the contemplated rule and any Letter of Authorization issued under that rule include all marine mammal species that may be taken by Level A or Level B harassment as a result of the proposed activities. Further, the Commission recommended that if the Service proceeds with publication of a proposed rule it clarify whether authorization is needed to take sperm whales and, if so, specify the numbers that can be taken by Level A and Level B harassment under the authorization; require the Navy to conduct an external peer review of its marine mammal density estimates, the data upon which those estimates are based, and the manner in which those data are being used; require the Navy to provide additional details concerning its Integrated Comprehensive Monitoring Program, including an estimated time frame for its implementation; require the Navy to develop and implement a plan to evaluate the effectiveness of monitoring and mitigation measures before beginning or in conjunction with conducting operations covered by the proposed incidental take authorization; and condition any proposed rule to require that the Navy suspend an activity, pending the Service's review and authorization to proceed, if a marine mammal is seriously injured or killed and the injury or death could be associated with the Navy's activities. The Commission further recommended that the Service require the Navy to submit annual reports providing full documentation of methods, results, and interpretation pertaining to all monitoring tasks and the dates and locations of operations, marine mammal sightings, and estimates of the number and nature of potential takes of marine mammals by harassment or in other ways; and work with the Navy to develop a database for storing original records of marine mammal interactions, which will provide a basis for evaluating interaction records over long periods of time and large areas.

Agency Response: The Service published the proposed rule on 20 October 2009. The Service stated that it has preliminarily determined that the Navy's specified activities will have a negligible impact on sperm whales, and that the proposed rule requires that Navy personnel shall ensure that the Service is notified immediately or as soon as clearance procedures allow if an injured, stranded, or dead marine mammal is found during or shortly after, and in the vicinity of, any Navy training exercise utilizing mid- or high-frequency active sonar, or underwater explosive detonations. The Service stated that the proposed rule also requires that at the end of the fourth year of the rule, the Navy submit a draft report that analyzes and summarizes all of the multi-year marine mammal information gathered during anti-submarine warfare and explosive exercises for which annual reports are required.

17 April

To: Fish and Wildlife Service

Issue: Reconsideration of seven applications submitted by Conservation Force on behalf of applicants Dun, Halstead, Atcheson, Wiczorek, Hansen, Hamel, and Neilson, to import polar bear trophies taken from the Gulf of Boothia management unit in Canada for purposes of enhancement

Recommendation: In its letter regarding the initial applications, the Commission recommended that the permits be denied based on its belief that (1) there is compelling evidence that Congress intended to exclude sport hunting from this permitting authority, (2) even if an enhancement permit could be issued to authorize sport hunting or the importation of trophies from such hunts, the applicants have not met the statutory requirements for such permits, and (3) it would be particularly inappropriate to consider imports from the Gulf of Boothia as an enhancement activity inasmuch as the Service has never approved the population under the Act's trophy import provision (section 104(c)(5)), meaning that it has yet to determine that management is based on scientifically sound quotas ensuring that the population is maintained at a sustainable level. The Commission noted that based on its review of the new materials submitted by the applicants, it reiterates its earlier recommendations and rationale and believes that denial of the permits was appropriate, given the statutory requirements pertaining to enhancement permits.

Agency Response: The Service had denied the original permit requests on 2 February 2009 and upheld that decision on 28 April 2009, consistent with the Commission's recommendations.

20 April

To: National Marine Fisheries Service

Issue: Proposed rule to authorize the U.S. Navy, Naval Air Weapons Station, to take three species of marine mammals by Level B harassment incidental to target and missile launch activities in the vicinity of San Nicolas Island, California, over five years

Recommendation: The Commission recommended that the Service adopt a general policy of providing a 60-day comment period for all proposed regulations issued under section 101(a)(5)(A), and in no case less than a 45-day comment period, absent a showing of good cause that such a comment period is impractical, unnecessary, or contrary to the public interest, as provided for under section 553(b)(3)(B) of the Administrative Procedures Act. With regard to the content of the proposed rule, the Commission recommended that the Service make the Navy's interim report on 2010 monitoring activities available to the Commission and others for review and comment before authorizing any changes to the monitoring program; require the Navy to investigate any injury or death of a marine mammal if the animal's death could be associated with the Navy's activities to determine the cause, assess the full impact of the activity, determine how the activity should be modified to avoid future injuries or deaths, and ascertain if additional taking authority is needed; and require the Navy to halt an activity if a marine mammal species other than those covered by the authorization is observed within the operating area.

Agency Response: The Service issued the final rule on 28 May 2009. The Service stated that, in this case, it considered a 30-day comment period to be reasonable because a delay in implementing the regulations would result in a delay of testing and development of a critical program involving a new weapon system being developed as part of the Navy's national security mission to improve military readiness and protect homeland security. The Service stated that it will provide a copy of the Navy's interim report submitted in 2010 to the Commission and others for review and comment before authorizing any changes to the monitoring program. The Service stated that the Navy is not authorized to investigate or handle marine mammal carcasses; however, the Navy must notify the National Marine Fisheries Service's Stranding Network immediately and the agency's Office of Protected Resources and Southwest Regional Office within 48 hours of the discovery of an injured or dead marine mammal. The Service also required that if an injurious or lethal take of a marine mammal occurs, the launch procedure and monitoring methods must be reviewed, in cooperation

with the Service and, if necessary, appropriate changes will be made to a letter of authorization prior to conducting the next launch of the same vehicle under the authorization. The Service required that the Navy suspend activities in the event of the serious injury or death of a marine mammal is already part of the general conditions contained in letters of authorization issued by the Service.

7 May

To: National Marine Fisheries Service

Issue: Application from the National Marine Mammal Laboratory, National Marine Fisheries Service, to amend a permit to authorize, among other things, an increase in the number of California sea lions to be taken by Level A and B harassment

Recommendation: The Commission noted that, in its review of the original application three years earlier, it recommended that the Service defer issuance of the permit until the applicant had established an Institutional Animal Care and Use Committee as required under the Animal Welfare Act and the Animal and Plant Health Inspection Service's regulations implementing that statute. The Commission noted that, despite that earlier recommendation and the applicant's failure to comply with the unambiguous requirements of the Animal Welfare Act, the Service issued the permit. The Commission again recommended that issuance of the permit be deferred until the applicant comes into compliance with the applicable Animal Welfare Act requirements by establishing an Institutional Animal Care and Use Committee and the proposed research had been reviewed by that Committee.

Agency Response: At the end of 2009 the applicant had sought and gained approval of the proposed studies by an Institutional Animal Care and Use Committee, and the permit was approved.

7 May

To: National Marine Fisheries Service

Issue: Application from the U.S. Air Force, 30th Space Wing, to take by Level A and B harassment Pacific harbor seals, northern elephant seals, and California sea lions at Vandenberg Air Force Base for scientific research purposes, and to accidentally kill up to two seals of each species annually in the course of the research over five years

Recommendation: The Commission recommended that the Service issue the requested permit, provided that the permit require that activities be suspended, pending review and authorization to proceed, if a total of two animals are accidentally injured or killed in any single year; the proposed studies have been reviewed and approved by the applicant's Institutional Animal Care and Use Committee in accordance with § 2.37 of the Animal and Plant Health Inspection Service's regulations governing the humane handling, care, treatment, and transportation of marine mammals; and the Service ensure that activities to be conducted under this permit and those of other permit-holders who might be carrying out research on the same species in the same areas are coordinated and, as possible, data are shared to avoid unnecessary duplication of research and disturbance of animals.

Agency Response: The Service issued the permit on 25 June 2009.

12 May

To: National Marine Fisheries Service

Issue: Application from Peter Tyack, Ph.D., to take by harassment various species of beaked whales and large delphinids to study cetacean behavior, sound production, and responses to mid-frequency sound at received levels of up to 180 dB re 1 μ Pa

Recommendation: The Commission recommended that the Service issue the requested permit, provided that it require that the investigator stop an activity if observations indicate that the introduced sound may lead to serious injury or mortality; specify that tagging not be conducted on calves or females accompanied by calves less than six months of age, as estimated on the basis of their size; consult with

the applicant to identify steps to be taken to monitor any animal that appears to become disoriented or injured during the playback experiments and to recover and necropsy any animal that may have died as a result of the activities; require that an activity be suspended, pending review and authorization to proceed, if an animal may have been injured or killed while conducting that activity; take steps to ensure that activities to be conducted under this permit and those of other permit-holders who might be carrying out research on the same species in the same areas are coordinated to avoid unnecessarily duplicative research and unnecessary disturbance of animals; and ensure that the applicant obtains all necessary permits under the Convention on International Trade in Endangered Species of Wild Fauna and Flora before importing samples into or exporting them out of the United States.

Agency Response: The Service issued the permit on 15 July 2009.

14 May

To: National Marine Fisheries Service

Issue: Advance notice of proposed rulemaking and request for information concerning designation of critical habitat for the endangered Cook Inlet stock of beluga whales under the Endangered Species Act

Recommendation: The Commission noted that the designation of critical habitat for Cook Inlet beluga whales is one of the most important actions that can be taken to prevent the extinction of the population, and that it strongly supports the Service in completing this action as soon as possible. The Commission recommended that the Service designate all waters of Cook Inlet from Kalgin Island northward to the headwaters of Knik and Turnagain Arms and all coastal waters less than 18 m deep in the remaining portions of the inlet as critical habitat for Cook Inlet beluga whales.

Agency Response: The Service published the proposed rule on 2 December 2009.

14 May

To: National Marine Fisheries Service

Issue: Application from the Northeast Fisheries Science Center, National Marine Fisheries Service, to amend a permit to increase the number of harbor seals and gray seals that may be harassed during the collection of scats and harbor seal pup carcasses

Recommendation: The Commission recommended that the Service approve the requested amendment, provided that the conditions currently contained in the permit remain in effect.

Agency Response: The Service issued the amended permit on 8 July 2009.

14 May

To: National Marine Fisheries Service

Issue: Proposed rule to implement identification and certification procedures under the High Seas Driftnet Fishing Moratorium Protection Act to promote compliance with international fisheries management and conservation agreements and thereby encourage bycatch reduction methods in international fisheries comparable to those in U.S. fisheries

Recommendation: The Commission recommended that the Service include in the final rule detailed descriptions of the U.S. standards (both quantitative criteria [i.e., limits on bycatch rates or numbers] and restrictions on gear types and fishing practices needed to satisfy those criteria) that will be used to assess comparability of other nations' regulatory regimes or set forth a process for publishing and updating such descriptions elsewhere.

Agency Response: At the end of 2009 the Service was in the process of developing a framework to implement section 101(a)(2).

- 14 May **To:** Fish and Wildlife Service
- Issue:** Application from the U.S. Geological Survey, Alaska Science Center, to amend a permit to authorize the taking of an additional 50 polar bears for a National Science Foundation–funded collaboration with the University of Wyoming and for investigations by the U.S. Geological Survey of bear survival strategies
- Recommendation:** The Commission recommended that the Service approve the permit amendment request, provided that the conditions contained in the current permit remain in effect.
- Agency Response:** The Service issued the permit amendment of 30 July 2009.
- 26 May **To:** National Marine Fisheries Service
- Issue:** Application from The Mirage Casino-Hotel to import two adult male captive-born bottlenose dolphins from Dolphin Quest in Bermuda to the Mirage Casino-Hotel, Las Vegas, Nevada, for purposes of public display and as part of a long-term breeding loan agreement between the facilities
- Recommendation:** The Commission recommended that the Service issue the requested permit, provided that it determines that the applicant’s program for education or conservation is consistent with the professionally recognized standards of the public display community.
- Agency Response:** The Service issued the permit on 4 August 2009.
- 25 May **To:** National Marine Fisheries Service
- Issue:** Proposed rule to authorize the Port of Anchorage to harass small numbers of beluga whales, harbor seals, harbor porpoises, and killer whales incidental to a five-year marine terminal redevelopment project
- Recommendation:** The Commission recommended that the Service withdraw the proposed rule and refrain from authorizing the taking of Cook Inlet beluga whales incidental to port redevelopment and expanded use until it has conducted further research to identify the factor or factors that are causing or contributing to the decline and/or lack of recovery of the population and can discount the factors associated with port construction and use as significant contributors.
- Agency Response:** The Service issued the final rule on 25 May 2009. The Service responded that its 2008 Conservation Plan for the Cook Inlet Beluga Whale cites the primary concern relating to coastal development in Upper Cook Inlet as potential restriction of passage of beluga whales along Knik Arm to important feeding areas. The Service noted that based on captive and field acoustic studies it is possible that beluga whales may alter their behavior in response to noise from the marine terminal redevelopment project. However, to date, the monitoring reports do not indicate short- or long-term change in behavior or habitat use. After five months of pile driving there is no indication of a change in habitat use or restriction of beluga whale passage, and it disagrees that the status quo is jeopardizing the continued existence of the species.
- 26 May **To:** Fish and Wildlife Service
- Issue:** Initiation of a five-year review of the status of southern sea otters under the Endangered Species Act and request for information on the population’s status and recommendations on additional actions and studies that would benefit the species in the future and that would be appropriate to include in an update of the population’s recovery plan

Recommendation: The Commission recommended that the Service retain the current listing of the southern sea otter population as threatened; add various studies and actions to any update of the southern sea otter recovery plan; annually review and update the southern sea otter stock assessment report; and consult with the National Marine Fisheries Service to ensure adequate observer coverage of fisheries likely to take sea otters incidentally, particularly fisheries in areas immediately north and south of the mainland range of southern sea otters.

Agency Response: Although the Service had not completed a 5-year status review for southern sea otters at the end of 2009, the Service plans to review the stock assessment report on an annual basis and has contacted the National Marine Fisheries Service to obtain information on known fisheries interactions with southern sea otters.

28 May

To: National Marine Fisheries Service

Issue: Application from the U.S. Navy to take marine mammals incidental to military readiness training operations in the Gulf of Mexico Range Complex in the northern Gulf of Mexico over a five-year period

Recommendation: The Commission recommended that if the Service decides to publish a proposed rule to authorize the taking of marine mammals incidental to the proposed military training operations, the Service (1) correct the discrepancy between its *Federal Register* notice and the Navy's application addendum regarding the numbers of animals requested to be taken incidental to the proposed activities, and (2) require the Navy to conduct an external peer review of its marine mammal density estimates, the data upon which those estimates are based, and the manner in which those data were used for that purpose; provide additional details concerning its Integrated Comprehensive Monitoring Program, including an estimated time frame for its implementation; develop and implement a plan to evaluate the effectiveness of monitoring and mitigation measures before beginning or in conjunction with conducting operations covered by the proposed incidental take authorization; implement a minimum 60-minute waiting period when deep-diving species (e.g., sperm and beaked whales) or species that cannot be identified by watchstanders are observed within or are about to enter a safety zone; and suspend an activity, pending review and authorization to proceed by the Service, if a marine mammal is seriously injured or killed and the injury or death could be associated with the Navy's activities. The Commission further recommended that the National Marine Fisheries Service work with the Navy to develop a database for storing original records of marine mammal interactions, which will provide a basis for evaluating interaction records over long periods of time and large areas.

Agency Response: The Service issued the proposed rule on 14 July 2009. The Service stated that the Navy has provided the Service with a copy of the draft Gulf of Mexico Range Complex Monitoring Plan. In addition, the Service stated that it and the Navy have incorporated a suggestion from the public, which recommended the Navy hold a peer review workshop to discuss the Navy's Monitoring Plans for the multiple range complexes and training exercises in which the Navy would receive Incidental Take Authorizations. The Service also stated that, if a marine mammal is injured or killed as a result of the proposed Navy training activities, the Navy shall suspend its activities immediately and report such an incident to the Service.

29 May

To: National Marine Fisheries Service

Issue: Application from Ocean World to import three captive-born female California sea lions (a one-year-old and two animals yet to be born) from Zoo Tiergarten Nuremberg, Nuremberg, Germany, for purposes of public display

Recommendation: The Commission noted that the activities for which a permit is being sought appear to meet the Marine Mammal Protection Act's requirements assuming that the Service determines

that the applicant's program for education or conservation purposes meets the recognized standards of the public display community. The Commission recommended that, prior to issuing the requested permit, the Service obtain additional information as to why sea lions already in captivity, and that might otherwise be euthanized, would not suit Ocean World's needs.

Agency Response: The Service issued the permit on 30 June 2009.

29 May

To: National Marine Fisheries Service

Issue: Application from Whitlow W.L. Au, Ph.D. to amend a permit to authorize (1) an increase in the numbers of individuals of nine species of cetaceans that may be suction-cup tagged to collect sufficient data to address the originally stated research objectives, and (2) the harassment of 18 non-threatened, non-endangered species of cetaceans while conducting acoustic playback studies to investigate the effects of noise on the behavior of cetaceans around Hawaii and the effects of low-level sounds that might elicit mild alert responses

Recommendation: The Commission recommended that the Service issue the requested permit amendment, provided that the conditions contained in the current permit remain in effect (i.e., that tagging not be conducted on calves or females accompanied by calves less than six months of age, as estimated on the basis of their size) and that the Service require that the investigator stop an activity if (1) an animal exhibits a strong adverse reaction to tagging activities, or (2) observations indicate that the proposed playback activities may lead to serious injury or mortality or have resulted in adverse behavioral reactions (as defined in Southall et al. 2007) or in the separation of mothers and calves for longer than 10 minutes; consult with the applicant to identify steps to be taken to monitor any animal that appears to become disoriented or injured during the playback experiments; and require that an activity be suspended, pending review and authorization to proceed, if it appears that an animal may have been injured as a result of an activity authorized under the permit.

Agency Response: The permit request was subsequently withdrawn.

3 June

To: National Marine Fisheries Service

Issue: Proposed rule to authorize the U.S. Navy to take marine mammals incidental to its activities at the Naval Surface Warfare Center, Panama City, Florida, over a five-year period

Recommendation: The Commission recommended that if the Service proceeds with publication of a final rule to authorize the taking of marine mammals incidental to the proposed military readiness activities, it require the Navy to conduct an external peer review of its marine mammal density estimates, the data upon which those estimates are based, and the manner in which those data were used for that purpose; provide additional details concerning its Integrated Comprehensive Monitoring Program, including an estimated time frame for its implementation; develop and implement a plan to evaluate the effectiveness of monitoring and mitigation measures before beginning or in conjunction with conducting operations covered by the proposed incidental take authorization; implement a minimum 60-minute waiting period when deep-diving species (e.g., sperm and beaked whales) or species that cannot be identified by watchstanders are observed within or are about to enter a safety zone; suspend an activity pending review and authorization from the Service to proceed if a marine mammal is seriously injured or killed and the injury or death could be associated with the Navy's activities. The Commission further recommended that the Navy be required to submit annual reports that document in full the methods, results, and interpretation of all monitoring tasks; and work with the National Marine Fisheries Service to develop a database for storing original records of marine mammal interactions, which will provide a basis for evaluating such interactions over long periods of time and across large areas.

Agency Response: To the Commission’s knowledge, the Navy had not submitted its use of density distribution, behavior, and habitat use to peer review. It was in the process of developing an Integrated Comprehensive Monitoring Plan to improve its mitigation and monitoring capacity. It had not implemented a 60-minute waiting period when deep-diving species may have been present. It had instigated annual reviews of activities with the National Marine Fisheries Service. To the Commission’s knowledge, the Navy was still considering whether and to what extent data from past exercises and interactions with marine mammals would be stored in a database.

5 June **To:** National Science Foundation

Issue: Application from Stacy Kim for authorization under the Antarctic Conservation Act of 1978 to launch a remotely operated vehicle under the Ross Ice Shelf at the northwest end of White Island

Recommendation: The Commission recommended that the National Science Foundation deny the requested authorization unless the applicant can show (1) that there is an ecological component to the proposed research that would further our understanding of the White Island Weddell seal population or that would contribute to its conservation, or (2) absent such a showing, that the proposed research cannot be accomplished at a location other than White Island and that the research would not be detrimental to the seal population.

Agency Response: The Foundation denied the authorization on 23 July 2009.

5 June **To:** Fish and Wildlife Service

Issue: Application from the U.S. Geological Survey, Alaska Science Center to amend a permit to authorize an increase in the number of walrus that can be tagged with subdermally anchored electronic tags and that can be harassed incidentally to conducting the research each year

Recommendation: The Commission recommended that the Service approve the amendment request, provided that the conditions contained in the current permit remain in effect.

Agency Response: The Service issued the permit on 31 July 2009.

8 June **To:** National Marine Fisheries Service

Issue: Application from the Lamont-Doherty Earth Observatory to take small numbers of marine mammals by harassment incidental to conducting a marine seismic survey in the northeast Pacific Ocean during 2009

Recommendation: The Commission recommended that before issuing the requested authorization the Service provide additional justification for its preliminary determination that the planned monitoring program will be sufficient to detect, with a high level of confidence, all marine mammals within or entering the identified safety zones; clarify the qualifier “when feasible” with respect to using marine mammal visual observers; extend the monitoring period to at least one hour before initiation of seismic activities or the resumption of airgun activities after a power-down because of a marine mammal sighting within the safety zone; and require that observations be made during all ramp-up procedures to gather the data needed to analyze and provide a report on the effectiveness of this method as a mitigation measure.

Agency Response: The Service issued the incidental harassment authorization on 25 August 2009. The Service considered the planned monitoring program (using visual detection and passive acoustic monitoring) to be sufficient to detect, with reasonable certainty, most marine mammals within or entering identified safety radii. The Service stated that, for this authorization, the qualifier “feasible”

is only applicable when the seismic system is not operating, and that 30 minutes is an adequate length of time for monitoring prior to the start-up of airguns, given that marine mammal observers monitor the area for at least 30 minutes prior to starting the airgun array (day or night). The Service stated that the applicant must submit a draft and final report on all activities and monitoring results to the Service within 90 days after the expiration of the authorization. In this regard the Service stated that it has asked the National Science Foundation and the applicant to gather all data that could potentially provide information regarding effectiveness of ramp-ups as a mitigation measure although, considering the low numbers of marine mammal sightings and low numbers of ramp-ups, it is unlikely that the information will result in any statistically robust conclusions for this particular seismic survey. The Service noted, however, that these requirements may provide information regarding the effectiveness of ramp-up as a mitigation measure over the long term.

8 June **To:** National Marine Fisheries Service

Issue: Application from Neptune LNG, L.L.C., to harass small numbers of various species of seals, toothed whales, and baleen whales, including North Atlantic right whales, incidental to the construction and operation of an offshore liquefied natural gas port in Massachusetts Bay

Recommendation: The Commission recommended that the Service issue the requested incidental harassment authorization subject to the mitigation, monitoring, and reporting measures identified in the *Federal Register* notice.

Agency Response: The Service issued the authorization on 26 June 2009.

9 June **To:** Fish and Wildlife Service

Issue: Application from the National Marine Mammal Laboratory, National Marine Fisheries Service, to take by harassment walrus and polar bears while conducting aerial surveys in the Chukchi and Beaufort Seas over a five-year period

Recommendation: The Commission recommended that the Service issue the requested permit.

Agency Response: The Service issued the permit on 22 July 2009.

19 June **To:** National Marine Fisheries Service

Issue: Application from Gregory D. Bossart, V.M.D., to take by Level A and B harassment Atlantic bottlenose dolphins in the Indian River Lagoon, Florida, and to accidentally kill up to two dolphins over the five-year duration of the permit for the purpose of conducting health assessment and surveillance studies

Recommendation: The Commission recommended that the Service require the applicant (and other applicants seeking authorization for research activities that involve an invasive procedure or that harm or materially alter the behavior of the animals under study) to demonstrate that the proposed research has been reviewed and approved by an Institutional Animal Care and Use Committee as required by section 2.31 or section 2.37 of the Animal and Plant Health Inspection Service's Animal Welfare Act regulations; and defer issuance of any application, including the subject request, seeking authorization for such research until the applicant has provided documentation demonstrating compliance. The Commission further recommended that upon the Service's receipt of such documentation the permit be issued provided that the Service require that an activity be suspended, pending review and authorization from the Service to proceed, if more than two animals are accidentally killed during the five-year duration of the permit; and ensure that activities to be conducted under this permit and those of other permit-holders who might be carrying out research on the same species or in the same areas

are coordinated and, as possible, data are shared to avoid unnecessary duplication of research and disturbance of animals.

Agency Response: The Service issued the permit on 15 October 2009.

19 June

To: National Marine Fisheries Service

Issue: Application from Scripps Institution of Oceanography to take small numbers of marine mammals by harassment incidental to conducting an ocean-bottom seismograph deployment and a magnetic, bathymetric, and seismic survey program in the Pacific Ocean off the coast of Oregon

Recommendation: The Commission recommended that the Service issue the requested authorization provided that the authorization include all of the proposed monitoring and mitigation measures to minimize the likelihood of serious injury to the potentially affected marine mammal species; clarify when the use of night-vision devices will be required and provide additional justification for its implied conclusion that observers will be able to achieve a high nighttime detection rate; and require that operations be suspended immediately, pending review by the Service, if a dead or seriously injured marine mammal is found in the vicinity of the operations and the death or injury could have occurred incidental to the seismic survey.

Agency Response: The Service issued the authorization on 13 July 2009. The Service stated that although it depends on the lights on the ship, the sea state, and thermal factors, marine mammal observers estimated that visual detection is effective out to between 150 and 250 m (492 to 820 ft) using night-vision devices and about 30 m (98 ft) with the naked eye. The Service noted that depending on water depth relevant safety zones for this survey range from 8 to 150 m (26 to 492 ft). It believes that observers are effective at visually detecting marine mammals within these distances. Marine seismic surveys may continue into night and low-light hours if such a segment(s) of the survey is initiated when the entire relevant safety zones are visible and can be effectively monitored. No initiation of airgun array operations is permitted from a shutdown position at night or during low-light hours (such as in dense fog or heavy rain) when the entire relevant safety zone cannot be effectively monitored by visual observers. The authorization includes a requirement to this effect.

29 June

To: Fish and Wildlife Service

Issue: Application from the University of Illinois, Veterinary Diagnostic Laboratory, to acquire and import an unspecified number of biological specimens (to include blood, sera, tissues, skin, hair, and bone) from manatees, dugongs, sea otters, marine otters, walruses, and polar bears

Recommendation: The Commission recommended that the Service approve the requested permit provided that the applicant be required to obtain all necessary permits under the Convention on International Trade in Endangered Species of Wild Fauna and Flora before importing or exporting any marine mammal parts; the applicant maintain detailed records indicating the source of each specimen and the circumstances under which it was collected; and the applicant periodically provide reports to the Service sufficient to demonstrate that each specimen was taken in accordance with the laws of the country of origin, was not taken in violation of the Marine Mammal Protection Act or other applicable U.S. laws, and is being used only for bona fide scientific purposes.

Agency Response: Permit issued on 12 November 2009

6 July

To: National Marine Fisheries Service

Issue: Application from Shell Offshore, Inc., and Shell Gulf of Mexico, Inc., to take by harassment small numbers of marine mammals incidental to conducting seismic surveys in the Chukchi Sea during open-water seasons between August 2009 and July 2010

Recommendation: The Commission recommended that the Service require Shell to describe in detail how it adjusted the data in Moore et al. (2000) to estimate cetacean densities in the Chukchi Sea in the fall; require Shell and other applicants to develop and implement a biologically realistic study design for estimating take levels; prior to issuing the requested incidental harassment authorization, establish explicit and specific mitigation measures for bowhead and beluga whales that will ensure that the proposed activities do not affect these species in ways that will make them less available to subsistence hunters (e.g., provisions of any conflict avoidance agreements between Alaska Native hunters and the applicant); require the applicant to undertake the studies needed to verify observer proficiency; and provide additional rationale for allowing seismic surveys to continue under nighttime conditions when observer proficiency is severely compromised. In addition, the Commission recommended that the Service require the applicant to supplement its mitigation measures by using passive acoustic monitoring and require the same of other applicants conducting seismic work in the Arctic; require the applicant to collect and analyze data pertaining to the efficacy of ramp-up as a mitigation measure; and require that operations be suspended immediately pending review and authorization by the Service to proceed if a dead or seriously injured marine mammal is found in the vicinity of the operations and the death or injury might be attributable to the applicant's activities. The Commission further recommended that with regard to the possible cumulative effects of the proposed activity and other industrial activities in the Arctic the Service conduct a more extensive analysis of the potential or likely effects of currently authorized and proposed oil and gas activities, climate change, and additional anthropogenic risk factors (e.g., industrial operations) and the possible cumulative effects of all of these activities over time; together with the applicant, other holders of incidental harassment authorizations for work in the Arctic, and appropriate agencies and organizations develop a comprehensive population monitoring and impact assessment program to assess whether these activities, in combination with other risk factors, are individually or cumulatively having any significant adverse population-level effects on marine mammals, or having an unmitigable adverse effect on the availability of marine mammals for subsistence use by Alaska Natives; and sponsor a workshop or workshops to facilitate the development of a comprehensive population monitoring and impact assessment program.

Agency Response: The Service issued the authorization on 19 October 2009. In response to the Commission's question regarding how the Service adjusted the data in Moore et al. (2000), the Service stated that Shell used the data from Moore et al. (2000) to calculate densities for beluga and gray whales during the fall period in the Chukchi Sea. However, to be consistent with methods used to calculate bowhead densities in previous years Moore et al. (2000) was not used although that data could have been used. The Service stated that in the absence of peer reviewed literature this was the best information available. In order to account for the recommendation that Shell and other applicants be required to develop and implement a biologically realistic study design for estimating take levels, the Service stated that Shell provides take estimates in the 90-day report based on several methods of calculation: a minimum, a potential maximum, and a mid-level estimate. The Service required Shell to implement mitigation measures for conducting seismic surveys that are designed to avoid, to the greatest extent practicable, impacts on coastal marine mammals and thereby meet the needs of those subsistence communities that depend upon these mammals for sustenance and cultural cohesiveness. For the 2009 season, several of these mitigation measures were taken from the 2009 agreement signed by Shell on 24 June 2009 and include coastal stand-off distances for seismic and vessel transiting activities; a coastal community communication station; and emergency assistance to whalers, among other measures. The Service stated that its 2009 environmental assessment for this action contains an analysis of why passive acoustic monitoring is not required to be used by Shell to implement mitigation measures, and that Shell will deploy acoustic recorders to collect data

on vocalizing animals, although this information will not be used in a real-time or near-real-time capacity. The Service stated that, along with the fact that marine mammals may not always vocalize while near the passive acoustic monitoring device, another shortcoming is that it requires a quiet vessel so that vessel noise does not hinder the ability to hear marine mammals. The Service noted that the Minerals Management Service planned to conduct a workshop in November 2009 to review available acoustic monitoring technology (passive and active), its feasibility and applicability for use in Minerals Management Service-authorized activities, and what additional developments need to take place to improve its effectiveness. The Service stated that requiring shutdown of the airguns due to inclement weather or darkness in the Arctic could result in a loss of efficiency and increase the potential for Shell and other companies to increase effort by bringing additional seismic vessels into the Beaufort and/or Chukchi Seas. The Service therefore considered the requirement to be economically and otherwise impractical. The Service identified an alternative mitigation that involves the use of a high-frequency marine mammal monitoring (HF/M3) sonar, similar to a model used by the U.S. Navy, a measure that could increase detection of marine mammals during darkness. The Service believed that utilizing the HF/M3 with ramp-up would result in the harassment of fewer marine mammals and further ensure that auditory injury does not occur. However, based on the small discharge volume of the airgun array to be used by Shell for its 2009/2010 survey operations and the required mitigation and monitoring measures, the Service stated that it did not believe that marine mammal injury will occur, with or without the use of the HF/M3. The Service required that if for any reason the seismic sources are stopped during low visibility conditions they are not to be restarted until the conditions are suitable for the marine safety zones to be re-established. The Service stated that as a result of a dialogue on monitoring by scientists and stakeholders attending the Service's public meetings in Anchorage in April 2006, October 2006, and April 2007, the industry has expanded its monitoring program to fulfill its responsibilities under the Marine Mammal Protection Act. The Service noted that Shell's 2009 monitoring plan was subjected to an independent peer review, and for the fourth year, Shell has included a marine mammal research component designed to provide baseline data on marine mammals for future operations planning.

13 July

To: National Marine Fisheries Service

Issue: Applications from the National Marine Mammal Laboratory, the Alaska Department of Fish and Game, the Alaska SeaLife Center, Dr. Markus Horning, The North Pacific Universities Marine Mammal Research Consortium, the National Marine Fisheries Service, The North Pacific Universities Marine Mammal Research Consortium, the Aleut Community of St. Paul Island, and the Aleut Community of St. George Island, to continue or initiate research on the ecology and biology of threatened and endangered Steller sea lions and depleted northern fur seals to investigate the cause or causes of their declines

Recommendation: The Commission noted that the multiple research programs currently authorized and for which authorizations are being requested have the potential to provide substantial information needed for informed and effective management of the populations and their ecosystems. The Commission expressed concern, however, that the collection of studies described in the applications lacks sufficient consistency with the Steller Sea Lion Recovery Plan, and that the overall research has not been integrated into an adaptive, experimental research and management strategy to investigate the indirect effects of fishing on Steller sea lions. The Commission recommended that the Service promptly undertake discussions with the Commission on how best to (1) develop implementation plans for the Steller sea lion recovery plan and the northern fur seal conservation plan, and (2) establish a research oversight team to oversee and coordinate the activities of all permit-holders conducting research on these populations; require implementation plans and applicable permits to incorporate science-based methods for assessing the effects of research activities whenever there is a reasonable basis for concern about potential impacts; require each permit-holder to include in its annual reports a description of the research conducted, the number of animals taken, the methods used for assessing potential effects of the research on the subject animals, the results of capture, tagging, branding, and

monitoring activities, any deaths that occurred, and—if deaths occurred—the measures proposed to avoid or reduce the occurrence of such injuries and deaths in the future. The Commission recommended that the Service should ensure that the estimated serious injury and mortality rates of the combined studies do not exceed limits determined to be acceptable in the Service’s final environmental impact statement; develop improved methods for tracking and resolving uncertainties concerning the potential adverse effects of the research; prior to issuing the permits, require that all research that involves an invasive procedure or that may harm or materially alter the behavior of the animals being studied has been reviewed and approved by an Institutional Animal Care and Use Committee and withhold approval of any permit application for which written confirmation of such review and approval has not been provided; require the applicants to confirm that a veterinarian will be present to carry out or supervise all activities involving the use of chemical and gas anesthesia.

Agency Response: The Service issued the permits on 17 August 2009.

17 July

To: Joint Subcommittee on Ocean Science and Technology CCSP/USGCRP Office

Issue: Request for comments on updating *Charting the Course for Ocean Science in the United States for the Next Decade—An Ocean Research Priorities Plan and Implementation Strategy*

Recommendation: The Commission commended The Joint Subcommittee on Ocean Science and Technology for preparing the plan. The Commission noted that the Administration’s ocean vision, based on the work of the Interagency Ocean Policy Task Force, may require significant change in ocean policy and necessitate revision to the *Ocean Research Priorities Plan and Implementation Strategy* accordingly and further opportunity for public comment on the revised version. The Commission noted that it believes that the effects and implications of climate change are not given sufficient attention in the current plan. The Commission further noted that although the current plan includes a section on implementation it is not clear that agencies and organizations have truly embraced this new guidance and incorporated it into their budget and planning processes.

Agency Response: No recommendations were made and no responses expected beyond consideration of Commission comments in the updating of the subject report.

20 July

To: National Marine Fisheries Service

Issue: Application from Robert A. Garrott, Ph.D., to amend a permit to authorize the tagging of 30 Weddell seal pups in the first year (from among those animals that can be captured) with an additional temperature-logging tag, and, after the first year, to increase the number of pups that would be tagged to 100

Recommendation: The Commission recommended that the Service require the permit holder to adjust the initial phase of the planned study to assess potential effects of attaching temperature-logging tags to the flippers of seal pups; and authorize deployment of such tags for one year only, with approval for subsequent use being conditional upon a showing that the tags can be deployed without significant effects (e.g., tearing of webbing, slowed growth).

Agency Response: The Service approved the amendment request on 2 September 2009.

20 July

To: National Marine Fisheries Service

Issue: Application from Rice University to take small numbers of marine mammals by harassment incidental to conducting a marine seismic survey in the northwestern Atlantic Ocean during August 2009

Recommendation: The Commission recommended that the Service issue the requested authorization, provided that the authorization include all of the proposed monitoring and mitigation measures to minimize the likelihood of serious injury to the potentially affected marine mammal species. The Commission further recommended, among other things, that the Service (1) clarify when the use of night-vision devices will be required and provide additional justification for its implied conclusion that observers will be able to achieve a high nighttime detection rate, and (2) require the use of passive acoustic monitoring during all operations, the authorization require that the monitoring period be extended to at least one hour before seismic activities are initiated or to at least one hour before airgun activities are resumed after a power-down because of a marine mammal sighting within the safety zone.

Agency Response: The Service issued the incidental harassment authorization on 11 August 2009. The Service concurred with the Commission's recommendation regarding monitoring and mitigation but noted that marine seismic surveys may continue into night and low-light hours if such segment(s) of the survey are initiated when the entire relevant safety zones are visible and can be effectively monitored. The Service required that no initiation of airgun array operations is permitted from a shut-down position at night or during low-light hours (such as in dense fog or heavy rain) when the entire relevant safety zone cannot be effectively monitored by the marine mammal observers on duty. The Service noted that passive acoustic monitoring remains optional but is used as a supplemental effort specific to the R/V *Marcus G. Langseth*. The Service considered 30 minutes to be an adequate length for the monitoring period prior to the start-up of airguns because, among other things, the ramp-up is required; in many cases marine mammal observers are making observations during times when the sound sources are not being operated and will actually be observing the area prior to the start-up observation period anyway; many of the species that may be exposed do not stay underwater more than 30 minutes; and if a deep-diving individual happened to be in the area in the short time immediately prior to the pre-start-up monitoring, if an animal's maximum underwater time is 45 minutes, there is only a one in three chance that its last random surfacing would be prior to the beginning of the required monitoring period. To provide information regarding the effectiveness of ramp-up as a mitigation measure, the Service required that observers make observations prior to ramp-up, during all ramp-ups, and during all daytime seismic operations and record detailed information when a marine mammal is sighted. The Service required that operations be suspended immediately, pending its review, if a dead or seriously injured marine mammal is found in the vicinity of the operations and the death could be attributed to the activities.

27 July

To: Council on Environmental Quality

Issue: Joint Ocean Commission Initiative

Recommendation: The Commission urged that any new ocean policy developed by the Administration be based on a broad ecosystem perspective, which considers the potential adverse effects of climate change as well as other factors (e.g., the introduction into the oceans of contaminants, disease, alien species, noise, and debris; overfishing; harmful algal blooms and dead zones; increasing vessel traffic; oil, gas, and mineral extraction; and ill-managed coastal development). The Commission noted that, to address all these factors, including their cumulative impact, our nation's ocean policy must be comprehensive and based on an understanding of the oceans' elements, processes, and capacity to provide their many benefits on a sustainable basis; the factors that drive our escalating needs (i.e., our values, demographic expansion, consumption-based economy, and growing demands for resources and space); and where our course will lead if we maintain our current heading.

Agency Response: No recommendations were made and no responses expected beyond consideration of the Commission's comments in the updating of the subject report. The Commission believes that the Ocean Policy Task Force gave due consideration to the Commission's comments and that they were duly reflected in subsequent deliberations.

- 29 July **To:** National Marine Fisheries Service
- Issue:** Application from Russell Fielding, Louisiana State University, to acquire and import an unspecified number of biological specimens (i.e., muscle, blubber, and teeth) from Risso’s, spinner, and spotted dolphins and short-finned pilot whales collected from animals killed for domestic consumption on St. Vincent and the Grenadines, to study the levels of toxic contamination in muscle and blubber tissue in cetaceans caught for food in the Caribbean
- Recommendation:** The Commission recommended that the Service issue the permit provided that it has considered the best available information for the purpose of making at least a preliminary determination that the underlying taking satisfies the humane taking requirement of the Marine Mammal Protection Act; condition the permit on the issuance of a valid CITES permit to export samples from St. Vincent and the Grenadines and obtain the U.S. Fish and Wildlife Service’s concurrence in the non-detriment findings of any such export permit prior to allowing specimens to be imported into the United States; and strongly encourage the applicant to seek out collaborators that could use the samples to conduct genetic analyses and other research that would provide insights into the stock structure of the species, their population dynamics and biology, and the conservation risks they face.
- Agency Response:** The request was in process at the end of 2009.
- 31 July **To:** National Marine Fisheries Service
- Issue:** Application from the Southwest Fisheries Science Center, National Marine Fisheries Service, to amend a permit to authorize taking by harassment of Weddell seals to study the species’ movements, site fidelity, and demographics. Up to 60 Weddell seals annually would be captured, instrumented, and sampled (blood, vibrissae, muscle, blubber, and milk). The Center is requesting authorization for the accidental death of up to four Weddell seals (two adults and two juveniles) annually. The Center also is requesting authorization to attach microprocessors to flipper tags of fur seals, increase the number of tissue samples that can be collected from fur seals, increase the number of leopard seals and fur seals that can be tagged (for the purpose of retagging), and deploy an unmanned aircraft over the seals for aerial photography.
- Recommendation:** The Commission recommended that the Service take immediate action to use existing Institutional Animal Care and Use Committees or to establish additional committees to bring its Science Centers into compliance with applicable requirements of the Animal Welfare Act, or defer further action on the requested permit amendment until the permit holder demonstrates (1) that it is in compliance with section 2.37 of the Animal and Plant Health Inspection Service’s Animal Welfare Act regulations requiring the establishment and use of Institutional Animal Care and Use Committees, and (2) that the proposed research has been reviewed and approved by such a committee; and defer consideration of any other scientific permit applications and amendment requests submitted from within the agency that involve any invasive procedure or other activity that might harm or materially alter the behavior of the animals under study until such a committee has been established and has found the proposed research to be consistent with Animal Welfare Act requirements.
- Agency Response:** The Service issued the permit on 9 September 2009.
- 3 August **To:** National Marine Fisheries Service
- Issue:** Proposed rulemaking regarding the Hawaii-based shallow-set longline fishery
- Recommendation:** The Commission recommended that the Service (1) conduct the research needed to clarify the stock structure of the marine mammal species that may be taken in the Hawaii shallow-set longline fishery, (2) complete the surveys needed to provide up-to-date, reliable estimates of

stock abundance, and (3) revise the potential biological removal level of each stock; fund observer coverage for all western Pacific fisheries at levels needed to obtain reasonably accurate and precise estimates of marine mammal takes; evaluate all observed and documented fisheries-related injuries to humpback whales to determine whether they were serious and consider them as such in the absence of definitive information; convene a take reduction team to address false killer whale bycatch in the Hawaii deep-set longline fishery in the Pacific Islands area but also include the Hawaii shallow-set longline fishery and the stocks taken in that fishery under the purview of the team; limit the increase in fishing effort to relatively small increments to ensure that the fishery remains ecologically sustainable; and maintain 100 percent observer coverage of the shallow-set longline fleet and continue to improve the real-time reporting of marine mammal and sea turtle interactions to ensure that interaction limits are not exceeded.

Agency Response: The Service published the final rule on 4 December 2009. The Service stated that the best available science was used in the biological opinion regarding this rulemaking, comprehensive shallow-set fishery observer coverage will continue to monitor any fishery interactions with marine mammals, and the final rule is not likely to cause significantly adverse effects on marine mammal stocks. The Service also stated that the final rule will not affect the research needed for a stock assessment report, including field surveys or revisions to the potential biological removal levels of each marine mammal stock. The Service noted that it considers every opportunity for research and data collection, especially with regard to appropriate levels of observer coverage, and any decisions to expand population assessments are ultimately subject to funding availability. The Service further stated that the final rule has no impact on the determinations of humpback whale interactions with the Hawaii-based shallow-set longline fishery. The Service noted that the agency's current system for reviewing marine mammal injury records for the central North Pacific stock of humpback whales is conducted through the Alaska Fisheries Science Center and the Alaska Scientific Review Group. The Service stated that the Hawaii pelagic stock of false killer whales and Hawaii-based deep-set longline fishery is not the subject of the final rule. In April 2009 the agency began to develop a take reduction plan and assemble a take reduction team for the Hawaii pelagic stock of false killer whales. The final rule removes the set limit and allows optimum yield to be achieved from the shallow-set fishery. Fishing effort may increase gradually to historical levels. Because the Hawaii-based longline fisheries (shallow-set and deep-set) are regulated under a limited entry program (maximum 164 permits combined), it is likely that the fishery will not be overcapitalized in the future. The Hawaii shallow-set fishery has 100 percent observer coverage, so the agency is able to monitor the precise number of individual turtles that interact with the fishery. If or when an annual interaction limit is reached, the shallow-set longline fishery will be closed north of the equator beginning on a specified date until the end of the calendar year. Further, in the event that either annual interaction limit is exceeded, the Service will lower the following year's interaction limit by the amount it was exceeded.

6 August

To: National Marine Fisheries Service

Issue: Proposed rule authorizing the U.S. Navy to take small numbers of five species of marine mammals by Level B harassment incidental to military readiness training operations in the Naval Undersea Warfare Center, Keyport Range Complex, in Washington State from September 2009 through April 2014. Activities covered by the authorization would include the use of mid-frequency and high-frequency active sonar and an extended echo-ranging system

Recommendation: The Commission recommended that the Service work with the Navy to ensure that the final rule and any letter of authorization issued under that rule provide authorization for the taking of all marine mammal species that are known to occur in the study area including those listed under the Endangered Species Act and that may be exposed to Level A or Level B harassment as a result of the proposed activities; and either reconsider its decision to exclude endangered and threatened species from the authorization or provide a well-reasoned, science-based explanation for its apparent belief that the proposed mitigation measures will be much more effective for listed species

than for unlisted species. The Commission further recommended that if the Service proceeds with publication of a final rule to authorize the taking of small numbers of marine mammals incidental to the proposed military training operations, it describe the “specified events” that would involve or require special surveys at the Dabob Bay Range site; require the Navy to develop and implement a detailed plan to verify the performance of the visual monitoring, passive acoustic monitoring, and other monitoring and mitigation measures being proposed to enable the Navy, the National Marine Fisheries Service, and other interested parties to evaluate their effectiveness; and suspend an activity if a marine mammal is killed or seriously injured and the death or injury could be associated with the Navy’s activities. Authorization for resumption of the activity should be contingent upon a review by the Service of the circumstances of the death or injury and the Navy’s plans for avoiding additional mortalities. If, upon review, those plans are deemed inadequate, then the Navy should be required to halt its operations until it has obtained the necessary authorization.

Agency Response: At the end of 2009 the Service had not yet taken action on the request.

6 August

To: National Science Foundation

Issue: Application from Robert A. Garrott, Ph.D., for a modification of a permit issued under the Antarctic Conservation Act of 1978 to temporarily attach temperature-logging tags on Weddell seal pups for scientific research purposes

Recommendation: The Commission recommended that the National Science Foundation defer issuing the requested authorization pending confirmation from the National Marine Fisheries Service that the permit holder has obtained the necessary authorization for the planned activities under the Marine Mammal Protection Act.

Agency Response: The Foundation approved the modification request on 27 October 2009.

7 August

To: National Marine Fisheries Service

Issue: Application from United Launch Alliance to renew a one-year incidental harassment authorization for the take of small numbers of Pacific harbor seals, California sea lions, and northern elephant seals incidental to activities related to the Delta IV/Evolved Expendable Launch Vehicle at South Vandenberg Air Force Base, California

Recommendation: The Commission recommended that the Service approve the request, provided that all reasonable measures will be taken to ensure the least practicable impact on the subject species, and the required mitigation and monitoring activities are carried out as described in the Service’s *Federal Register* notice and the application.

Agency Response: The Service approved the renewal request on 4 September 2009.

10 August

To: National Marine Fisheries Service

Issue: Proposed rulemaking regarding the List of Fisheries for 2010

Recommendation: The Commission expressed support in general for the Service’s proposed changes to the 2010 List of Fisheries. In addition, the Commission recommended, among other things, that the Service continue to classify the Alaska southeast salmon purse seine fishery as category II; reclassify the Gulf of Alaska sablefish longline fishery from category III to category II; and classify all pot/trap fisheries off Washington, Oregon, and California as category II. The Commission also recommended that the Service develop and implement expanded monitoring programs for the California halibut, white sea bass, and other species of the set gillnet fishery and the California yellowtail, barracuda, and

white sea bass drift gillnet fisheries. The Commission noted that the Service revised its estimates of the number of participants for northeast and mid-Atlantic fisheries in the proposed 2010 List of Fisheries based on state and federal permit information without removing any duplication (i.e., individuals holding both state and federal permits for a particular fishery) or accounting for inactive permits. Thus, although the information previously included in the List of Fisheries may have underestimated the number of participants, the new information likely overestimates the level of participation in some fisheries. The Commission recommended that the Service review the available information on state and federal permit holders in northeast and mid-Atlantic fisheries and revise the published List of Fisheries to accurately reflect the number of active vessels and participants in each fishery. The Commission reiterated several recommendations that were included in its comments on proposed Lists of Fisheries in past years but that have yet to be adopted (e.g., that the Service develop and implement the research and monitoring programs needed to manage high-seas fisheries in a manner consistent with the requirements of the Marine Mammal Protection Act and the High Seas Driftnet Fishing Moratorium Protection Act; expedite its investigation of bottlenose dolphin stock structure in the Gulf of Mexico, expand its efforts to collect reliable information on serious injury and mortality rates of marine mammals incidental to Gulf of Mexico fisheries; reevaluate the classification of Gulf of Mexico fisheries as information becomes available; and indicate the level of observer coverage for each fishery as part of the List of Fisheries. The Commission recommended that the Service (1) include tribal fisheries on the List of Fisheries, (2) revise its regulations to clarify that treaty tribal fisheries are subject to the requirements of the Marine Mammal Protection Act, including section 118, and (3) begin working with the affected tribes to integrate the registration process with existing licensing or permitting systems if it appears that some tribal fisheries will be listed as category I or category II fisheries.

Agency Response: The Service published the final List of Fisheries on 16 November 2009. The Service responded that, regarding the Alaska southeast salmon purse seine fishery, a 15-year lack of evidence of serious injury and mortality in this fishery, even in the absence of an observer program, is enough to warrant its recategorization from category II to category III. Regarding the Gulf of Alaska sablefish longline fishery, the Service stated that the potential biological removal level for the North Pacific sperm whale stock is unknown because a reliable abundance estimate is not available. The Service is in the process of analyzing bycatch data from 2007 and 2008 and will re-evaluate the category placement for the Gulf of Alaska sablefish longline fishery on the 2011 List of Fisheries. Regarding classifying all pot/trap fisheries off Washington, Oregon, and California as category II, the Service stated that it reviewed all of the available data on entangled large whales off the U.S. West Coast, the distribution of species entangled, and the spatial and temporal characteristics of pot and trap fisheries to develop criteria for categorizing fisheries. The Service stated that it is continuing to work on methods for improved data collection and analysis and will consider recategorizing additional pot and trap fisheries when and if more information and/or analysis become available, as appropriate. It also stated that it is working to expand observer coverage of the California state gillnet fisheries and plans to place observers on the California set gillnet fishery (3.5-in mesh size) for halibut, white seabass, and other species beginning January 2010. The Service stated that available observer funds should yield coverage of up to 25 percent, and it plans to place observers on the California drift gillnet fisheries (mesh size ≥ 3.5 in and < 14 in) for yellowtail, barracuda, and white seabass beginning in summer 2010 if observer funds are available. The Service concurred that the updated number of estimated participants for each northeast and mid-Atlantic fishery may complicate management efforts due to uncertainty around the number of active versus passive participants and duplicative permit information. It stated, therefore, that it will not make the changes recommended in the proposed 2010 List of Fisheries and will revert back to the estimates of federal permits from the 2009 List of Fisheries in this final 2010 List of Fisheries for the mid-Atlantic gillnet, northeast sink gillnet, Atlantic mixed species trap/pot, mid-Atlantic menhaden purse seine, mid-Atlantic haul/beach seine, mid-Atlantic mid-water trawl, northeast bottom trawl, northeast mid-water trawl, and Gulf of Maine Atlantic herring purse seine fisheries. The Service stated that it will work with the relevant state agencies to obtain more reliable information on state permits for those fisheries to be

incorporated in future Lists of Fisheries. Concerning the Commission's past recommendations, the Service agreed that the development of a research and monitoring plan to manage high-seas fisheries in a manner consistent with the requirements of the Marine Mammal Protection Act will require novel stock assessment techniques and the development, and/or continuation, of international cooperation. The Service stated that it is currently developing a strategic action plan for addressing international marine mammal conservation issues, including the need to gather the necessary data and strengthen international partnerships to effectively manage marine mammal bycatch in domestic and foreign high-seas fisheries. The Service agreed that it is important to investigate further stock structure and abundance of bottlenose dolphins in the Gulf of Mexico. The Service noted, however, there are currently no resources to fund observer programs in the Gulf of Mexico fisheries, and therefore, it is focusing on building volunteer stranding network capacity in the Gulf and increasing the level and quality of stranding response and has taken concrete steps to improve stranding capacity. The Service did not consider the Commission's comment regarding tribal fisheries applicable to the List of Fisheries rulemaking at hand as the List of Fisheries categorizes fisheries based solely on the incidental, not intentional, serious injury and mortality to marine mammals. The Service stated, however, that it will address this during the comment period for the proposed 2009 stock assessment reports.

10 August

To: Papahānaumokuākea Marine National Monument**Issue:** Request for comments on the draft natural resources science plan for the Papahānaumokuākea Marine National Monument

Recommendation: The Commission recommended that the National Oceanic and Atmospheric Administration adopt the draft natural resources science plan after the co-trustees reorganize the identified research topics under headings used in the Monument management plan rather than those used in the Hawaiian Archipelago Marine Ecosystem Research Plan; clarify that criteria and procedures used to prioritize research topics listed in the draft natural resources science plan also should be used to evaluate future research projects that may not be explicitly addressed in the plan; simplify the numerical system used to rank research priorities; consider additional criteria for setting research priorities, such as whether the research can be done only within Monument boundaries and whether takes of animals for research are kept to the lowest number necessary to accomplish research objectives; shorten and modify the list of possible research topics to correspond to the management activities identified in the Monument management plan; revise the prioritization scheme to be more discriminating among proposed research topics; and clarify that the list of research topics in the plan is not intended to be comprehensive or to preclude possible projects not explicitly listed but rather to illustrate the importance of relating proposed research projects to specific information needs and management activities identified in the Monument management plan.

Agency Response: At the end of 2009 the final natural resources science plan had not been completed, and it was not possible to determine whether and to what extent the plan reflected Commission recommendations and comments.

13 August

To: National Marine Fisheries Service

Issue: Proposed rule to authorize the U.S. Navy to take by Level A and Level B harassment small numbers of up to eight species of marine mammals incidental to military readiness training operations in the Navy's Gulf of Mexico Range Complex from 3 December 2009 through 2 December 2014

Recommendation: The Commission recommended that if the Service proceeds with a final rule to authorize the taking of marine mammals incidental to the proposed military training operations the Service require the Navy to conduct an external peer review of its marine mammal density estimates, the data upon which those estimates are based, and the manner in which those data were used for that purpose; develop and implement a plan to validate the effectiveness of monitoring and mitigation

measures before beginning, or in conjunction with, the proposed military readiness training operations; describe the protocol for stranding network personnel to communicate with the Navy in the event of a stranding that is possibly associated with Navy activities; and suspend an activity if a marine mammal is seriously injured or killed and the injury or death could be associated with the Navy's activities. The injury or death should be investigated to determine the cause, assess the full impact of the activity or activities potentially implicated (e.g., the total number of animals involved), and determine how the activity should be modified to avoid future injuries or deaths.

Agency Response: At the end of 2009 the Service had not yet taken action on the request.

18 August

To: National Marine Fisheries Service

Issue: Proposed rule to authorize the U.S. Navy to take by Level B harassment small numbers of 26 species of marine mammals incidental to military readiness training operations in the Northwest Training Range Complex off the coasts of Washington, Oregon, and northern California from February 2010 through February 2015

Recommendation: The Commission recommended that, if the Service proceeds with publication of a final rule, the rule require the Navy to conduct an external peer review of its marine mammal density estimates, the data upon which those estimates are based, and the manner in which those data were used for that purpose; develop and implement a plan to validate the effectiveness of monitoring and mitigation measures before beginning, or in conjunction with, the proposed military readiness training operations; and suspend an activity if a marine mammal is seriously injured or killed and the injury or death could be associated with the Navy's activities. The injury or death should be investigated to determine the cause, assess the full impact of the activity or activities potentially implicated (e.g., the total number of animals involved), and determine how the activity should be modified to avoid future injuries or deaths.

Agency Response: At the end of 2009 the Service had not yet taken action on the request.

20 August

To: National Marine Fisheries Service

Issue: Proposed rule to modify regulations implementing the Harbor Porpoise Take Reduction Plan

Recommendation: The Commission recommended that the Service adopt the proposed rule implementing amendments to the Harbor Porpoise Take Reduction Plan, provided that it base harbor porpoise bycatch estimates on all the regional fisheries that seriously injure or kill them; consult with its Canadian counterpart regarding the need to resume an observer program to assess harbor porpoise bycatch in the sink gillnet fishery; follow the recommendations of its take reduction team and codify in its regulations the western Gulf of Maine closure area as part of the Harbor Porpoise Take Reduction Plan; expand the system of harbor porpoise management areas off New England as proposed so that all gillnets would have to be equipped with pingers during prescribed seasons and implement any "consequence closure areas" to close gillnet fishing in identified areas for specified time periods if bycatch rates exceed threshold levels after two years or during any subsequent two-year period. The Service also should describe the steps and timing involved in implementing these "consequence closure areas" in the preamble to the final rule and incorporate all necessary environmental analyses in the accompanying documentation; implement regulations as proposed to establish a second seasonal management area in waters off New Jersey where harbor porpoise by-catch levels have been high. The regulations should include the stringent gear restrictions already applicable on a seasonal basis in the existing management zone in this area and should close this new area completely from 1 February to 15 March; and either (1) provide pinger detection devices to fishery observers working in areas where pingers are required to determine if pingers on nets being monitored are functioning properly, or (2)

if this is not possible, provide observers with extra pingers to replace the two nearest the location of any porpoise that is caught in a net so that those pingers can be collected for testing.

Agency Response: At the end of 2009 the agency's final rule on the take reduction plan was undergoing clearance.

24 August **To:** National Marine Fisheries Service

Issue: Application from the Naval Base Ventura County Point Mugu to take small numbers of Pacific harbor seals incidental to a boom exercise at Point Mugu, California

Recommendation: The Commission recommended that the Service approve the request provided that all reasonable measures will be taken to ensure the least practicable impact on the subject species, and the required mitigation and monitoring activities are carried out as described in the Service's *Federal Register* notice and the application.

Agency Response: The Service issued the authorization on 10 September 2009 consistent with the Commission's recommendation.

28 August **To:** National Marine Fisheries Service

Issue: Application from the Southwest Fisheries Science Center, National Marine Fisheries Service, to (1) take by harassment over five years various species of pinnipeds and cetaceans in waters off California, Oregon, Washington, Hawaii, and Alaska and in international waters (primarily the Pacific and Southern Oceans), in the course of estimating abundance, collecting behavioral data, recording vocalizations, and photography; and to take, salvage, and/or import/export/re-export marine mammal parts, specimens, and biological samples and import/export/re-export salvaged parts or specimens and biological samples collected by other researchers under those researchers' authorizations

Recommendation: The Commission recommended that the Service defer consideration of any scientific permit application or amendment request submitted from within the agency that involves any invasive procedure or other activity that might harm or materially alter the behavior of the animals under study until an Institutional Animal Care and Use Committee has reviewed the proposed research activities and has found them to be consistent with Animal Welfare Act requirements; immediately convene an existing Institutional Animal Care and Use Committee or establish and convene a new committee to review and approve, if appropriate, the procedures included in this application that are invasive or that might harm or materially alter the behavior of the subject species, thereby bringing this applicant and its other science centers into compliance with applicable requirements of the Animal Welfare Act; and defer further action on the requested permit until the permit holder demonstrates (1) that it is in compliance with section 2.37 of the Animal and Plant Health Inspection Service's Animal Welfare Act regulations requiring the establishment and use of Institutional Animal Care and Use Committees for such research, and (2) that the proposed research has been reviewed and approved by such a committee.

Agency Response: No action had been taken on the request at the end of 2009.

28 August **To:** National Marine Fisheries Service

Issue: Draft Guidance for Monitoring the Recovery of Pacific Northwest Salmon and Steelhead Listed under the Federal Endangered Species Act (Idaho, Oregon, and Washington)

Recommendation: The Commission recommended that the Service revise its monitoring guidance document to ensure that any guidelines for managing pinnipeds involved in the taking of endangered

salmonids are based on the best possible information and meet the standards set forth in the Marine Mammal Protection Act, the Endangered Species Act, and any other pertinent statutes.

Agency Response: The Service had not yet finalized the guidance document at the end of 2009.

10 September **To:** U.S. Fish and Wildlife Service

Issue: Draft stock assessment reports for the Florida and Puerto Rico stocks of West Indian manatees.

Recommendation: With respect to Florida manatees, the Commission recommended that the Fish and Wildlife Service (1) revise the assessment of population parameters, potential biological removal level, and human-caused mortality and serious injury by presenting information separately for each of the four regional management units identified in the current Florida manatee recovery plan; (2) add a table to the section on fishery-related injuries that provides for each animal the date they were rescued; the management unit where they were found; the nature, severity, and treatment of their injuries; and their current condition; and (3) provide the information on manatee interactions with fishing gear separately for each of the four management units recognized in the recovery plan. With respect to Puerto Rico manatees, the Commission recommends that the Service either add information to better support the conclusion that the Puerto Rico population has recently increased in size or revise the draft report to indicate that the current population trend is uncertain but, at best, appears to be relatively stable.

Agency Response: The agency had not responded as of the end of 2009.

10 September **To:** U.S. Coast Guard

Issue: Final Environmental Impact Statement addressing the Port Dolphin LLC Liquefied Natural Gas Deepwater Port application

Recommendation: The Commission recommended that the U.S. Coast Guard revise its proposed monitoring and reporting requirements for the Port Dolphin LLC Liquefied Natural Gas Deepwater Port to require monitoring and reporting of (1) the ecological effects of introduced noise and thermal effluent at the proposed construction site, and (2) the nature of any interactions with marine mammals during port construction and operations, including interactions arising from port maintenance and support.

Agency Response: The Coast Guard had not responded as of the end of 2009.

15 September **To:** Minerals Management Service

Issue: Safety and environmental management systems for Outer Continental Shelf oil and gas operations, 1010-AD15

Recommendation: The Commission recommended that the Minerals Management Service move forward to implement its plan to require safety and environmental management systems for all oil and gas operations on the Outer Continental Shelf.

Agency Response: The Service had not responded as of the end of 2009.

21 September **To:** Minerals Management Service

Issue: Draft Proposed 5-Year Outer Continental Shelf Oil and Gas Leasing Program for 2010-2015, and Notice of Intent to Prepare an Environmental Impact Statement for the Proposed 5-Year Program

Recommendation: The Commission recommended that the Minerals Management Service (1) establish buffer zones prohibiting oil and gas production on and around sensitive areas based on existing local, state, and federal marine protected areas, national monuments, essential fish habitats, designated critical habitats for rare, depleted, endangered, or otherwise protected species, and biological “hotspots” or areas of particular biological richness; (2) base buffer zones or areas given special protection using at least the minimal considerations listed on pages two and three of this letter; (3) review the inventory of marine protected areas found on the Web site of the Department of Commerce’s National Marine Protected Areas Center as one source of information regarding sites that may warrant special protection and work closely with the National Marine Fisheries Service and the Fish and Wildlife Service to take advantage of their expertise in identifying areas that may warrant special protection; (4) work with the Department of Energy to integrate its new 5-year-oil and gas leasing plan into a long-term energy conservation plan; (5) in consultation with the National Marine Fisheries Service, Fish and Wildlife Service, and the Marine Mammal Commission, develop a set of standards for information to be obtained prior to the initiation of new energy-related operations.

Agency Response: At the end of 2009 the issues involved and the Commission’s comments were still under consideration by the Service.

21 September **To:** U.S. Fish and Wildlife Service

Issue: Draft stock assessment reports for the Pacific walrus and the two stocks of polar bears that occur in the United States.

Recommendation: With respect to the draft stock assessment report for the Southern Beaufort Sea stock of polar bears, the Commission recommends that the Fish and Wildlife Service (1) reassess all relevant data on polar bear distribution and movement to determine the eastern boundary of the Southern Beaufort Sea stock in the most scientifically credible manner, and reassess its minimum population estimate for this stock to take into account the most scientifically valid new stock boundary; (2) revise downward its estimate of the maximum net productivity rate for this population to reflect ongoing and predicted changes in polar bear habitat that will prevent polar bear stocks from achieving growth rates that might be expected in a favorable environment; and (3) work with the North Slope Borough, the Inuvialuit Game Council, and Canadian authorities to review whether the current harvest limits for this population are sustainable and to consider whether they should be reduced, keeping in mind the need for application of the precautionary principle. With respect to the draft stock assessment report for the Chukchi/Bering Seas stock of polar bears, the Commission recommended that the Fish and Wildlife Service (1) give its highest priority to reaching an agreement with Russia on a joint strategy to determine the status of this stock and the current levels of productivity in major denning areas and establish a program to monitor this stock in subsequent years; (2) provide an explanation as to why it believes the number 2,000 can be used as both the best estimate of population size and the best estimate of the minimum population size; (3) revise downward its estimate of the maximum net productivity rate for this population to reflect ongoing and predicted changes in polar bear habitat that will prevent polar bear stocks from achieving growth rates that might be expected in a favorable environment; and (4) use the first meeting of the United States–Russia Polar Bear Commission to begin to address overharvest from this stock.

Agency Response: To the Commission’s knowledge, the Service was not planning to reassess the eastern boundary of the Southern Beaufort Sea stock of polar bears, and it did not revise downward its estimate of net productivity rate. The Service works with its Canadian counterparts and the Inuvialuit Game Council regarding harvest levels, but the Commission is not aware that they have collectively undertaken any additional review of the sustainability of the harvest. With regard to the Chukchi/Bering Seas stock, the Service was planning a meeting with its Russian counterparts to begin cooperative investigations of this stock and development of shared conservation measures. The Service did not

explain its use of 2,000 bears as both the best available estimate and the minimum estimate, despite acknowledgment that this estimate is uncertain.

23 September **To:** U.S. Fish and Wildlife Service

Issue: Proposed resolutions to the Conference of Parties to the Convention on International Trade in endangered Species of Wild Fauna and Flora (CITES); Fifteenth Regular Meeting

Recommendation: The Commission recommended that the Fish and Wildlife Service (1) not propose to list the narwhal on CITES Appendix I; (2) not propose to list the polar bear on CITES Appendix I; but (3) propose to list the walrus on CITES Appendix II.

Agency Response: At the end of 2009 the Service was still considering proposals for changing the listing status of narwhal, polar bear, and walrus.

24 September **To:** National Marine Fisheries Service

Issue: Draft 2009 stock assessment reports for marine mammals

Recommendation: To improve stock assessment efforts generally, the Commission recommended that the National Marine Fisheries Service (1) work with the Commission to complete a review of stock assessment efforts to date; (2) review its national observer program to identify gaps and determine the resources that are needed to (a) observe all fisheries that do or may interact directly with marine mammals and (b) provide reasonably accurate and precise estimates of serious injury and mortality levels; (3) work with federal and state fisheries management agencies and the industry to develop a funding strategy that will support adequate observer programs for collecting data on incidental mortality and serious injury of marine mammals and other protected species; (4) identify all transboundary stocks that are subject to partial assessment and develop a strategy to provide complete assessments, whether by expanding surveys and observation programs or working in conjunction with foreign or international marine resource or fishery management organizations; (5) list as “unknown” the potential biological removal level for all beaked whale stocks for which there is a reasonable basis for concern that they are being taken in fisheries or by other human activities, and respond to any evidence of such take with a review and development of mitigation measures as needed; and (6) develop and implement a systemic approach for integrating all human-related risk factors into stock assessment reports. To improve stock assessment efforts in the Atlantic and Gulf of Mexico, the Commission recommended that the National Marine Fisheries Service (1) expedite its proposed rule to implement and enforce the needed protective measures for the Gulf of Maine and Bay of Fundy harbor porpoise stock; (2) estimate the take rate for the Canadian East Coast stock of minke whales using a Poisson distribution and then use existing data to calculate the level of observer coverage needed to generate take estimates with acceptably small confidence intervals; (3) conduct and report the necessary surveys to update stock assessment reports for northwest Atlantic pinnipeds; and (4) improve stock assessments for bottlenose dolphins in both the Atlantic and the Gulf of Mexico by conducting the research needed to describe their stock structure, provide more accurate and precise estimates of the abundance and trends of the various stocks, and provide more accurate and precise estimates of the level of dolphin serious injury and mortality in the fisheries and from other human activities in these regions. To improve stock assessment efforts in the Alaska region, the Commission recommends that the National Marine Fisheries Service (1) proceed with formal recognition of 12 stocks of harbor seals in Alaska and then proceed with the necessary research and management of those stocks, as required by the Marine Mammal Protection Act; (2) continue to seek the additional support needed to develop and implement an ice seal research and management strategy that is commensurate with the grave threats that they face; and (3) work with the Minerals Management Service to ensure that funding for research on the eastern stock of North Pacific right whales is incorporated into the Administration’s fiscal year 2011 budget. To improve stock assessment

efforts in the Pacific, the Commission recommended that the National Marine Fisheries Service (1) investigate the possible sources of fishery mortality from central California to the Washington coast and place observers on vessels in fisheries that may be taking harbor porpoises to more accurately estimate the total bycatch; (2) convene a take reduction team to address longline fishery interactions with the Hawaii pelagic stock of false killer whales; and (3) build the needed capacity in the Pacific Islands Fisheries Science Center and Regional Office to assess and manage the many cetacean stocks in the Pacific that have heretofore been given far from adequate attention.

Agency Response: At the end of 2009 the Service was still considering responses to the Commission’s recommendations. However, the Commission has made many of the same recommendations in previous years, and the Service generally has not implemented them. One exception involves the convening of a take reduction team to address takes of false killer whales in Hawaiian longline fisheries, which the Service was planning to do at the end of 2009.

2 October **To:** National Marine Fisheries Service

Issue: Request for research permit from the University of Alaska Museum to authorize the collection of parts of dead marine mammals or those taken by Native subsistence hunters or researchers in academic, federal, or state institutions.

Recommendation: The Commission recommended that the National Marine Fisheries Service issue the research permit provided that (1) the University be responsible for maintaining detailed accounts of how, when, and where all samples were collected and obtained, and provide the Service periodically with detailed reports; and (2) researchers not authorized to conduct research under the permit or who do not hold other valid research permits and who wish to use those specimens be required to obtain a permit or other appropriate authorization from the Service before obtaining such materials from the permit holder.

Agency Response: The permit had not been issued by the end of 2009.

6 October **To:** National Marine Fisheries Service

Issue: Application from the U.S. Army Corps of Engineers and the U.S. Marine Corps to take small numbers of Atlantic bottlenose dolphins by harassment incidental to blasting and dredging operations at the U.S. Marine Corps’ Blount Island facility in Duval County, Florida

Recommendation: The Commission recommended that the Service issue the requested authorization, provided that the monitoring and mitigation activities proposed by the Service are carried out as described. The Commission noted that the Service’s *Federal Register* notice states that the Fish and Wildlife Service considers the proposed time frame for the activities (i.e., between November and March) to be “the manatee construction window” for utilizing explosives. The Commission suggested that if they have not already done so the applicants and the National Marine Fisheries Service consult with the Fish and Wildlife Service to ensure that authorization for the taking of manatees by harassment is not required.

Agency Response: At the end of 2009 the Service had not yet taken action on the request.

6 October **To:** Fish and Wildlife Service

Issue: Application from Charles Grossman, Ph.D., Xavier University, to amend a permit to authorize him to acquire annually from the Florida Fish and Wildlife Conservation Commission up to three larynxes (including pharynxes, trachea, and primary bronchi) from necropsied Florida manatees, to investigate the mechanics of manatee vocalizations.

Recommendation: The Commission recommended that the Service approve the requested amendment, provided that the conditions contained in the current permit remain in effect.

Agency Response: The Service issued the permit on 6 November 2009.

7 October

To: Fish and Wildlife Service

Issue: Application from the Alaska Department of Fish and Game to satellite-tag and collect skin biopsy samples from adult and subadult walruses to obtain information on their movements, speed of travel, feeding areas, and haul-out behavior in the waters and beaches of western Alaska

Recommendation: The Commission recommended that the Service ensure that activities to be conducted under this permit and those of other permit holders who might be carrying out research on the same species or in the same areas are coordinated and, as possible, data are shared to avoid unnecessary duplication of research and disturbance of animals. In this regard, before issuing the permit, the Service should consult with the applicant and the U.S. Geological Survey, Alaska Science Center, to ensure that the applicant's proposed tagging protocol is consistent with that of the center and appropriate for use on subadult animals and animals under six years of age; consult with the applicant to determine if authorization for a certain number of accidental deaths (e.g., one annually) is warranted and, if such authority is not granted, require that activities be suspended, pending review and authorization to proceed, if a walrus is accidentally killed or seriously injured as a result of research activities; require that the applicant cease an activity if there is evidence that the activity may be interfering with mother/calf bonding or other vital functions; require that researchers carefully assess the risk of a possible stampede before approaching walruses, particularly large groups, and delay or abort an approach if it appears that a stampede could occur if activities proceed; and before issuing the requested permit, ensure that the proposed research has been approved by the applicant's Institutional Animal Care and Use Committee.

Agency Response: The Service issued the permit on 22 December 2009.

14 October

To: Minerals Management Service

Issue: Notice of intent to prepare an environmental assessment for lease sale 215 in the Gulf of Mexico Western Planning Area

Recommendation: The Commission noted that it does not usually comment on notices of intent, but the coastal regions of western Louisiana and Texas contain some areas of special significance for protected marine life, including marine mammals and sea turtles. The Commission recommended that the Service include in its environmental analyses the existing information on bottlenose dolphin stocks occurring in or near the lease sale area, as well as the need for or value of additional information to describe their status, natural history, and vulnerability to other threats; work with the National Marine Fisheries Service to ensure collection of essential baseline information on possibly affected bottlenose dolphin populations before development activities begin; include in its environmental analyses a comprehensive summary of existing information regarding the sperm whale and other deep-diving cetaceans in the proposed lease area, identify critical gaps in that information, and describe the studies and monitoring that would be necessary to ensure that the Service has adequate baseline information on these species in this area and will be able to detect potentially significant adverse effects if and when oil and gas development begins in the area; and discuss and analyze all aspects of the proposed lease sale and its potential effects on the Kemp's ridley sea turtle.

Agency Response: At the end of 2009 the Service was developing its environmental impact statement.

15 October **To:** National Science Foundation

Issue: Application from Robert A. Garrott, Ph.D., to modify a permit issued under the Antarctic Conservation Act of 1978 to attach temporarily temperature-logging tags on Weddell seal pups for scientific research purposes

Recommendation: The Commission recommended that the National Science Foundation approve the requested permit modification. The Commission noted that the permit holder has obtained the necessary authorization for the planned activities under the Marine Mammal Protection Act that requires that the permit holder terminate research involving temperature-logging flipper tags at the end of the 2009 field season and that continued use of such tags be contingent upon further authorization from the National Marine Fisheries Service.

Agency Response: The Foundation approved the permit modification.

17 October **To:** Council on Environmental Quality

Issue: The Interim Report of the Interagency Ocean Policy Task Force

Recommendation: The Commission noted that no single document will have more influence on the direction of our country's ocean use, science, management, and conservation in the coming decade. The Commission expressed the belief, however, that the report and ensuing ocean policy must be further strengthened. The Commission urged the Council on Environmental Quality and the Interagency Task Force to be more forthcoming with regard to the challenges that lie ahead if we are to use the world's oceans in a truly sustainable fashion. Doing so will require a stronger commitment to our vision and goals, a harder look at our social customs and the prevailing economic paradigm, and a greater willingness to adapt our lives and life styles to ensure that we pass to future generations a world undiminished in its complexity, beauty, and wonder. The Commission urged the Council on Environmental Quality, the interagency task force, and the Obama Administration to raise the priority given to ocean research, management, use, and conservation to ensure that such matters are not neglected in the face of other, conflicting crises; define ecosystem-based management in such a way as to continue to protect single species but also promote a stronger ecological basis for management decisions; recognize and respect the limits of natural marine ecosystems to perturbation by human activities; implement ocean zoning to enhance ocean conservation, not facilitate its exploitation; seek a stronger commitment to comprehensive and robust systems for ocean observation; draw a stronger connection between ocean conservation and the manner in which it will be affected by continued human population growth; strengthen its call for international cooperation on ocean conservation; forthrightly anticipate and analyze where existing trends and projections will take us if we maintain the current course, and then use that information to recommend the essential new direction for ocean policy; call on those whose activities pose risks to marine ecosystems to assume a larger responsibility for meeting the costs of essential research; and (1) review the structure and function of the previous framework under the Ocean Action Plan to determine if it was effective and why or why not, (2) describe how those involved in the new framework will assess their effectiveness, and (3) describe how the new framework will influence the direction of our society and move it toward the goal of healthy, sustainable marine ecosystems.

Agency Response: At the end of 2009 the new National Ocean Policy was still under development.

19 October **To:** Fish and Wildlife Service

Issue: Application from Emma Napper, Ph.D., for authorization to take by Level B harassment southern sea otters during filming in Monterey Harbor, Moss Landing, Pebble Beach, Pacific Grove and Point Lobos State Reserve in California

Recommendation: The Commission recommended that the permit, if issued, specify the number of sea otters that are authorized to be harassed during the conduct of the authorized filming activities and in the record of its decision, the Service fully document the basis for its determination that the proposed activities will not result in taking under the Endangered Species Act and, hence, that no permit is required under that Act.

Agency Response: Permit issued on 6 November 2009.

19 October **To:** Fish and Wildlife Service

Issue: Application from the U.S. Geological Survey, Alaska Science Center, to amend a permit to increase the number of walrus that can be harassed incidental to conducting the research each year

Recommendation: The Commission recommended that the Service approve the permit amendment request provided that the conditions contained in the current permit remain in effect and that all due caution is used to avoid possible adverse effects from research-related activities. The Commission further recommended that the researchers use great caution in conducting their studies to avoid research-related stampedes, and that any animal killed in a stampede should be counted against the limit of six accidental deaths even when they were not directly involved in research. Further, the Commission urged that researchers use caution when selecting adult animals for study (i.e., select only females that clearly do not appear to be pregnant).

Agency Response: The Service re-issued the permit on 18 September 2009 to authorize an emergency increase in the numbers to harvest.

22 October **To:** National Marine Fisheries Service

Issue: Application from Scott Kraus, Ph.D., to take by harassment North Atlantic right whales during aerial and vessel surveys and biopsy sampling activities over a five-year period

Recommendation: The Commission recommended that if the National Marine Fisheries Service is planning to review or revise its decision to prepare a programmatic environmental impact statement on the issuance of permits for research on right whales, it move cautiously and with a record of decision that provides clear and adequate justification for doing so, and the Service defer issuance of this permit and similar authorizations to take right whales until it has resolved the National Environmental Policy Act issues concerning research on this species.

Agency Response: No action had been taken on the request at the end of 2009.

29 October **To:** Fish and Wildlife Service

Issue: Request information regarding a petition to revise designated critical habitat for Florida manatees under the Endangered Species Act

Recommendation: The Commission recommended that the Service ensure that designated areas incorporate both winter and summer habitats (i.e., warm-water refuges, key foraging areas, and associated travel corridors) necessary for the conservation and recovery of each of the four regional manatee subpopulations identified in the current Florida manatee recovery plan; include as critical habitat all warm-water refuges used by at least a few manatees in each of the four regions; include as critical habitat major natural warm-water springs, such as Silver Spring on the Oklawaha River, that are not used currently or are used infrequently but that could become important for recovery and conservation in the foreseeable future; identify as essential features of warm-water refuges the

characteristics necessary to generate or maintain water temperatures sufficient to support manatees during periods of cold weather (e.g., discharge rates, water flow, and basin dimensions) and their shelter or seclusion from sources of disturbance (i.e., human activities) that could disrupt or interfere with thermoregulation; review available information on the location and geographic extent of winter foraging areas used by manatees near all major warm-water refuges and ensure that all such areas are included within designated critical habitat; include as critical habitat summer foraging areas used regularly by a significant percentage of each Florida manatee subpopulation and identify as essential physical and biological features the conditions necessary to maintain their forage base and seclusion from sources of disturbance (i.e., human activities) that could disrupt or interfere with feeding; and include as critical habitat all travel corridors used by manatees between major warm-water refuges and principal winter feeding areas and other frequently used travel corridors between major summer feeding areas.

Agency Response: The Service had not completed action on the recommendation at the end of 2009.

29 October **To:** National Marine Fisheries Service

Issue: Application from the National Marine Fisheries Service, Office of Science and Technology, to take by harassment beaked whales and various other odontocetes, baleen whales, and pinniped species by conducting playback experiments using received sound levels of up to 180 dB re 1 μ Pa, to study what characteristics of sounds (including mid-frequency sonar) evoke behavioral responses in beaked whales and other deep-diving cetaceans; and to tag individual cetaceans with digital archival recording tags using suction cups and to import and export skin samples collected during tag retrieval

Recommendation: The Commission recommended that the Service defer further action on this application until the permit applicant demonstrates that the proposed research has been reviewed and approved by an Institutional Animal Care and Use Committee, and defer consideration of any other scientific permit applications and amendment requests submitted from within the agency that involve any invasive procedure or other activity that might harm or materially alter the behavior of the animals under study until such a committee has been established and has found the proposed research to be consistent with Animal Welfare Act requirements.

Agency Response: No action had been taken on the request at the end of 2009.

29 October **To:** National Marine Fisheries Service

Issue: Application from Colleen Reichmuth, Ph.D., to continue psychological and physiological studies to evaluate the perceptual and cognitive capabilities of up to six pinnipeds at Long Marine Laboratory in Santa Cruz, California, for a five-year period

Recommendation: The Commission recommended approval of the requested authorization provided that the permit, if issued, require that the applicant not re-initiate research on temporary threshold shifts unless approved by the Service after it has reviewed the additional measures the applicant will take to avoid inducing any lasting changes on hearing sensitivity in the subject marine mammals; and the permit, if issued, require that the study be immediately discontinued, pending consultation with the Service and authorization to proceed, if any of the marine mammals used in the study exhibit undue stress or otherwise show signs of unanticipated adverse effects as a result of the authorized activities.

Agency Response: The Service issued the permit on 7 December 2009.

29 October **To:** National Marine Fisheries Service

Issue: Application from Shane Moore, Moore & Moore Films, to amend a permit to take annually by Level B harassment killer whales from the eastern North Pacific transient stock, gray whales, and minke whales by close approach during filming activities

Recommendation: The Commission recommended that the Service approve the requested amendment to extend the permit, provided that the conditions contained in the current permit remain in effect.

Agency Response: No action had been taken on the request at the end of 2009.

29 October **To:** National Marine Fisheries Service

Issue: Application from the St. George Reef Lighthouse Preservation Society to take small numbers of California sea lions, Steller sea lions, Pacific harbor seals, and northern fur seals by harassment incidental to aircraft operations and restoration and maintenance work on the St. George Reef Light Station on Northwest Seal Rock off the coast of Culver City, California

Recommendation: The Commission recommended that the National Marine Fisheries Service issue the requested authorization, subject to the inclusion of the proposed monitoring and mitigation measures (e.g., restrictions on the timing and frequency of activities, the use of helicopter approach and timing measures to minimize disturbance to the animals, and measures to avoid exposing animals to visual and acoustic stimuli associated with the proposed activities).

Agency Response: At the end of 2009 the Service had not yet issued the authorization.

30 October **To:** National Marine Fisheries Service

Issue: Application from the Alaska Department of Fish and Game to amend a permit to authorize an increase in the number of ringed, bearded, spotted, and ribbon seals that may be captured annually to allow for selection of animals of specific age, sex, and molt condition

Recommendation: The Commission recommended that the Service approve the requested amendment, provided that the conditions currently contained in the permit remain in effect.

Agency Response: At the end of 2009 the Service had not yet approved the amendment request.

30 October **To:** National Marine Fisheries Service

Issue: Revised application from the National Marine Mammal Laboratory to include a request for authorization to conduct research on Steller sea lions and killer whales

Recommendation: The Commission reiterated its comments and recommendations regarding the original application (i.e., that the Service defer issuance of the permit until it has determined that the applicant is in compliance with § 2.37 of the Animal and Plant Health Inspection Service's Animal Welfare Act regulations, which requires that certain types of research be reviewed and approved by an Institutional Animal Care and Use Committee). The Commission recommended that the Service deny the requested permit unless the permit applicant demonstrates that the proposed research has been reviewed and approved by an Institutional Animal Care and Use Committee; and deny any other scientific permit application or amendment request submitted from within the agency that involves any invasive procedure or other activity that might harm or materially alter the behavior of the animals under study until the applicant demonstrates that such a committee has been established and has found the proposed research to be consistent with Animal Welfare Act requirements. Further, the

Commission requested that the Service provide it with detailed explanations of the reasons that it has not followed or adopted the Commission's recommendations concerning the establishment and use of Institutional Animal Care and Use Committees and has not deferred action on permit applications for which such review is required but has not been completed. In general, section 202(d) of the Marine Mammal Protection Act provides 120 days for an official to provide such a response.

Agency Response: The Service issued the permit on 17 August 2009.

30 October

To: National Science Foundation

Issue: Application from Daniel P. Costa, Ph.D., for authorization under the Antarctic Conservation Act of 1978 to conduct research on Weddell seals in the Ross Sea, including McMurdo Sound and several Antarctic Special Protected Area locations including northwest White Island (ASPA 137)

Recommendation: The Commission recommended that the National Science Foundation defer issuing the requested authorization pending confirmation from the National Marine Fisheries Service that the permit holder has obtained the necessary authorization for the planned activities under the Marine Mammal Protection Act; in consultation with the National Marine Fisheries Service, ensure that the proposed activities, if approved, are carefully coordinated with those of other researchers currently working on these seals; work with the National Marine Fisheries Service to assess the possible cumulative effects of multiple research activities involving Weddell seals in eastern McMurdo Sound; to the extent possible, direct Weddell seal research that does not require the use of marked animals from the eastern McMurdo Sound population to animals inhabiting the western portions of the Sound; to the extent possible, require researchers studying Weddell seals in eastern McMurdo Sound to find and use animals that have not previously been marked, to minimize impacts to other ongoing research projects; work with the applicant to identify seals or populations other than those at White Island to be used for the proposed research.

Agency Response: The Foundation had not issued the requested permit at the end of 2009.

2 November

To: National Science Foundation

Issue: Application from George Watters, Ph.D., Southwest Fisheries Science Center, National Marine Fisheries Service, to modify an Antarctic Conservation Act permit to expand currently authorized research activities on pinnipeds

Recommendation: The Commission recommended that the National Science Foundation defer action on this request until the National Marine Fisheries Service demonstrates that the proposed research has been reviewed and approved by an Institutional Animal Care and Use Committee, as required under the Animal Welfare Act; and defer consideration of any other scientific permit amendment requests and applications submitted from the National Marine Fisheries Service that involve any invasive procedure or other activity that might harm or materially alter the behavior of the animals under study until that agency has established such a committee and that committee has found the proposed research to be consistent with Animal Welfare Act requirements.

Agency Response: At the end of 2009 the Foundation had not yet taken action on the request.

9 November

To: National Marine Fisheries Service

Issue: Application from the Oregon Coast Aquarium to import up to eight rehabilitated, nonreleasable harbor seals from the Vancouver Aquarium Science Center, Vancouver, British Columbia, Canada, to the Oregon Coast Aquarium, Newport, Oregon, for public display

Recommendation: The Commission recommended that the Service issue the requested permit, provided that it determines that the applicant's program for education or conservation is consistent with the professionally recognized standards of the public display community. The Commission further recommended that the importation of seals under this permit be contingent on concurrence by the National Marine Fisheries Service that the animals are not candidates for release to the wild.

Agency Response: No action had been taken on the request at the end of 2009.

9 November **To:** Fish and Wildlife Service

Issue: Petition to list the Pacific walrus subspecies (*Odobenus rosmarus divergens*) as threatened or endangered under the Endangered Species Act

Recommendation: The Commission recommended that, in its review of the petition, the Service begin its status review of the Pacific walrus by defining the range occupied by some portion of the population (e.g., 90 percent), analyzing or predicting the current and expected changes in ice habitat in that area, and describing, to the extent possible, the anticipated changes in reproduction and survival that may occur as the ice haul-out habitat is lost and walruses are forced to haul out on land for various vital functions that otherwise took place in the ice habitat; describe, evaluate, and take into account the potential consequences of increased exposure and susceptibility of Pacific walruses to predation and disease under changing climatic conditions and the resulting implications for the status of the walrus population; (1) review the range of human-related threats that likely will arise or expand as the Arctic climate warms, (2) describe the current regulatory mechanisms for addressing them, and (3) evaluate the effectiveness of those mechanisms; work with the Eskimo Walrus Commission to include in the analysis of the listing petition (1) an estimate of the numbers of walruses being taken at present, including any potential biases in that estimate, (2) a review of the existing information on total population abundance, and (3) an assessment of whether current subsistence harvests are sustainable, keeping in mind the uncertainty in harvest levels (including hunting loss) and population numbers as well as the total walrus mortality from other human activities; and describe the possible consequences of having inadequate information on population status, the challenges that must be overcome to obtain the essential data and information, and the steps the Service plans to take to gather that data and information.

Agency Response: The Service had not completed action on the recommendation at the end of 2009.

18 November **To:** National Marine Fisheries Service

Issue: Application from the U.S. Air Force for a renewal of a one-year authorization to take by harassment small numbers of up to 16 species of cetaceans incidental to air-to-surface gunnery tests and training activities within the Eglin Gulf Test and Training Range in the Gulf of Mexico

Recommendation: The Commission recommended that the requested authorization be issued provided that the Service revise its interpretation of temporary threshold shift (TTS) to indicate that it constitutes a temporary loss of function with consequences that may vary widely from negligible to biologically significant (e.g., compromised ability to forage, respond to reproductive cues, detect predators) depending on a variety of circumstances at the time the loss occurs, including the nature of the structural and functional hearing loss, the animal's behavioral response to the stimulus, its history, and environmental conditions; as such, and under certain circumstances, TTS may constitute Level A harassment; conduct a thorough review of the considerable information available on behavioral responses of marine mammals to sound before it moves forward with proposed regulations tied to the narrow findings of Schlundt et al. (2000) as the basis for estimating the number of animals likely to exhibit behavioral responses; require performance testing of mitigation measures to assess their actual effectiveness at detecting marine mammals. The Navy is being asked to conduct similar evaluation programs, and doing so seems essential if our collective approach to such matters is to be considered

science-based; work with the Air Force to design and conduct the necessary performance verification testing for electronic detection devices under the pertinent sea state conditions; and review its overall strategy for managing risks associated with such testing and training activities and consider how its existing strategy might be modified to be both more precautionary but also more likely to lead to scientific advancement in this field of research.

Agency Response: No action had been taken on the request at the end of 2009.

19 November **To:** National Marine Fisheries Service

Issue: Proposed rule to govern the taking of marine mammals during U.S. Navy exercises within its Mariana Islands Range Complex in the western Pacific Ocean from March 2010 through February 2015

Recommendation: The Commission recommended that if the Service proceeds with publication of a final rule to authorize the taking of small numbers of marine mammals incidental to the proposed military training operations the Service require that any final rule and Letter of Authorization issued under that rule include all marine mammal species that may be taken by Level A or Level B harassment as a result of the proposed activities. In that regard, the Service and/or the Navy should consult with the Fish and Wildlife Service to determine if authorization also is needed to take dugongs, which, according to the proposed rule, could occur within the Mariana Islands Range Complex; require the Navy to conduct an external peer review of its marine mammal density estimates, the data upon which those estimates are based, and the manner in which those data are being used; require that a sufficient level of monitoring be conducted during all training activities to ensure that marine mammals are not being taken in unanticipated ways and numbers; require that, upon its completion, the plan for the Navy's Integrated Comprehensive Monitoring Program be made available for Commission review and comment; advise the Navy and specify in the final rule and Letter of Authorization that any and all data that the Navy collects as part of monitoring and reporting requirements established under the authorization are essential for documenting compliance with the requirements of the Marine Mammal Protection Act, the incidental take regulations, and the terms and conditions of the Letter of Authorization and, unless subject to national security restrictions, should be considered as public information; require that, in the event of the death or serious injury of a marine mammal during activities associated with any of the training exercises or other activities covered by this authorization, those activities be suspended, pending an investigation and determination that further serious injuries or deaths are unlikely or until authorization for such taking has been obtained; require that the Navy, in conjunction with the Service, investigate any injury or death of a marine mammal to determine the cause, assess the full impact of the activity or activities (e.g., the total number of animals involved), and determine how activities should be modified to avoid future injuries or deaths. If the death or serious injury involves a marine mammal not included in the authorization for such takes, the Service should allow the activity to proceed only if it has reviewed the circumstances and determined that additional serious injuries or deaths are unlikely or the Navy has obtained authorization for such taking; prior to issuing the final regulations, the Service ensure that it can provide oversight of and response to an uncommon stranding event in the Mariana Islands Range Complex Study Area sufficient to meet in full the monitoring and reporting requirements of the Marine Mammal Protection Act; work with the Navy to analyze the cumulative effects of adding LFA sonar to the other activities planned for the Mariana Islands Range Complex before using LFA sonar as a component of the proposed training exercises and, if appropriate, add authorization for the use of LFA to the final rule and Letter of Authorization; and limit the authorization to avoid Navy operations within the Marianas Trench Marine National Monument to the extent possible. Further, if the Navy must conduct activities within the Monument, the Service include in the final rule and Letter of Authorization a description of the measures that the Navy will adopt to minimize adverse impacts and to comply with the intent of the presidential proclamation establishing the Monument.

Agency Response: At the end of 2009 the Service had not yet taken action on the request.

25 November **To:** National Marine Fisheries Service

Issue: Application from Paul Ponganis, Ph.D., for authorization to take by harassment up to 10 adult female California sea lions annually (not to exceed 20 animals over a five-year period) to investigate the role of blood oxygen store depletion in the dive behavior and foraging ecology of the species

Recommendation: The Commission recommended that the Service issue the requested permit provided that the Service require the applicant to identify pups associated with lactating females targeted for capture before attempting to capture those animals and to monitor animals following their release to assess the effects of the research procedures on the animals and to verify that mothers and pups reunite; the Service, if it has not already done so, discuss with the applicant the advisability of obtaining authorization for the accidental death or serious injury of a certain number of animals (i.e., one or two) as a result of the proposed research activities; the Service require that, in the event that a female dies or is seriously injured as a result of the activities, the orphaned pup, if unlikely to survive on its own, be humanely provided for or, if that is not possible, euthanized; the permit, if issued, provide authorization for the taking by harassment of a small number of Guadalupe fur seals incidental to the research; and the Service authorize the use of a prophylactic antibiotic to minimize the risk of infection in the animals being studied.

Agency Response: No action had been taken on the request at the end of 2009.

25 November **To:** National Marine Fisheries Service

Issue: Application from Provincetown Center for Coastal Studies for authorization to harass right whales during aerial and shipboard surveys and tagging to monitor right whale demographics, life history traits, and behavior over a five-year period

Recommendation: The Commission recommended that if the National Marine Fisheries Service is planning to review or revise its decision to prepare a programmatic environmental impact statement on the issuance of permits for research on right whales it move cautiously and with a record of decision that provides clear and adequate justification for doing so, and the Service defer issuance of this permit and similar authorizations to take right whales until it has resolved the National Environmental Policy Act issues concerning research on this species.

Agency Response: No action had been taken on the request at the end of 2009.

25 November **To:** National Science Foundation

Issue: Application from Louis Jacobs, Southern Methodist University, for authorization under the Antarctic Conservation Act of 1978 to collect and import the remains of mummified pinnipeds (i.e., southern elephant, Weddell, crabeater, leopard, and Antarctic fur seals) for destructive chemical analysis, radiocarbon dating, and archiving at the university's Shuler Museum of Paleontology

Recommendation: The Commission recommended that the National Science Foundation defer issuance of the requested authorization until it has been notified that the National Marine Fisheries Service has issued a permit under the Marine Mammal Protection Act to authorize the proposed activities or that the Service has confirmed that the activities are otherwise authorized under the Act; restrict the collection of material from mummified remains to the minimum required for radiocarbon dating, organochlorine analysis, and stable isotope analysis; require that the permit holder record the precise location (i.e., GPS coordinates) of each carcass from which samples are obtained and that these data be archived in a national database for use by other researchers; and advise the permit holder of the possible need to obtain an import permit under the Convention on International Trade

in Endangered Species of Fauna and Flora (CITES) and suggest that he consult with the Fish and Wildlife Service concerning the applicable requirements.

Agency Response: The Foundation had not issued the requested permit at the end of 2009.

7 December **To:** National Marine Fisheries Service

Issue: Application from Daniel Costa, Ph.D., to amend a permit to take Weddell seals in the Ross Sea including McMurdo Sound and several Antarctic Special Protected Area locations, including Northwest White Island (ASPA 137)

Recommendation: The Commission recommended that the Service, in consultation with the National Science Foundation, ensure that the proposed activities, if approved, are carefully coordinated with those of other researchers currently working on Weddell seals in McMurdo Sound; assess the possible cumulative effects of multiple research activities involving Weddell seals in eastern McMurdo Sound; direct research on Weddell seals that does not require the use of marked animals from the eastern McMurdo Sound population to animals inhabiting the western portions of the sound; require researchers studying Weddell seals in eastern McMurdo Sound to find and use animals that have not previously been marked to avoid interfering with ongoing research projects; and work with the applicant to identify seals or populations other than those at White Island to be used for the proposed research.

Agency Response: The Service approved the amendment request on 29 December 2009.

14 December **To:** National Marine Fisheries Service

Issue: Application from the Sonoma County Water Agency for authorization to take small numbers of Pacific harbor seals, California sea lions, and northern elephant seals by harassment incidental to construction and maintenance of a lagoon outlet channel at the Russian River Estuary in Jenner, California

Recommendation: The Commission recommended that the Service issue the requested authorization subject to the inclusion of the proposed monitoring and mitigation measures (e.g., including slow and cautious approaches by agency crews and construction equipment. In light of the types of taking that are anticipated and the mitigation measures that will be employed, the Service has preliminarily determined that the proposed activities will result, at most, in temporary modification of pinniped behavior and will have a negligible impact on the stocks).

Agency Response: At the end of 2009 the Service had not yet issued the authorization.

14 December **To:** Fish and Wildlife Service

Issue: Application from Tom Smith, Brigham Young University, for authorization to take by Level B harassment up to 18 polar bears annually over a five-year period during the placement and maintenance of remote video cameras to study polar bear behavior at den sites on Alaska's North Slope near Prudhoe Bay

Recommendation: The Commission recommended that in view of the potential for unintended but nonetheless significant effects on individual animals, the Service issue the requested permit, provided that the authorization require the researchers to build a barrier of snow blocks to shield them and their snow machines from the view of the bears. If bears come out of the dens for a period of time, the researchers should wait behind the snow barrier until the animals return to the dens and not follow the animals if they move away from the dens; the Service require the applicant to discontinue activities at a particular site if the bear or bears being filmed demonstrate any potentially significant response

(e.g., agitation) to the filming crew; the Service require the applicant to document and report any adverse effects related to human presence near the denning site, because polar bears are likely to come under increasing stress from consequences of climate change, and keeping track of their responses to human activities seems essential to provide a basis for making permitting and other decisions in the future; and the Service include requirements to ensure that the activities to be conducted under this permit and those of other permit holders who might be carrying out research on the same species or in the same areas are coordinated and, as possible, data are shared to avoid unnecessary duplication of research and disturbance of animals.

Agency Response: The Service had not completed action on the recommendation at the end of 2009.

16 December **To:** National Marine Fisheries Service

Issue: Request from the Department of the Navy to acquire two non-releasable, rehabilitated California sea lions from the Marine Mammal Care Center at Fort MacArthur and The Marine Mammal Center, respectively, pursuant to the National Defense Authorization Act of 1986 (10 U.S.C. § 7524), which requires the Navy to obtain the concurrence of the Secretary of Commerce on transfers of marine mammals acquired under that Act

Recommendation: The Commission had no objection to the proposed transfer of the sea lions, noting that the Animal and Plant Health Inspection Service is satisfied that the Navy's facility in San Diego, California, where the animals will be housed, is in compliance with its regulatory requirements under the Animal Welfare Act for the humane handling, care, treatment, and transportation of marine mammals.

Agency Response: The Service granted approval for the requested transfer.

17 December **To:** National Marine Fisheries Service

Issue: Application from the Southeast Fisheries Science Center for authorization to take by harassment (aerial and vessel-based line-transect sampling, acoustic sampling, behavioral observations, and vessel-based photo-identification and biopsy sampling) all cetacean species that may occur in domestic and international waters of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea, for the purpose of stock assessments; and to import into the United States tissue samples collected in international waters and in other countries

Recommendation: The Commission noted that the Service has reached the same conclusion as the Commission that § 2.37 of the Animal and Plant Health Inspection Service's Animal Welfare Act regulations apply to Service research activities. The Commission therefore recommended that action on the application be deferred until the research has been reviewed and approved by an Institutional Animal Care and Use Committee and the applicant has provided the necessary assurance of compliance. Because the Service will begin enforcing this requirement in a matter of weeks, deferring action in this instance should not create a hardship for the applicant. The Commission further recommended that, regarding the applicant's request to conduct research involving North Atlantic right whales, the Service move cautiously and with a record of decision that provides clear and adequate justification if it is planning to review or revise its decision to prepare a programmatic environmental impact statement on the issuance of permits for research on right whales in the Atlantic and Pacific Oceans. The Commission also recommended that the Service defer authorization for the harassment of North Atlantic right whales in this permit, if issued, and similar authorizations to take right whales until it has resolved the National Environmental Policy Act issues concerning research on this species. As noted in its previous letters on this topic, the Commission urges the Service to proceed expeditiously with resolution of this issue because under current conditions research necessary to support recovery efforts is being delayed.

- Agency Response:** At the end of 2009 the Service had not yet issued the authorization.
- 17 December **To:** Fish and Wildlife Service
- Issue:** Application from Natalija Lace, University of Southern Mississippi, to take by harassment up to seven manatees being maintained for rehabilitation at the Lowry Park Zoo, Tampa, Florida, to study the effects of underwater sounds on manatee sleep patterns
- Recommendation:** The Commission recommended that the Service issue the requested permit to authorize the proposed activities as described in the application.
- Agency Response:** The Service had not completed action on the recommendation at the end of 2009.
- 21 December **To:** National Marine Fisheries Service
- Issue:** Proposed rule and 12-month finding regarding a petition from the Center for Biological Diversity to list the spotted seal (*Phoca largha*) under the Endangered Species Act
- Recommendation:** The Commission concurred with the Service's finding that the southern distinct population segment of the spotted seal warrants listing as threatened. The Commission recommended that the Service proceed with listing of the southern distinct population segment as threatened under the Endangered Species Act; devise and implement a research plan to address the major uncertainties and programmatic shortcomings revealed in the status review of the spotted seal, including a realistic research budget; strengthen efforts under the existing Agreement between the government of the United States of America and the government of the Russian Federation on Cooperation in the Field of Protection of the Environment and Natural Resources and confers with the Department of State on how to further build discussions and collaboration with Russian, Korean, Chinese, and Japanese researchers and managers to (1) assess the status of spotted seal populations throughout the species' range, and (2) identify the need for protective measures where necessary; and revisit the question of status of the Okhotsk and Bering Sea distinct population segments in five years after suitable information has been collected to assess their status.
- Agency Response:** At the end of 2009 the Service was still considering whether to list the spotted seal.
- 22 December **To:** National Marine Fisheries Service
- Issue:** Application from Robert Pilley to take by Level B harassment up 112 Atlantic bottlenose dolphins annually over a two-year period to acquire film footage of bottlenose dolphin strand feeding events in the estuaries and creeks of Bull Creek and Hilton Head, South Carolina, to be used in a six-part television series, Earthflight, produced by the British Broadcasting Corporation and the Discovery Channel
- Recommendation:** The Commission recommended approval of the requested permit.
- Agency Response:** At the end of 2009 the Service had not yet issued the authorization.
- 22 December **To:** Fish and Wildlife Service
- Issue:** Application from David Clapham, M.D., Ph.D., to obtain and import from Germany for scientific research a total of 22 biological samples (RNA, DNA, skin, and spinal cord) taken from two adult male polar bears by Inuit hunters in Canada during 2008 as part of traditional community harvests and exported to Germany in 2009 for RNA/DNA isolation

Recommendation: The Commission recommended that the requested permit be issued provided that the Service determines that all samples to be imported were taken in accordance with the laws of the country of origin and provided that the applicant is required to obtain the necessary permits under the Convention on International Trade in Endangered Species of Wild Fauna and Flora before importing samples.

Agency Response: The Service issued the permit on 22 December 2009.

28 December **To:** Department of the Interior

Issue: Proposal to designate critical habitat for the polar bear (*Ursus maritimus*)

Recommendation: The Commission recommended that the Service adopt a final rule designating as critical habitat for the polar bear all areas identified in the proposed rule published in the *Federal Register* on 29 October 2009. In addition, the Commission recommended that the Service review that designation periodically (e.g., every five years) to consider changes in habitat use and the need to supplement the original designation; work with key agencies (e.g., the Environmental Protection Agency, the Department of Energy, the Department of Transportation, etc.) to develop a coordinated strategy to identify how best to use their authorities to address the negative effects on polar bears of climate change, thereby promoting the conservation of polar bears, and similarly situated species, and their habitats; examine the integrated natural resources management plan for each military facility that otherwise would occur within the designated critical habitat to ensure that it provides adequate long-term protection of polar bears and polar bear habitat before excluding any of those sites; clarify the exclusion on man-made structures in the final rule by delineating the boundaries of the existing municipal areas and structures that would be excluded from the critical habitat designation; and review the man-made structures exclusion every five years to ensure that it continues to be appropriate to the habitat needs of the polar bear.

Agency Response: The Department had not issued a final rule at the end of 2009.

30 December **To:** National Marine Fisheries Service

Issue: Application from Point Reyes Bird Observatory Conservation Science requesting authorization to take small numbers of California sea lions, Pacific harbor seals, northern elephant seals, and Steller sea lions by Level B harassment incidental to research on seabirds carried out on the South Farallon Islands, Año Nuevo Island, and Point Reyes National Seashore, California, and up to four Steller sea lions per year incidental to research being conducted on northern elephant seals at the South Farallon Islands (authorized under scientific research permit No. 373-1868)

Recommendation: The Commission recommended that the Service issue the requested authorization. The Commission further recommended that because taking other than by Level B harassment is possible any authorization issued specify that if a death or serious injury of a marine mammal occurs that appears to be related to the research activities be suspended while the Service determines whether steps can be taken to avoid further injuries or deaths or until such taking has been authorized by regulations promulgated under section 101(a)(5)(A) of the Marine Mammal Protection Act.

Agency Response: At the end of 2009 the Service had not yet issued the authorization.

31 December **To:** National Marine Fisheries Service

Issue: Permit Application Nos. 14682 (Whitlow Au, Ph.D.); 13846 (Jim Darling, Ph.D.); 14451 (Joseph Mobley, Jr.); 14585 (Adam Pack, Ph.D.); 14599 (Fred A. Sharpe, Ph.D.); 14122 (Janice Straley); 14296 (Briana Witteveen, Ph.D.); 14353 (Ann Zoidis); Request for Amendment, Permit No.

10018 (Rachel Cartwright, Ph.D.) to take North Pacific humpback whales and various other species of cetaceans for purposes of scientific research

Recommendation: The Commission recommended that the Service defer issuing the requested permits until it has completed an environmental assessment or an environmental impact statement under the National Environmental Policy Act and after providing the Commission and the public an opportunity to review and comment on the draft document; defer issuing the requested authorizations to conduct research on North Pacific right whales until it has completed the necessary analysis under the National Environmental Policy Act or has provided an adequate justification for not doing so; and ensure that the proposed research has been reviewed and approved by each applicant's Institutional Animal Care and Use Committee. Upon resolution of those issues, the Commission recommended that the National Marine Fisheries Service issue the requested permits provided that the Service is satisfied that the applicant has provided sufficient justification for tagging humpback whale calves and mothers accompanied by calves on the breeding grounds; take steps to ensure that the applicants consistently use the correct approach for describing the numbers of animals for which taking authority is being sought under the permits, including clearly specifying the numbers of animals to be taken and the number and kinds of takes being requested per animal; and take steps to ensure that activities to be conducted under these permits and those of other permit holders who might be carrying out research on the same species in the same areas are coordinated and, as possible, data and samples are shared, to avoid unnecessarily duplicative research and unnecessary disturbance.

Agency Response: At the end of 2009 the Service had not yet taken action on the permit requests.

Appendix B

2009 PUBLICATIONS FROM COMMISSION-SPONSORED ACTIVITIES

- Andersen, S.H. 2009. Investigations on the harbor porpoise (*Phocoena phocoena*) in Denmark from 1962 to 1983. Aquatic Mammals Historical Perspectives Series 35(3):394–398. (MMC contract E4047339)
- Boyd, I.L. 2009. The history of marine mammal research in the United Kingdom: An exploration of the interaction of human socioeconomics and marine mammal ecology. Aquatic Mammals Historical Perspectives Series 35(1):82–93. (MMC contract E4047339)
- Burn, D.M., M.S. Udevitz, S.G. Speckman, and R.B. Benter. 2009. An improved procedure for detection and enumeration of walrus signatures in airborne thermal imagery. International Journal of Applied Earth Observation and Geoinformation 11(5):324–333. (MMC contract E4026016)
- Hofman, R. 2009. The continuing legacies of the Marine Mammal Commission and its Committee of Scientific Advisors on Marine Mammals. Aquatic Mammals Historical Perspectives Series 35(1):94–129. (MMC contract E4047339)
- Huntington, H.P. 2009. A preliminary assessment of threats to arctic marine mammals and their conservation in the coming decades. Marine Policy 33(1):77–82. (MMC contract T03325177)
- Kooyman, M.M., and G. L.Kooyman. 2009. The history of pinniped studies in Antarctica. Aquatic Mammals Historical Perspectives Series 35(4):523–556. (MMC contract E4047339)
- Newsome, S.D., M.T. Tinker, D.H. Monson, O.T. Oftedal, K. Ralls, M.M. Staedler, M.L. Fogel, and J.A. Estes. 2009. Using stable isotopes to investigate individual diet specialization in California sea otters (*Enhydra lutris nereis*). Ecology 90(4):961–974. (MMC contract EE0009713)
- Perrin, W.F. 2009. Early days of the tuna/dolphin problem. Aquatic Mammals Historical Perspectives Series 35(2):292–305. (MMC contract E4047339)
- Quintana-Rizzo, E., and T. Gerrodette. 2009. Primer estudio sobre la diversidad, distribución y abundancia de cetáceos en la Zona Económica Exclusiva del Océano Pacífico de Guatemala. Report prepared for the Chicago Board of Trade Endangered Species Fund, Chicago Zoological Society. Guatemala, Guatemala, 8 October 2009, 66 pages. (MMC contract E4047594)
- Schultz, J.K., J.D. Baker, R.J. Toonen, and B.W. Bowen. 2009. Extremely low genetic diversity in the endangered Hawaiian monk seal (*Monachus schauinslandi*). Journal of Heredity 100(1):25–33. (MMC contract GP0012185)
- Simpkins, M., K.M. Kovacs, K. Laidre, and L. Lowry. 2009. A framework for monitoring Arctic marine mammals: Findings of a workshop sponsored by the U.S. Marine Mammal Commission and U.S. Fish and Wildlife Service, Valencia, March 2007. CAFF International Secretariat, CAFF CBMP Report No. 16. (MMC contract E4026054)
- van Heel, W.H.D. Aquatic mammals: A journal and an association. Aquatic Mammals Historical Perspectives Series 35(3):399–411. (MMC contract E4047339)



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