3. Affected Environment

3.1 Introduction

This chapter describes the environmental and socioeconomic conditions most likely to be affected by the alternatives. The information serves as a baseline from which to identify and evaluate potential impacts from implementation of the alternatives. In compliance with NEPA, CEQ, and NOAA regulations and guidelines, the description of the affected environment focuses on those resource areas that are potentially subject to impacts from the anticipated actions. These resources include:

- Biological resources: protected and sensitive habitats, submerged aquatic vegetation (SAV) and macroalgae, sea turtles, marine mammals, threatened and endangered species, fish, birds, and other wildlife;
- Water and sediment quality;
- Human health and safety;
- Cultural resources; and
- Socioeconomics.

Some environmental resources and conditions that are often analyzed in an EIS have been omitted from this analysis. Effects in the following categories are considered insignificant or irrelevant to the anticipated actions, or impacts from the alternatives are not anticipated:

- ***Air quality:*** Air quality impacts from any individual activity would either be non-existent or minor (such as limited dust or emissions from a vehicle or boat engine). The impacts would be insignificant contributions when compared to impacts from other motor vehicle emissions on highways and roads where MMHSRP activity is occurring, and would not represent a significant contribution to regional air quality. Pathogen spread through treatment or necropsy of sick animals would not be considered air pollution, but is analyzed under human health and safety.
- ***Noise:*** Most MMHSRP activities would not result in the production of noise. One exception would be the use of heavy machinery in response or disposal activities. However, this equipment would produce noise similar to or below levels that are allowed under local ordinances governing normal construction activities, and would be of short duration and extremely localized, and therefore resulting in insignificant impacts.

- ***Land use:*** The activities of the MMHSRP would not involve significant changes in land use or be inconsistent with existing local and regional plans and policies on land use. The land where response activities would occur is not considered suitable for agricultural use or housing development.
- ***Public services and utilities:*** Public services include transportation, police, fire, and other emergency services. Utilities include electric power, gas/steam/oil, telecommunications, water facilities, storm drainage, and sanitary sewer systems. The MMHSRP's activities would not disrupt, damage, or incur any other impact to these areas**.**
- ***Coastal zone management:*** NMFS has determined that the alternatives for the MMHSRP's activities are consistent with the coastal management programs in the affected area. No significant impacts would be expected from these activities.

3.2 Biological Resources

3.2.1 Definition of the Resource

Biological resources include native or naturalized plants and animals, and the habitats in which they exist. Sensitive and protected biological resources include plant and animal species listed as threatened or endangered by NMFS, USFWS, or that are otherwise protected under Federal or state laws. Resources evaluated include protected and sensitive habitats; SAV and macroalgae; sea turtles; fish and shellfish; coastal and marine birds; and marine mammals.

Protected and Sensitive Habitats

Protected and sensitive habitats are usually defined as those areas that are identified as marine sanctuaries, national seashores, critical habitats, coral reefs, national parks, wildlife refuges, national forests, national monuments, estuarine research reserve sites, and fisheries management areas. These particular areas are under Federal jurisdiction and are managed by NMFS, USFWS, the National Park Service (NPS), the National Ocean Service, the Bureau of Land Management (BLM), and the U.S. Forest Service (USFS). Wilderness areas are typically designated within current national parks, national wildlife refuges (NWR), national forests, and national monuments. Jurisdiction over wilderness areas is divided between USFWS, NPS, BLM, and USFS. Sensitive habitats may also be protected under State and local jurisdictions, including protected reserves, parks, beaches, and seashores. Executive Order (EO) 13089, *Coral Reef Protection* requires federal agencies, whose actions may affect U.S. coral reef systems, to identify those actions and ensure that they will not degrade the conditions of such ecosystems. Coral reefs are colonial invertebrates that excrete a

calcium carbonate skeleton. Coral reefs provide habitat to a reef fish and invertebrates, increase biodiversity, and protect shorelines from coastal erosion. Coral reefs support commercial and recreational fishing, boating, scuba diving, and pharmaceutical research.

SAV and Macroalgae

The term SAV refers to rooted, vascular, flowering plants that live and grow below the water surface (Stephan *et al.* 2000). SAV includes seagrasses and macrophytes (aquatic plants not rooted to a substrate). Macroalgae, such as seaweed and kelp, are multicellular algae large enough to be visible to the eye. SAV and macroalgae are among the most productive ecosystems in the world. Both occur in all U.S. coastal waters, with the exception of South Carolina and Georgia, where turbidity and tidal amplitude inhibit SAV growth (Stephan *et al.* 2000). SAV and macroalgae provide food and habitat for a variety of organisms, including important commercial and recreational fisheries species. SAV improves water quality, filters nutrients and contaminants, provides sediment stabilization, and reduces coastal erosion (GMP 2004).

Marine Mammals and Sea Turtles

The mission of NMFS is to manage, conserve, and protect all living marine resources within the U.S. EEZ, including marine mammals and sea turtles. Threatened and endangered marine mammals and sea turtles are protected under the ESA. Fifteen marine mammal species (or stocks of species) within the U.S. are listed under the ESA, and 7 foreign species are listed. Six sea turtle species within the U.S. are listed under the ESA, and 2 foreign species are listed. All marine mammals are protected under the MMPA. Some populations of marine mammals are designated as depleted under the MMPA. Twenty-six species, or stocks of species, have been listed as depleted.

The ESA (16 U.S.C. 1531–1534), administered by NMFS and USFWS, mandates the protection and conservation of threatened and endangered species and the ecosystems on which they depend. Under the ESA, an "endangered species" is defined as any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. "ESA Candidate species" are those that have been petitioned to be listed as threatened or endangered. Critical habitat may also be designated for threatened and endangered species. Critical habitat is defined as specific areas within the geographical area occupied by a species at the time of listing, if the areas contain physical or biological features essential to conservation, and those features may require special management considerations or protection. Specific areas outside the geographical area occupied by the species

may also be designated as critical habitat, if it is determined that the area is essential for conservation. Section 7 of the ESA requires that all Federal agencies consult with NMFS or USFWS, as applicable, before initiating any action that could affect a listed species. Under Section 7, a Federal agency must ensure that any project authorized, funded, or conducted by that agency is "…not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined to be critical." All six species of sea turtles occurring in the U.S. are protected under the ESA. Federal protection of sea turtles is split between NMFS and USFWS. NMFS has the lead responsibility for the conservation and recovery of sea turtles in the marine environment. USFWS has the lead responsibility for sea turtles on nesting beaches.

The MMPA (16 U.S.C. 1361 et seq.) protects all marine mammals, regardless of whether or not they are listed under the ESA. The Secretary of Commerce is responsible for the protection of all cetaceans (whales, porpoises, and dolphins) and pinnipeds (seals and sea lions), except walruses, and has delegated authority for implementing the MMPA to NMFS. The Secretary of the Interior is responsible for the protection of walruses, polar bears, sea otters, manatees, and dugongs, and has delegated this responsibility to the USFWS. These responsibilities include providing oversight and advice to regulatory agencies on all Federal actions that might affect these species. Marine mammals may be designated as "depleted" under the MMPA if the Secretary of Commerce, after consultation with the MMC, determines that the species or population stock is below its optimum sustainable population. Marine mammals that are listed as threatened or endangered under the ESA are also designated as depleted under the MMPA.

The ESA prohibits the "take" of threatened and endangered species, with certain exceptions, within the U.S, in waters under U.S. jurisdiction, and by U.S. citizens on the high seas. Under Section 3 of the ESA, "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Exceptions are permitted for activities that are for scientific purposes or to enhance the propagation or survival of the affected species [Section 10(a)(1)(A)] or for activities where the take would be incidental to an otherwise lawful activity [Section 10(a)(1)(B)]. Permits may be issued after submission, review, and a public comment period of an application and conservation plan, provided that the impacts of the take will be minimized to the maximum extent practicable. The taking must not appreciably reduce the likelihood of the survival and recovery of the species in the wild. Since 1999, the MMSHRP has obtained a 10(a)(1)(A) permit

for directed research and enhancement (including response and rehabilitation) of endangered species (Appendix G).

The MMPA prohibits the "take" of marine mammals, with certain exceptions, in waters under U.S. jurisdiction and by U.S. citizens on the high seas. Under Section 3 of the MMPA, "take" of marine mammals is defined as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." "Harassment" is defined as any act of pursuit, torment, or annoyance that has the potential to injure marine mammal stock in the wild, or that has the potential to disturb a marine mammal or marine mammal stock in the wild by disrupting behavioral patterns, including migration, breathing, nursing, breeding, feeding, and sheltering. The Secretary of Commerce may issue permits which authorize the direct taking of marine mammals for scientific research, importation for public display, and the enhancement of the survival or recovery of a species or stock under Section 104 of the MMPA. Permits may also be issued for photography of marine mammals for educational or commercial purposes. Since 1999, the MMHSRP has obtained an MMPA permit for directed take of marine mammals (Appendix G).

Fish, Shellfish, and EFH

The ESA provides protection for threatened and endangered fish and shellfish species. The ESA allows the listing of distinct population segments (DPS) of threatened and endangered species. NMFS policy stipulates that a salmon population will be considered "distinct" for purposes of the ESA if it represents an Evolutionarily Significant Unit (ESU) of the biological species. To qualify as an ESU, a population (or group of populations) must be (a) reproductively isolated from populations of the same species, and (b) represent an important component in the evolutionary legacy of the species.

Pursuant to Section 303(a) (7) of the Magnuson-Stevens Fishery Conservation and Management Act, regional fishery management councils must identify EFH used by all life history stages of each managed species. EFH is defined as waters and substrate that are necessary to the species for spawning, breeding, feeding, or growth to maturity. EFH that provides extremely important ecological functions or are particularly vulnerable to degradation should be identified as habitat areas of particular concern in order to prioritize conservation efforts. Activities that have been shown to affect EFH include disturbance or destruction of habitat from stationary fishing gear, dredging and filling, agricultural and urban runoff, direct discharge, and the introduction of exotic species. Consultation with NMFS is required if a proposed action permitted, funded, or undertaken by a

Federal agency could adversely affect EFH. When a Federal agency determines that an action may adversely affect EFH, the agency must initiate consultation with NMFS. The Federal agency must submit to NMFS an EFH assessment containing "a description of the action; an analysis of the potential adverse effects of the action on EFH and the managed species; the federal agency's conclusions regarding the effects of the action on EFH; and proposed mitigation, if applicable." For this PEIS, consultation with NMFS was initiated on June 22, 2006. An EFH Assessment was completed in March 2008. The consultation determined that impacts to EFH would not be expected to occur, with mitigation, as a result of the Proposed Actions and alternatives; therefore EFH will not be discussed further.

Coastal and Marine Birds

The ESA provides protection for threatened and endangered bird species. The Migratory Bird Treaty Act and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, provide protection for all migrating bird populations. Under these regulations, NMFS is required to analyze the potential impacts its actions may have on threatened, endangered, and migratory birds.

3.2.2 Affected Environment

3.2.2.1 Protected and Sensitive Habitats

Atlantic Coast federally protected and sensitive habitats include 14 National Estuarine Research Reserves (NERRs), 69 National Wildlife Refuges (NWRs), 5 National Marine Sanctuaries (NMSs), 5 national parks, 8 national seashores, 10 wilderness areas, and 1 ecological preserve (DOC/NOAA and DOI 2006, Wilderness.net 2006). Critical habitat has been designated for the North Atlantic right whale (*Eubalaena glacialis*), West Indian manatee, piping plover (*Charadrius melodus*), yellow-shouldered blackbird (*Agelaius xanthomus*), green sea turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), hawksbill sea turtle (*Eretmochelys imbricata*), and Johnson's seagrass (*Halophila johnsonii*) (Appendix E, Table E-1).

There are 39 designated coral reefs ranging from the southern tip of South Carolina to the Upper Florida Keys. Gray's Reef, located off of Sapelo Island, GA, is one of the largest nearshore live-bottom reefs in the southeastern U.S. Fifty-four coral reefs are located within Puerto Rico and the U.S. Virgin Islands. The staghorn coral (*Acropora cervicornis*) and elkhorn coral (*Acropora palmata*) are the first coral species to be listed as threatened under the ESA (Appendix E, Table E-5). These corals are the dominant reef building species and occur through out Florida, the Bahamas, and the Caribbean. Elkhorn and staghorn coral are found in shallow water reefs in high energy zones. In

the action area, the corals occur in the Florida Keys, Puerto Rico, and the U.S. Virgin Islands. Current threats to the species are pollution, excess nutrients, pathogens, climate change, and overfishing (NMFS 2006a).

Gulf of Mexico federally protected and sensitive habitats include 5 NERRs, 32 NWRs, 1 NMS, 1 national park, 2 national seashores, and 7 wilderness areas (DOC/NOAA and DOI 2006, Wilderness.net 2006). Critical habitat has been designated for the West Indian manatee, Gulf sturgeon (*Acipenser oxyrhynchus desotoi*), and whooping crane (*Grus americana*). Thirty-two coral reefs are located in the Gulf of Mexico, including the Florida Middle Grounds and the Flower Garden Banks, the northernmost coral reefs in North America (Appendix E, Table E-2).

Pacific Coast federally protected and sensitive habitats include 6 NERRs, 34 NWRs, 5 NMSs, 1 national seashore, 2 national parks, 5 national monuments, 5 national forests, 34 wilderness areas, and 1 Steller sea lion conservation area (DOC/NOAA and DOI 2006, Wilderness.net 2006). Critical habitat has been designated for the following species: Steller sea lion, North Pacific right whale, Southern Resident killer whale DPS, tidewater goby (*Eucyclogobius newberryi*), Western snowy plover (*Charadrius alexandrinus nivosus*), Coastal California gnatcatcher (*Polioptila californica californica*), spectacled eider (*Somateria fischeri*), Steller's eider (*Polysticta stelleri*), marbled murrelet (*Brachyramphus marmoratus marmoratus*), three coho salmon (*Oncorhynchus kisutch*) ESUs, five chinook salmon (*Oncorhynchus tshawytscha*) ESUs, two chum salmon (*Oncorhynchus keta*) ESUs, and four steelhead (*Oncorhynchus mykiss*) ESUs (Appendix E, Table E-3).

Pacific Islands federally protected and sensitive habitats include Hawaiian monk seal critical habitat, four NWRs, two NMSs, one national park, and one wilderness area (DOC/NOAA and DOI 2006, Wilderness.net 2006). The Northwestern Hawaiian Islands Marine National Monument was established in June 2006. The monument encompasses the healthiest and most undisturbed coral reef ecosystem in the U.S. and contains many rare, threatened, and endangered species. Three new marine national monuments will be established in 2009 in the Pacific Islands: the Marianas Trench, Pacific Remote Islands, and Rose Atoll Marine National Monuments. Two territorially protected marine sanctuaries are located in CNMI (Appendix E, Table E-4).

3.2.2.2 SAV and Macroalgae

From Maine to Virginia, eelgrass (*Zostera marina*) is the dominant SAV species, and co-occurs with widgeon grass (*Ruppia maritima*). In North Carolina, Cuban shoalgrass (*Haludule wrightii*) and eelgrass are the dominant SAV species. No SAV occurs in South Carolina and Georgia. In Florida,

dominant species of SAV include Cuban shoalgrass, turtlegrass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and several species of *Halophila* (Stephan *et al.* 2000). Johnson's seagrass is a threatened species found along the east coast of Florida, from central Biscayne Bay to Sebastian Inlet. Critical habitat for Johnson's seagrass has been designated in the Indian River Lagoon and Biscayne Bay, FL (Appendix E, Table E-5). Macroalgae species on the Atlantic Coast include sea lettuce (*Ulva lactuca*) and rockweed (*Fucus spp.*). On the Atlantic coast, SAV loss was reported in 23 of the 62 estuaries surveyed in NOAA's National Estuarine Eutrophication Assessment. Severe SAV loss is occurring in the main stem of the Chesapeake Bay, Tangier/Pocomoke Sounds (MD), Patuxent River (MD), Choptank River (MD), and Gardiners Bay (NY). No severe SAV loss was found in the South Atlantic (North Carolina to Florida) (Bricker *et al.* 1999).

In the Gulf of Mexico, six common SAV species include Cuban shoalgrass, turtlegrass, manatee grass, widgeon grass, paddle grass (*Halophila decipensi*), and star grass (*Halophila engelmannii*) (GMP 2004). Macroalgae species include Sargassum (*Sargassum fluitans*), forked sea tumbleweed (*Dictyota bartaryresii*), and watercress alga (*Halimeda opuntia*) (NMS 2005). SAV loss was reported in 18 of the 38 estuaries surveyed in NOAA's National Estuarine Eutrophication Assessment. Severe SAV loss is occurring in Lake Pontchartrain, LA and Galveston Bay, TX (Bricker *et al.* 1999).

Common SAV species on the Pacific Coast include eelgrass, surfgrass (*Phyllospadix serrulatus*), and pickelweed (*Salicornia virginica*) (NOAA CSC 2001). Macroalgae species include giant kelp (*Macrocystis pyrifera*), golden rockweed (*Silvetia compressa*), bull kelp (*Nereocystis leutkeana*), rockweed (*Fucus sp.*), and sea lettuce (NMS 2005, OCNMS 2004). An invasive alga, *Caulerpa taxifolia*, has been found in California coastal waters. SAV loss was reported in 8 of the 39 estuaries surveyed in NOAA's National Estuarine Eutrophication Assessment. Severe SAV loss is occurring in Morro Bay and San Francisco Bay, CA (Bricker *et al.* 1999).

In the Pacific Islands, common SAV species include paddle grass, Hawaiian paddle grass (*Halophila hawaiiana*), *Halophila minor*, and *Halophila ovalis* (NOAA CSC 2001). Macroalgae species include *Stypopodium flabelliforme*, *Halitheda opuntia*, *Caulerpa webbiana*, and *Padina australis* (NMS 2005). Seagrass beds provide important foraging grounds for green, olive ridley, and loggerhead sea turtles. Six invasive species of macroalgae occur in Hawaii: *Acanthophora spicifera*, *Hypnea musciformis*, *Kappaphycus* spp., *Eucheuma denticulatum*, *Avrainvillea amadelpha*, and *Gracilaria salicornia*. These species are spreading and competing with native marine flora and fauna (Puttock *et al.* undated).

3.2.2.3 Sea Turtles

Six species of sea turtles have the potential to occur on the Atlantic Coast. Threatened species include the loggerhead (*Caretta caretta*), green, and olive ridley (*Lepidochelys olivacea*) sea turtles. Olive ridley sea turtle occurrences are rare but have been recorded in Puerto Rico, southern Florida, and the Grand Banks. Endangered species include Kemp's ridley (*Lepidochelys kempii*), leatherback, and hawksbill sea turtles. Hawksbill sea turtles commonly occur in southern Florida, Puerto Rico, the Virgin Islands, and the northern Gulf of Mexico, and have also been documented as far north as Massachusetts. The Florida breeding population of green sea turtles is also listed as endangered (Appendix E, Table E-6). Critical habitat for the green sea turtle is designated in waters extending seaward 3 nautical miles from the mean high water line of the Culebra Islands in Puerto Rico (50 CFR 226.208). Critical habitat for the hawksbill sea turtle is designated in waters extending seaward 3 nautical miles from the mean high water line of Isla Mona and Monito Island, Puerto Rico (50 CFR 226.209). Critical habitat for the leatherback is designated off Sandy Point on St. Croix Island in the Caribbean and around southwest Cape Point.

Four species of sea turtles have the potential to occur on the Pacific Coast. Threatened species include the green, olive ridley, and loggerhead sea turtles. Endangered species include the leatherback sea turtle and the green sea turtle breeding population found on the Pacific coast of Mexico. The East Pacific green turtle, or "black turtle," may be referred to as *Chelonia mydas agassizii*. No sea turtles nest on the Pacific Coast of the U.S.; the closest nesting beaches are in Baja California, Mexico. However, all five species have been recorded in U.S. waters and have been found stranded on the coast. Foraging and short-term inter-breeding residency has been recorded for green turtles in San Diego and leatherbacks in central and northern California. Green sea turtles occasionally occur in Alaska and have been found in southern Alaskan waters. Olive ridley sea turtles occurrences are rare in Oregon, Washington, and Alaska, but have been recorded (Hodge 2001). Loggerheads in Alaska are a rare occurrence and leatherbacks have been found in the Bering Sea (Appendix E, Table E-6).

Five species of sea turtles have the potential to occur in the Pacific Islands. Threatened species include the green, loggerhead, and olive ridley sea turtles. Endangered species include the leatherback and hawksbill sea turtles (Appendix E, Table E-6).

3.2.2.4 Fish and Shellfish

Three species of endangered fish occur on the Atlantic Coast: the Atlantic salmon (*Salmo salar*), the shortnose sturgeon (*Acipenser brevirostrum*), and the smalltooth sawfish (*Pristis pectinata*) (Appendix E, Table E-7). Atlantic salmon are a DPS located in the Gulf of Maine. Atlantic salmon in Maine outside of the range of the Gulf of Maine DPS have been proposed for listing as endangered. The shortnose sturgeon occurs throughout the Atlantic Coast and the smalltooth sawfish occurs from North Carolina to Florida. There is no critical habitat designated for these species on the Atlantic Coast, but critical habitat has been proposed for the Gulf of Maine Atlantic salmon DPS. Commercial and recreational fisheries are managed by the states; the New England, Mid-Atlantic, South Atlantic, and Caribbean Fishery Management Councils; and NMFS. Important commercial, recreational, and/or ecological species include sand lance (*Ammodytes hexapterus*), bay anchovy (*Anchoa mitchilli*), Atlantic croaker (*Micropongonia undulatus*), Atlantic menhaden (*Brevoortia tyrannus*), American shad (*Alosa sapidissima*), and striped bass (*Morone saxatilis*). Shellfish species include blue crab (*Calinectes sapidus*), Atlantic oyster (*Crassostrea virginica*), and hard clams (*Mercenaria mercenaria*) (CIMS 2006).

In the Gulf of Mexico, Gulf sturgeon is threatened and the smalltooth sawfish is endangered (Appendix E, Table E-8). Critical habitat has been designated for Gulf sturgeon in the Pensacola Bay system, Santa Rosa Sound, Mississippi Sound/Pascagoula Bay system, Choctawhatchee Bay system, Apalachicola Bay system, and Suwanee Sound (USFWS 2003). Critical habitat has been proposed for smalltooth sawfish along the southwestern coast of Florida. Commercial and recreational fisheries in the Gulf of Mexico are managed by the states, the Gulf of Mexico Fishery Management Council, and NMFS. Important commercial, recreational, and/or ecological species include Gulf menhaden (*Brevoortia patronis*), red drum (*Sciaenops ocellatus*), striped mullet (*Mugil cephalus*), and anchovy. Shellfish species include blue crab, stone crab (*Menippe mercenaria*), and penaeid shrimp.

Protected shellfish and fish species that occur throughout the West Coast (excluding Alaska) include coho salmon (threatened and endangered), chinook salmon (threatened and endangered), sockeye salmon (*Oncorhynchus nerka*) (threatened and endangered), chum salmon (*Oncorhynchus keta)* (threatened), and steelhead (threatened, endangered, and candidate). The southern DPS of green sturgeon (*Acipenser medirostris*) is listed as threatened in California. Two endangered species that only occur in California are the white abalone (*Haliostis sorenseni*) and the tidewater goby. Critical habitat has been designated for the tidewater goby and includes 10 coastal stream segments in Orange and San Diego counties, California (Appendix E, Table E-9). Critical habitat includes the stream

channels and their associated wetlands, floodplains, and estuaries (65 FR 69693–69717). There are no threatened or endangered fish species in Alaska.

On the Pacific coast, the Southern Oregon/Northern California Coasts coho ESU and the Oregon Coast coho ESU are threatened. The Central California Coast coho ESU is endangered. Critical habitat has been designated for each of these coho ESUs. Four ESUs of chinook salmon are threatened and have critical habitat: the California Coastal ESU, the Central Valley spring-run ESU, the Lower Columbia River ESU, and the Puget Sound ESU. The Sacramento River winter-run ESU of chinook salmon is endangered and critical habitat has been designated for this ESU. Two ESUs of chum salmon are threatened and have critical habitat: Hood Canal summer-run ESU and the Columbia River ESU. Three ESUs of steelhead are threatened and have critical habitat: the Northern California ESU, the Central California ESU, and the South-Central California Coast ESU. The Southern California ESU of steelhead is endangered and has designated critical habitat. Threatened chinook salmon ESUs that could be incidentally harvested in Alaska include the Snake River fall-run ESU, Upper Willamette River ESU, Puget Sound ESU, and the Lower Columbia River ESU (NMFS 2005).

Commercial and recreational fisheries on the West Coast are managed by the states, the Pacific Fishery Management Council, the North Pacific Fishery Management Council, and NMFS. Important commercial, recreational, ecological, and/or subsistence species include salmon, California halibut (*Paralichthys californicus*), white croaker (*Genyonemus lineatus*), Pacific herring (*Clupea harengus pallasi*), Atka mackerel (*Pleurogrammus monopterygiusi*) and Pacific cod (*Gadus macrocephalus*) (CDFG 2001, WDFW 1997, WDFW 2006). Important shellfish species include Dungeness crab (*Cancer magister*), Pacific razor clam (*Siliqua patula*), geoduck clam (*Panopea abrupta*), king crab (*Paralithodes spp.*), and Tanner crab (*Chionoecetes bairdi*) (ADFG 2006).

No threatened or endangered species of fish occur in the Pacific Islands. Commercial and recreational fisheries are managed by the State of Hawaii, U.S. Territories, the Western Pacific Fishery Management Council, and NMFS. Important commercial, recreational, and/or ecological species include albacore tuna (*Thunnus alalunga*), skipjack tuna (*Katsuwonus pelamis*), wahoo (*Acanthocybium solanchi*), wrasses (*Labridae*), jacks (*Carangidae*), and blue marlin (*Makaira nigricans*) (NMFS 2005).

3.2.2.5 Coastal and Marine Birds

Threatened species on the U.S. Atlantic Coast include the bald eagle (*Haliaeetus leucocephalus*) and piping plover. Critical habitat for wintering populations of piping plovers has been designated along the coastal shoreline of North Carolina and south along the eastern coast of the U.S. to the Gulf of Mexico. The wood stork (*Mycteria americana*) is endangered from South Carolina to Florida. The yellow-shouldered blackbird is listed as endangered only in Puerto Rico. Critical habitat for the yellow-shouldered blackbird has been designated on the main island of Puerto Rico and on Isla Mona. The roseate tern (*Sterna dougallii dougallii*) is endangered from Maine to North Carolina. The Caribbean population of the roseate tern is threatened in Florida, Puerto Rico, and the Virgin Islands. A non-essential population of whooping cranes is located from Virginia to Florida. Individuals of the population are treated as threatened if they occur in a NWR or national park. (Appendix E, Table E-10). Seabirds, shorebirds, wading birds, and waterfowl using the Atlantic Flyway migrate through or nest on the Atlantic coast. Species include the great blue heron (*Ardea herodius*), snowy egret (*Egretta thula*), osprey (*Pandion haliaetus*), great cormorant (*Phalacrocorax carbo*), red knot (*Calidris canutus*), and whimbrel (*Numenious phaeopus*) (Clark and Niles 2000).

Threatened species in the Gulf of Mexico include the bald eagle and piping plover. Piping plover critical habitat has been designated along the coastal shoreline of the Gulf Coast, from Texas to Florida. The whooping crane is only listed as endangered in Texas and critical habitat has been designated along the Texas Gulf Coast. The brown pelican (*Pelecanus occidentalis*) is endangered in Texas, Louisiana, and Mississippi. The wood stork is only endangered in Alabama (Appendix E, Table E-11). The Mississippi and Central Flyways pass through the Gulf of Mexico. Species that migrate through or nest on the coast include the snowy egret, great blue heron, gull-billed tern (*Sterna nilotica*), sanderling (*Calidris alba*), and American oystercatcher (*Haematopus palliates*) (Hunter *et al.* 2002, Elliott and McKnight 2000).

Threatened species found from California to Alaska include the bald eagle, marbled murrelet, and the western snowy plover (Appendix E, Table E-12). Critical habitat for the western snowy plover has been designated in California, Oregon, and Washington. Critical habitat for the marbled murrelet has been designated in Alaska. Other threatened species found in California include the Coastal California gnatcatcher and the San Clemente sage sparrow (*Amphispiza belli clementeae*). Critical habitat for the Coastal California gnatcatcher has been designated in along the southern California coast.

Endangered species on the entire West Coast include the short-tailed albatross (*Phoebastria albatrus*) and Alaska breeding population of Steller's eider (Appendix E, Table E-12). Occurrences of Steller's eider in California, Oregon, and Washington are rare or accidental. Critical habitat for the Steller's eider has been designated in Alaska. The endangered brown pelican is found in California, Oregon, and Washington. Endangered species only found in California include the California clapper rail (*Rallus longirostris obsoletus*), light-footed clapper rail (*Rallus longirostris levipes*), San Clemente loggerhead shrike (*Lanius ludovicianus mearnsi*), and California least tern (*Sterna antillarum browni*). The California condor (*Gymnogyps californianus*) is an endangered species that has recently been reintroduced in Southern California and may be found along the coast. In Alaska, the spectacled eider is endangered and critical habitat has been designated.

The Pacific Flyway passes through the U.S. Pacific Coast. Species include the royal tern (*Sterna maxima*), common murre (*Uria aalge*), snowy egret, Caspian tern (*Sterna caspia*), black-crowned night heron (*Nycticorax nycticorax*), and the sooty shearwater (*Puffinus griseus*) (Hickey *et al.* 2003, USFWS 2005, ADFG 2005).

Eleven endangered coastal and marine bird species are found in the Pacific Islands area: the short-tailed albatross, Hawaiian coot (*Fulica Americana alai*), Hawaiian duck (*Anas wyvilliana*), laysan duck (*Anas laysanensis*), laysan finch (*Telespyza cantans*), nihoa finch (*Telespyza ultima*), Hawaiian dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*), Newell's Townsend's shearwater (*Puffinus auricularis newelli*), Hawaiian stilt (*Himantopus mexicanus knudseni*), Guam bridled white-eye (*Zosterops conspicillatus conspicillatus*), and Mariana crow (*Corvus kubaryii*) (Appendix E, Table E-13). No critical habitat has been designated for these bird species.

A variety of birds inhabit the region including geese, ducks, coots, rails, waders, and gulls. Species include the Hawaiian goose (*Branta sandvicensis*), Tahiti petrel (*Pterodroma rostrata*), black-crowned night-heron, pacific-golden plover (*Pluvialis fulva*), and red-footed booby (*Sula sula*) (HAS 2002, USFWS 2005).

3.2.2.6 Marine Mammals

Most marine mammal species are wide-ranging and have been reported stranded in all NMFS regions. Populations of some species such as large whales, pinnipeds, and some small cetaceans routinely cross regional boundaries. Other marine mammals are considered resident, staying to a relatively localized area.

Animals that strand live may be immediately released, transferred to a rehabilitation facility, euthanized, or die naturally. Animals in rehabilitation may be released, sent to a public display or research facility (if deemed nonreleasable), euthanized, or they may die naturally. Significantly more pinnipeds strand each year than cetaceans. Figure 3-1 shows the total number of strandings (dead and live) nationwide from 2001-2006. The majority of stranded pinnipeds are alive when first reported, and up to 50 percent of the rehabilitated seals and sea lions are released back into the environment. The majority of cetaceans strand dead. Of the live-stranded small cetaceans, few are taken into a rehabilitation facility and very few are released. Only one mysticete has ever been rehabilitated in the U.S. – a juvenile gray whale (*Eschrichtius robustus*) in the Southwest Region. Figures 3-2 and 3-3 summarize nationwide pinniped and cetacean strandings, respectively, from 2001-2006. Released animals are those that were taken into a rehabilitation facility and released after treatment.

In this section, descriptions of the marine mammals that may occur in each NMFS region are presented, along with an overview of stranding information, including trends in strandings by numbers, species and seasonality, mass strandings, and UMEs.

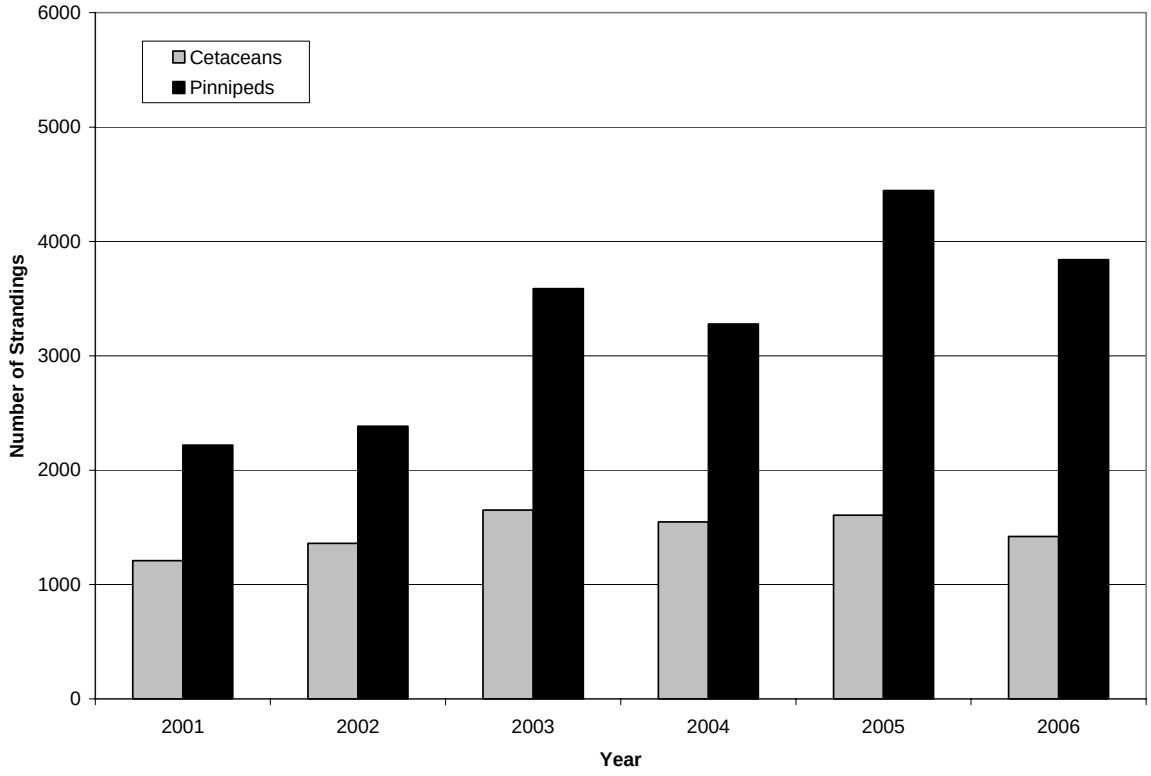


Figure 3-1. Nationwide Stranding Summary 2001-2006

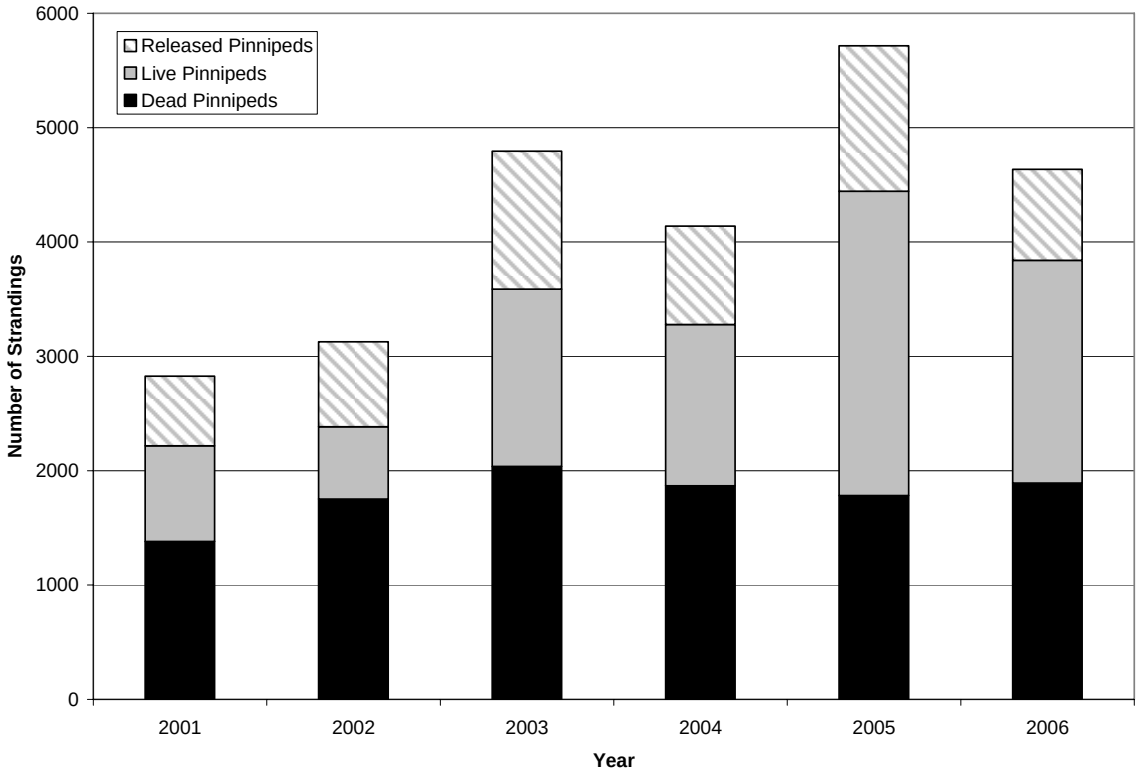


Figure 3-2. Pinniped Strandings Nationwide 2001-2006

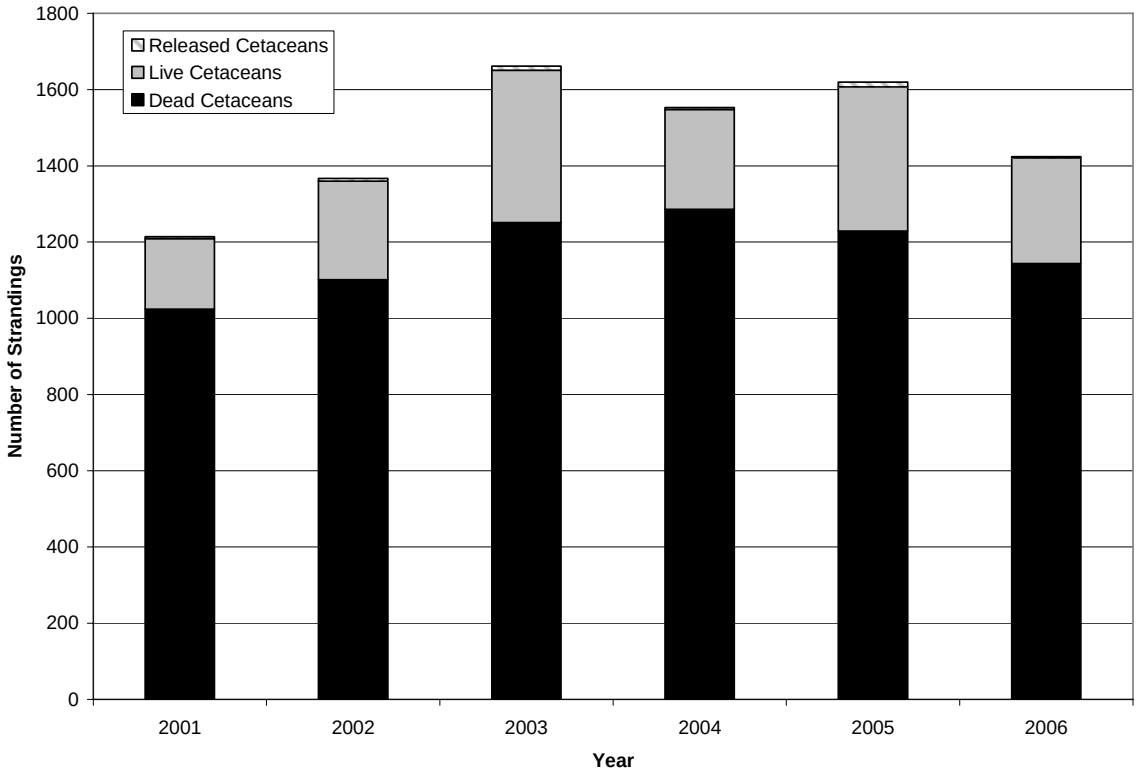


Figure 3-3. Cetacean Strandings Nationwide 2001-2006

NMFS Northeast Region. Thirty-eight species of marine mammals have the potential to occur in the Northeast Region (Appendix E, Table E-14) (Geraci and Lounsbury 2005). Six of these species are listed as endangered: the North Atlantic right whale, humpback whale, fin whale, blue whale, sei whale, and sperm whale. All threatened and endangered marine mammal species are listed as depleted under the MMPA. The Western North Atlantic coastal migratory stock of bottlenose dolphins, which range from New Jersey to Florida, are also listed as depleted under the MMPA. Critical habitat for the right whale is designated within this region in portions of Cape Cod Bay, Stellwagen Bank, and the Great South Channel off the coast of Massachusetts (59 FR 28793-28834).

The most commonly stranded pinniped species in the Northeast Region are harbor seals (*Phoca vitulina*), harp seals (*Phoca groenlandica*), hooded seals (*Cystophora cristata*), and gray seals (*Halichoerys grypus*). The number of stranded pinnipeds and particularly the ice seals (harp, hooded and gray seals) has been increasing in recent years. This is believed to be due to growth in the overall Northeast pinniped populations. Figure 3-4 depicts the number of reported pinniped strandings in the Northeast Region from 2001-2006. Twelve pinnipeds were placed in public display facilities from 2001-2006.

The most commonly stranded cetacean species in the Northeast Region are bottlenose dolphins, harbor porpoises (*Phocoena phocoena*), Atlantic white-sided dolphins (*Lagenorhynchus acutus*), common dolphins (*Delphinus delphis*), pilot whales (*Globicephala melas* and *G. macrorhynchus*), and minke whales. Other less common strandings include striped dolphins (*Stenella coeruleoalba*), Risso's dolphins, pygmy sperm whales (*Kogia breviceps*), dwarf sperm whales (*Kogia sima*), sperm whales, killer whales, humpback whales, right whales, and fin whales. Many of the large whale carcasses are discovered floating many miles offshore by aerial survey and fishery spotter planes, and never land on the beach unless towed in by the stranding network for sampling. Figure 3-5 shows cetacean strandings in the Northeast Region from 2001-2006. Two cetaceans were placed in public display facilities from 2001-2006.

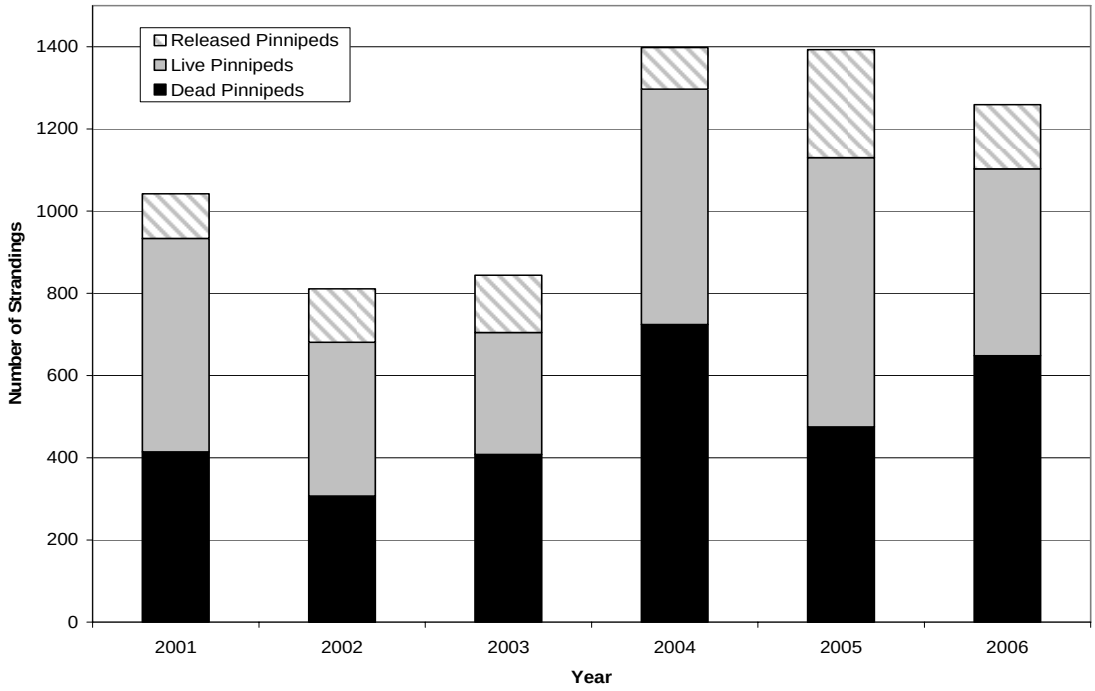


Figure 3-4. Northeast Region Pinniped Strandings 2001-2006

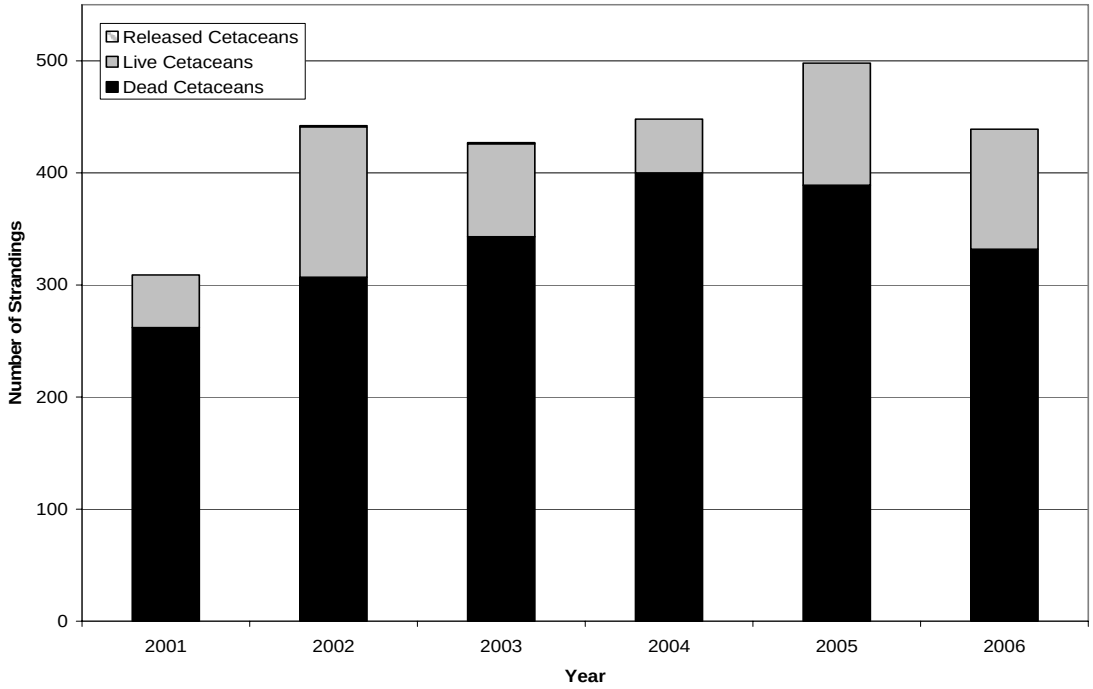


Figure 3-5. Northeast Region Cetacean Strandings 2001-2006

Mass Strandings. The Northeast Region, particularly Cape Cod, MA, has one of the highest incidences of live single and mass strandings of small cetaceans in the U.S. Mass strandings occur an average of once per year on Cape Cod and 6 to 10 live cetacean stranding events (single or mass strandings) occur annually in the Northeast Region, most often in the winter. Each event may involve single or multiple animals, resulting in the large proportion of live strandings in Figure 3-5.

Human Interactions. Approximately 25 fisheries interactions are documented annually. Bottlenose dolphins and harbor porpoise are the small cetaceans most frequently impacted by human interactions, primarily fishery interactions. Large whales also show evidence of fishery and other human interactions. Approximately 61.6 percent of the overall right whale population shows physical evidence of entanglements (such as scars) and between 10 to 28 percent experience entanglement each year (Hamilton *et al.* 1998, Knowlton *et al.* 2001). According to the 2003 Stock Assessment, 60 percent of right whale mortalities and serious injuries reported from 1997 to 2001 resulted from entanglements or fishery interactions (NMFS 2003). This number increased to approximately 69 percent from 1999 to 2003 (NMFS 2005b). Disentanglement activity reports to the MMHSRP have verified entanglements of right, humpback, fin, and minke whales. Ship strikes of right whales have also been documented in the region. More than half (56 percent) of the recorded right whale ship strikes from 1975 to 2002 occurred off the coasts of the Northeast U.S. and Canada, and the mid-Atlantic area accounted for 22 percent (Jensen and Silber 2003). Six confirmed ship strikes of Gulf of Maine humpback whales and eight confirmed ship strikes of Western North Atlantic fin whales occurred from 2001 to 2005 in the Northeast Region (Nelson *et al.* 2007). Ship strikes have also been documented for sperm, sei, blue, and minke whales (Jensen and Silber 2003).

Temporal Changes. Stranding patterns vary temporally as marine mammal distribution changes with the seasons. In the spring, strandings of gray seal pups and harbor porpoise are common, as well as mass strandings of small cetaceans. Harbor seal pups, bottlenose dolphins, and large whale strandings are common in summer. Ship strikes and entanglements are frequent in summer. Fall strandings may include marine mammals in out of habitat situations. Common strandings in winter include juvenile ice seals, as they fail to forage successfully. Ice seal populations have also been increasing in Canada, leading to increasing numbers of animals in U.S. waters.

Marine Mammal Population Changes. The North Atlantic right whale population continues to be depleted and has not shown any signs of recovery. The best estimate of the size of the North Atlantic right whale population is a range of 300 to 350. Although other population size estimates are available, the most recent Stock Assessment Report (Waring *et al.* 2007) indicates that the best

estimate minimum population size for the species is 313 individually-recognized whales known to be alive in 2002. Recent models indicate that this population is likely declining, rather than remaining static or increasing (Caswell *et al.* 1999). Recent abundance estimates of the humpback whale Gulf of Maine stock indicated a continued increase in population growth. However, the size of the humpback whale stock may be below the Optimum Sustainable Population (OSP) in the U.S. EEZ. Populations of gray, harp, hooded, and harbor seals are likely increasing in the U.S. EEZ (Waring *et al.* 2007).

UMEs. Table 3-1 describes the UMEs that have occurred in the Northeast Region from 1991 to April 2008. The 2006-2007 pinniped UME was declared after morbillivirus was found in several pinnipeds in rehabilitation, and later detected from carcasses. *Morbillivirus* is the highly contagious and lethal genus of virus (Family Paramyxoviridae) that has been responsible for more significant marine mammal die-offs due to infectious disease than any other pathogen to date. These *Morbillivirus* die-offs include several seal epizootics in Northern Europe and Russia involving tens of thousands of seals, and dolphin mortalities in the Mediterranean Sea and along the U.S. Atlantic and Gulf of Mexico coasts. In April 2008, a UME was declared in for offshore delphinids in the Mid-Atlantic.

Table 3-1. UMEs in the Northeast Region, 1991-2008

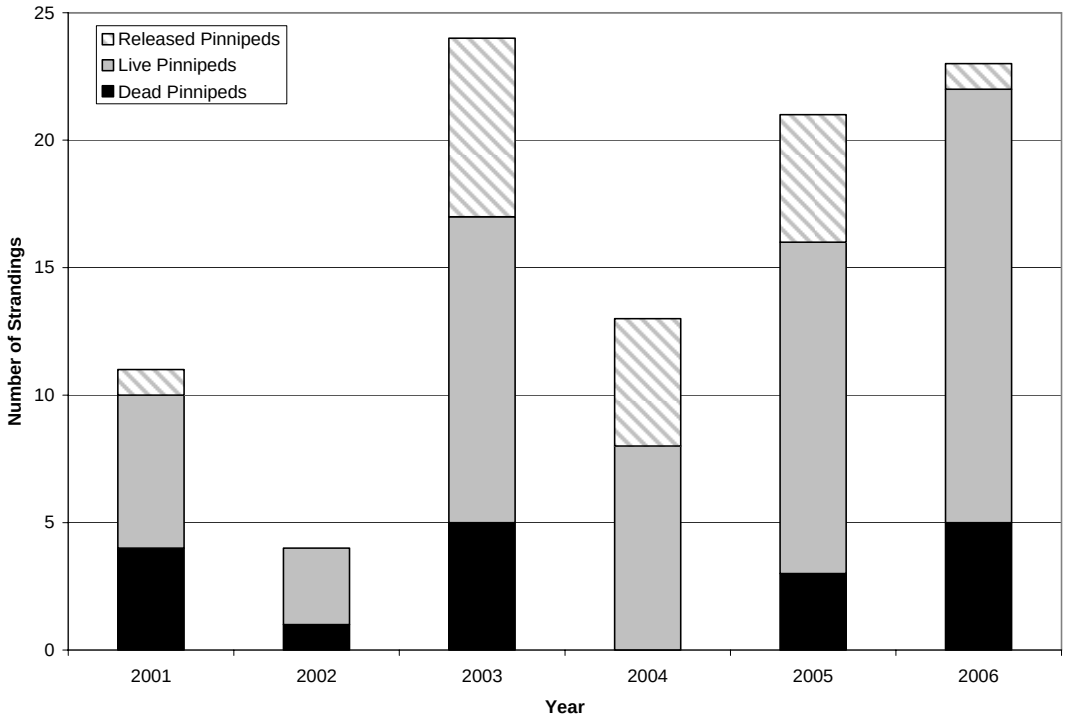
Year	Species	Location	Cause	Numbers of Animals
1991	Harbor seals	New York	possible erysipelas	24
1992	Phocids	New England	infectious disease	24
2003	Large whales (primarily humpback whales)	Gulf of Maine	domoic acid (suspected)	21
2003	Harbor seals and minke whales	Maine	undetermined (results pending)	21 minke whales, 42 harbor seals
2004	Small cetaceans	Virginia	undetermined	67
2005	Large whales	North Atlantic	undetermined	~34
2006-2007	Humpback whales	North Atlantic	undetermined, UME has not been closed	48
2006-2007	Pinnipeds	North Atlantic	morbillivirus	>1000 (harbor, gray, harp, and hooded seals)
2008	Offshore delphinids (primarily common and Atlantic white-sided dolphins)	Mid-Atlantic	undetermined	35

Reference: NMFS 2008b

NMFS Southeast Region. Thirty-two species of marine mammals have been reported in the Southeast Region (Appendix E, Table E-15) (Geraci and Lounsbury 2005). Six of these species are listed as endangered: the West Indian manatee, North Atlantic right whale, humpback whale, blue whale, sei whale, and sperm whale. All threatened and endangered marine mammal species are also listed as depleted under the MMPA. The Western North Atlantic coastal migratory stock of bottlenose dolphins are also listed as depleted under the MMPA. Critical habitat for the right whale is designated from the shoreline between the mouth of the Altamaha River, Georgia, to the Sebastian River Inlet, Florida, seaward to 15 nautical miles (59 FR 28793-28834). Critical habitat for the West Indian manatee is designated within several watersheds along the east and west coast of Florida (42 FR 47840–47845).

The most commonly stranded pinniped species in the Southeast Region are harbor seals, representing over 90 percent of stranded pinnipeds. The majority (80 percent) of these strandings are immediately released back into the water. Other pinnipeds that strand in the Southeast Region include small numbers of hooded, harp, and gray seals. Recently there has been an increase in strandings of these seal species, many of them in the Caribbean. Figure 3-6 depicts the number of reported pinniped strandings in the Southeast Region from 2001-2004. Ten pinnipeds were placed in public display facilities from 2001-2006.

The Southeast region currently has the most stranded cetaceans of any region, and a variety of taxa are represented (an average of 17 species of odontocetes annually). The most commonly stranded species in the Southeast region are bottlenose dolphins, pygmy sperm whales, dwarf sperm whales, and harbor porpoise. Other cetaceans that strand regularly, but in smaller numbers overall include: striped dolphins, spinner dolphins (*Stenella longirostris*), Atlantic spotted dolphins (*Stenella frontalis*), pantropical spotted dolphins (*Stenella attenuata*), Fraser's dolphin (*Lagenodelphis hosei*), Risso's dolphin, rough-toothed dolphin, melon-headed whales (*Peponocephala electra*), pilot whales, and several beaked whale species. Of mysticetes, the North Atlantic right whale is the most common mysticete to strand. On average, approximately three stranded right whales are reported each year in the Southeast Region. Other mysticetes that strand in the Southeast Region include humpback whales, minke whales, and rarely Bryde's whales (*Balaenoptera edeni*) and sei whales. Figure 3-7 depicts the number of reported cetacean strandings in the Southeast Region from 2001-2006. Nineteen cetaceans were placed in public display facilities from 2001-2006.



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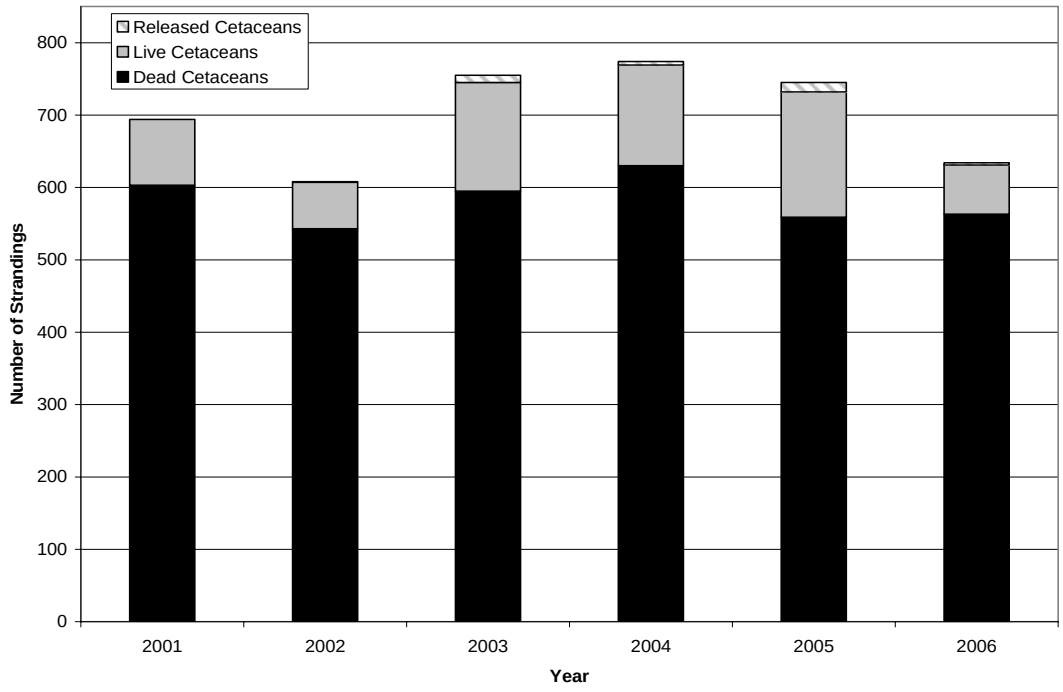
2 **Figure 3-6. Southeast Region Pinniped Strandings 2001-2006**



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4 **Figure 3-7. Southeast Region Cetacean Strandings 2001-2006**

Mass Strandings. Mass strandings occur frequently in the Southeast Region. The majority of mass strandings are either pilot whales or rough-toothed dolphins. Other species that have mass stranded include bottlenose dolphins, Fraser's dolphins, striped dolphins, and pantropical spotted dolphins.

Human Interactions. Human interactions accounted for 12 percent of the total number of strandings from 2001-2004. Of these, seven percent are fishery interactions including crab pot and recreational hook and line, and the remaining five percent of human-related mortality included boat strikes, gun shot wounds, and plastic ingestion. Documented human interactions with odontocetes are primarily fisheries interactions, although ship strikes do occur. Documented human interactions with mysticetes include entanglements and ship strikes. Reported right whale strandings have been associated with entanglements and boat strikes more often than other causes. Right whale entanglements are described above under the NMFS Northeast Region section. Three humpback whales, one fin whale, and one Bryde's whale were confirmed entangled in the Southeast Region from 2001 to 2005 (Nelson *et al.* 2007). Twenty-two percent of the recorded right whale ship strikes from 1975 to 2002 occurred off the coast of the Southeast area (Jensen and Silber 2003). Two confirmed ship strikes of Gulf of Maine humpback whales have also occurred in the Southeast Region from 2001 to 2005 (Nelson *et al.* 2007).

Temporal Changes. Seasonal peaks are seen in many species in the Southeast Region, and are generally related to migratory patterns, calving seasons, environmental conditions (including water temperature and harmful algal blooms) and fishery activities. For example, bottlenose dolphin strandings generally occur in the spring and summer in the more southern parts of the region, and in the spring and fall towards the north. Right whale and humpback whale strandings are most common in the southern component of their home range from November through April.

Marine Mammal Population Changes. Population changes to North Atlantic right whales and Gulf of Maine humpbacks are the same as those listed for the Northeast Region. The West Indian manatee population trends are poorly known. However, based upon a carcass recovery program in Florida, manatee deaths have increased by an average of 5.9 percent per year from 1976 through 1992.

UMEs. Table 3-2 describes the UMEs that have occurred in the Southeast Region as from 1991 to April 2008.

Table 3-2. UMEs in the Southeast Region, 1991-2008

Year	Species	Location	Cause	Numbers of Animals
1991	Bottlenose dolphins	Florida (Sarasota)	undetermined	30
1992	Bottlenose dolphins	Texas	undetermined	220
1994	Bottlenose dolphins	Texas	morbillivirus	72
1996	Right whales	Florida, Georgia	human interaction	6
1996	Manatees	Florida (West Coast)	brevetoxin	149
1996	Bottlenose dolphins	Mississippi	undetermined	30
1999-2000	Bottlenose dolphins	Florida (Panhandle)	brevetoxin	115
2001	Bottlenose dolphins	Florida (Indian River)	undetermined (saxitoxin suspected)	35
2002	Manatees	Florida (West Coast)	brevetoxin	34
2003	Manatees	Florida (West Coast)	brevetoxin (suspected)	96
2004	Bottlenose dolphins	Florida (Panhandle)	undetermined (brevetoxin suspected)	107
2004	Small cetaceans	North Carolina	undetermined	100
2005-2006	Multispecies (manatees, bottlenose dolphins)	Florida (West Coast)	brevetoxin (suspected)	204 bottlenose dolphins, 130 manatees
2005	Harbor porpoises	North Carolina	undetermined	43
2005-2006	Bottlenose dolphins	Florida (Panhandle)	brevetoxin (suspected)	97
2006	Manatees	Florida (Everglades)	brevetoxin (suspected)	24
2007	Bottlenose dolphins	Texas and Louisiana	undetermined	62
2007	Manatees	Florida (west coast)	brevetoxin	37
2008	Bottlenose dolphins (majority are neonates)	Texas	undetermined	~120
2008	Bottlenose dolphins	Florida (Indian River)	undetermined	~48

Reference: NMFS 2008b

NMFS Southwest Region. Thirty-seven species of marine mammals have the potential to occur in the Southwest Region (Appendix E, Table E-16) (Geraci and Lounsbury 2005). The Steller sea lion,

southern sea otter (*Enhydra lutris nereis*), and Guadalupe fur seal are listed as threatened. Humpback, blue, sei, sperm, fin, and North Pacific right whales are listed as endangered. All threatened and endangered marine mammal species are listed as depleted under the MMPA. In California, Steller sea lion critical habitat is designated as major rookeries and their associated air and aquatic zones. The air zones extend 3,000 feet above rookery areas historically occupied by sea lions, and aquatic zones extend 3,000 feet seaward from these areas (58 FR 45269–45285).

The most commonly stranded pinniped species in the Southwest region are California sea lions (*Zalophus californianus*), followed by harbor seals and northern elephant seals (*Mirounga angustirostris*). There are also infrequent strandings of Steller sea lions, Guadalupe fur seals, and northern fur seals. Over half of all stranded otariids were reported alive when first observed. Figure 3-8 depicts the number of reported pinniped strandings in the Southwest Region from 2001-2006. Eighteen pinnipeds were placed in public display facilities from 2001-2006.

The most commonly stranded small cetaceans in the Southwest Region are long- and short-beaked common dolphins (*Delphinus capensis* and *D. delphis*), harbor porpoise, bottlenose dolphins, Risso's dolphins, Dall's porpoises (*Phocenoides dalli*), and Pacific white-sided dolphins (*Lagenorhynchus obliquidens*). The most commonly stranded large whales are gray whales, which in some years are the most commonly observed stranded cetacean. Infrequently stranded cetacean species include Northern right whale dolphins (*Lissodelphis borealis*), rough-toothed dolphins, pygmy and dwarf sperm whales, sperm whales, short-finned pilot whales, beaked whales, humpback whales, and minke whales (*Balaenoptera acutorostrata*). Most stranded cetaceans are dead when first observed and reported. Figure 3-9 depicts the number of reported cetacean strandings in the Southwest Region from 2001-2006. Two cetaceans were placed in public display facilities from 2001-2006.

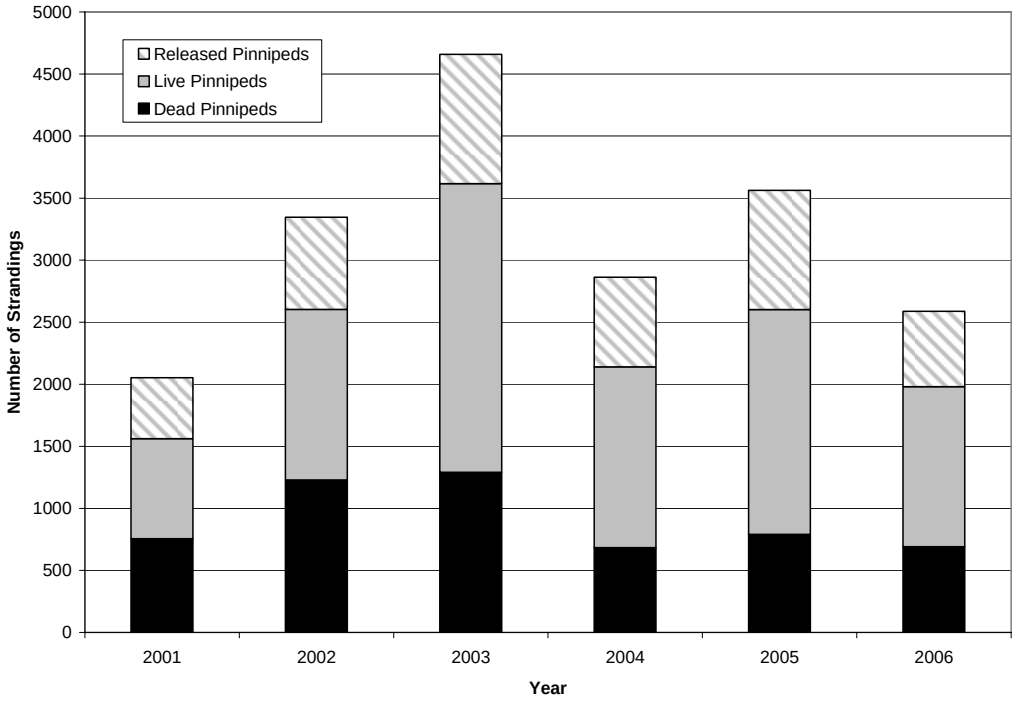

Figure 3-8. Southwest Region Pinniped Strandings 2001-2006

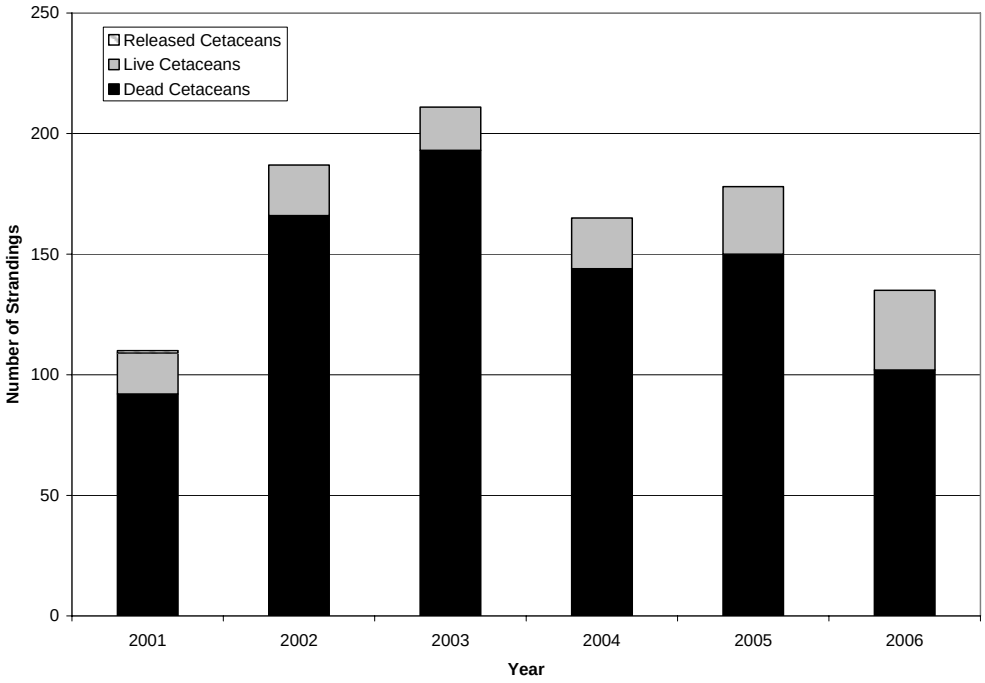

Figure 3-9. Southwest Region Cetacean Strandings 2001-2006

Mass Strandings. Mass strandings are rarely reported in the Southwest Region.

Human Interactions. Documented human interactions in the Southwest region include boat strikes, fishery interactions, and deliberate shootings. Seventeen whales (10 gray whales and 7 humpback whales) were reported entangled in fishing gear, and other animals were determined to have been hit by ships. Each year some pinnipeds are documented to have been shot.

Temporal Changes. The majority of gray whale strandings in the Southwest Region occur from March through May when the whales are found off the coast of California during their northern migration. Several large stranding events, affecting both odontocetes and pinnipeds, have been recorded in the spring coincident with the occurrence of large toxic phytoplankton blooms. Most elephant seal strandings are pups and most occur from March-May during the fasting period between the end of weaning and when the animals enter the open ocean to feed on their own. Most harbor seal strandings occur from April-June, coinciding with the peak of pupping season.

Marine Mammal Population Changes. Most marine mammal stocks in California waters are stable and/or increasing. California sea lions have been increasing recently at 5.4 percent to 6.1 percent per year. Short-finned pilot whales have declined in abundance in the Southern California Bight. This decline is likely a result of a change in distribution since the 1982-1983 El Niño event. The Guadalupe fur seal population has been growing at approximately 13.7 percent per year (Carretta *et al.* 2007).

UMEs. Table 3-3 describes the UMEs that have occurred in the Southwest Region from 1991 to April 2008.

Table 3-3. UMEs in the Southwest Region, 1991-2008

Year	Species	Location	Cause	Number of Animals
1991	California sea lions	California	leptospirosis	160
1992-1993	Pinnipeds	California	El Nino	~1000
1994	Common dolphins	California	undetermined	53
1997	Harbor seals	California	viral pneumonia	90
1998	California sea lions	California	domoic acid	70
1999-2001	Gray whales	California, Oregon, Washington	undetermined	651
2000	California sea lions	California	domoic acid	184

Table 3-3. UMEs in the Southwest Region, 1991-2008 (continued)

Year	Species	Location	Cause	Number of Animals
2000	Harbor seals	California	infectious disease	26
2002	Multispecies (common dolphins, California sea lion, sea otters)	California	domoic acid	~500
2003	Sea otters	California	ecological factors	69
2007	Cetaceans (primarily common dolphins)	California	domoic acid	63
2007	Large whales (primarily blue whales)	California	human interaction, undetermined	8

Reference: NMFS 2008b

NMFS Northwest Region. Twenty-eight species of marine mammals have the potential to occur in the Northwest Region (Appendix E, Table E-17) (Geraci and Lounsbury 2005). The Steller sea lion is the only threatened marine mammal species in the region. Endangered marine mammal species include the humpback, blue, sei, sperm, fin, and North Pacific right whales. The Southern Resident DPS of killer whales in Washington is also listed as endangered. Approximately 2,560 square miles of inland waters of Washington have been designated as critical habitat for the Southern Resident killer whale DPS (71 FR 69054-69070). All threatened and endangered species are listed as depleted under the MMPA. The Eastern Pacific stock of the northern fur seal (*Callorhinus ursinus*) is also listed as depleted under the MMPA. In Oregon, Stellar sea lion critical habitat is designated as major rookeries and their associated air and aquatic zones. The air zones extend 3,000 feet (0.9 kilometers) above rookery areas historically occupied by sea lions, and aquatic zones extend 3,000 feet seaward from these areas (58 FR 45269–45285).

The majority of stranded animals in the region are harbor seals. Approximately 50 percent of stranded harbor seals are live when first observed and are predominantly pups. Other commonly stranded pinnipeds include California sea lions, Steller sea lions, and Northern fur seals. These animals are usually dead when first reported. The number of elephant seals reported to the network has recently been increasing, associated with recently colonized haul-out and breeding sites in southern Oregon and the inland waters of Washington. The majority of elephant seals that are reported to the network are not stranded, but are hauled out to molt. The network's response includes posting signs to alert the public about the life history of the seals and to help prevent harassment of

the resting animals. Figure 3-10 depicts the number of reported pinniped strandings in the Northwest Region from 2001-2006. The increasing trend in reported strandings, shown in Figure 3-10, may reflect improved coverage by the stranding network combined with increased funding. One pinniped was placed in a public display facility from 2001-2006.

The most common stranded cetacean species are the gray whale, harbor porpoises, Dall's porpoises, Pacific white-sided dolphins, killer whales, sperm whales, Risso's dolphin, minke, humpback, and fin whales. Seventeen different odontocete species, including beaked whales, have been reported stranded from 1989-2003. The majority of stranded odontocetes are dead when first observed. Figure 3-11 depicts the number of reported cetacean strandings in the Northwest Region from 2001-2006. The increasing trend in reported strandings, shown in Figure 3-11, may reflect improved coverage by the stranding network combined with increased funding. No cetaceans were placed in public display facilities from 2001-2006.

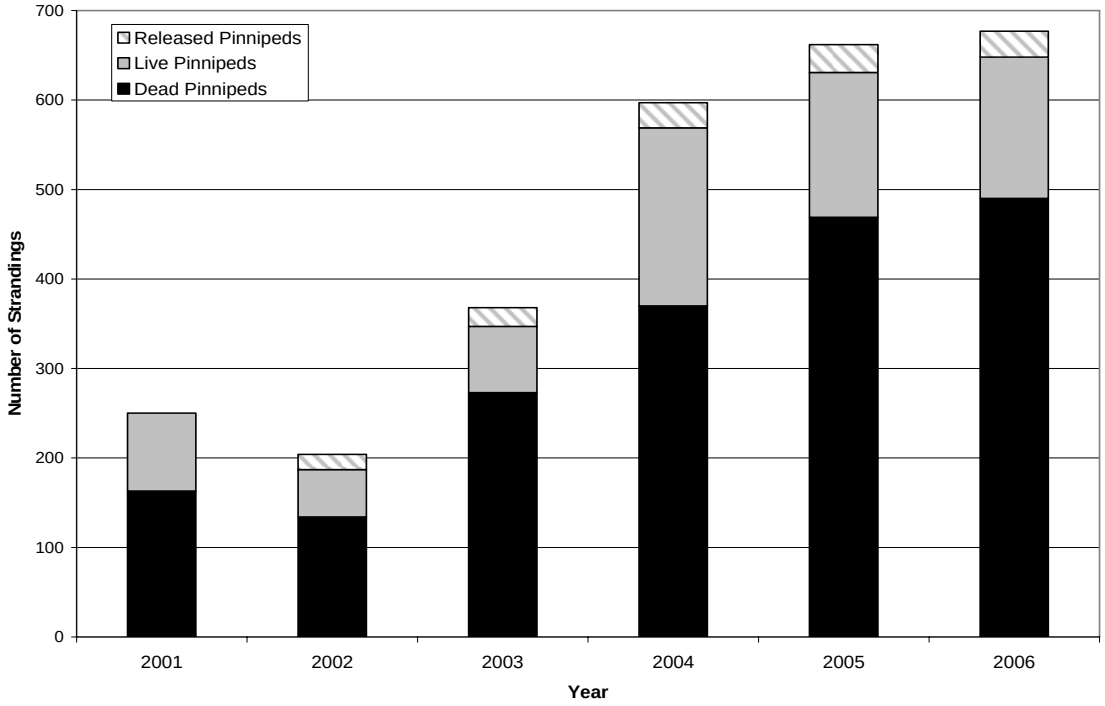

Figure 3-10. Northwest Region Pinniped Strandings 2001-2006

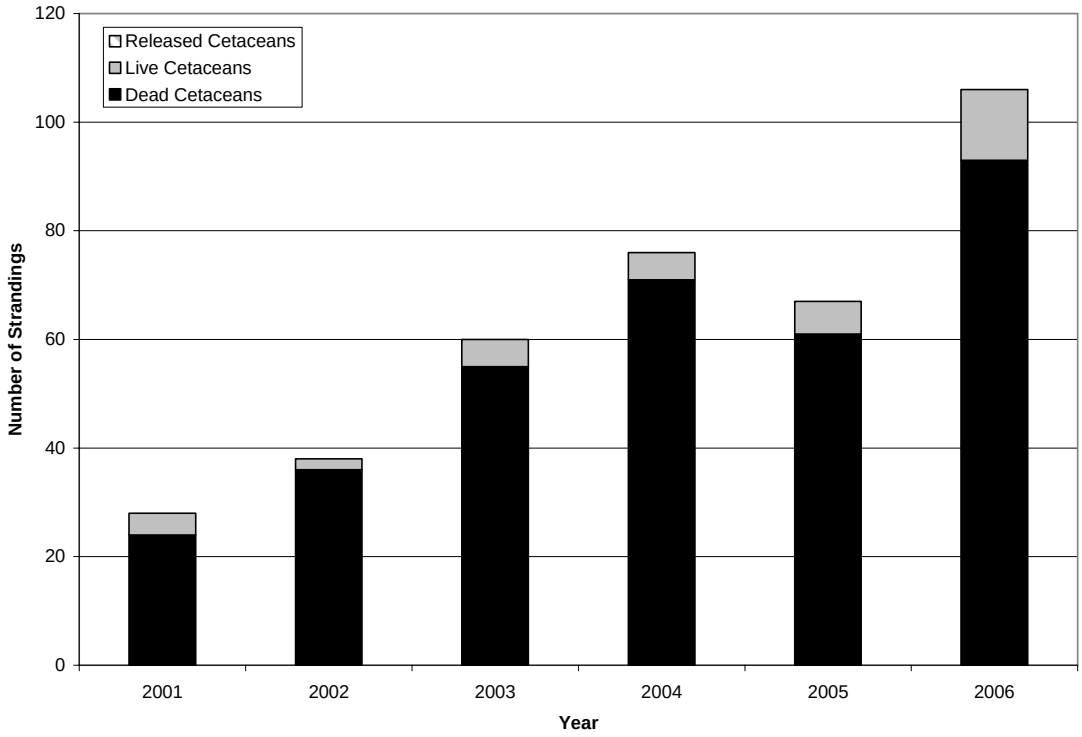

Figure 3-11. Northwest Region Cetacean Strandings 2001-2006

Mass Strandings. The occurrence of mass strandings in Oregon and Washington is rare. However, a mass stranding of 41 sperm whales occurred in central Oregon in 1979.

Human interactions. Boat strikes and fisheries interactions with large whales have been documented. Documented human interactions with phocids include fisheries interactions, vehicle collisions, and shootings. Documented human interactions involving otariids are primarily shootings.

Temporal changes. Gray whales strand most frequently in the spring during their northward migration.

Marine Mammal Population Changes. The Southern Resident killer whale DPS experienced an almost 20 percent decline from 1996 to 2001. Since 2001 there has been a small increase in the population, and there were 87 whales in the Southern Resident DPS in 2007 (NMFS 2008a). Based on aerial surveys, the Washington inland stock of harbor porpoise has increased three fold since 1997. The outer coast stock of harbor porpoise appears to be declining. There has also been an increase in male California sea lions in Washington State waters.

UMEs. Table 3-4 describes the UMEs that have occurred in the Northwest Region from 1991 to April 2008.

Table 3-4. UMEs in the Northwest Region, 1991-2008

Year	Species	Location	Cause	Numbers of Animals
1993	Pinnipeds	Washington	human interaction	53
1999-2001	Gray whales	California, Oregon, Washington	undetermined	651
2006	Harbor porpoises	Oregon, Washington	undetermined	113
2007	Guadalupe fur seals	Oregon, Washington	undetermined	15

Reference: NMFS 2008b

NMFS Alaska Region. Twenty-nine species of marine mammals have the potential to occur in the Alaska Region (Appendix E, Table E-18) (Geraci and Lounsbury 2005). Threatened marine mammal species include the southwest Alaska DPS of the northern sea otter (*Enhydra lutris kenyoni*), the eastern DPS of the Steller sea lion, and the polar bear. Endangered marine mammal species include the western DPS of Steller sea lions, the Cook Inlet stock of beluga whales (*Delphinapterus leucas*), bowhead (*Balaena mysticetus)*, blue, humpback, fin, sei, sperm, and North Pacific right whales. ESA Candidate species include bearded, ringed, and spotted seals. All threatened and endangered species are listed as depleted under the MMPA. The Eastern Pacific Stock of northern fur seals is listed as depleted under the MMPA. The AT1 group of transient killer whales is also listed as depleted. Critical habitat for the Steller sea lion is designated within Alaska and is defined as major rookeries; haul-outs; and associated terrestrial, air, and aquatic zones. There are also three special aquatic foraging areas that are designated as critical habitat for the Steller sea lion: Shelikof Strait (in the Gulf of Alaska), Bogoslof Island area and Seguam Pass (in the Bering Strait), and the Aleutian Islands area (58 FR 45269–45285). Critical habitat for the North Pacific right whale has been designated in the Gulf of Alaska and the Southeast Bering Sea (71 FR 38277-38297).

The Alaska Regional Stranding Network coordinates with Alaska Native tribal governments and villages, particularly for species that have co-management agreements, as mandated through Section 119 of the MMPA. Stranded animals are examined to determine if the death resulted from a struck-but-lost situation. At times, Native villages request parts from an animal for subsistence use or Native articles of handicrafts and clothing.

Stranding reports in Alaska are limited by the extensive and mostly rural coastline. Commonly reported stranded pinniped species (excluding walrus) include harbor seal, Steller sea lion, ringed seal, bearded seal, spotted seal, and elephant seal. On average, from 2001-2006, five harbor seal pups a year were brought to the rehabilitation facility in Alaska. Figure 3-12 depicts the number of reported pinniped strandings (excluding walrus) in the Alaska Region during from 2001-2006. One pinniped was placed in a public display facility from 2001-2006.

The most commonly stranded cetacean species in the Alaska Region are gray whales, beluga whales, humpback whales, killer whales, Dall's porpoise, harbor porpoise, and Cuvier's (*Ziphius cavirostris)*, Baird's (*Berardius bairdii*), and Stejneger's (*Mesoplodon stejnegeri*) beaked whales. Infrequently reported stranded species include Pacific white-sided dolphins, sperm whales, minke whales, and fin whales. Most beluga whale strandings are from the Cook Inlet stock. On average, from 2001-2006, three beaked whale strandings were reported each year. Figure 3-13 depicts the number of reported cetacean strandings in the Alaska Region from 2001-2006. No cetaceans were released from rehabilitation during this time period. No cetaceans were placed in public display facilities from 2001-2006.

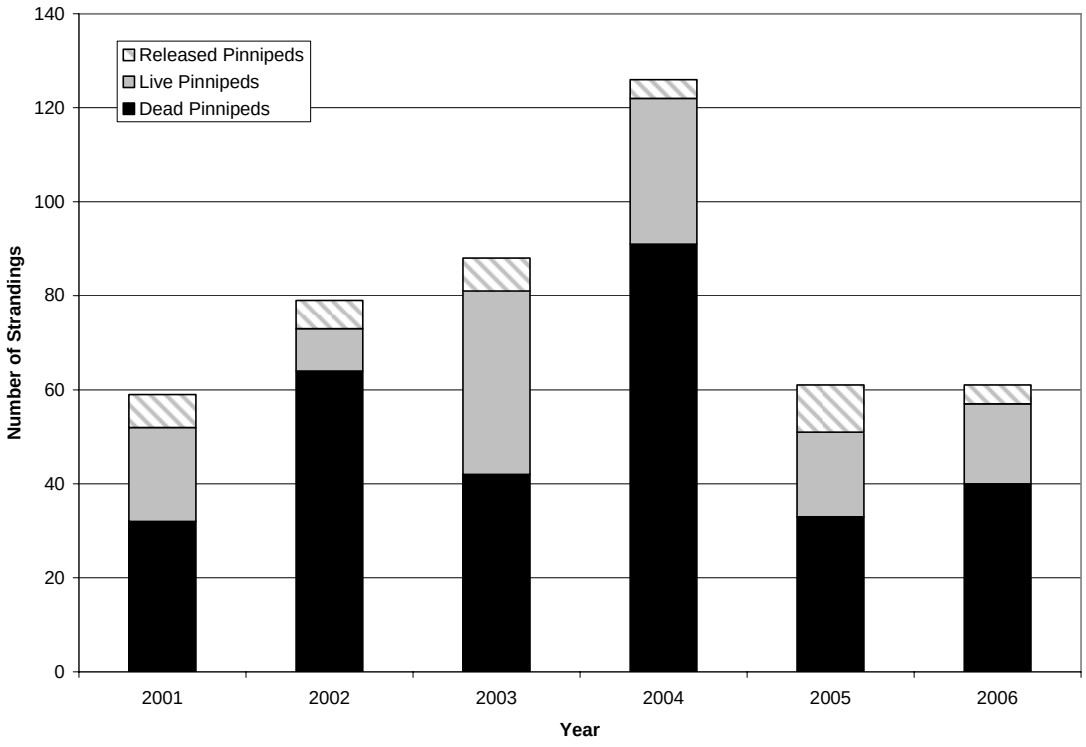

Figure 3-12. Alaska Region Pinniped Strandings 2001-2006

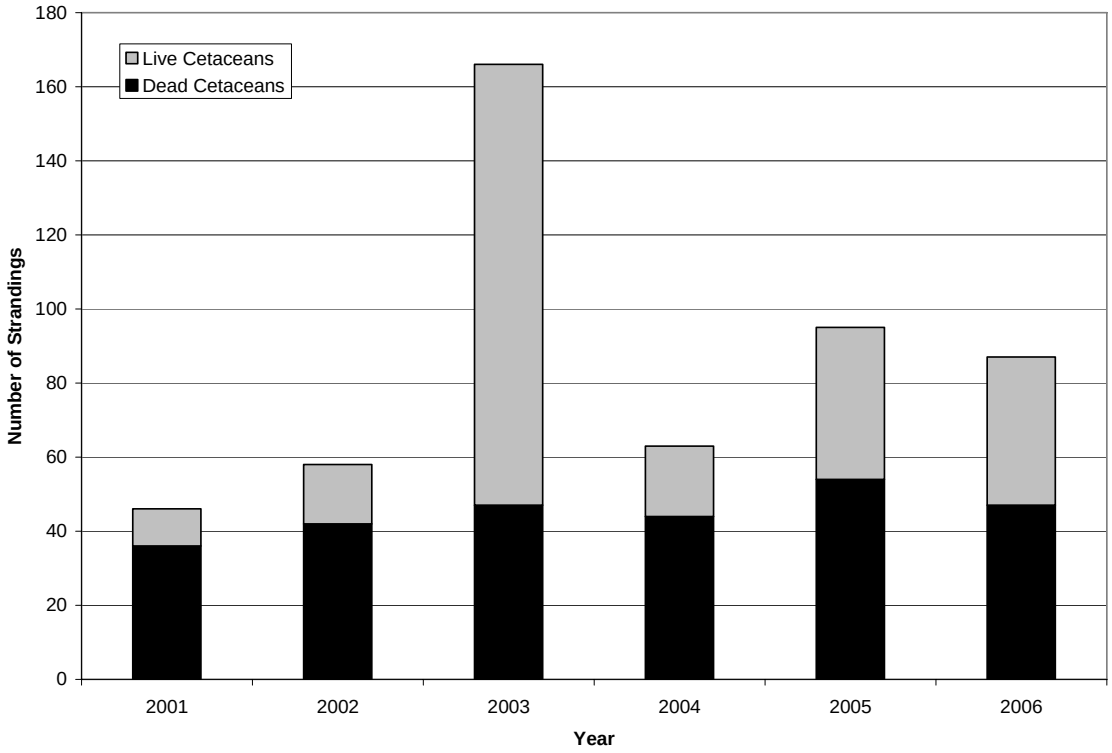

Figure 3-13. Alaska Region Cetacean Strandings 2001-2006

Mass Strandings. Cook Inlet beluga mass strandings, as related to tides, were reported three times in 2000 (two unconfirmed reports) and five times in 2003 (two unconfirmed reports), with a best estimate of 20 animals per event. In 2006 there were six polar bear mortalities. Mass walrus mortalities are occasionally reported at Alaska terrestrial haul-outs. In 2005, about 30 walruses died from terrain falls at Cape Pierce in the Togiak National Wildlife Refuge. Trampling deaths have been reported in the Punuk Islands near St. Lawrence Island.

Human Interactions. Documented human interactions for stranded animals include boat strikes and fisheries interactions. From 2000-2004, an average of seven humpback whale entanglements were reported annually. This number increased to approximately 22 in 2005 and 15 in 2006. Some of these entanglement events may be the result of increased reporting awareness or re-sightings of the same animal. However, the number of entangled humpback whale reports appears to be increasing. During this time, several bowhead and gray whales were also reported entangled. Several boat strike reports involving humpback whales are reported annually. Numerous cases of Steller sea lion fishery interactions are reported annually. These cases include animals that have swallowed hooks, flashers, and lures; animals with packing bands around their necks; and animals wrapped in net or other fishery

related material. From 1996-2000, the estimated mean mortality of walruses from fisheries activities was 1.2 walrus per year.

Temporal Changes. Most stranding reports of NMFS marine mammal species are received during the warmer months (May-October). No reported strandings of NMFS species appear to be from temporal or ice changes. Polar bear and Pacific walrus strandings would be most likely attributed to changing sea ice habitat and could occur year round. The most critical times for polar bears would likely be in the spring, soon after cubs are born, through the fall. For Pacific walrus, the critical time for young animals and calves would be during the late spring-early summer when the female and calves follow the ice pack north.

Marine Mammal Population Changes. Some marine mammal populations are increasing, including: the Central North Pacific stock of humpback whales, bowhead whales, the eastern population stock of Steller sea lions, and Bristol Bay beluga whales. Harbor seal populations have experienced declines in parts of Alaska, notably the Aleutian Islands, Prince William Sound, and Glacier Bay. Cook Inlet belugas were designated as depleted on May 31, 2000 (65 FR 34590) and endangered on October 22, 2008 (73 FR 62919). Surveys on Cook Inlet belugas from 1999-2008 have demonstrated a decline of 1.5 percent per year (NMFS 2008c). AT1 killer whales were designated as depleted on June 3, 2004 (69 FR 31321). Northern fur seals, which were designated as depleted on May 18, 1988 (53 FR 17888) are not recovering and continue to decline. The size and trend of the Pacific walrus population are currently unknown. Population point estimates from 1975-1990 ranged between 202,039 to 246,360 walruses, but were not precise enough to accurately reflect trend. The Southern Beaufort Sea population and Chukchi/Bering Seas populations of polar bear are thought to be declining.

UMEs. A northern sea otter UME was declared in Alaska on August 24, 2006 for elevated levels of sea otter mortality since 2002, with the majority of deaths in 2005 and 2006. A significant and unusual pathology, *Streptococcus bovis* endocarditis/septicemia was reported in approximately 43 percent of these animals.

NMFS Pacific Islands Region. Twenty-three marine mammal species have the potential to occur in the Pacific Islands Region (Appendix E, Table E-19) (Geraci and Lounsbury 2005). No threatened species occur in the region. Endangered species include the Hawaiian monk seal and humpback, sperm, and fin whales. All endangered species are listed as depleted under the MMPA. Critical habitat for the Hawaiian monk seal is designated and is defined as all beach areas, sand spits, and

islets (including all beach crest vegetation to its deepest extent inland), lagoon waters, and inner reef waters. Critical habitat also includes ocean waters out to a depth of 20 fathoms around Kure Atoll, Midway Islands (except Sand Island and its harbor), Pearl and Hermes Reefs, Lisianski Island, Laysan Island, Maro Reef, Gardner Pinnacles, French Frigate Shoals, Necker Island, and Nihoa Island (53 FR 18998).

The only pinniped species to naturally occur in the Hawaiian Islands is the Hawaiian monk seal. Hawaiian monk seals rest and pup on beaches in the main Hawaiian Islands, and may mistakenly be reported as being stranded. However, a total of 10 sick and injured (stranded) monk seals were reported from 2000-2004, and 8 of these animals were found dead. Rarely, elephant seals may also be found stranded in the main Hawaiian Islands. Figure 3-14 depicts the number of reported pinniped strandings in the Pacific Islands Region from 2001-2006. No pinnipeds were sent to public display facilities during this period.

The most common cetacean species to be reported stranded are humpback whales, sperm whales, spinner dolphins, spotted dolphins, and striped dolphins. Infrequently reported cetacean species include bottlenose dolphin, rough-toothed dolphin, pygmy sperm whale, dwarf sperm whales, pilot whales, false killer whales (*Pseudorca crassidens*), melon-headed whales, beaked whales, and killer whales. Approximately four large whales are reported stranded each year, with most of the strandings occurring during the humpback whale mating and calving season (November to April). Figure 3-15 depicts the number of reported cetacean strandings in the Pacific Islands Region from 2001-2006. No cetaceans were sent to public display facilities during this period.

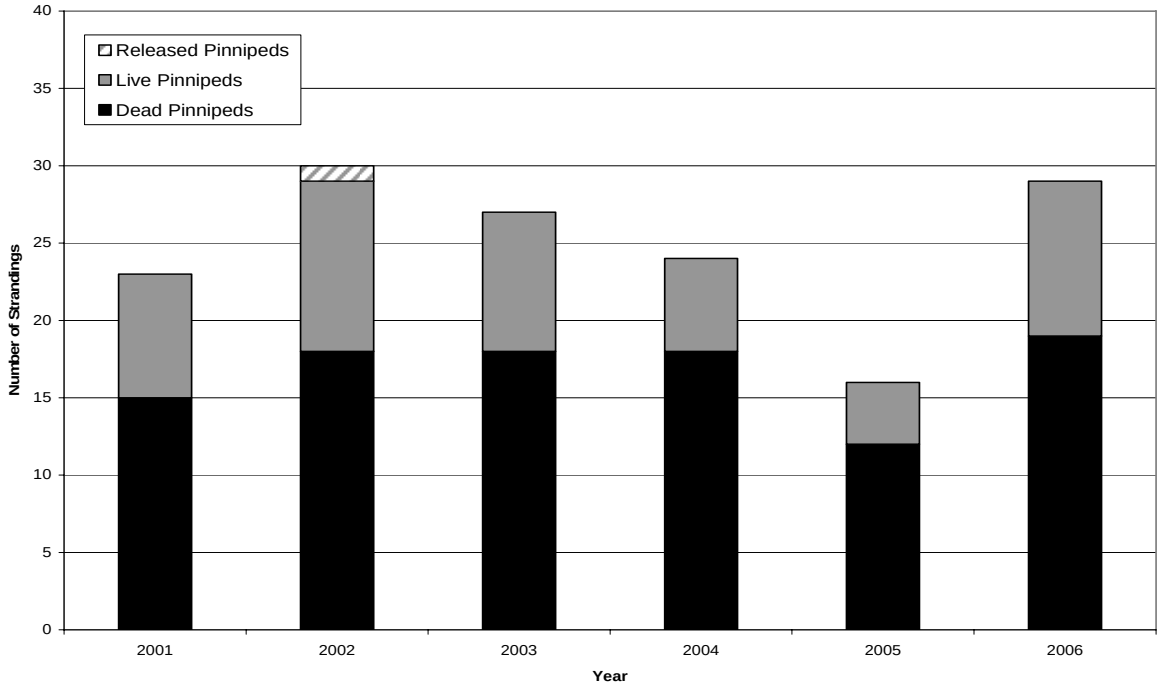

Figure 3-14. Pacific Islands Region Pinniped Strandings 2001-2006

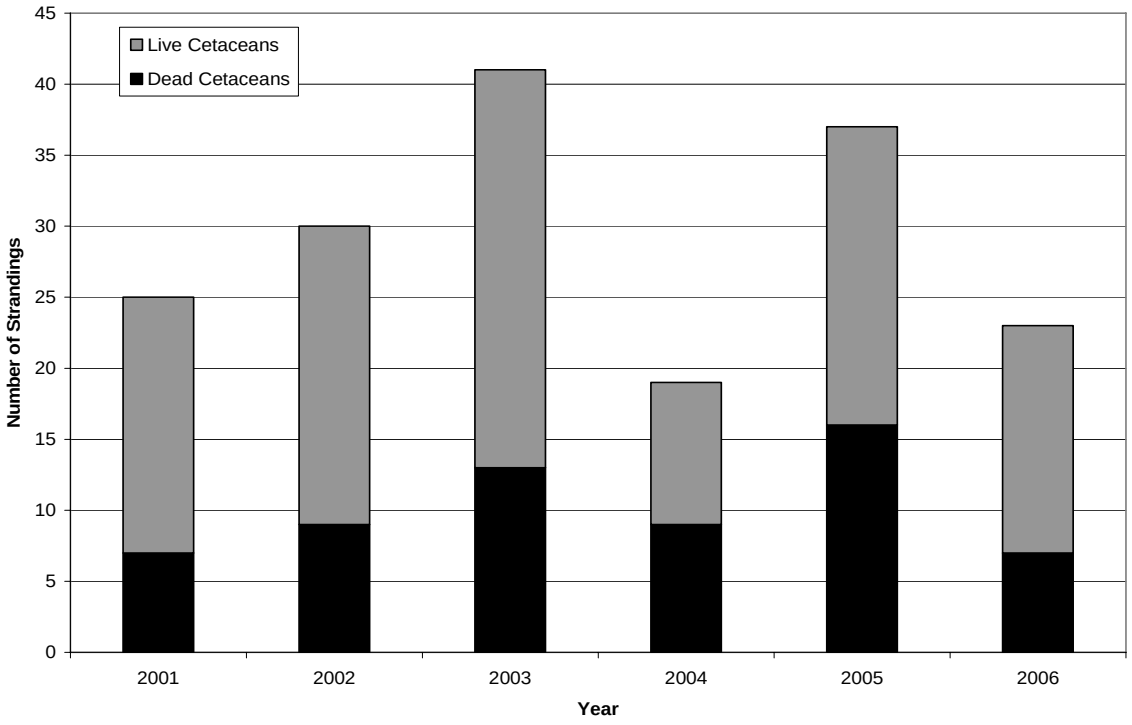

Figure 3-15. Pacific Islands Region Cetacean Strandings 2001-2006

Mass Strandings. Mass strandings are rarely recorded in the Pacific Islands Region. However, in 2004 a group of 150-200 melon-headed whales were reported close to shore inside Hanalei Bay on the island of Kaua'i. These animals milled in shallow water for several hours and only returned to deep water after human intervention. The local citizens constructed a *lau* (a floating strand of woven vines) and used it to herd the animals out of the Bay.

Human Interaction. On average, four monk seals are reported hooked or entangled in fishing gear or marine debris. Documented human interactions with large whales include boat strikes and fisheries interactions. Humpback whales have been reported entangled in fishing gear, with an average of four entanglements per year.

Temporal Changes. No temporal changes have been noted in the Pacific Islands Region.

Marine Mammal Population Changes. The Hawaiian monk seal population has been declining at an average of 3.8 percent per year since 1998. The population is well below historical levels and has not recovered from past declines. Since 2000, there has been a general decline in both abundance and juvenile survival at Pearl and Hermes Reef, Midway Atoll, and Kure Atoll. The main Hawaiian Islands population may be increasing, but this has not been confirmed and the abundance appears to be too low to influence the current total population numbers (Carretta *et al.* 2007).

UMEs. A monk seal UME occurred from 2001 to 2002 due to starvation (NMFS 2008b).

3.3 Water and Sediment Quality

3.3.1 Definition of the Resource

Water quality is defined as the biological, chemical, and physical properties of a waterbody that determine it's suitability for human use or for its role in the ecosystem. In coastal environments water quality is influenced by river drainage, erosion, and atmospheric deposition (*e.g.*, precipitation and dust). Human activities affect water quality through nonpoint source runoff, pollutant discharges, dumping, hazardous material spills, and air emissions. Water quality is determine through a variety of indicators, including dissolved inorganic nitrogen (DIN), dissolved inorganic phosphorus (DIP), water clarity, and dissolved oxygen. Concentrations of DIN and DIP that indicate poor condition vary according to location. Water clarity is considered poor if less than 10 percent of surface light reaches 1 m. Dissolved oxygen is considered poor if concentrations less than 2 mg/L are present. Data on water quality are mainly taken from the Environmental Protection Agency (EPA) National Coastal Condition Report II (NCCR) (EPA 2005).

Sediment quality is the ability of sediment to support a healthy benthic population and it helps to determine the ecological health of aquatic systems. Sediments provide essential habitat and food for many organisms. Activities affecting sediment quality are runoff, pollutant discharges, dumping, hazardous materials spills, and air emissions. Typical sediment contaminants include heavy metals and POPs. POPs include dioxin, Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs), and pesticides. Most major harbors in the U.S. have moderate to severe sediment contamination. Sediment toxicity can be measured by conducting static toxicity tests with amphipods. Sediment contamination can be determined using Effects Range Median (ERM) and Effects Range Low (ERL) guidelines. The ERM is the median concentration of a contaminant observed to have adverse biological effects. The ERL is the 10^{th} percentile concentration of a contaminant demonstrating adverse biological effects. Sediment toxicity from organic matter can be assessed by measuring the Total Organic Carbon (TOC) content. Data on sediment quality are compiled in the NCCR (EPA 2005).

3.3.2 Affected Environment

The North Atlantic coast is the most densely populated coastal region in the U.S. The overall estuarine ecological condition is rated as poor. Twenty-seven percent of the estuarine area is impaired for aquatic life use. Thirty-one percent of the estuarine area is impaired for human use. The water quality in estuaries is considered fair to poor. The DIN rating is fair, with 11 percent having concentrations exceeding 0.5 mg/L. The DIP rating is good, with 5 percent having concentrations exceeding 0.05 mg/L. The overall rating of water clarity is fair, with 23 percent of the estuarine area in poor condition. Northeast estuaries dissolved oxygen concentrations are good. Hypoxia and anoxia were apparent in 10 percent of the estuarine area, mainly in the isolated trenches of the Chesapeake Bay (EPA 2005).

A poor sediment quality rating was given to 16 percent of estuaries on the Northeast coast Unimpaired sediments are located in the Acadian Province (with the exception of Great Bay, NH), eastern Long Island Sound, and open regions of the Delaware and Chesapeake Bays. Toxic sediments were found in eight percent of Northeast estuaries. Sediments in Cape Cod Bay, New York Harbor, and western Long Island Sound are impaired by toxicity. Sediment contamination is considered fair. Sediment around major urban areas (New York Harbor, Narragansett Bay) exceeds ERM guidelines for metals and other organic contaminants. Other contaminants exceeding ERL guidelines included nickel, mercury, arsenic, chromium, Dichloro-Diphenyl-Trichloroethane (DDT),

and PCBs. The TOC for estuaries was good and elevated TOC levels corresponded to areas with high sediment contamination (EPA 2005).

Water quality of the South Atlantic coast estuaries is affected by the increasing coastal population. Estuarine areas are in fair to good ecological condition. Twenty-three percent of the estuarine area is impaired for aquatic life and human uses. The water quality in estuaries is considered fair to good. The DIN rating is good and no estuarine areas have a DIN concentration exceeding 0.5 mg/L. DIP is considered fair, with 12 percent having concentrations exceeding 0.05 mg/L. The overall rating of water clarity is fair, with 12 percent of the estuarine area in poor condition. Dissolved oxygen concentrations are good, with only two percent of the area exhibiting hypoxia. Sediment quality in the South Atlantic coast estuaries is fair to good. Sediment toxicity, contamination, and TOC are all considered good (EPA 2005).

In Puerto Rico, the overall ecological condition of estuaries is poor. Seventy-seven percent of the area is impaired for aquatic life use. The water quality in estuaries is considered fair. DIN is considered good, with no estuaries exceeding concentrations greater than 0.1 mg/L. The DIP rating is good, with only six percent exceeding concentrations greater than 0.01 mg/L. Water clarity is fair and dissolved oxygen concentrations are good, with one percent of the areas exhibiting hypoxia. Water quality in all of Puerto Rico's shoreline waters has been assessed. Twenty-one percent of shoreline waters are impaired, 24 percent are threatened, and 55 percent are fully supporting designated uses. Sediment quality is poor in Puerto Rico, with three percent of sediment considered toxic. Sediment contamination criteria (ERM and ERL) were exceeded in 23 percent of sediments, mostly for heavy metals, pesticides, and PCBs. Sediment TOC is poor, as 44 percent of sediment had a high TOC level (EPA 2002).

The U.S. Virgin Islands surface water quality is generally good, but quality is declining due to an increase in point and non-point source discharges into the marine environment. Vessel wastes and uncontrolled runoff are major direct discharges into surface waters (VI DPNR 2001). Estuaries in the Virgin Islands have not been assessed, as these waterbodies are not considered to be true estuaries. Ninety-seven percent of the shoreline has been assessed. Four percent of shoreline waters are impaired, 10 percent threatened, and 86 percent are fully supporting designated uses (EPA 2005). Sediment quality information for the Virgin Islands is not available.

Water quality in the Gulf of Mexico is affected by the growing population along the coast. The Gulf of Mexico estuarine area is in fair ecological condition. Thirty-five percent of the area is impaired for

aquatic life uses, and 14 percent are impaired for human use. The water quality in estuaries is considered fair. DIN is considered good, with only two percent having concentrations greater than 0.5 mg/L. The DIP rating is fair, with 11 percent having concentrations exceeding 0.05 mg/L. The overall rating of water clarity is fair, with 29 percent in poor condition. Dissolved oxygen concentrations are good, with only one percent of the area exhibiting hypoxia. Coastal and deeper waters of the Gulf are degraded from spills and dumping from vessels. An area of hypoxia, located off of the Louisiana continental shelf, begins in late spring and disappears in the fall. Sediment quality in the Gulf of Mexico is fair, with less than one percent exhibiting toxicity. However, the toxicity percentage may be different, as data was missing from 38 percent of estuaries. Sediment ERM guidelines were exceeded primarily in Texas estuaries and ERL guidelines were exceeded in Mobile Bay, AL. Sediment TOC levels are considered good in the Gulf Coast (EPA 2005).

Ecological conditions in Pacific Coast estuaries are fair to poor. The water quality index for estuaries is good to fair. Poor water quality is mainly concentrated in south Hood Canal (Puget Sound) and San Francisco Bay. The DIN rating is good, with less than one percent exceeding concentrations of 0.5 mg/L. DIP is considered fair, with concentrations exceeding 0.1 mg/L in San Francisco Bay and south Hood Canal. Water clarity is considered poor, especially in San Francisco Bay. Dissolved oxygen concentrations are good and hypoxia was only exhibited in two subestuaries of Puget Sound (EPA 2005). Sediment quality in Pacific Coast estuaries is fair to poor and toxicity is poor. There are high metal concentrations in San Francisco Bay and high metal and organic contaminants in Puget Sound and Los Angeles Harbor. ERM guidelines were exceeded in San Francisco Bay for chromium, mercury, and copper. In Southern California, DDT levels exceeded ERM guidelines. One site on the Columbia River exceeded ERM guidelines for either PAHs or PCBs. Three sites in Puget Sound also exceed these contaminant criteria. Los Angeles Harbor had high concentrations of metals and PAHs. Sediment TOC is considered good to fair. Los Angeles Harbor and Big Lagoon (in Northern California) are areas with high TOC (EPA 2005).

Most of Alaska's vast coastline has not been monitored for water quality. The majority of water resources are likely in pristine condition due to its size, sparse population, and remoteness. Water quality may be impaired around urban areas and near seafood processing facilities in the Aleutian Islands (EPA 2002). Only 0.1 percent of Alaska's estuaries water quality has been assessed. Of this percentage, 89 percent are impaired and 11 percent are fully supporting designated uses. Only 0.1 percent of the Alaska shoreline has been assessed. Thirty-six percent of the assessed shoreline water is impaired. Sixty-four percent of shoreline water is fully supporting designated uses (EPA 2005).

An overall assessment of Alaska's sediment quality has not been conducted. Harbors and bays have the potential to contain toxic sediments contaminated with PCBs, lead, dioxin, and petroleum products.

Hawaii does not have a comprehensive coastal monitoring program. Water quality in Hawaii is variable, depending on storm water runoff. Storm water runoff decreases water quality as it carries pollutants into estuaries and coastal waters. Most industrial facilities and wastewater treatment plants discharge into coastal waters. Turbidity, nutrients, and pathogens from nonpoint source pollution also affect Hawaii's water quality (EPA 2002). Water quality has been assessed in 99 percent of Hawaiian estuaries. Of this percentage, 57 percent is impaired and 43 percent is fully supporting designated uses. Eighty-three percent of shoreline waters have been assessed. Two percent of shoreline waters are impaired, 1 percent is threatened, and 97 percent is fully supporting designated uses (EPA 2005). An overall assessment of Hawaii's sediment quality has not been conducted.

Guam's marine waters and bay sediments are generally free of pollutants, except in areas of localized pollutant runoff or where discharges from land or vessels occur. The deep surrounding seas rapidly dilute pollutant discharges (GEPA 2000). Of the bays assessed for water quality, three percent supported aquatic life and 65 percent supported swimming. Pollutants impacting water quality in these areas include pathogens, metals, suspended solids, urban runoff, and municipal facilities. The main cause of pollution in shoreline waters are microbial organisms (EPA 2002). Sediment quality has been assessed for four of Guam's main harbors: Agana Boat Basin, Outer Apra Harbor, Agat Marina, and Merizo Pier. Overall the sites were relatively clean, including deeper water sediments. Most sites had high levels of copper, zinc, lead, and tin. Apra Harbor had the highest levels of these contaminants as well as PCBs and PAHs (GEPA 2000).

Water quality in American Samoa is generally in good condition. Poor water quality conditions exist in populated areas where nutrient enrichment from human and animal wastes occurs. Heavy rains can bring sediments to coastal waters, a result of improper land use practices. Water and sediment quality in Pago Pago Harbor are in poor condition. Fish and substrates are contaminated with heavy metals, pesticides, and other pollutants. Previously, nutrient loading from cannery wastes caused algal blooms and fish kills. Wastes are now being dumped beyond the inner harbor (Craig 2002). Of the ocean shoreline assessed, 14 percent was impaired for aquatic life support. Fish consumption and swimming uses were impaired in 100 percent of the assessed shoreline (EPA 2002). Sediment quality information for the American Samoa is not available.

In the southern islands of CNMI, coastal water quality is impacted by sewage outfalls and overflows, septic systems, dredging, excess nutrients, and urban runoff. Sedimentation from unpaved roads and development increases turbidity in nearshore waters during heavy rains. High nutrient levels have negatively affected coral reefs and lagoons. Water quality data was collected in 2005 on Saipan, Tinian, Rota, and Managaha. In Saipan, 34 percent of coastal waters were non-supportive and 36 percent were fully supportive of recreational uses. In Tinian and Rota, 64 percent were fully supportive of recreational uses, and no areas were non-supportive. All waters assessed on Managaha were fully supportive of recreational uses. Water quality near coral reefs was also monitored in 2005. Twenty-eight percent of assessed waters were non-supportive of aquatic uses. Forty-eight percent were fully supportive of aquatic uses (Castro *et al.* 2006). Sediment quality information for CNMI is not available.

3.4 Cultural Resources

3.4.1 Definition of the Resource

Cultural resources are prehistoric or historic remains, artifacts, or indicators of past human activities and accomplishments. They include "historic properties," defined as prehistoric or historic sites, buildings, structures, or objects listed or eligible for listing on the National Register of Historic Places (NRHP). Artifacts, records, and physical remains associated with historic properties may be considered cultural resources (NRCS 2006). Other types of cultural resources include cultural or religious practices and Traditional Cultural Properties (TCPs). TCPs are properties associated with cultural practices or beliefs of a living community that are important in maintaining the continuing cultural identity of the community (Parker and King 1998). Examples of TCPs include: Native American ceremonial locations; urban neighborhoods that are the traditional home of a particular cultural group; and locations associated with the traditional beliefs of a Native American group.

NEPA and CEQ regulations require Federal agencies to consider potential impacts on the "human environment," which is defined as "the natural and physical environment and the relationships of people to that environment" (40 CFR 1508.14). Therefore, a Federal action must be analyzed for probable impacts on the cultural aspects of the human environment. The National Historic Preservation Act (NHPA) requires Federal agencies to consider the effects of their actions on historic properties (16 U.S.C. 470 et seq.). The Archeological and Historic Preservation Act requires Federal agencies to report any perceived impacts their actions may have on historical or archaeological data (including relics and specimens) (16 U.S.C. 469a et seq.). The Native American Graves Protection

and Repatriation Act requires the identification and appropriate disposition of human remains, funerary objects, sacred objects, or objects of cultural patrimony that are excavated on purpose or discovered inadvertently on Federal or tribal lands (25 U.S.C. 3001 et seq.).

3.4.2 Affected Environment

Prehistoric sites on land include shell middens, lithic scatters, habitation sites, burials, and ceremonial sites and sacred sites of early Native American populations. Other Native American cultural remains include domestic artifacts, stone tools, ivory objects, woven fishing nets, fiber-tempered pottery, masks, pictographs, and petroglyphs. Petroglyphs have been found on prominent boulders along the shoreline in Washington State (Stilson *et al.* 2003).

In some coastal areas of the U.S., Native American tribes and other aboriginal peoples maintain strong cultural and subsistence ties to the environment and living natural resources, including marine mammals. This rich heritage may be traced to pre-history through art, language, tradition, or social customs. Native American villages located on the Pacific Coast depended on salmon, shellfish, and marine mammals for subsistence and cultural purposes. Whaling and sealing played a large role in the culture of tribes, including the Makah Tribe in Washington. The Makah hunted whales and used drift or stranded whales for subsistence uses, including food, tools, and trade. In the Pacific Northwest, Native American lands, trust resources, and tribal rights have been secured through treaties, statutes, judicial decisions, and EOs. NMFS administers its trust responsibilities, with respect to treaties, through government-to-government relationships with tribes. Present coastal tribes in Washington continue to use coastal resources for subsistence, ceremonial, and commercial activities. Important ceremonial resources include oysters, crabs, clams, salmon, bottomfish, kelp, seaweeds, sea urchins, and sea birds (OCNMS 1993).

Alaska Natives use marine mammal parts for cultural handicrafts and harvest marine mammals for subsistence. The Inuit people of Arctic Alaska currently hunt ribbon seals (*Phoca fasciata*), ringed seals (*Phoca hispida*), bearded seals (*Erignathus barbatus*), spotted seals (*Phoca largha*), bowhead whales, gray whales, walrus, and polar bears. Alaska natives also harvest beluga whales in the Bering, Chukchi, and Beaufort Seas and Cook Inlet. Harbor seals are currently harvested throughout their range by coastal Alaska Natives. Northern fur seals are hunted in the Pribilof Islands. There is also a limited harvest of Steller sea lions and sea otters. Under the MMPA (Section 119), NMFS enters into cooperative agreements with Alaska Native organizations to co-manage subsistence and conserve marine mammals, including ice seals, harbor seals, fur seals, beluga whales, and bowhead

whales. Co-management agreements help meet species protection and recovery goals under the ESA and MMPA, while sustaining the traditional livelihoods of Alaska Natives. Alaska Native organizations also participate in marine mammal research and monitoring efforts.

Prehistoric sites are prevalent in the Pacific Islands. Guam coastal areas include latte stones and ancient Chamorro artifacts. Latte stones were pillars which ancient Chamorro houses were built upon. Latte stones are inserted in sand containing fragments of pottery, shells, fish bones, charcoal, stone and shell tools. Burials in sand-lined pits have also been found near or under Latte stones. In American Samoa, habitation sites are expected to be located in coastal areas. Material remains found at these sites may include Lapita pottery, basalt flakes and tools, volcanic glass, shell fishhooks, shell ornaments, and faunal remains. Archaeological evidence indicates that early sites may be found on the shores of prehistoric embankments that have been filled in with sand. Remains of prehistoric villages may be visible on the surface, but many are buried underground (ASHPO 2006). Underground remains of prehistoric sites are also present in CNMI. Remains of Latte villages can be found on CNMI coastal stretches and may include petroglyphs and Latte stones.

Archaeological sites in Hawaii include burial sites and TCPs. TCPs include volcanic cones, landforms associated with deities, and submerged coral formations which were once fishing locations. Habitation sites, burials, religious structures, and fishponds are present along the shoreline. Most sites are above the high-water mark and may be buried underneath the sand of many beaches. The largest known concentration of native Hawaiian burials is located on the Mokapu Peninsula, Oahu. This dune complex has been listed on the NRHP. The site was excavated for military purposes from 1938-1940 and reburial efforts are being conducted (Cleghorn 2001). Archaeological historic sites below the high-water mark are typically fishponds, but anchor holes and petroglyphs have been documented. Most archaeological sites and TCPs in Hawaii have not been surveyed. It is likely that most coastline areas contain historic sites and resources (USCG 1999). In the Northwestern Hawaiian Islands, Nihoa and Necker Islands are both listed on the NRHP for their ceremonial and religious usage by Native Hawaiians.

Many historic resources in the action area are listed on, or eligible to be listed on, the NRHP. These include lighthouses, ports, docks, coastal forts, and shipwrecks. The majority of historic sites in the Pacific Islands are areas from World War II. In American Samoa, Guam, and CNMI Japanese pillboxes and other coastal defenses can be found along the coastline. On CNMI, a mass grave of Japanese and U.S. military forces killed during battle is located on the coast (Cabrera 2005). Many shipwrecks are grounded on beaches throughout CNMI (CNMI 2001).

Submerged cultural resources include inundated archaeological sites, Native American artifacts, shipwrecks, and aircrafts. Native American artifacts include canoe runs, canoes, fish weirs, and petroglyphs (Stilson *et al.* 2003). Inundated archaeological sites found in nearshore areas include fishing weirs, bowls, donut stones, prehistoric stone anchors, historic metal anchors, and the remains of landings and wharfs. There is the potential for prehistoric sites offshore, where areas of the continental shelf were once shoreline. Archaeological surveys have not been conducted in most of these areas. American tanks that did not make landfall in CNMI sit in reef waters next to beaches (Cabrera 2005).

3.5 Human Health and Safety

3.5.1 Definition of the Resource

A human health and safety risk is any hazardous, unhealthy, or unsanitary condition causing, or capable of causing, an unreasonable threat to the health, safety, and welfare of persons living or working in the vicinity of such condition. Human health and safety risks are present during response, rehabilitation, release, disentanglement, and research activities. Possible concerns for workers include physical injury, illness, exposure to contaminants, and ocean conditions. The Occupational Safety and Health Administration (OSHA) sets standards to assure safe and healthy working conditions and prevent work-related injuries and illnesses. OSHA requires employers to have health and safety plans. Employers must also maintain accurate records of employee work-related injuries, illnesses, deaths, and exposure to toxic materials or harmful physical agents. OSHA has laboratory standards for air contaminants and the risk of exposure to hazardous chemicals.

Human health and safety risks may also affect the general public during normal beach and ocean activities, such as swimming, boating, and surfing. Possible concerns are drowning, illness, contact with marine animals, and exposure to contaminants.

3.5.2 Affected Environment

3.5.2.1 Marine Mammal Worker Safety

Stranding Response. For authorized persons responding to strandings, hazards include physical injury, marine debris, zoonotic diseases, contaminant and toxin exposure, and exposure to the elements. In a survey of marine mammal workers, over half (54 percent) of the 483 respondents reported having at least one injury or illness believe to be the result of direct contact with marine mammals. Most injuries were cuts, scrapes, bites, and rashes (Mazet *et al.* 2004). Physical injuries

may occur from the stranded marine mammal. Stranded whales may thrash their flukes or roll over onto a person. Pinnipeds may attack and inflict serious bites that could become infected. Chemical exposure may occur if personnel are in contact with euthanasia solutions or other drugs. Other physical injuries include cuts from bone fragments and instruments. Lifting and rolling large animals and the use of heavy equipment can cause strains and bruises. Wet conditions can lead to slips, trips, falls, and possible drowning. Drowning is a risk during water rescues, especially if heavy surf conditions, dangerous undertows, or rip currents exist. Rescuers can become entangled in lines and nets used during water rescues, increasing the risk of drowning or other physical injury. The beach composition (fine sand, mud, cobble, boulder, etc.) can increase the difficulty of responding to strandings and may increase the risk of physical injuries.

Marine debris is a hazard during stranding responses. Workers may be injured by stepping on broken glass, rusty metal, needles, or other litter. Workers could become entangled in derelict fishing gear during water responses. Workers may also come into contact with contaminated debris, including medical wastes and sewage.

Reports of human illnesses from contact with marine mammals are rare, but have occurred. Marine mammals may carry infectious zoonotic diseases that may be transmitted to humans. Pathogens may be transmitted through direct contact with tissues, body fluids, or aerosols of the infected animals. These pathogens include, but are not limited to, *Mycoplasma* spp. (seal finger), *Mycobacterium* spp., *Erysipelothrix* sp., *Leptospira* sp., *Brucella* spp., seal poxvirus, and calicivirus. Seal finger typically occurs after a pinniped bite and can cause swelling and severe pain, especially in the joints of the hands. Seal poxvirus can cause painful skin lesions that may last up to a year. Leptospira can produce chills, headaches, myalgia, and eye pain in humans. Other organisms that infect marine mammals and could affect humans include *Salmonella* spp., *Vibrio* spp., *Clostridium* sp., parasites, and fungi (Mazet *et al.* 2004, Cowan *et al.* 2001). In the survey by Mazet *et al.* (2004), respondents reported dangerous infections, including tuberculosis, leptospirosis, and brucellosis.

Marine animals in the water are a safety concern for marine mammal workers. Handling or stepping on coral can lead to cuts which may become infected. Jellyfish, including Portuguese man o'war, stings may cause minimal damage or fatal injuries. The defense mechanism of venomous fish (rays, scorpionfish, lionfish, etc.) can lead to bite or puncture wounds. Shark attacks are possible during response activities if workers are entering the water. Shark attacks are prevalent in U.S. coastal waters, with over 490 attacks since 1990. Of this number, 322 attacks have occurred in Florida; 53 in Hawaii; and 35 in California (FLMNH 2005).

Stranding responders may also be exposed to biotoxins from HABs. Most biotoxins are only a risk if contaminated seafood is consumed, except for brevetoxins. Aerosolized brevetoxins may be inhaled by humans and can cause respiratory problems, nausea, vomiting, and neurological symptoms. Responding to marine mammals contaminated with oil or other materials may cause lightheadedness; nausea; and eye, skin, and respiratory irritation (Geraci and Lounsbury 2005).

Stranding responders are exposed to the elements and may suffer from sunburn, heat exhaustion, and heatstroke. Symptoms of heat exhaustion and heatstroke include profuse sweating, muscle cramps, nausea, dizziness, fever, and unconsciousness. Hypothermia may occur in cold weather and if responders are in cold water for long periods of time. Symptoms of hypothermia include weakness, drowsiness, confusion, uncontrollable shivering, and cold, pale skin.

Disentanglement. Safety issues that may arise during disentanglement activities on water are related to aircraft operations, boating operations, the entanglement, physical and chemical restraint of the animal, and weather conditions. Safety hazards during aerial surveys to locate animals include collisions with another aircraft or a fixed object, mechanical failure, and crashes due to inclement weather conditions.

During disentanglement operations, boating accidents may include collisions with another vessel or a fixed object, capsizing, a person falling overboard, and drowning. The risk of an accident may increase if boats come too close to the tail of the whale or if nets and lines foul the boat's propeller. Pursuit of an entangled animal, rough seas, inclement weather conditions, and nightfall all increase the risk of a boating accident. Persons onboard have the potential to become entangled in nets, ropes, or buoys attached to the animal, increasing the risk of falling overboard.

Physical injuries from disentanglement activities, both in water and on land, include bites from entangled animals, bruises, dislocations, and broken bones. Cuts may occur from instruments used to disentangle the animal. Other physical injuries may occur from contact with marine debris. Chemical exposure is possible during the administration of drugs for restraint, treatment, or euthanasia.

Rehabilitation. Safety risks relative to rehabilitation include physical injury; zoonotic diseases; and contaminant, toxin, and chemical exposure. Rehabilitation personnel may incur physical injuries such as slips, trips, and falls from wet conditions around animal pools and pens. Lifting or moving animals may cause strains and bruises. Injuries to personnel working with animals in pools and pens include

bites, bruises, and drowning. Exposure to zoonotic diseases, contaminants, and toxins are potential risks to all personnel handling animals. Animal handlers in pools would be exposed to water contaminated with urine and feces. Chemical exposure is possible during the administration of drugs, including euthanasia solutions.

Release. Release activities may cause strains, bruises, animal bites, or more severe physical injuries from moving animals for transport. Exposure to liquid nitrogen may occur during freeze branding procedures. During vessel releases, physical injuries could occur as a result of vessel collisions, capsizing, inclement weather, and rough waters. Sunburn, heat exhaustion, heat stroke, and hypothermia are possible, if release activities require people to be outside for extending periods of time. Physical injuries may occur from contact with marine debris.

Research. Research activities conducted under the MMHSRP may occur in a laboratory and in or on the water. Safety issues in research laboratories include exposure to hazardous chemicals, flammable solvents, cryogenic liquids, air contaminants, biological agents, and UV radiation. Physical injuries such as cuts, punctures, bruises, and burns may occur while using laboratory equipment and materials.

Research activities conducted in the water would typically be health assessment captures and releases. Risks include entanglement in nets, drowning, exposure to zoonotic diseases, cuts from instruments, accidental needle sticks, and injuries from freeze branding. Sunburn, heat exhaustion, and heatstroke may also occur, with symptoms including profuse sweating, muscle cramps, nausea, dizziness, fever, and unconsciousness. Hypothermia may occur in cold weather and if researchers are in cold water for long periods of time. Symptoms of hypothermia include weakness, drowsiness, confusion, uncontrollable shivering, and cold, pale skin. Jellyfish, sting rays, other venomous fish, and sharks all pose threats to researchers in water. Physical injuries could occur as a result of vessel collisions, capsizing, inclement weather, rough waters, and contact with marine debris. Slips, trips, and falls would also be hazards during research activities.

3.5.2.2 Public Safety

Public health and safety issues during recreational activities in the action area include pollution, marine debris, HABs, marine animals, marine debris, surf conditions, exposure to the elements, and boating operations.

A major public health concern in recreational waters is pollution. Pollutants entering the water include sewage, trash, medical wastes, oil or chemical spills, stormwater runoff, and boating waste. In 2004, sewage spills and overflow closed beaches for a total of 1,319 days. Stormwater runoff closed beaches for 4,144 days. These pollutants can contaminate the water with toxins, heavy metals, pesticides, bacteria, and viruses. Microbial infections include gastroenteritis, salmonellosis, shigellosis, giardiasis, skin rashes, and pinkeye. In 2004, beach advisories or closures occurred for approximately 14,615 days due to elevated bacteria levels. Viral infections can cause hepatitis; gastroenteritis; respiratory illness; and ear, nose, and throat problems (NRDC 2005). Marine debris is often found on beaches and the ocean floor. Beachgoers may be injured by stepping on broken glass, rusty metal, needles, or other litter or come in contact with contaminated debris. Swimmers and divers may get entangled in derelict fishing gear.

Beaches may also be closed during a HAB event. Typically biotoxins from HABs are only hazardous if contaminated seafood is consumed. Inhalation of aerosolized brevetoxins can cause respiratory irritation, nausea, and neurological problems.

Human interactions with stranded marine mammals are public health risks. As mentioned above, stranded animals can thrash around, roll onto, and attack humans. Consumption of marine mammals, which currently occurs in Alaska, may also be hazardous if animals have environmental contaminants or diseases. Zoonotic diseases can be passed if a person comes into contact with the animal or its body fluids. Coral, jellyfish, venomous fish, and sharks are marine animals that humans may encounter during recreational activities.

Surf conditions include strong currents, rip currents, dangerous shorebreaks, and large and/or high waves. Hazardous surf conditions can cause injuries and drowning. Exposure to the elements can lead to sunburn, heat exhaustion, heatstroke, or hypothermia.

Boating operations include motorboats, sailboats, personal watercraft (jet skis), and kayaks. In 2004, the top five types of recreational boating accidents were: collision with a vessel; collision with a fixed object; falls overboard; capsizing; and skier mishap. The causes of boating fatalities are drowning, trauma, and hypothermia. Contributing factors to accidents are reckless operations, excessive speeds, hazardous waters, alcohol use, operator inexperience, and machinery system failure. Most accidents occurred during fishing activities and waterskiing or tubing activities (USCG 2005).

3.6 Socioeconomics

3.6.1 Definition of the Resource

Socioeconomics are defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Population levels are determined by regional birth and death rates, as well as immigration and emigration. Economic activity typically encompasses employment, personal income, and industrial or commercial growth. The alternatives would not affect population levels within the action area; therefore this information will not be discussed. Important economic activities in the coastal regions of the U.S. include commercial, recreational, and subsistence fisheries; tourism; and other recreational activities. Other recreational activities conducted include clamming, beachcombing, surfing, boating, and planned events (festivals, sport tournaments, etc.). The alternatives have the potential to economically impact the MMHSRP rehabilitation facilities. Therefore, current costs of maintaining these facilities are discussed.

EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, requires Federal agencies to identify and address any disproportionately high and adverse human health or environmental effects their actions may have on minority and low-income populations. The alternatives are largely based upon marine mammal strandings and entanglements. Strandings and entanglements cannot be predicted and may occur anywhere on the coasts or in waters of the U.S. Potential effects of the alternatives would not occur with greater frequency for minority and low-income populations than for the general population as a whole. No environmental justice impacts would be expected from the alternatives and therefore will not be discussed further.

3.6.2 Affected Environment

Economic activities in coastal regions likely to intersect with one or more activities covered under this PEIS include industries encompassing stranding network participants (*e.g.*, zoos and veterinary services) and tourism industries. Basic information for the relevant industries was obtained through the U.S. Economic Census. The information provided includes revenues, number of establishments, and number of employees by coastal states and territories (or if data was available at the county level, by aggregating data by coastal counties). Tabulations of this information are provided in Appendix M.

Existing and potential members of the stranding network (and those who provide services to the network) are likely to fall into either two categories: zoos/botanical gardens and veterinary services.

The zoos and botanical gardens industry category is comprised of establishments primarily engaged in the preservation and exhibition of live plant and animal life and animal life displays, including aquaria. Since numerous SA holders are non-profits, statewide information for zoos and botanical gardens were also provided for those facilities with federal tax-exempt status. The veterinary services industry category is comprised of establishments of licensed veterinary practitioners primarily engaged in the practice of veterinary medicine, dentistry, or surgery for animals, as well as establishments primarily engaged in providing testing services for licensed veterinary practitioners. Summary information by state for these two industry categories are contained in Appendix M. The information for these industry categories include activities for the entire state, since some stranding activities related to those covered under the PEIS may occur further inland.

Tourism industries which may be affected by the various activities in this PEIS include lodging and restaurants located adjacent to stranding activities. Since marine mammal stranding events occur in the water or on the beach, tourism-related businesses that are likely to be affected are those located on or near the ocean; therefore summary statistics for lodging and restaurants located in coastal counties are reported. Appendix M contains combined summary information for lodging and restaurant industries located in coastal counties. Lodging includes hotels, motels, bed and breakfasts, recreational vehicle parks, campgrounds, recreational camps and vacation camps. The restaurant category includes full-service restaurants, limited-service restaurants, cafeterias, snack bars, and bars.

Stranding responses are usually short-term events. Most stranding responses last for a day. Responses to mass strandings of live animals may take several days. In tourist-based coastal economies, the economic input of stranding responders will be minimal and undetectable in regional economic statistics.

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