Draft Programmatic Environmental Impact Statement for the Marine Mammal Health and Stranding Response Program

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Volume I: Draft Programmatic Environmental Impact Statement

National Marine Fisheries Service
Office of Protected Resources
1315 East-West Highway
Silver Spring, MD 20910

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National Oceanic and Atmospheric Administration (NOAA)
National Marine Fisheries Service (NMFS)
Office of Protected Resources

In accordance with:
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The National Environmental Policy Act

Pursuant to:
The National Environmental Policy Act of 1969

Programmatic Environmental Impact Statement
for the Marine Mammal Health and Stranding Response Program

Draft Programmatic Environmental Impact Statement

March 2007

Comments Must Be Submitted No Later Than April 30, 2007
Direct Comments to:

David Cottingham
Chief, Marine Mammal and Sea Turtle Conservation Division
Attn: MMHSRP DPEIS
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910
mmhsrpeis.comments@noaa.gov

ABBREVIATIONS AND ACRONYMS

ABR	Auditory Brainstem Response
ADFG	Alaska Department of Fish and Game
AEP	Auditory Evoked Potential
APHIS	Animal and Plant Health Inspection Service
ASHPO	American Samoa Historic Preservation Office
AVMA	American Veterinary Medical Association
BLM	Bureau of Land Management
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CI	Co-Investigator
CIMS	Chesapeake Information Management System
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNMI	Commonwealth of the Northern Mariana Islands
CPR	Cardio Pulmonary Resuscitation
CSC	Coastal Service Center
DDT	Dichloro-Diphenyl-Trichloroethane
DEA	Drug Enforcement Administration
DIN	Dissolved Inorganic Nitrogen
DIP	Dissolved Inorganic Phosphorus
DOC	Department of Commerce
DOI	Department of the Interior
DPS	Distinct Population Segment
EA	Environmental Assessment
EEZ	Exclusive Economic Zone

EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ERM	Effects Range Median
ERL	Effect Range Low
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FLMNH	Florida Museum of Natural History
FOSC	Federal On-Scene Coordinator
FR	Federal Register
GEPA	Guam Environmental Protection Agency
GMP	Gulf of Mexico Program
HAB	Harmful Algal Bloom
HAS	Hawaii Audubon Society
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSWRI	Hubbs-SeaWorld Research Institute
IATA	International Air Transport Association
ICS	Incident Command System
LOA	Letter of Agreement
m	Meter
mg/L	Milligrams per liter
MMC	Marine Mammal Commission
MMHSRA	Marine Mammal Health and Stranding Response Act
MMHSRP	Marine Mammal Health and Stranding Response Program
MMPA	Marine Mammal Protection Act

MSDS	Material Safety Data Sheet
NAO	NOAA Administrative Order
NCCR	National Coastal Condition Report II
NEPA	National Environmental Policy Act
NERR	National Estuarine Research Reserve
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NMMTB	National Marine Mammal Tissue Bank
NMS	National Marine Sanctuary
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRDC	Natural Resources Defense Council
NRHP	National Register of Historic Places
NWHICRER	Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve
NWR	National Wildlife Refuge
OCNMS	Olympic Coast National Marine Sanctuary
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PCCS	Provincetown Center for Coastal Studies
PEIS	Programmatic Environmental Impact Statement
PFMC	Pacific Fishery Management Council

PI	Principal Investigator
PIT	Passive Integrated Transponder
POP	Persistent Organic Pollutant
POTWs	Publicly Owned Treatment Works
PR1	Office of Protected Resources, Permits, Conservation and Education Division (NMFS
ROD	Record of Decision
ROI	Region of Influence
SA	Stranding Agreement
SAV	Submerged Aquatic Vegetation
TCP	Traditional Cultural Property
TOC	Total Organic Carbon
UME	Unusual Mortality Event
U.S.C.	United States Code
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VHF	Very High Frequency
VIDPNR	Virgin Islands Department of Planning and Natural Resources
WDFW	Washington Department of Fish and Wildlife
WGMMUME	Working Group on Marine Mammal Unusual Mortality Events

Executive Summary

The National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) has prepared this draft Programmatic Environmental Impact Statement (PEIS) pursuant to the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 Code of Federal Regulations 1500-1508), and the NOAA environmental review procedures (NOAA Administrative Order 216-6).

ES.1 Proposed Actions

With the passage of the Marine Mammal Protection Act (MMPA) in 1972, Congress gave jurisdiction over marine mammals in U.S. waters to the federal government. All cetaceans and all pinnipeds, except walrus (*Odobenus rosmarus*), were placed under the jurisdiction of the Department of Commerce and is now specifically housed in NMFS. The Department of the Interior, U.S. Fish and Wildlife Service was given authority over walrus, sea otters (*Enhydra lutris*), sirenians (manatees [*Trichechus spp.*] and dugongs [*Dugong dugon*]), and polar bears (*Ursus maritimus*).

In 1992, the Marine Mammal Health and Stranding Response Program (MMHSRP) was formalized with the passage of Title IV, an amendment to the MMPA entitled The Marine Mammal Health and Stranding Response Act. This Act charged the Secretary of Commerce to develop a marine mammal health and stranding response program with three goals:

1. Facilitate the collection and dissemination of reference data on the health of marine mammals and health trends of marine mammal populations in the wild;
2. Correlate the health of marine mammals and marine mammal populations, in the wild, with available data on physical, chemical, and biological environmental parameters; and
3. Coordinate effective responses to unusual mortality events by establishing a process in the Department of Commerce in accordance with Section 404.

The MMHSRP developed the following four Proposed Actions to encompass the activities of the MMHSRP :

1. Issuance of the *Policies and Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release* (Policies and Best Practices) as final guidance.
2. Issuance of a new Endangered Species Act (ESA)/MMPA permit to the MMHSRP. The new permit would include current and future response activities for endangered species,

disentanglement activities, biomonitoring projects, and import and export of marine mammal tissue samples. The permit would be issued no later than July 1, 2007 and would expire in five years.

3. Continuation of current MMHSRP operations, including response, rehabilitation, release, and research activities, with renewal and authorization of Stranding Agreements (SAs) and Scientific Research Authorizations and other NMFS activities referenced in Section 1.3.1.
4. Continuation of the Prescott Grant Program.

The Region of Influence (ROI) for the Proposed Actions and alternatives includes all areas where MMHSRP activities may occur. The ROI is geographically defined as the coastal zone and marine waters of the U.S., including the Exclusive Economic Zone. The coastal zone includes coastal waters, adjacent shorelands, intertidal areas, salt marshes, wetlands, and beaches. The ROI also includes the marine mammal rehabilitation facilities of the stranding network.

ES.2 Purpose and Need

The purposes of the Proposed Actions are to respond to marine mammals in distress, including those stranded, entangled, and out of habitat, and to answer research and management questions about marine mammal health. Stranded and distressed marine mammal response is conducted for many reasons including NMFS' legislative mandate and the need to obtain data for management and scientific purposes. Marine mammals are also sentinels of ecosystem health and may provide valuable links to human health. Response to marine mammals is also conducted out of a concern for animal welfare and ocean stewardship.

NMFS is charged with the national oversight and collaboration of the MMHSRP, and creating policies that will work for the majority of participants. The MMHSRP has identified several needs for effectively carrying out the mandates of Title IV:

1. Operational efficiency - To operate the MMHSRP effectively and efficiently, maximizing the benefits from opportunistic events while making the best use of limited resources;
2. Quality data - To collect data on marine mammal health and health trends in an organized and consistent manner to meet current and future information needs for appropriate conservation and management; and
3. Safety - To implement policies to ensure that MMHSRP activities are conducted humanely and in a manner that protects the safety of volunteers and the public to the maximum extent possible.

ES.3 Alternatives

The alternatives to implement the Proposed Actions are grouped into the following six topics: stranding agreements and response; carcass disposal; rehabilitation activities; release activities; disentanglement; and biomonitoring and research activities. A No Action Alternative, Status Quo Alternative, and Preferred Alternative are designated under each issue. The No Action Alternative for each issue is based upon NMFS not undertaking the coordination and operation of the MMHSRP. Current SAs would not be renewed and new SAs would not be issued. The Policies and Practices manual and the ESA/MMPA permit would not be issued. The stranding and disentanglement networks would continue their current activities. As current SAs expired, the current National Stranding Network would cease to exist. Once the current ESA/MMPA permit expires on June 30, 2007, the current disentanglement network would no longer function.

Table ES-1 summarizes the alternatives considered in the PEIS.

Table ES-1. Alternatives Considered in Detail

Alternative	Description
Stranding Agreements and Response	
Alternative A1	No Action- SA's expire, stranding response would end.
Alternative A2	Status Quo- Current SAs would be renewed, current stranding response activities continue. Final SA criteria would not be issued.
Alternative A3	SAs issued to any applicants after review, new SA template would not be utilized. Final SA criteria would not be issued. Current and future activities included.
Alternative A4 (Preferred)	Final SA criteria would be implemented, new SA template would be utilized, current and future activities included.
Alternative A5	Final SA criteria would be implemented, new SA template would be utilized, and response to threatened, endangered or rare animals would be required.
Carcass Disposal	
Alternative B1	No Action- SA's expire, no carcass disposal would occur, carcasses would be left where stranded.
Alternative B2	Status Quo- Current methods of carcass disposal continue.
Alternative B3 (Preferred)	Recommendation to transport chemically euthanized animal carcasses off-site.
Rehabilitation Activities	
Alternative C1	No Action- Current SAs would expire, stranding response would cease, and animals would not be rehabilitated.
Alternative C2	Status Quo- Current rehabilitation activities would continue. Final Rehabilitation Facility Standards would not be implemented.
Alternative C3 (Preferred)	New SAs would be issued, rehabilitation activities continue. Final Rehabilitation Facility Standards would be implemented.

Table ES-1. Alternatives Considered in Detail (continued)

Alternative	Description
Rehabilitation Activities (continued)	
Alternative C4	New SAs would be issued, rehabilitation activities would continue. Rehabilitation of threatened endangered and rare animals would be required; response to other animals would be optional. Final Rehabilitation Facility Standards would be implemented.
Release of Rehabilitated Animals	
Alternative D1	No Action- Current SAs would expire, stranding response and rehabilitation would cease, and therefore there would be no animals to release.
Alternative D2	Status Quo- Current release activities would continue. Adaptive changes to release activities would not be permitted. Final release criteria would not be implemented.
Alternative D3 (Preferred)	New SAs would be issued, release activities continue. Final Release criteria would be implemented.
Disentanglement Activities	
Alternative E1	No Action- No disentanglement network.
Alternative E2	Status Quo- Disentanglement network would continue current activities, no modifications or new members added
Alternative E3 (Preferred)	Disentanglement network would continue current activities on East Coast with modifications to West Coast network. The Disentanglement Guidelines and training prerequisites would be implemented.
Biomonitoring and Research Activities	
Alternative F1	No Action- Biomonitoring and research activities would not occur.
Alternative F2	Status Quo- New ESA/MMPA permit would continue current biomonitoring and research activities.
Alternative F3 (Preferred)	New ESA/MMPA permit would be issued to include current and future biomonitoring and research activities.

ES.4 Environmental Impacts and Mitigation

The environmental impacts of the alternatives were analyzed for the following resources:

- 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.

Table ES-2 summarizes the impacts on these resources from each of the alternatives. While potential adverse and beneficial effects on all of the chosen resource areas could occur, effects on marine mammals and human health and safety would be considered the most important. Mitigation measures have been developed to avoid, minimize, or eliminate the potential adverse effects on the affected resources from the proposed alternatives.

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1 **Table ES-2. Summary Matrix of Impacts**

Alternatives	Impact Area: Biological Resources	Water & Sediment Quality	Cultural Resources	Human Health & Safety	Socioeconomics
Stranding Agreements & Response					
Alternative A1- No Action	Moderate, adverse effects on marine mammals, as stranded animals would be removed from the population. Valuable information on marine mammal health would not be collected. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds.	No effects on water and sediment quality.	No effects on cultural resources.	Minor, short-term adverse effects as the public interact with stranded animals. Beneficial effects as response personnel no longer needed.	Moderate, long-term beneficial direct effects on stranding network members, as there would be reduction, if not an elimination, of costs. Minor to moderate indirect adverse effects to SA holders whose activities attract external funding. Negligible adverse effects to businesses adjacent to stranding sites. Potential beneficial effects if people come to see stranding event.
Alternative A2- Status Quo	Minor, short-term adverse effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, shellfish, and birds from equipment use or leaks on beaches/nearshore waters and the presence of responders. Minor to moderate, adverse effects on marine mammals would be expected from response activities and if new SAs are not issued.	Minor, short-term adverse effects on surrounding sand and nearshore waters could occur from equipment leaks and euthanasia solution or other environmental contaminants in tissue, blood, and other body fluids.	Potential minor, adverse effects on submerged cultural resources or resources buried in sand from equipment and vehicle use on beaches and nearshore waters. There would not be any effects on Alaska Natives, Native American tribes, or other aboriginal people's cultural uses of coastal resources.	Minor, short-term adverse effects on the public (interacting with a stranded animal) and stranding responders (*e.g.*, physical injury and zoonotic diseases).	Minor to moderate, long-term adverse effects to stranding network members from operating costs associated with these activities. Negligible adverse effects to businesses adjacent to stranding sites. Potential beneficial effects if people come to see stranding event.
Alternative A3	Same effects on biological resources as Alternative A2. Some beneficial impacts could come from allowing new SA holders to be added, given that they have the proper experience with marine mammal response, as geographic coverage would increase and new rehabilitation facilities may be added.	Same effects as Alternative A2.	Same effects as Alternative A2.	Same effects as Alternative A2.	Minor to moderate, long-term adverse effects on network members from operating expenses. New involvement with response activities would help offset expense of these activities. Negligible adverse effects to businesses adjacent to stranding sites. Potential beneficial effects if people come to see stranding.
Alternative A4 (Preferred)	Same effects on biological resources as Alternative A2. Beneficial impacts from use of new techniques and tools during response activities and ability to add new SA holders. Long-term beneficial effects on marine mammals would be expected to occur with the implementation of SA criteria.	Same effects as Alternative A2.	Same effects as Alternative A2.	Same effects as Alternative A2, with one exception. SA criteria would ensure that responders are experienced and have the knowledge to avoid or minimize health and safety risks.	Alternative A4 is similar to Alternative A3, but under Alternative A4 the Final SA criteria would be implemented. Moderate to major, adverse effects to the current SA holders would be expected to occur, as existing SA holders may need more training or may need to alter existing practices in order to meet the new criteria. Negligible adverse effects to businesses adjacent to stranding sites. Potential beneficial effects if people come to see stranding event.

Table ES-2. Summary Matrix of Impacts (continued)

Alternatives	Impact Area: Biological Resources	Water & Sediment Quality	Cultural Resources	Human Health & Safety	Socioeconomics
Stranding Agreements & Response					
Alternative A5	Same effects from stranding response activities as Alternative A2, with two exceptions. Beneficial effect on threatened, endangered, or rare animals and an adverse effect on other species. Same effects from the implementation of SA criteria as Alternative A4.	Same effects as Alternative A2.	Same effects as Alternative A2.	Same effects as Alternative A4.	Minor to major, long-term adverse effects to SA holders similar to those described in Alternatives A3 and A4, but they would also depend on the proportion of stranded marine mammals that are not rare, threatened, or endangered and whether or not the network member chooses to continue responding to those animals. Negligible adverse effects to businesses adjacent to stranding sites. Potential beneficial effects if people come to see stranding event.
Carcass Disposal					
Alternative B1- No Action	Potential adverse effects could occur from leaving carcasses on the beach to naturally decompose. Animal carcasses may contain contaminants, which could negatively impact the surrounding environment. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds.	Potential adverse effects could occur from leaving carcasses on the beach to naturally decompose. Animal carcasses may contain contaminants, which could negatively impact the surrounding water and sediment quality.	No effects on cultural resources.	Minor, short-term adverse effects as the public interact with stranded animals. Contaminated or chemically euthanized carcasses could potentially contaminate the groundwater and/or nearshore water. Beneficial effect on personnel involved in carcass disposal, as they would no longer be exposed to risks.	Negligible adverse impacts in terms of lost revenues, restaurants, and parks in the immediate vicinity of the carcass(es), if the public chose to avoid the area. Potential beneficial effects if people come to see stranding event
Alternative B2- Status Quo	Minor to moderate, short- and long-term adverse effects, as animal carcasses may contain persistent environmental contaminants or euthanasia solution, which could negatively impact the surrounding environment. Other adverse effects from burial, equipment use, spills of hazardous materials or wastes from equipment, vessels, or vessel accidents. Beneficial effect of carcass disposal at sea, as it may provide food for organisms.	Minor, short-term adverse effects on water and sediment quality could occur from equipment leaks; euthanasia solution or other contaminants in tissue, blood, and other body fluids; spills of hazardous materials or wastes from vessels; or a vessel accident. Burial and equipment use may have a negligible impact on erosion.	Potential minor, long-term, adverse effects on submerged cultural resources or resources buried in sand from beach burial, and equipment and vehicle use on beaches and nearshore waters. There would not be any effects on Alaska Natives, Native American tribes, or other aboriginal people's cultural uses of coastal resources.	Minor and major, short- and long-term adverse effects as the public interacts with a stranded animal. Contaminated or chemically euthanized carcasses left on the beach or buried could potentially contaminate the groundwater and/or nearshore water, making it unhealthy for humans to swim near the carcass site. Workers involved in disposal could be exposed to zoonotic diseases, contaminants, and euthanasia solution.	Negligible adverse impacts in terms of lost revenues, restaurants, and parks in the immediate vicinity of the carcass(es), if the public chose to avoid the area. Potential beneficial effects if people come to see stranding event
Alternative B3 (Preferred)	Same effects as Alternative B2, with one exception. Chemically euthanized carcasses would not be buried on-site, minimizing some of the adverse effects.	Same effects as Alternative B2.	Same effects as Alternative B2.	Same effects as Alternative B2 with one exception. Recommended that chemically euthanized animal carcasses not be buried on the beach, which would remove the health and safety risks associated with beach burial.	Effects would be the same as those described under Alternative B2, except that chemically euthanized carcasses would be moved off-site and the cost would be incurred by the stranding network member. Adverse effects would be negligible, minor, or major, depending on the number of carcasses.

Table ES-2. Summary Matrix of Impacts (continued)

Alternatives	Impact Area: Biological Resources	Water & Sediment Quality	Cultural Resources	Human Health & Safety	Socioeconomics
Rehabilitation Activities					
Alternative C1- No Action	Moderate, long-term, adverse effects as marine mammals would not be taken into rehabilitation and most would likely die from injuries or disease. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds.	No effects on water and sediment quality.	No effects on cultural resources.	Beneficial effects would be expected as risks to rehabilitation personnel would end.	Potential major, long-term, adverse effects on facilities that focus primarily on rehabilitation activities. Facilities may cease operation, unless their activities could be shifted. Larger facilities that engage in other activities may experience a minor, long-term positive effect in terms of the reduced operating costs from the elimination of rehabilitation activities.
Alternative C2- Status Quo	Minor to major, short- and long-term, beneficial and adverse effects on marine mammals. Potential adverse effects from sampling, anesthesia, disease, euthanasia, and not implementing the Rehabilitation Facility Standards No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds.	Minor adverse effects due to use of open ocean/bay net pens and temporary pools and contamination from wastes, pathogens, etc. Rehabilitation facilities would have necessary permits for wastewater discharges.	Potential minor to major adverse effects on from the use of temporary pools and net pens, depending on where they are sited. Net pens may disturb or damage submerged cultural resources.	Minor, short-term, direct adverse effects on rehabilitation personnel, including physical injuries, exposure to chemicals, and exposure to zoonotic diseases.	Current rehabilitation facilities would continue to bear minor to major, long-term adverse effects. Rehabilitation facilities would operate as they currently do and therefore continue to incur supply, equipment, personnel, and maintenance expenses.
Alternative C3 (Preferred)	Same effects as Alternative C2, with one exception. Rehabilitation Facility Standards would decrease the risk of disease transmission ensure a healthy environment, maximize the success of rehabilitation, and increase the potential for release to the wild. Would reduce animal pain and suffering.	Same effects as Alternative C2.	Same effects as Alternative C2.	Same effects as Alternative C2, with one exception. Health and safety standards in the rehabilitation facility standards would have a beneficial effect.	Minor to major, adverse effects on rehabilitation facilities. Facilities would need to upgrade to comply with the minimum facility standards. Level of impact would depend on each facility, if they need to upgrade, and how much they would need to upgrade to meet the minimum standards.
Alternative C4	Same effects as Alternative C3, with a few exceptions. Adverse effects on animals that are not rare, threatened, or endangered. These animals often serve as models for other species and this would be an indirect adverse affect on rare, threatened, and endangered species.	Same effects as Alternative C2.	Same effects as Alternative C2.	Same effects as Alternative C3.	Alternative C4 would adversely affect rehabilitation facilities in the same manner as Alternative C3. Alternative C4 could adversely affect facilities to a lesser extent, however, since under the rehabilitation of non-rare and non-ESA species would only be optional.
Release of Rehabilitated Animals					
Alternative D1- No Action	Adverse effects as marine mammals would not be released back to the wild, which negatively impacts all species, but especially threatened or endangered species. Beneficial effect on wild populations, as there would not be the risk of introducing a diseased animal that could potentially infect other marine mammals. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds.	No effects on water and sediment quality.	No effects on cultural resources.	Beneficial effects would be expected as risks to release personnel would end.	Beneficial effects as the end of release activities would eliminate the expenses related to these activities.

Table ES-2. Summary Matrix of Impacts (continued)

Alternatives	Impact Area				
	Biological Resources	**Water & Sediment Quality**	**Cultural Resources**	**Human Health & Safety**	**Socioeconomics**
Release of Rehabilitated Animals					
Alternative D2- Status Quo	Minor, short- and long-term, adverse and beneficial effects on marine mammals. Release activities (tagging, marking, and transport) may have adverse effects. Released animal could carry a zoonotic disease and infect wild population. Adverse effects on all biological resources from equipment use, spills of hazardous materials or wastes from equipment, vessels, or vessel accidents.	Minor, short-term, direct adverse effects could occur from spills of hazardous materials or wastes from release vessels; a vessel accident; or leaks from equipment into sand or surrounding waters.	Minor, long-term, adverse effects on cultural resources buried in sand from equipment and vehicle use on beaches.	Minor, short-term, direct adverse effects on release personnel, including physical injuries and exposure to chemicals.	Minor to moderate, adverse effects as continued expenses would be incurred from release activities. Facilities that release more animals, larger species of marine mammals, or those that need to travel greater distance to release animals would incur a greater share of expenses.
Alternative D3 (Preferred)	Same effects as Alternative D2, with one exception. Release criteria would be implemented and may reduce the effects on marine mammals.	Same effects as Alternative D2.	Same effects as Alternative D2.	Same effects as Alternative D2	Minor to moderate, adverse effects as costs may increase at each facility in order to comply with the release criteria. Possible addition of facilities could help offset the release activities and their costs.
Disentanglement Activities					
Alternative E1- No Action	Major, long-term adverse effects on marine mammals from ending the Disentanglement Network as animals would have increased pain and suffering and would most likely die. No significant effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds. Gear on an entangled animal may be shed and become marine debris, which could potentially harm biological resources.	No effects on water and sediment quality.	No effects on cultural resources.	Beneficial effects would be expected as risks to responders would end. Potential adverse impacts on public health if individuals attempt to disentangle an animal.	Minor to moderate, beneficial effects on current participants could occur from the elimination of expenses incurred from disentanglement activities.
Alternative E2- Status Quo	Minor, short-term adverse effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, birds, and marine mammals from spills of hazardous materials or wastes from vessels or a vessel accident. Minor to major, short- and long-term, beneficial and adverse effects on marine mammals. Disentanglement would continue; new responders could not be added. Animal adverse reactions to close approaches, physical/chemical restraint, or be injured during the process.	Minor, short-term, adverse effects could occur from spills of hazardous materials or wastes from release vessels or a vessel accident.	No effects on cultural resources.	Adverse effects on responders, including physical injuries, exposure to chemicals, potentially death. Potential adverse impacts on public health if individuals attempt to disentangle an animal.	Minor to moderate, adverse effects would continue to be borne by participants engaged in disentanglement activities.

Table ES-2. Summary Matrix of Impacts (continued)

Alternatives	Impact Area				
	Biological Resources	**Water & Sediment Quality**	**Cultural Resources**	**Human Health & Safety**	**Socioeconomics**
Disentanglement Activities					
Alternative E3 (Preferred)	Same effects as Alternative E2, except that new responders and techniques could be added and Disentanglement Guidelines/training would be in place to reduce adverse effects.	Same effects as Alternative E2.	No effects on cultural resources.	Same effects as Alternative E2. There would be less risk under this alternative, as modifications new tools and techniques and the Disentanglement Guidelines/training could reduce safety risks.	No impacts to East Coast participants. Minor to moderate, adverse effects would be borne by West Coast participants due to modifications of current operations and training expenses.
Biomonitoring & Research Activities					
Alternative F1- No Action	Adverse effects on marine mammals as important health information would no longer be collected. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds.	No effects on water and sediment quality.	No effects on cultural resources.	Beneficial effects would be expected as risks from research activities would end.	No effects on socioeconomics.
Alternative F2- Status Quo	Minor, short-term adverse effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, birds, and marine mammals from spills of hazardous materials or wastes from vessels; a vessel accident; or leaks from equipment into sand or surrounding waters. Protected and sensitive habitats and SAV and macroalgae could be damaged by vessels/researchers. Sea turtles/birds and their nests could be disturbed/ damaged. Fish may be caught in nets or disturbed. Minor to major, short- and long-term, adverse effects on marine mammals from close approach, tagging, marking, restraint, handling, capture, transport, sampling, and other activities. Long-term beneficial effects from collection of health information.	Minor, short-term, direct adverse effects could occur from spills of hazardous materials or wastes from release vessels; a vessel accident; or leaks from equipment into sand or surrounding waters.	Adverse effects would not likely occur. Potential effects on submerged cultural resources or resources buried in sand from equipment and vehicle use on beaches and vessel use in nearshore waters.	Minor, short-term, direct adverse effects on research personnel, including physical injuries, exposure to chemicals, and exposure to zoonotic diseases.	Minor to moderate, adverse effects could occur depending on the nature of biomonitoring and research activities and the ongoing personnel and research expenses.
Alternative F3 (Preferred)	Same effects as Alternative F2, with other adverse effects from new research activities.	Same effects as Alternative F2.	Same effects as Alternative F2.	Same effects as Alternative F2.	Minor to moderate, adverse effects could occur depending on the nature of new biomonitoring and research activities and the ongoing personnel and research expenses.

DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT FOR THE MARINE MAMMAL HEALTH AND STRANDING RESPONSE PROGRAM

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1. Purpose and Need for the Proposed Actions

1.1 Introduction

This draft Programmatic Environmental Impact Statement (PEIS) has been prepared pursuant to the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality's (CEQ) Regulations for Implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and the National Oceanic and Atmospheric Administration (NOAA) environmental review procedures (NOAA Administrative Order [NAO] 216-6). It describes a reasonable range of alternatives and the existing environmental conditions. The draft PEIS contains a detailed analysis of the environmental consequences of the alternatives. This chapter describes the Marine Mammal Health and Stranding Response Program (MMHSRP) and the underlying purpose and need for the proposed actions.

1.2 Establishment and Overview of the MMHSRP

1.2.1 Establishment of the MMHSRP

Public response to marine mammals in distress, particularly those that are on the beach or "stranded," has occurred in various forms for decades. Historically, private organizations were founded to respond to stranded marine mammals. Many efforts were also conducted by museums to obtain marine mammal specimens for their collections. Aquaria with marine mammals in captivity also responded and provided veterinary care to stranded and injured marine mammals, particularly cetaceans. Prior to the 1970s, response was extremely localized, relatively inconsistent, and occurred with minimal Federal involvement. Communication between different groups responding to strandings was minimal, and accounts of single strandings were not integrated into any sort of meaningful analysis or overall picture that reflected animal stranding patterns or distributions.

With the passage of the Marine Mammal Protection Act (MMPA) in 1972, Congress gave jurisdiction over marine mammals in U.S. waters to the Federal government. All cetaceans and all pinnipeds, except walrus (*Odobenus rosmarus*), were placed under the jurisdiction of the Department of Commerce and is now specifically housed in the National Marine Fisheries Service (NMFS), NOAA. The Department of the Interior, U.S. Fish and Wildlife Service (USFWS) was given authority over walrus, sea otters (*Enhydra lutris*), sirenians (manatees [*Trichechus spp.*] and dugongs [*Dugong dugon*]), and polar bears (*Ursus maritimus*). The MMPA protected marine mammals from capture or harassment, and NMFS implementing regulations prohibited the possession of parts from carcasses

except by those specifically authorized to do so. This was a significant driving force in the development of a formal regional stranding network.

The U.S. Marine Mammal Commission (MMC) sponsored a workshop in 1977 which brought scientists together to discuss marine mammal strandings. One recommendation from that workshop was to establish a framework for a national marine mammal stranding network with regional centers and a centralized data file, coordinated by NMFS. The network was formally established, and was organized, as independent volunteer organizations coordinated through each of the NMFS jurisdictional regions.

Throughout the 1980s, the stranding network continued to grow across the U.S. and worldwide. Information, mostly from stranded animals, began to accumulate on marine mammal mortalities caused by human interactions, such as fisheries, and marine mammal mass mortality events. In the late 1980s, a number of mass mortality events occurred in the U.S. and abroad, gaining significant public attention. A mass die-off of humpback whales (*Megaptera novaeangliae*) in the Northeast U.S. was linked to saxitoxin, resulting from a harmful algal bloom (HAB). Hundreds of bottlenose dolphins (*Tursiops truncatus*) stranded dead in the Southeast U.S. due to *Morbillivirus* infection. The investigation into these events encountered significant difficulties due to the lack of baseline data on marine mammal health and NMFS and Congressional efforts began to formalize the health and stranding program. Mounting evidence from these strandings and others showed high levels of anthropogenic contaminants, such as persistent organic pollutants (POPs), raising concerns about the overall health of marine mammal populations. Interest in marine mammal health and strandings continued to increase as the public raised concerns about deteriorating ocean conditions. Based on these growing concerns Congress passed the Marine Mammal Health and Stranding Response Act (MMHSRA) in 1992.

Under the MMHSRA, the MMHSRP was formalized with the passage of Title IV, an amendment to the MMPA. This Act charged the Secretary of Commerce to develop a marine mammal health and stranding response program with three goals:

1. Facilitate the collection and dissemination of reference data on the health of marine mammals and health trends of marine mammal populations in the wild;
2. Correlate the health of marine mammals and marine mammal populations, in the wild, with available data on physical, chemical, and biological environmental parameters; and

3. Coordinate effective responses to unusual mortality events (UMEs) by establishing a process in the Department of Commerce in accordance with Section 404 of the MMPA.

In this legislation, there is specific language relative to stranding networks. First, a stranding was defined as "an event in the wild in which (A) a marine mammal is dead and is (i) on a beach or shore of the United States; or (ii) in waters under the jurisdiction of the United States (including any navigable waters); or (B) a marine mammal is alive and is (i) on a beach or shore of the United States and is unable to return to the water; (ii) on a beach or shore of the United States and, although able to return to the water, is in need of apparent medical attention; or (iii) in the waters under the jurisdiction of the United States (including any navigable waters), but is unable to return to its natural habitat under its own power or without assistance" (16 United States Code [U.S.C.] 1421h). Secondly, the Department of Commerce is authorized by Section 112(c) of the MMPA to enter into agreements with individuals or groups to "take" marine mammals in response to a stranding event. "Take" means to "harass, hunt, capture, or kill or to attempt to harass, hunt, capture, or kill any marine mammal" (16 U.S.C. 1362). Title IV also mandated the implementation of several other programs under the umbrella of the MMHSRP. These programs are described below.

1.2.2 Overview of the Current MMHSRP

Since the passage of Title IV, the MMHSRP has grown significantly. The current MMHSRP includes the following components:

- National Marine Mammal Stranding Network
- Marine Mammal UME Program
- National Marine Mammal Tissue Bank (NMMTB) and Quality Assurance Program
- Marine Mammal Health Biomonitoring, Research, and Development
- Marine Mammal Disentanglement Network
- John H. Prescott Marine Mammal Rescue Assistance Grant Program (a.k.a. the Prescott Grant Program)
- Information Management and Dissemination.

The National Marine Mammal Stranding Network consists of organizations nationwide who respond to stranded or entangled pinnipeds (except walrus) and all cetaceans within U.S. waters. These organizations are authorized to respond under the MMPA, utilizing the authority of either Section 112(c) or Section 109(h). Organizations operating under 112(c) authority have entered into formal

agreements with NMFS for stranding response. These agreements are known as Stranding Agreements (SAs), previously termed Letters of Agreement (LOAs). Organizations with SAs include non-profits, for-profits, institutions of higher education, museums, governmental agencies, and individuals. Section 109(h) of the MMPA allows Federal, state, and local government employees in the line of duty to take a stranded marine mammal in a humane manner (including euthanasia) if such taking is for: the protection or welfare of the mammal; the protection of public health and welfare; or the nonlethal removal of nuisance animals. Appendix F lists the current (2007) members of the NMFS National Stranding Network. The National Stranding Database was mandated under the MMPA (16 U.S.C. 1421f) to contain marine mammal health reference data and data on species that are subject to UMEs. The establishment of a data access policy was also mandated, to allow access to marine mammal tissues in the NMMTB, any analyses conducted on these tissues, and other marine mammal data in the database. Standardized datasheets to record stranding information have been developed and are revised periodically.

The Working Group on Marine Mammal Unusual Mortality Events (WGMMUME), mandated under the MMPA (16 U.S.C. 1421c), is a multidisciplinary panel of experts organized by NMFS to assist in determining criteria for UMEs. A UME is defined in the MMPA as "a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response." The WGMMUME coordinates emergency responses and investigations into causes of mortality and morbidity. The Group also evaluates the environmental factors associated with UMEs, provides training and resources (when possible), and oversees the Marine Mammal UME Fund.

The development of the NMMTB at the National Institute of Standards and Technology was mandated by the MMPA (16 U.S.C. 1421f) and initiated by NMFS. Sources of tissues include: samples from UMEs; samples from marine mammals taken incidental to commercial fishing operations; samples from marine mammals taken for subsistence purposes; biopsy samples; and any other samples properly and legally collected. The MMHSRP was mandated to issue guidance "for analyzing tissue samples (by use of the most effective and advanced diagnostic technologies and tools practicable) as a means to monitor and measure overall health trends in representative species or populations of marine mammals…" (16 U.S.C. 1421f). The NMMTB provides a long-term archive for marine mammal tissue samples, so that future retrospective analyses can be conducted. The MMHSRP also coordinates and conducts field assessments of wild populations of marine mammals, particularly in areas where there is a health question or concern, such as a previous mass stranding, UME, die-off, or outbreak.

Analogous to the stranding network, response to entangled marine mammals was conducted at a local level on an ad hoc basis for several decades. NMFS Headquarters and the NMFS Northeast Region began the formalization of the Marine Mammal Disentanglement Network in 1997, when a contract was issued to the Provincetown (Massachusetts) Center for Coastal Studies (PCCS) to respond to entangled large whales along the East Coast. The Disentanglement Network is a partnership between NMFS, PCCS, the U.S. Coast Guard (USCG), state agencies, and other entities. The Disentanglement Network is responsible for monitoring and documenting whales that have become entangled in fishing gear, as well as conducting rescue operations. PCCS has established protocols for all aspects of response, including animal care and assessment; vessel and aircraft support; and media and public information. PCCS has also developed response equipment and currently trains other members of the stranding and disentanglement networks. Today, over 500 civilian and governmental volunteers have received training as first responders for entangled whales. Appendix F lists the current members of the Disentanglement Network.

The Prescott Grant Program was established under the Marine Mammal Rescue Assistance Act of 2000. NMFS was authorized to disburse $4.0 million to eligible members of the National Stranding Network for: the recovery or treatment of marine mammals; the collection of data from living or dead stranded marine mammals for scientific marine mammal health research; and facility operation costs. Since 2001, 187 awards totaling over $16.5 million have been disbursed to stranding network members. Projects funded by the Prescott Grant Program have resulted in an increase in stranding response, data collection, and scientific analyses.

1.3 Purpose and Need for the Actions

1.3.1 Purpose for the Actions

The purposes of the proposed actions are to respond to marine mammals in distress, including those stranded, entangled, and out of habitat, and to answer research and management questions about marine mammal health. Stranded and distressed marine mammal response is conducted for many reasons, including NMFS' legislative mandate and the need to obtain data for management and scientific purposes. Marine mammals are also sentinels of ecosystem health and may provide valuable links to human health. Response to marine mammals is also conducted out of a concern for animal welfare and ocean stewardship. Each of these reasons will be discussed below.

NMFS is mandated under Title IV of the MMPA with collecting, disseminating, and investigating correlates of data on marine mammal health and investigating UMEs. Due to the scope and nature of

marine mammal strandings in U.S. waters, NMFS has delegated responsibility for stranding response to local persons, organizations, and institutions through MMPA 112(c) agreements. These groups are required to share basic information from the response with NMFS to fulfill the statutory mandates. Basic information, such as location, animal disposition, and morphological data, is collected on a Level A datasheet. NMFS also conducts many research projects to assess marine mammal health on wild free-ranging animals, including remote sampling (biopsy, breath, etc.) and captures. These research projects allow the MMHSRP to utilize controlled experimental designs (*i.e.,* number of samples, age classes, sex, location) and collect samples from off-shore species that are rarely reported stranded on beaches.

NMFS has an interest in collecting data from stranded and wild animals to monitor marine mammal population status and health. Data from stranding events and health-related research projects are utilized in marine mammal stock assessment reports. Reports of interactions between fisheries and marine mammals, particularly if the interaction may have played a role in the mortality of the marine mammal, are also very important data for fishery management.

Information obtained from stranded, sampled, and captured marine mammals is also important in expanding a basic biological understanding of many species. Geographic locality of strandings and rates of occurrence can reflect species distribution and abundance; seasonal patterns may also be interpreted. For some species that are cryptic and difficult to observe at sea *(e.g., Kogia sp.*), population distribution information from surveys may be incomplete or underestimated. Records of stranded animals may help fill in some of the gaps. By placing tracking devices on rehabilitated and captured marine mammals, movement and diving behavior can also be studied in species that have never otherwise been tagged, in addition to assessing the fate of the released animal. Recently rehabilitated and tracked rare marine mammal species include Risso's dolphins (*Grampus griseus*) and rough-toothed dolphins (*Steno bredanensis*).

Samples collected from stranded marine mammals are used in a variety of scientific research projects. Life history studies utilizing tissues from stranded marine mammals can determine age (growth layer groups in teeth or bones), sexual maturity (dissection of ova or testes), and reproductive history (scars in the ovaries of females documenting ovulation and pregnancy). Other studies can determine food habits (through prey remains in stomachs and digestive tracts) and the relationship between traits and other variables (age at sexual maturity, length at sexual maturity, differences in food habits with geographic range, etc.). Field studies investigating similar attributes may require years or decades of dedicated survey or remote sensing efforts, and can only be performed on certain populations of

individually identifiable marine mammal species. Scientific studies of stranded marine mammals have improved the understanding of genetic diversity and relatedness, contaminants and toxins in marine mammals, marine mammal diseases, and parasites. Most of the samples used in these studies are impossible to collect from free-ranging marine mammals, particularly offshore species which can be logistically difficult to locate and study. However, the MMHSRP is involved in several health research projects, and samples collected remotely via biopsies and other methods, or collected via health assessment captures may provide basic information about populations including genetic identification of individuals or stocks, feeding behavior, disease prevalence, toxicological information, and general population health.

Marine mammals are sentinels of ocean health. As top predators in the ocean ecosystem, marine mammals reflect their prey and their environment. Many environmental contaminants and biotoxins accumulate upwards in the food web, and can be detected at high levels in predators. Changes in the temporal and geographic distribution in pathogens, prey, and toxins may be detected in stranded marine mammals. These differences reflect changes in the severity, transport, concentration, and dispersion of these elements in the environment, creating a picture of environmental variability and change over space and time.

The health of marine mammals has also been linked to human health, both directly and as models. By examining strandings, threats that are shared by humans who utilize the marine ecosystem may be investigated. Marine mammals serve as models to examine the effects of biotoxins and disease on a mammalian system. Directly, many of the diseases that marine mammals have are considered "zoonotic," which means that they have the potential to spread between animals and humans. Some zoonotic diseases that have been detected in marine mammals include brucellosis, leptospirosis, *West Nile virus*, *Erysipelothrix rhusiopathiae*, rabies, *Herpes virus*, and *Morbillivirus*. Marine mammals can directly serve as warning signals that these disease organisms are present in the marine environment, even if they have not been detected in other sampling or monitoring programs. Marine mammals also have a direct link with human health in those areas and cultures in which consumptive uses (*i.e*. harvest and eating) of marine mammals are practiced. In the U.S., this occurs primarily in Alaska Native communities.

A final rationale for stranding response is out of a greater concern for the ocean or the environment in general. Humans perceive themselves as caretakers of ocean resources, including marine mammals. There is a desire to responsibly manage these resources for the use and enjoyment of current and

future generations. Those involved in stranding response derive a sense of accomplishment from helping marine mammals return to the wild, either immediately or after rehabilitation.

1.3.2 Need for the Actions

NMFS is charged with the national oversight and collaboration of the MMHSRP, and creating policies that will work for the majority of participants. The MMHSRP has identified several needs for effectively carrying out the mandates of Title IV:

1. Operational efficiency - To operate the MMHSRP effectively and efficiently, maximizing the benefits from opportunistic events while making the best use of limited resources;
2. Quality data - To collect data on marine mammal health and health trends in an organized and consistent manner to meet current and future information needs for appropriate conservation and management; and
3. Safety –To implement policies to ensure that MMHSRP activities are conducted humanely and in a manner that protects the safety of volunteers and the public to the maximum extent possible.

To meet the purpose and need, the MMHSRP developed the following four proposed actions:

1. Issuance of the Policies and Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release (a.k.a. Policies and Best Practices) as final guidance.
2. Issuance of a new Endangered Species Act (ESA)/MMPA permit to the MMHSRP. The new permit would include current and future response activities for endangered species, disentanglement activities, biomonitoring projects, and import and export of marine mammal tissue samples.
3. Continuation of current MMHSRP operations, including response, rehabilitation, release, and research activities, with renewal and authorization of SAs and Scientific Research Authorizations and other NMFS activities referenced in Section 1.3.1.
4. Continuation of the Prescott Grant Program.

1.3.2.1 Policies and Best Practices Manual

The Policies and Best Practices manual is a collection of protocols and guidance for stranding response, rehabilitation, and release activities. These documents, developed by NMFS (and USFWS for release activities), would be used to standardize practices of the National Stranding Network members, while allowing for regional flexibility. The manual is currently released as an interim draft

and would be issued as final guidance after the NEPA analysis has been completed. Future development of these protocols and guidance may involve the issuance of regulations and subsequent NEPA analyses, but none are currently proposed. The five draft documents included in the manual are the:

- Evaluation Criteria for a Marine Mammal SA (New Applicants and Renewals)
- National Template for Marine Mammal SAs
- Standards for Marine Mammal Rehabilitation Facilities (a.k.a. Rehabilitation Facility Standards)
- Standards for the Release of Rehabilitated Marine Mammals (a.k.a. release criteria)
- Marine Mammal Disentanglement Guidelines

These documents are summarized in Section 2 and their full text is located in Appendix C.

1.3.2.2 ESA/MMPA Permit

The NMFS Office of Protected Resources, Permits, Conservation and Education Division (PR1) issues the ESA/MMPA permit to authorize takes of marine mammals, including threatened and endangered species. The permit covers some of the MMHSRP's activities including emergency response activities for threatened and endangered species, health assessment studies, and other research projects.

The current permit, NMFS Permit No. 932-1489-08 (Appendix G), which expires June 30, 2007, allows the MMHSRP Coordinator to:

- Collect, preserve, label, and transport all species of the Orders Cetacea and Pinnipedia (except walrus), for tissue and fluid samples for physical, chemical, or biological analyses, import, and export;
- Take stranded or distressed marine mammals, including threatened or endangered species;
- Salvage specimens from dead marine mammals, including threatened or endangered species;
- Conduct aerial surveys to locate imperiled marine mammals or survey the extent of disease outbreaks or die-offs;
- Harass marine mammals on land incidental to other MMHSRP activities authorized by the permit; and
- Develop and maintain cell lines from species under NMFS jurisdiction.

Takes of live marine mammals include those that are stranded, entangled, disentangled, trapped out of habitat, extra-limital, in peril (*e.g.*, in vicinity of an oil spill), or are a nuisance. The permit does not authorize takes of USFWS species, but fluid and tissue samples of USFWS species may be received if they were collected legally. Sources of legally obtained samples for research activities are listed in Appendix G.

As the Principal Investigator (PI), the MMHSRP Coordinator may add Co-Investigators (CIs) to conduct research and enhancement activities under this permit at their discretion. Addition of CIs typically occurs following a review of the proposed activities (including protocols and statistical analyses) and curriculum vitae of the investigator. Under the current ESA/MMPA permit, animals may be taken during close approach, capture, tagging, marking, biopsy sampling, collection of sloughed skin and feces, breath sampling, blood sampling, administration of drugs, euthanasia, video recording, and incidental harassment. General descriptions of these research methodologies are in Appendix H. Live threatened and endangered species may be taken during emergency response. This includes returning the animal back to the wild; treating a distressed condition; disentangling an animal on the beach or at sea; transporting the animal for return to the wild or a treatment/rehabilitation facility; or humanely euthanizing the animal.

For import and export of marine mammal specimens, the MMHSRP may be required to have import and export permits, if the species is listed on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix I or II. The CITES permits are issued by the USFWS and are required to import and export samples, parts, carcasses, or live animal species (for treatment or release) listed on CITES Appendix I. Species listed on CITES Appendix II only require an export permit, unless the importing country has stricter measures than CITES.

Under the preferred alternative (Section 2.1.6.2), the new permit would be issued on or before July 1, 2007 and activities would be authorized for five years (the length allowed for a permit). Takes of live marine mammals would also include animals that are: exhibiting abnormal behavior; injured or diseased; in need of medical treatment; a potential to cause harm or a health risk to a wild population or to human health; released from public display, rehabilitation facilities, research facilities, or capture/release projects. Live marine mammals may also be taken from rehabilitation facilities if they are neglected, abused, or have other humane issues. Samples legally obtained for research activities would be expanded to include samples from: live animals during surveillance; imported samples; confiscated animals (*e.g.* as part of enforcement action); or animals legally taken in other permitted research activities in the U.S. or abroad. New activities that would be listed under the new permit

include, but would not be limited to passive acoustic recording, active acoustic playbacks, and vaccinations (including clinical trials and use in wild populations). General descriptions of these research methodologies are in Appendix H.

1.3.2.3 MMHSRP Operations

The day-to-day operations of the MMHSRP include coordination and oversight of the National Marine Mammal Stranding Network and the Disentanglement Network. The MMHSRP authorizes response and rehabilitation activities through SAs, issued under Section 112(c) of the MMPA. SA authorizations have been delegated to the NMFS Regional Administrators. Issuance and periodic review of these SAs is undertaken by the MMHSRP through the Regional Stranding Coordinators, located in each NMFS jurisdictional region. Through SAs, NMFS authorizes persons, organizations, or institutions to respond to reports of marine mammals that are stranded or in distress. Stranding data are collected and maintained in the National Database. The MMHSRP also coordinates UME investigations with the WGMMUME. The MMHSRP reviews the evaluation and decision to release rehabilitated animals. If rehabilitated animals are deemed non-releasable, the MMHSRP will oversee the transfer of these animals to public display or scientific research facilities.

The MMHSRP authorizes marine mammal disentanglement efforts under its ESA/MMPA permit (see Section 2.1.5). The MMHSRP also funds some of the disentanglement activities through contracts. The ESA/MMPA permit also authorizes stranding response to ESA-listed marine mammal species and a variety of marine mammal research projects (see Section 2.1.6 and Appendix H). The MMHSRP issues Authorization Letters to qualified researchers to allow the use of stranded marine mammal parts in scientific research projects. The MMHSRP oversees the collection and maintenance of marine mammal tissue samples in the NMMTB. The MMHSRP also issues grants and cooperative agreements through the Prescott Grant Program to stranding network participants and researchers utilizing samples from stranded marine mammals. All activities conducted utilizing federal funds are under the authority of the SA or Authorization Letter.

1.3.2.4 Prescott Grant Program

The MMHSRP partially funds some of the activities of the National Marine Mammal Stranding Network through the competitive Prescott Grant Program, which disburses up to $4 million per year to stranding network members and researchers. Some of this grant money is used to fund response and rehabilitation activities (transportation, equipment, supplies, and salary) and research activities utilizing samples or data from stranded marine mammals. These activities are authorized either by

the recipient's SA, Regional Authorization letter to possess marine mammal parts from stranded animals, or separately issued ESA/MMPA scientific research permit.

The awarding of competitive grants is a multi-step process which addresses compliance with NEPA and other applicable laws and regulations several times. A complete application must contain enough information on the potential environmental impacts of the project for NOAA to make a NEPA compliance determination. These applications are evaluated through peer-review and internal NMFS merit review panels, who take into consideration the environmental information that was provided. After the funding decision has been made regarding which projects have been selected, the Prescott program will assess the activities contained within each proposal to ensure that they have been addressed in this PEIS. These activities may include stranding response, rehabilitation, release, and scientific research activities that are authorized under the MMHSRP's MMPA/ESA permit. If the project falls entirely within the scope of the PEIS, no further environmental review will be conducted. If projects are selected for funding that include activities that are not assessed in this document (*e.g.*, facility construction or renovation), a separate environmental analysis will be prepared for that award. In addition, each award may have Special Award Conditions imposed upon it with respect to environmental compliance, if necessary.

A list of all projects previously funded by Prescott Grant funds, with recipient and title, is given in Appendix K. This grant program is subject to annual Congressional appropriation, which may be reduced or eliminated in any fiscal year, and recipients should consider Prescott grant funds as supplemental to their operating budgets.

1.4 Region of Influence

The Region of Influence (ROI) for the alternatives includes all areas where MMHSRP activities may occur. The ROI is geographically defined as the coastal zone and marine waters of the U.S., including the Exclusive Economic Zone (EEZ). The coastal zone includes coastal waters, adjacent shorelands, intertidal areas, salt marshes, wetlands, and beaches. The ROI also includes the marine mammal rehabilitation facilities of the stranding network (described in Section 2.1.3). In Section 3.2, Biological Resources, the discussion on marine mammals has been divided according to the six NMFS regions. This has been done to address the differences in marine mammal species and strandings within each region. The states and territories included in the NMFS Northeast, Southeast, Southwest, Northwest, Alaska, and Pacific Islands regions are listed in Table 1-1.

Table 1-1. Description of NMFS Regions

NMFS Regions	States/Territories
Northeast	ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, VA
Southeast	NC, SC, GA, FL, AL, MS, LA, TX, PR, VI
Southwest	CA
Northwest	OR, WA
Alaska	AK
Pacific Islands	HI, Guam, American Samoa, Commonwealth of the Northern Mariana Islands (CNMI)

1.5 Public Involvement Process

NMFS is required by NEPA to provide the public an opportunity to comment on the PEIS. The Notice of Intent (NOI) was published in the Federal Register (FR) on December 28, 2005 (70 FR 76777-76780). The NOI announced NMFS' decision to prepare a PEIS and conduct public scoping meetings. Scoping meetings were held in January and February of 2006 in each NMFS region. Comments on the scope of the PEIS and the Policies and Best Practices were received. The scoping process and public comments received can be found in the Scoping Report (Appendix D).

NMFS will make the Draft PEIS available to the public for a 45-day comment period, after the Notice of Availability (NOA) is published in the FR. NMFS will consider any comments submitted by agencies, organizations, or members of the public on the Draft PEIS. Copies of the Dear Reviewer letter and distribution list are located in Appendix A.

The Final PEIS will include the comments received on the Draft PEIS and NMFS responses to them. An NOA for the Final PEIS will be published in the FR. The public may comment on the document for 30 days after the NOA is published. After that time, a Record of Decision (ROD) will be prepared, detailing NMFS' decision regarding the MMHSRP and the alternatives.

1.6 Agency Cooperation and Consultation

NMFS invited the MMC, USFWS, U.S. Geological Survey (USGS), and the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) to be cooperating agencies in the PEIS process. APHIS is a cooperating agency for this PEIS. The USFWS and USGS declined to be cooperating agencies and the MMC did not respond. Cooperating agency responsibilities are outlined in 40 CFR 1501.6. At a minimum, a cooperating agency would provide reviews of preliminary documents. Cooperating agency correspondence is included in Appendix B.

Section 7 of the ESA requires that all Federal agencies consult with NMFS or USFWS, as applicable, before initiating any action that may affect a listed species. The MMSHRP initiated consultation with the NMFS Office of Protected Resources, Endangered Species Division and the USFWS. Consultation with NMFS is also required if a proposed action permitted, funded, or undertaken by a Federal agency could adversely affect Essential Fish Habitat (EFH). The MMHSRP has consulted with the NMFS Office of Habitat Conservation regarding EFH. Correspondence regarding ESA and EFH consultations is included in Appendix B.

The Coastal Zone Management Act requires Federal agency activities to be consistent, to the maximum extent practicable, with states' federally approved coastal management programs. NMFS has determined that the alternatives are consistent with the coastal management programs in the affected area. NMFS sent consistency determinations to the appropriate state coastal program administrators regarding its conclusion. NMFS is currently waiting for responses from each program. Correspondence regarding coastal zone management consultation is included in Appendix B.

As stated previously, this PEIS will serve as the NEPA analyses for the MMHSRP's ESA/MMPA permit application. The permit application has been submitted to NMFS PR1 for review. NMFS PR1 will distribute the application to other NMFS scientists, the MMC, NMFS Office of Law Enforcement, and other appropriate Federal agencies. NMFS PR1 will also publish a Notice of Receipt in the FR, which initiates a mandatory 30-day public comment period. NMFS PR1 will address any comments received on the application. NMFS PR1 will also comment on the PEIS to address any concerns relating to permit activities. Before issuance of the permit, NMFS PR1 will formally accept the Final PEIS as the NEPA analysis for the permit application. A Notice of Issuance of the permit will then be published in the FR.

1.7 Organization of the PEIS

The principal sections of this PEIS are as follows:

Section 1: Purpose of and Need for the Proposed Actions. This section briefly discusses the MMHSRP, describes the proposed actions, defines the project scope, explains the public involvement process, and identifies the organization of the document.

Section 2: Alternatives. This section describes the alternatives and alternatives considered but eliminated from further consideration.

Section 3: Affected Environment. This section describes the existing environmental conditions of select resources in the area in which the alternatives would occur.

Section 4: Environmental Consequences. Using information from Section 3, this section identifies the potential environmental impacts on each resource area under the alternatives. Direct and indirect impacts that may result from the alternatives are identified on a broad scale as is appropriate for a PEIS.

Section 5: Mitigation. This section identifies mitigation measures developed to address the potential environmental impacts identified in Section 4.

Section 6: Cumulative and Other Impacts. This section discusses the potential cumulative impacts that could result from the impacts of the alternatives, combined with past, other present and reasonably foreseeable future actions. Unavoidable impacts, irreversible and irretrievable commitment of resources, and the relationship between short-term uses and long-term productivity are also discussed.

Sections 7 and 8: These sections provide a list of this document's preparers and references.

Sections 9 and 10: These sections provide a glossary and index.

Appendices: This PEIS includes 13 appendices that provide additional information.

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2. Alternatives

2.1 Introduction

This section discusses the alternatives to implement the proposed actions. The alternatives are grouped into the following six topics: SAs and response; carcass disposal; rehabilitation activities; release activities; disentanglement; and biomonitoring and research activities. Activities and Policies and Best Practices documents are described under each issue, where appropriate, to clarify the actions taken under each alternative. A No Action Alternative, Status Quo Alternative, and Preferred Alternative are designated under each issue.

The No Action Alternative for each issue is based upon NMFS not undertaking the coordination and operation of the MMHSRP. Current SAs would not be renewed and new SAs would not be issued. The Policies and Best Practices manual and the ESA/MMPA permit would not be issued. The stranding and disentanglement networks would continue their current activities. As current SAs expired, the current National Stranding Network would cease to exist. Once the current ESA/MMPA permit expires on June 30, 2007, the current disentanglement network would no longer function.

2.1.1 Stranding Agreements and Response Activities

2.1.1.1 Response Activities

Response activities analyzed in this PEIS are only those that are conducted by groups operating under the authority of a SA, MMPA 109(h) (state and local governments), or another legal means. Response to a live stranded marine mammal may include beach assessment, capture, relocation, transport to a rehabilitation facility, euthanasia, and/or release back to the wild. Response to a dead stranded marine mammal may include beach assessment, collection of the carcass, field or laboratory necropsy, carcass disposal, and/or retention of parts and specimens. This may include the use of heavy machinery on or close to the beach in order to retrieve or move animals. Response may also include the administration of chemical agents (sedatives, antibiotics, euthanasia solution) or other veterinary intervention on the beach. While conducting a beach response, the stranding network member may cordon off or close areas of the beach to public access.

Hazing of marine mammals may occur if an animal is in the vicinity of an oil or hazardous material spill, HABs, or sonar. Animals may also be hazed to deter a potential mass stranding. For all marine mammals, including threatened and endangered species, hazing is authorized under the MMHSRP's ESA/MMPA permit. Hazing methods include, but are not limited to, the use of acoustic and visual

deterrents, vessels, exclusion devices, and capture and relocation. Active and passive acoustic deterrents may be used to deter cetaceans. Pingers, which are typically used in the commercial fishing industry, produce high-frequency pulses of sound to deter animals. Passive deterrents include devices that provide a reflection of echolocation signals. Pinniped acoustic deterrents include bells, firecrackers, or starter pistols. Visual deterrents for pinnipeds include flags, streamers, and flashing lights. Vessels can be used to herd animals back out to open water or away from a hazardous situation. Exclusion devices for pinnipeds may include nets or fencing.

2.1.1.2 Stranding Agreement Template and Criteria

While NMFS has issued SAs for many years, they have been in a variety of formats with a large amount of variability between regions. They have also differed significantly in the level of detail regarding the authorized activities of the agreement holder. The National Template for Marine Mammal SAs (see Appendix C) was developed to standardize the SA nationwide, while maintaining flexibility in certain areas to address differences in the NMFS regions. All sections that are in black are proposed to be implemented nationwide; the shaded sections are flexible and may be implemented on a region-by-region basis. The Template codifies the rights and responsibilities of both NMFS and the Stranding Network Participant. Different sections apply to different roles of stranding responders, and may be used independently or in conjunction with each other. For instance, a network member that only conducted dead animal response and necropsy activities would have Article III in their Stranding Agreement but not Article IV, V or VI, whereas a network member that responded to live and dead animals, and transported and rehabilitated live animals would have all Articles but VI, which corresponds to Designee organizations. One of the main differences between this template and previous versions utilized is Article IX, Section B, which sets out a procedure for probation, suspension and eventual termination following repeated violations of the terms and conditions of the SA.

The Evaluation Criteria for a Marine Mammal Stranding Program Agreement (a.k.a. SA criteria) are criteria for new and renewal SA applicants (see Appendix C). The qualifications were designed to standardize SAs across the U.S., but allow for regional flexibility when necessary. Qualifications are listed for response to dead stranded marine mammals/first response; response, triage, and transport of live stranded marine mammals; and rehabilitation and release of live stranded marine mammals.

2.1.1.3 Stranding Agreement and Response Alternatives

The following alternatives address the stranding response activities of the stranding network and the SA criteria in the Policies and Best Practices manual.

Alternative A1. No Action Alternative- SAs are not issued or renewed. No stranding response activities.

Under Alternative A1, NMFS would not issue new SAs or renew current SAs. The SAs would expire and authorized stranding response activities would end. The current stranding network would cease to exist. Federal (not including NMFS), state, and local agencies authorized under MMPA 109(h) would still be able to conduct emergency response to non-ESA listed species, and ESA-listed species under regulations at 50 CFR 17.21(c)(3) and 17.31(a), where applicable. However, response activities would likely be limited and localized, and would consist mostly of carcass disposal for the protection of public health and safety.

Alternative A2. Status Quo Alternative- Current SAs are renewed and current stranding response activities continue. Final SA criteria are not issued.

Under Alternative A2, NMFS would renew the current SAs but would not issue new SAs. Current stranding response activities would continue but new activities would not be included. New SA holders could not be added to the network and other changes to the network would not occur. The final SA criteria would not be issued. SAs would continue to be issued regionally with national programmatic oversight. Standardization would not occur or proceed slowly with resultant inefficiencies which may impact accomplishment of agency mandates.

Alternative A3. SAs are issued to any applicants after review. Final SA criteria are not issued. SAs include current and future stranding response activities.

Under Alternative A3, NMFS would issue SAs to any applicants after they were reviewed by the NMFS Regional Office (including renewals). The final SA Criteria would not be implemented, and the new SA template would not be utilized. SAs would include current and future stranding response activities.

Alternative A4. Preferred Alternative- Final SA criteria are implemented. SAs would be issued on a case-by-case basis. SAs include current and future stranding response activities.

Under Alternative A4, NMFS would implement the final SA criteria and issue SAs on a case-by-case basis to those entities meeting the SA criteria (including renewals and new applicants), utilizing the new SA template. SAs would include current and future stranding response activities.

Alternative A5. Final SA criteria are implemented. SAs would be issued on a case-by-case basis. Stranding response to threatened, endangered, and rare animals is **required**; response to other animals is optional.

Under Alternative A5, NMFS would implement the final SA criteria and issue SAs on a case-by-case basis to those entities meeting the SA criteria (including renewals and new applicants), utilizing the new SA template. SAs include current and future stranding response activities, however this alternative would require response to threatened, endangered and rare animals as part of the terms and conditions of the SA. Response to all other animals would be optional, but highly encouraged. Stranding participants could respond to these non-listed animals when feasible, based upon the availability of resources.

2.1.2 Carcass Disposal

2.1.2.1 Carcass Disposal Methods

During stranding response activities, carcass disposal methods depend on the species, the number and size of animals, location and logistics. Location includes coastal geography, currents, and state and/or local laws and regulations. Logistics refers to the availability of equipment, resources, and manpower. The method of carcass disposal will also be based upon the chemicals used on the animal, including antibiotics, sedatives, and/or euthanasia solution.

One method of disposal is to leave the carcass where the stranding occurred. Natural decomposition, scavengers, and the tide will eventually dispose of the remains. Leaving the carcass on-site is possible in uninhabited areas. However it is less feasible in populated areas where the carcass may be a public health or aesthetic concern, or if chemicals were used to euthanize the animal. Another method of disposal is to move a carcass from an unsuitable area (public beach) to a more appropriate location (a remote beach or a landfill) and let it decompose. Carcasses may also be buried onsite or transported and buried in a more suitable location. A carcass can be towed out to sea and released, but the release site must be far enough from shore so the carcass will not wash up again. If a carcass returns to shore, it necessitates further response and disposal activities. A carcass can also be sunk by attaching materials, such as cement barriers or chains, to weigh the carcass down.

Other industrial disposal methods include incinerating, rendering, and composting. The ability of the local stranding network to utilize these methods depends greatly on the resources available in their area and cost. Composting is an alternative method of carcass disposal that is not commonly used at the present time, but it is being explored in an experiment conducted by the University of New England utilizing funding from a recent Prescott grant. This study will look at the efficiency of composting, as well as the retention rate of euthanasia solution, bacteria and viruses, and possibly contaminants, by comparing readings from the pre-composted carcasses and the resulting compost. If composting were to be used as a method of carcass disposal, an additional NEPA analysis would be required.

2.1.2.2 Carcass Disposal Alternatives

The following alternatives define different options for marine mammal carcass disposal.

Alternative B1. No Action Alternative- No carcass disposal.

Under Alternative B1, NMFS would terminate carcass disposal. Current SAs would expire and stranding response would cease; any disposal activities conducted by stranding network members would also cease. Carcasses of stranded animals would be left on-site to decompose or wash back out into the ocean. Federal (not including NMFS), state, and local agencies authorized under MMPA 109(h) would still be able to conduct carcass disposal of non-ESA listed species, and ESA-listed species under regulations at 50 CFR 17.21(c)(3) and 17.31(a), where applicable for the protection of public health and safety. Their methods of carcass disposal and their impacts would not be covered under the MMHSRP.

Alternative B2. Status Quo Alternative- Current methods of carcass disposal continue.

Alternative B2 would continue the current carcass disposal methods used by stranding network members.

Alternative B3. Preferred Alternative- Recommendation to transport chemically euthanized animal carcasses off-site.

Under Alternative B3, NMFS would advocate the removal of chemically euthanized animal carcasses off-site for disposal by incineration, landfill, or other methods such as composting. Animals that die naturally or euthanized by other means may be disposed of by whatever means feasible and allowed, including those methods described in Section 2.1.2.1.

2.1.3 Rehabilitation Activities

2.1.3.1 Rehabilitation Facilities and Activities

Thirty facilities are currently authorized under SAs, the National Contingency Plan, or as NMFS designees to conduct marine mammal rehabilitation on species under NMFS jurisdiction (see Appendix F). These facilities are highly variable in terms of species treated, capacity, and facility amenities. Some rehabilitation is conducted in the open ocean, by using nets to fence off a bay or lagoon, or by using floating platforms with nets attached. Some facilities have elaborate structures including inground pools and underwater observation windows, while other groups have only aboveground or temporary pools, which are assembled only when needed. The length of time that a facility can rehabilitate an animal may depend on the species, medical needs, or the available equipment. Most rehabilitation activities conducted in temporary ("pop-up") pools with or without external filtration units must be short-term (days or possibly weeks), and efforts focus primarily on stabilization and assessment. Other organizations are capable of long-term rehabilitation efforts of weeks or months, although usually at considerable cost (in both money and effort). Carcass disposal methods at rehabilitation facilities include rendering, incinerating, or burial in a landfill.

Rehabilitation activities conducted by state or local government official in the normal course of their duties are covered by regulation at 50 CFR 216.22 (a)(3): "Where the marine mammal in question is injured or sick, it shall be permissible to place it in temporary captivity until such time as it is able to be returned to its natural habitat." The governmental official is required to report to the Secretary of Commerce the activities under this section every six months details on the marine mammal take, including "the description of the place and means of confinement and the measures taken for its maintenance and care" when the animal has been retained in rehabilitation (50 CFR 216.22(b)(5)).

2.1.3.2 Rehabilitation Facility Standards

The Rehabilitation Facility Standards set minimum facility, husbandry, and veterinary standards for rehabilitating marine mammals to optimize the success of releasing the animals back to the wild (see Appendix C). The standards also address personnel health and safety issues and contingency planning. Some standards are based on the Animal Welfare Act regulations, which define minimum standards for captive marine mammals. Standards are also based on expert input from a 1998 NMFS workshop in Miami, Florida. Recommended standards (above the minimum) are included for facility design and operation and are suggestions for optimizing the rehabilitation success rate. Meeting or

exceeding the recommended standards may be considered a goal to strive towards when upgrading existing or designing new facilities or protocols.

2.1.3.3 Rehabilitation Activities Alternatives

The following alternatives address the rehabilitation activities of the stranding network and the Rehabilitation Facility Standards in the Policies and Best Practices manual.

Alternative C1. No Action Alternative- No rehabilitation of stranded animals.

Under Alternative C1, NMFS would terminate the rehabilitation of stranded animals. Current SAs would expire, stranding response would cease, and therefore animals would not be rehabilitated. Sick and injured animals would be left on the beach.

Alternative C2. Status Quo Alternative- Current rehabilitation activities continue.

Under Alternative C2, NMFS would continue the current rehabilitation activities of the stranding network. New rehabilitation facilities could not be added to the stranding network. Adaptive changes to rehabilitation activities would not be permitted. The final Rehabilitation Facility Standards would not be implemented.

Alternative C3. Preferred Alternative- NMFS issues new SAs and response and rehabilitation activities continue. Final Rehabilitation Facility Standards are implemented.

Under Alternative C3, NMFS would continue the current rehabilitation activities of the stranding network, with the ability to designate new rehabilitation facilities and modify rehabilitation activities if necessary. The final Rehabilitation Facility Standards would be implemented.

Alternative C4. New SAs are issued and response and rehabilitation activities continue. Rehabilitation of threatened, endangered, and rare animals is **required**; response to other animals is optional. Final Rehabilitation Facility Standards are implemented.

Under Alternative C4, NMFS would require the rehabilitation of stranded threatened, endangered, and rare animals. Rehabilitation of all other animals would be optional, but highly encouraged. Stranding participants could rehabilitate these animals when feasible, based upon the availability of resources. The final Rehabilitation Facility Standards would be implemented.

2.1.4 Release of Rehabilitated Animals

2.1.4.1 Release Activities

Release of a rehabilitated animal occurs when an attending veterinarian, after consultation with NMFS, determines the animal is releasable. The presumption and goals for rehabilitated animals are to release them back to the wild. In some cases, releasing a rehabilitated animal may not be the best solution for either the individual animal or its conspecifics (members of the same species). The minimum protocols for the release of a rehabilitated marine mammal are covered under regulation at 50 CFR 216.27. Every six months, the marine mammal must be evaluated for releasability by the attending veterinarian. The release determination recommendation and a release plan are made by the attending veterinarian of the rehabilitation facility, in consultation with their assessment and/or husbandry team. This plan includes: 1) a description of the marine mammal, including its physical condition and estimated age; 2) the date and location of the proposed release; and 3) the method and duration of transport prior to release, per 50 CFR 216.67 (a)(2)(ii). The recommendation and release plan are reviewed and approved or changed, if necessary, by NMFS prior to a release. The release recommendation and plan are provided to NMFS at least 15 days in advance of a proposed release date. The NMFS Regional Administrator may allow for pre-approved waivers for routine pinniped cases as stated in 50 CFR 216.27(a)(2)(i)(A). This allows for the release of animals without the required 15 day advanced notice or detailed release plan for an individual case. Typically these waivers apply to cases involving routine diagnosis (*i.e.,* known cause of stranding), treatment, and rehabilitation. Such waivers require the rehabilitation facility to submit a treatment and release protocol for approval. Waivers are not considered for cetacean cases. Non-releasable animals may, with NMFS approval, be permanently placed in a public display or scientific research facility, or may be euthanized.

Prior to release, NMFS requires that animals are tagged or marked for individual identification, and the tag number or description of the marking reported to NMFS. Current commonly used forms of identification for cetaceans include photo identification, freeze branding, and/or a dorsal fin tag. Photo identification should include the body, face, dorsal fin, flukes, and pectoral flippers, as well as any identifying characteristics such as scars or color pattern markings. A numerical freeze brand (if applicable) would be placed on both sides of the dorsal fin or just below the dorsal fin. Roto-tags would be attached on the trailing edge of the dorsal fin. Identification of non-delphinid cetaceans is determined in consultation with NMFS. NMFS must also approve any additional forms of identification to be attached, such as VHF or satellite tags. All pinnipeds must be flipper tagged for

identification. Tags and placement instructions would be obtained from NMFS as appropriate for the pinniped species. Other identification methods, such as freeze branding or glue tags, may be used in addition to flipper tags. The identification method is detailed in the release plan, and will be approved by NMFS prior to being implemented, especially if unique or atypical methods are utilized.

Cetaceans are transported to release sites by vessel. Pinnipeds are transported via vehicle or vessel to beach or ocean release sites. Post-release monitoring is conducted for all released animals. Post-release monitoring may be conducted using mark-resight methodology, radio telemetry, or satellite tags. Monitoring should continue on a regular basis for at least one full year or, at a minimum, the battery duration of the tag.

2.1.4.2 Release Criteria

The release criteria provide guidance for determining the release of rehabilitated marine mammals to the wild (see Appendix C). The guidance includes marine mammal species under NMFS and USFWS jurisdiction. It is a joint document developed by NMFS and USFWS in consultation with marine mammal experts. Standards are also based upon review and public comment of the 1997 draft NOAA Technical Memorandum "Release of Stranded Marine Mammals to the Wild: Background, Preparation, and Release Criteria." The standards provide recommendations for the medical, behavioral, and developmental assessment of rehabilitated animals prior to release. Recommendations on release site selection and post-release monitoring are also included. The release criteria also require a health screen and certification before an animal is released.

2.1.4.3 Release Alternatives

The following alternatives address the release activities of the stranding network and the release criteria in the Policies and Practices manual.

Alternative D1. No Action Alternative- No animals to be released.

Under Alternative D1, NMFS would end the release of stranded animals. Current SAs would expire, stranding response and rehabilitation would cease, and therefore there would be no animals to release.

Alternative D2. Status Quo Alternative- Current release activities continue.

Under Alternative D2, NMFS would continue the current release activities of the stranding network. Adaptive changes to release activities would not be permitted. The final release criteria would not be implemented.

Alternative D3. Preferred Alternative- New SAs are issued and response, rehabilitation, and release activities continue. Final release criteria are implemented.

Under Alternative D3, NMFS would continue the current release activities of the stranding network, with the ability to modify release activities when necessary. The final release criteria would be implemented.

2.1.5 Disentanglement Network

2.1.5.1 Disentanglement Activities

Disentanglement efforts are conducted for many marine mammals. For large whales, disentanglement efforts may include vessel and aerial searches for the affected animal and incidental harassment of non-entangled animals during these searches. Close approaches, tagging, use of buoys or sea anchors to slow an animal's movement, cutting of lines and possibly flesh (when the line is embedded), and remote sedation may occur during disentanglement. For pinnipeds and small cetaceans, disentanglement efforts may include capture with incidental disturbance of non-entangled animals, restraint, surgery, rehabilitation, administration of chemical agents (sedatives and/or antibiotics), and release. Biopsy sampling may occur, either through the use of a remote dart or the collection of tissues from the removed fishing gear. Appendix H contains the general methodologies used during disentanglement activities. All disentanglement activities of ESA-listed species are authorized under the ESA/MMPA permit; disentanglement of non-listed species are conducted under the authority of the SA.

2.1.5.2 Disentanglement Guidelines

The Marine Mammal Disentanglement Guidelines provide the definitions and roles for First Responders, Primary First Responders, and Primary Disentanglers for large whale disentanglements (see Appendix C). The five levels of responders are described, including the targeted individuals, responsibilities, and the criteria to be certified for each level. A First Responder is anyone in the Disentanglement Network with any level of training who may respond to an entanglement report under Network protocols and authorization. A Primary First Responder is an individual with a higher network classification (Levels 3-5) that may direct efforts locally and, under certain conditions

and authorization, may attempt disentanglements during first response. A Primary Disentangler is an individual who can perform all the duties of a First Responder, but also meets the NMFS criteria to undertake the actual disentangling. Primary Disentanglers have a classification of Level 4 or 5 in the Network. Under the direction of the NMFS Disentanglement Coordinator, these Guidelines are currently in use for the Disentanglement Network on the East Coast (both NMFS Northeast and Southeast Regions). There are approximately 165 trained members of the Disentanglement Network with response levels ranging from 2-5. There are several thousand more members that have been trained at response level 1.

There are no standardized protocols for disentanglement of small cetaceans and pinnipeds. Currently, these animals are approached on a case-by-case basis by members of the stranding network, responding to them as they would to any other stranded animal. Response to entangled small cetaceans typically requires in-water capture of free-swimming animals. Some animals may have impaired locomotion if the gear is heavy or anchored. Entangled pinnipeds are typically captured on land when they are hauled out. Animals may be freed of gear and immediately released, or brought into a rehabilitation facility for a period of time prior to release.

2.1.5.3 Disentanglement Alternatives

The following alternatives address the disentanglement network and the Disentanglement Guidelines in the Policies and Practices manual.

Alternative E1. No Action Alternative- No disentanglement network.

Under Alternative E1, NMFS would terminate the disentanglement network. The current SAs would expire and pinniped and small cetacean disentanglement would end. The current ESA/MMPA permit would expire and disentanglement activities of ESA-listed species would not be authorized. Entangled animals may be monitored, (as long as they were not harassed during the monitoring activities), but no action would be taken to disentangle them.

Alternative E2. Status Quo Alternative- Disentanglement network continues current activities, no modifications or new members added.

Under Alternative E2, NMFS would continue the current activities of the disentanglement network. Current SAs would continue to allow disentanglement of pinnipeds and small cetaceans. The new ESA/MMPA permit would be issued and would authorize the current disentanglement activities for

ESA-listed species. New members could not be added to the disentanglement network. Adaptive changes to disentanglement activities, including the use of newly developed equipment, would not be permitted.

Alternative E3. Preferred Alternative- Disentanglement network continues current activities on East Coast with modifications to West Coast network. The Disentanglement Guidelines and training prerequisites would be implemented.

Under Alternative E3, NMFS would continue the current activities of the disentanglement network, with the ability to add new participants and modify disentanglement activities and technologies when necessary. Current and future SAs would continue to allow disentanglement of pinnipeds and small cetaceans. The new ESA/MMPA permit would be issued and would authorize the current and future disentanglement activities of ESA-listed species. The East Coast network would continue their current activities. Modifications would be made to the West Coast network to coordinate the structure and training with the East Coast network. The Disentanglement Guidelines and training prerequisites for network participants would be implemented nationwide.

2.1.6 Biomonitoring and Research

2.1.6.1 Biomonitoring and Research Activities

The MMHSRP conducts and sponsors a variety of diagnostic assessments and research projects relating to marine mammal health. The diagnostic assessments are conducted on stranded animals as well as live, free-ranging animals that are remotely biopsied or captured as part of health assessment projects in geographic areas with known health concerns. The areas targeted for health assessment often include areas of previous and current die-offs. Animals captured for health assessments may have an obvious health problem (*e.g.* skin lesions) or be exposed to known toxins. Many different diagnostic and research labs are under permit and/or contract with the MMSHRP to provide analyses. Services provided include histopathology, virology, bacteriology, toxicology (contaminant and biotoxin analyses), and acoustic diagnostics. General research methodologies are described in Appendix H.

2.1.6.2 Biomonitoring and Research Alternatives

The following alternatives address the biomonitoring and research activities of the MMHSRP.

Alternative F1. No Action Alternative- Biomonitoring and research activities would not occur.

Under Alternative F1, NMFS would terminate the current biomonitoring and research activities of the MMHSRP. This would include the NMMTB, health assessment captures, and other various research projects.

Alternative F2. Status Quo Alternative- Continuation of current biomonitoring and research activities.

Under Alternative F2, NMFS PR1 would issue the MMHSRP a new ESA/MMPA permit that would include the current biomonitoring and research activities. New or future biomonitoring and research activities would not be added under the permit.

Alternative F3. Preferred Alternative- New ESA/MMPA permit issued to include current and future biomonitoring and research activities.

Under Alternative F3, NMFS PR1 would issue the MMHSRP a new ESA/MMPA permit that would include current and future biomonitoring and research activities.

2.2 Alternatives Considered but Eliminated from Further Analysis

2.2.1 Stranding Response Alternatives

Stranding Response Curtailed Immediately. This alternative would immediately stop the response to stranded animals and the current stranding network would cease to exist. Public comments supported the continuation of stranding response activities and stated that this alternative was not feasible. Under this alternative, NMFS would not be fulfilling its mandate under the MMPA, and there would be a high level of public controversy. Therefore, NMFS eliminated this alternative.

Stranding Response to Some Animals is Authorized, Other Animals are Prohibited. Public comments did not support prohibiting stranding response to certain animals. By denying organizations the ability to respond to some animals, these animals would have to be left on the beach. This would create public controversy, and would eliminate valuable information on marine mammal health and populations that is gained from the examination of stranded animals. Therefore, NMFS eliminated this alternative.

2.2.2 Carcass Disposal Alternatives

All Animals are Buried On-site. Burial is not an option in all geographic areas due to substrate issues (rocks or dense soil, shallow water table, inaccessibility by necessary machinery, etc.) or local restrictions. Burial of animal carcasses may be prohibited in some areas where animals strand. In addition, marine mammal carcasses have the potential to be highly toxic. Chemically euthanized animal carcasses may contain high concentrations of lethal chemicals. Other carcasses may have high toxin levels from biotoxins or other contaminants. Burying these carcasses would create a risk to scavengers, water quality, and soils. The option to transport carcasses off-site must be available. Therefore, NMFS eliminated this alternative.

All Animals are Transported Off-site for Disposal. Public comments did not support the alternative to transport all carcasses off-site for disposal. Transporting all carcasses off-site would place a financial burden on stranding network participants. In addition, some carcasses may not be transportable for logistical reasons: the animal is too large or too heavy to lift; equipment is unavailable or cost prohibitive; equipment is not permitted; or has no available beach access. Other disposal methods (burial, disposal at sea, natural decomposition) for non-toxic carcasses are more cost-effective and feasible. Therefore, NMFS eliminated this alternative.

No Animals are Chemically Euthanized. Chemical injection is currently the most common humane method of euthanasia for pinnipeds and small cetaceans. Other methods of euthanasia, such as ballistics (shooting) or explosives, may be dangerous to personnel assisting with the process as well as the public. Prohibiting the use of chemical euthanasia would require stranding personnel to either use these methods or not perform euthanasia. The use of other methods would increase the risks to human health and safety. Additional numbers of animals would be killed using other means or left on the beach to die, which could increase the suffering of the animal and potentially create public controversy. Therefore, NMFS eliminated this alternative.

2.2.3 Rehabilitation Activities Alternatives

Rehabilitation Activities Curtailed Immediately. This alternative would immediately stop the rehabilitation of stranded animals. Public comments supported the continuation of rehabilitation activities and stated that this alternative was not feasible. Under this alternative, NMFS would not be fulfilling its mandate under the MMPA. Therefore, NMFS eliminated this alternative.

Rehabilitation of Some Animals is Authorized, Other Animals are Prohibited. Public comments did not support prohibiting the rehabilitation of certain animals. By denying organizations the ability to respond to some animals, these animals would have to be left on the beach. This would create public controversy, and would eliminate valuable information on marine mammal health and populations. Rehabilitation of common species also gives rehabilitation facilities additional opportunities to perfect their rehabilitation practices, increasing the chance of successful rehabilitation and release of threatened, endangered and rare species. Therefore, NMFS eliminated this alternative.

2.2.4 Release of Rehabilitated Animals Alternatives

All Animals are Released (After Rehabilitation). Currently, nonreleasable animals may be placed in permanent captivity in a public display or at a research facility if they hold an APHIS exhibitor's or research license. During rehabilitation, problems may be detected that would prevent the animal from being deemed releaseable (*e.g.*, the animal has a medical issue requiring regular veterinary care and medications, or it develops behavioral problems). Requiring the facility to release this animal despite this condition would be detrimental to the welfare of the animal and possibly to the wild population and human safety. Therefore, NMFS eliminated this alternative.

Release of Some Animals is Required, Other Animals are Optional. Under this alternative, release of some species of rehabilitated animals would be required to occur under any circumstance, or the animal would be euthanized. Currently, these animals may be deemed nonreleaseable and placed in permanent captivity at a public display or at a research facility, where they contribute to the education of the general public or to the scientific body of knowledge. Requiring the release of animals would result in the release of inappropriate animals (those suffering from medical or behavioral conditions). This would be detrimental to the welfare of the animals and possibly to the wild population and human safety. Therefore, NMFS eliminated this alternative.

Release of Some Animals is Authorized, Other Animals are Prohibited. Under this alternative, release of some species of rehabilitated animals would be prohibited, regardless of the circumstances. Therefore, the animal would be placed in permanent captivity at a public display or at a research facility or euthanized, even if it was "releaseable" or appropriate to be released back into the wild. This would be a detriment to the wild population and would result in overcrowding at facilities, or needless euthanasia. Therefore, NMFS eliminated this alternative.

2.2.5 Disentanglement Alternative

Disentanglement of Some Animals is Authorized, Other Animals are Prohibited. Under this alternative, disentanglement of some species would be prohibited, regardless of the circumstances. Therefore, the animal would remain entangled and potentially unable to feed, swim, or reproduce, even if the entanglement could be dealt with at minimum risk to the animal and the response team This would be a detriment to the wild population and would result in needless death and suffering of marine mammals. Therefore, NMFS eliminated this alternative.

2.2.6 Biomonitoring and Research Activities Alternatives

Health Assessment Captures Would Not Occur. Under Title IV of the MMPA, one of the purposes of the MMHSRP is to collect and disseminate reference data on the health and health trends of marine mammal populations in the wild. Health assessment captures are an integral part of collecting this health reference data. Captures are also used to provide information on animals in areas where UMEs have occurred or are occurring, and significantly contribute to UME investigations. Therefore, NMFS eliminated this alternative.

Tissue Banking Would Not Occur. The NMMTB was established under Title IV of the MMPA to store, analyze, and archive marine mammal tissues. Without the NMMTB, reference data on the health of marine mammals and populations of marine mammals would not be collected and maintained. Under this alternative, NMFS would not be fulfilling its statutory mandate to maintain the NMMTB. Therefore, NMFS eliminated this alternative.

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. Thirteen marine mammal 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 of 1973 (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. 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 of 1972 (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). In cases where U.S. citizens are engaged in activities (other than fishing) that result in "unavoidable" incidental take of marine mammals, the Secretary can issue an incidental take authorization or an incidental harassment authorization. These authorizations can be issued, after public notice and public comment period, if the Secretary of Commerce finds negligible impacts.

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. For this PEIS, consultation with NMFS was initiated on June 22, 2006. The consultation determined that impacts to EFH would not be expected to occur as a result of the Proposed Actions and alternatives; therefore EFH will not be discussed further. Correspondence regarding EFH consultation is included in Appendix B.

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 ROI, 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 (*Eumetopias jubatus*) 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 (*Eubalaena japonica*), Southern Resident killer whale (*Orcinus orca*) 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*), two 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 (*Monachus schauinslandi*) 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. 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 ROI. 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. 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. 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). 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 is threatened and the Central California Coast coho ESU is endangered. Critical habitat has been designated for both of these 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 ROI. Commercial and recreational fisheries in the ROI 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.

Significantly more pinnipeds strand each year than cetaceans (Figure 3-1). 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.

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.

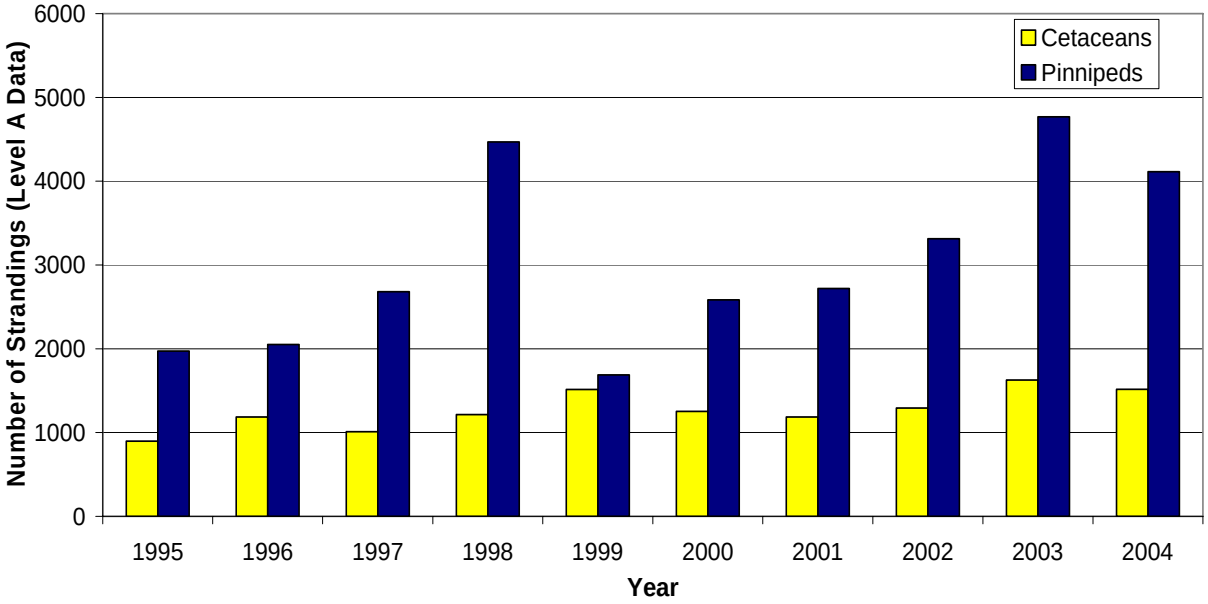

Figure 3-1. Nationwide Stranding Summary

This figure shows the stranding data for all regions combined over the 10 year period from 1995-2004, and includes all marine mammals (all cetacean and pinnipeds except walrus) which were reported to the stranding network and for which a Level A data sheet was completed.

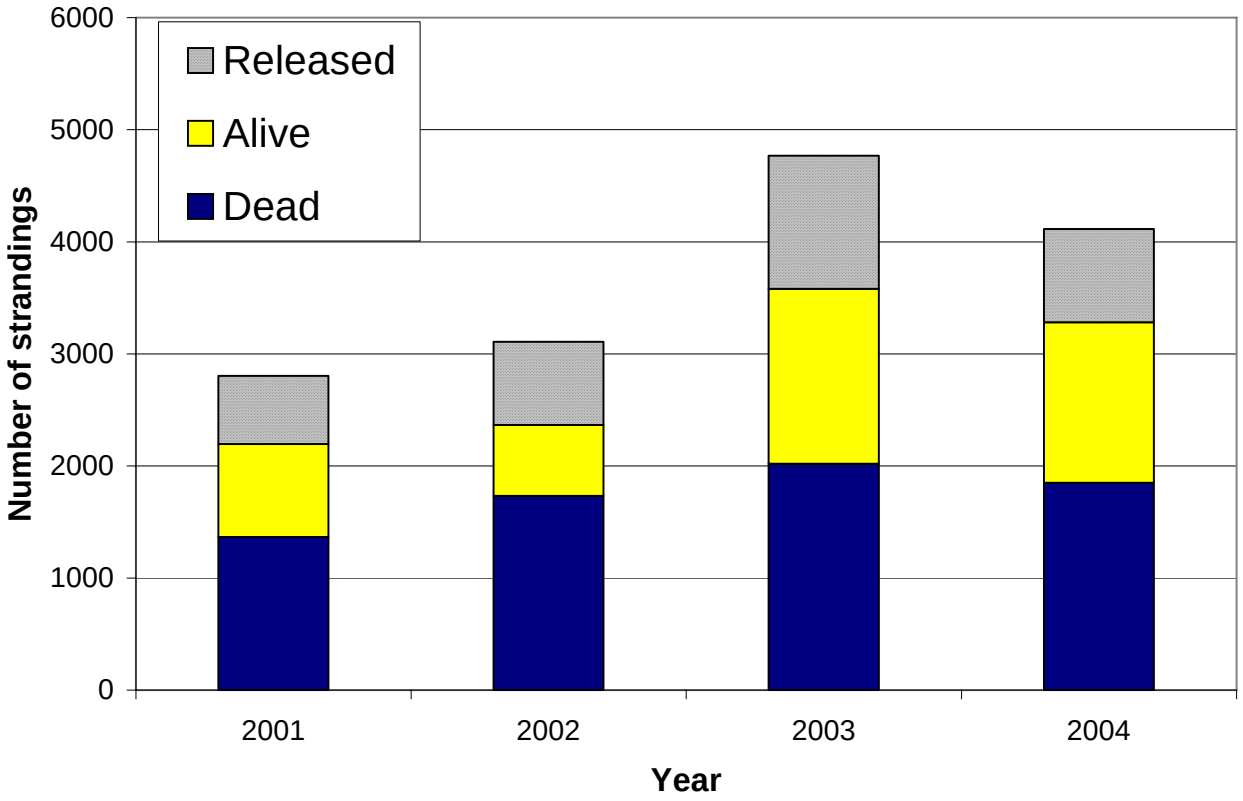

Figure 3-2. Pinniped Strandings Nationwide

This figure combines data from all regions and includes all pinnipeds which were reported to the national stranding network and received a Level A data sheet. The shaded portions of the "live" strandings are those pinnipeds that were taken to a rehabilitation facility, successfully rehabilitated, and released back into the environment.

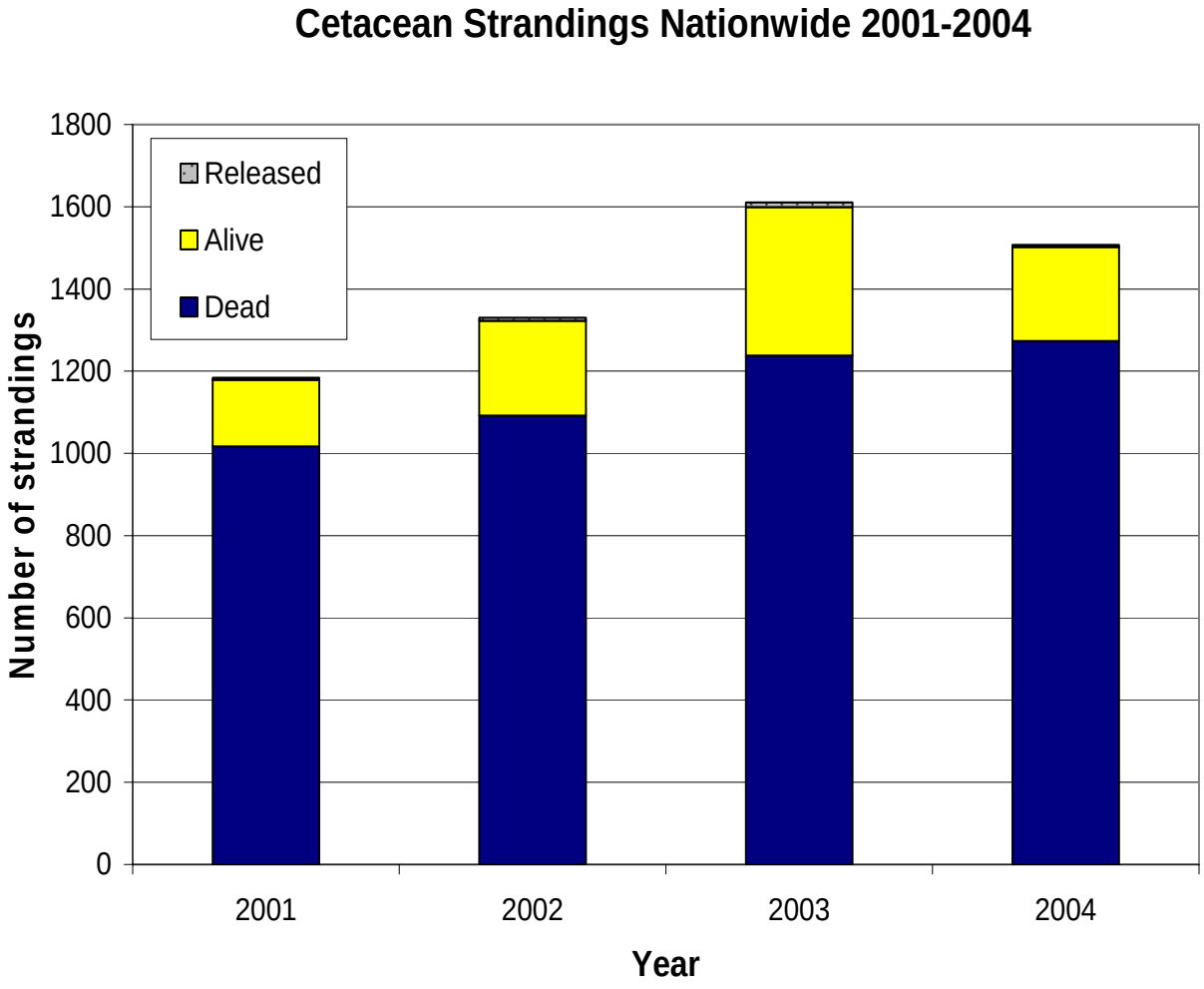

Figure 3-3. Cetacean Strandings Nationwide

This figure combines data from all regions and includes all cetaceans which were reported to the national stranding network and received a Level A data sheet. The shaded portions of the "live" strandings are those cetaceans that were taken to a rehabilitation facility, successfully rehabilitated, and released back into the environment.

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 (*Balaenoptera physalus*), blue whale (*Balaenoptera musculus*), sei whale (*Balaenoptera borealis*), and sperm whale (*Physeter macrocephalus*). All threatened and endangered 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 2001-2004.

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 2001-2004.

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).

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 US waters.

UMEs. In 2003, UMEs included large whales in New England and Maine harbor seals and minke whales (*Balaenoptera acutorostrata*). The Maine harbor seal UME continued into 2004. A Virginia small cetacean UME and a Mid-Atlantic small cetacean UME occurred also occurred in 2004. A large whale UME occurred in the Northeast Region in 2005. In October 2006, a humpback whale UME and a pinniped UME were declared in the Northeast Region. The humpback whale UME was declared due to the increase in humpback mortalities from March-October, 2006. The 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.

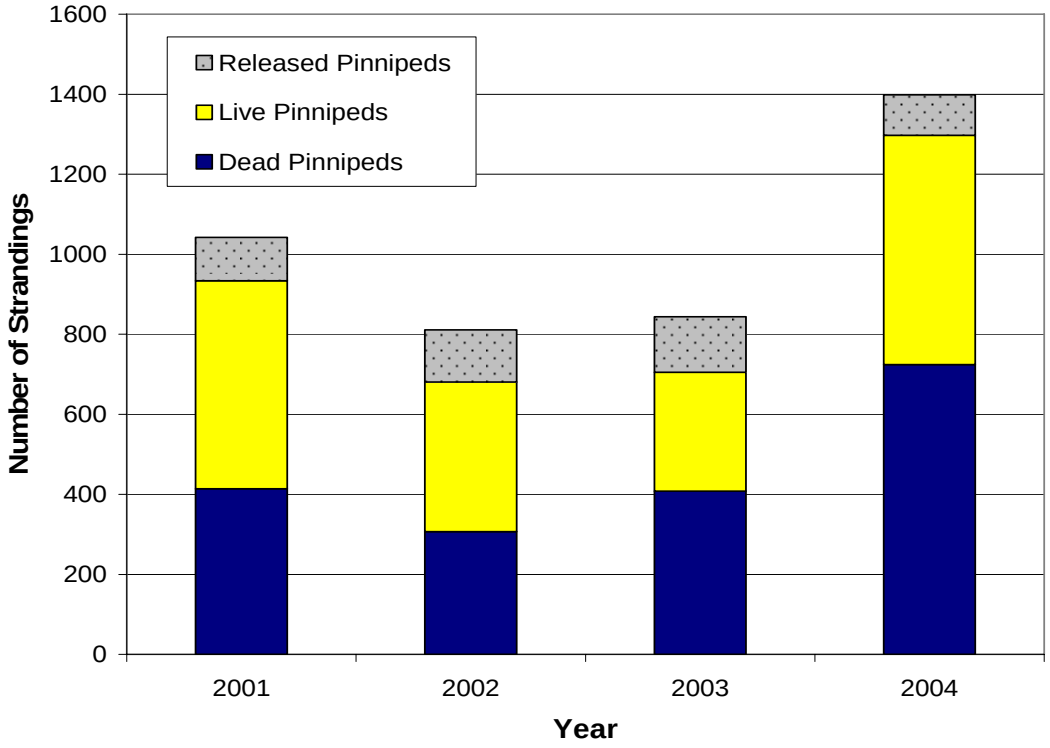

Figure 3-4. Northeast Region Pinniped Strandings 2001-2004

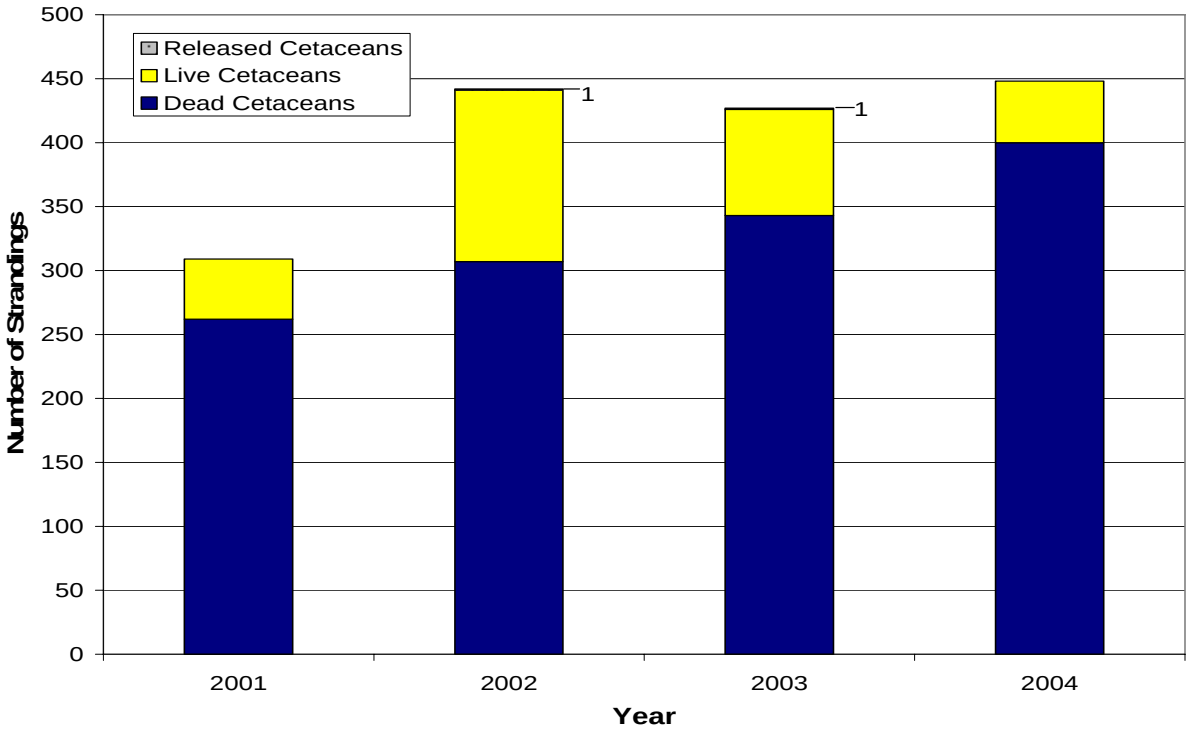

Figure 3-5. Northeast Region Cetacean Strandings 2001-2004

NMFS Southeast Region. Thirty-two species of marine mammals have been recorded to occur 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 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.

The Southeast region 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, followed by humpback whales, sperm 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 2001-2004.

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, and pantropical spotted dolphins.

Human Interactions. Documented human interactions with odontocetes are primarily fisheries interactions, although ship strikes do occur. 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. On average, approximately three stranded right whales are reported each year in the Southeast Region. Reported right whale strandings have been associated with boat strikes and entanglements more often than other causes. 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). Right whale entanglements are described above under the NMFS Northeast Region section.

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 during the migratory period from November through April.

UMEs. Bottlenose dolphin UMEs have occurred in the Florida panhandle in 1999-2000, 2004, 2005, and 2006. A multi-species UME (bottlenose dolphins and manatees) has been ongoing from 2005-2006 on the west coast of Florida. Other manatee UMEs have occurred on the west coast of Florida in 1996, 2002, and 2003. Small cetacean UMEs occurred in 2004 in North Carolina. A harbor porpoise UME occurred in North Carolina in 2005. Bottlenose dolphin UMEs have occurred in Texas in 1992 and 1994 (WGMMUME 2005).

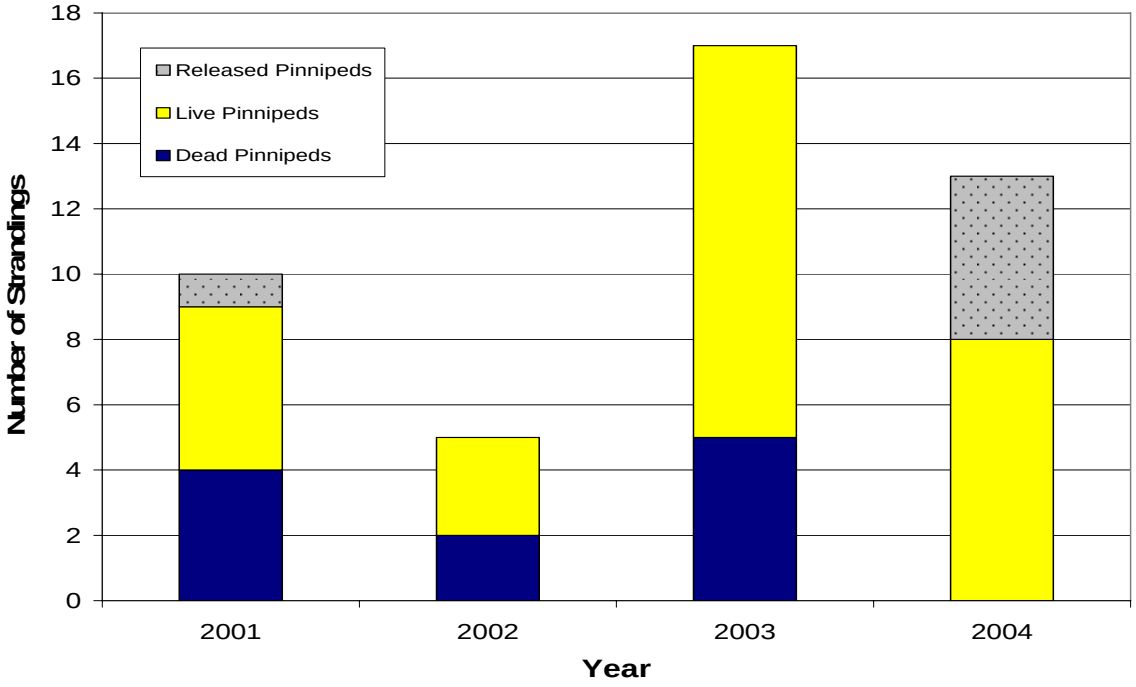

Figure 3-6. Southeast Region Pinniped Strandings 2001-2004

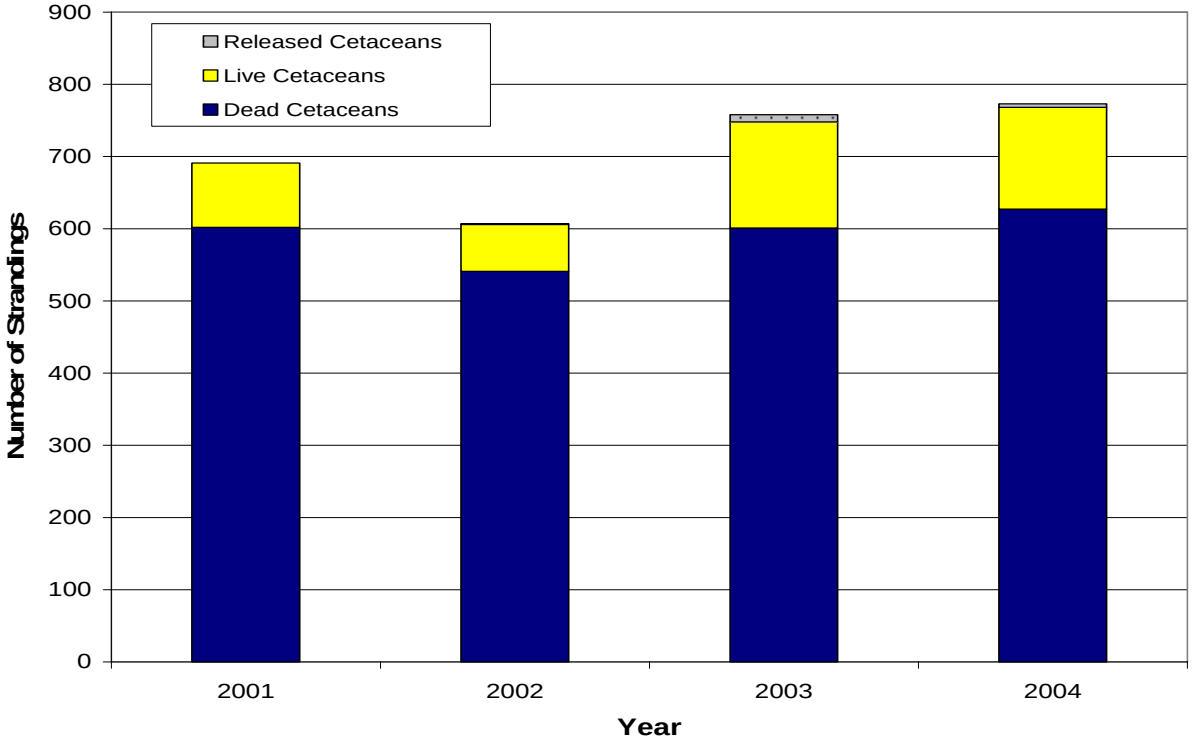

Figure 3-7. Southeast Region Cetacean Strandings 2001-2004

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 (*Arctocephalus* townsendi) are listed as threatened. Humpback, blue, sei, sperm, fin, and North Pacific right whales are listed as endangered. All threatened and endangered 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 2001-2004.

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. 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 2001-2004.

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.

UMEs. Multi-species UMEs occurred in 1995, 2002, and 2003. California sea lion UMEs occurred in 1991, 1998, and 2000. The 1998 and 2000 UMEs were caused by domoic acid. A gray whale UME occurred from 1999 to 2001 in California, Oregon, Washington, and Alaska, in addition to Canada and Mexico (spanning the entire migration corridor). Other UMEs include pinnipeds (1993), common dolphins (1994), and harbor seals (1997) (WGMMUME 2005).

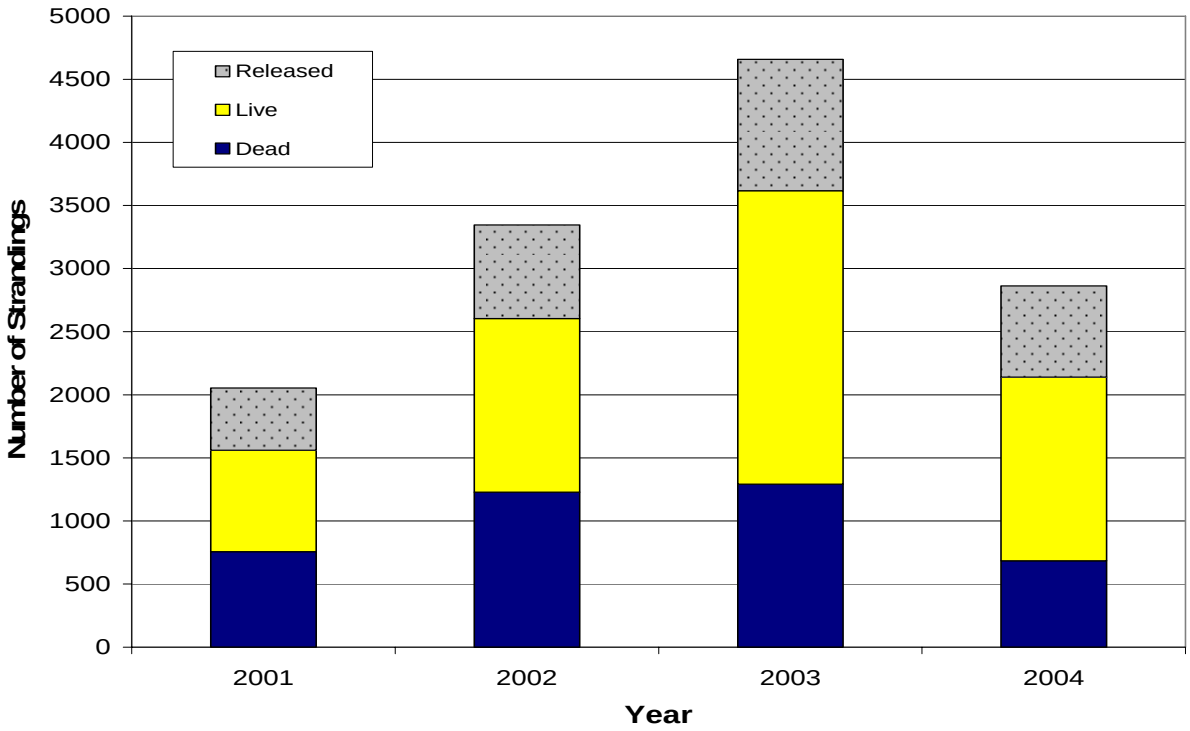

Figure 3-8. Southwest Region Pinniped Strandings 2001-2004

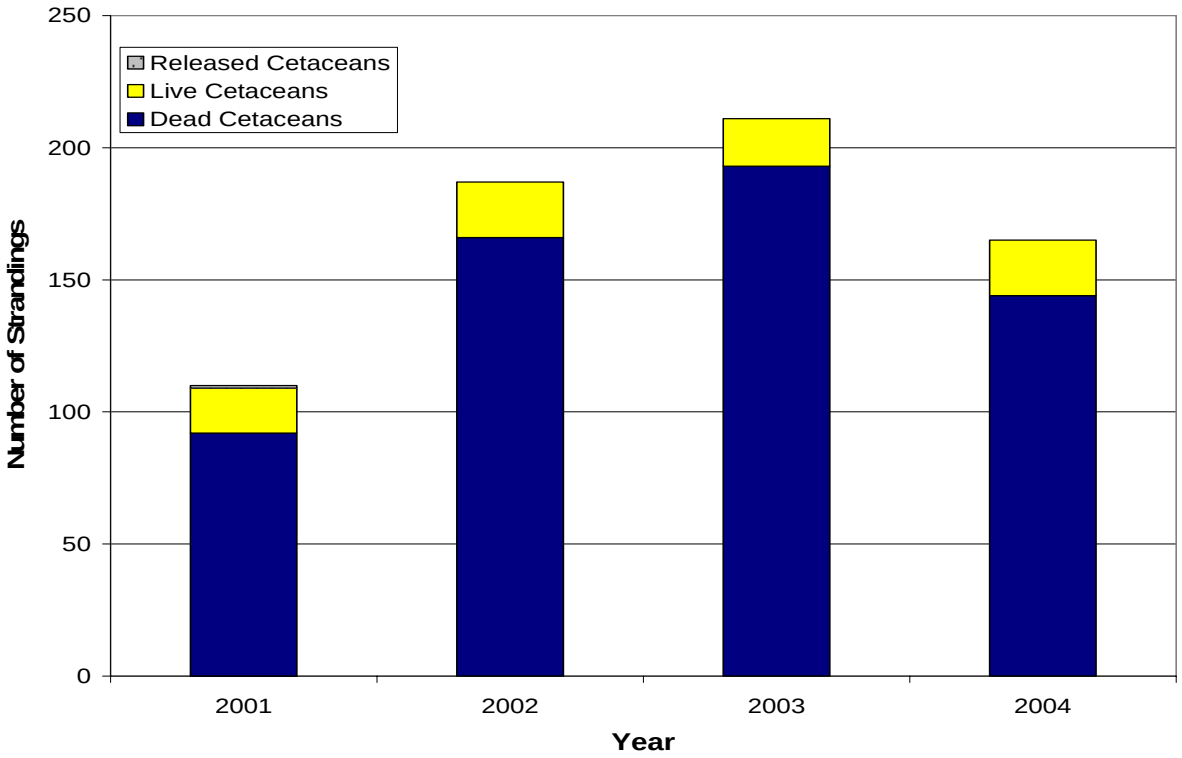

Figure 3-9. Southwest Region Cetacean Strandings 2001-2004

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 species in the region. Endangered 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 2001-2004. The increasing trend in reported strandings, shown in Figure 3-10, may reflect improved coverage by the stranding network combined with increased funding.

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 2001-2004. The increasing trend in reported strandings, shown in Figure 3-11, may reflect improved coverage by the stranding network combined with increased funding.

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.

UMEs. A gray whale UME occurred from 1999 to 2001 in Washington, Oregon, and California. A pinniped UME occurred in Washington in 1993 due to human interaction (WGMMUME 2005). After detecting a significant increase in the level of harbor porpoise strandings in 2006, a UME was declared for harbor porpoises in the Pacific Northwest on October 31, 2006.

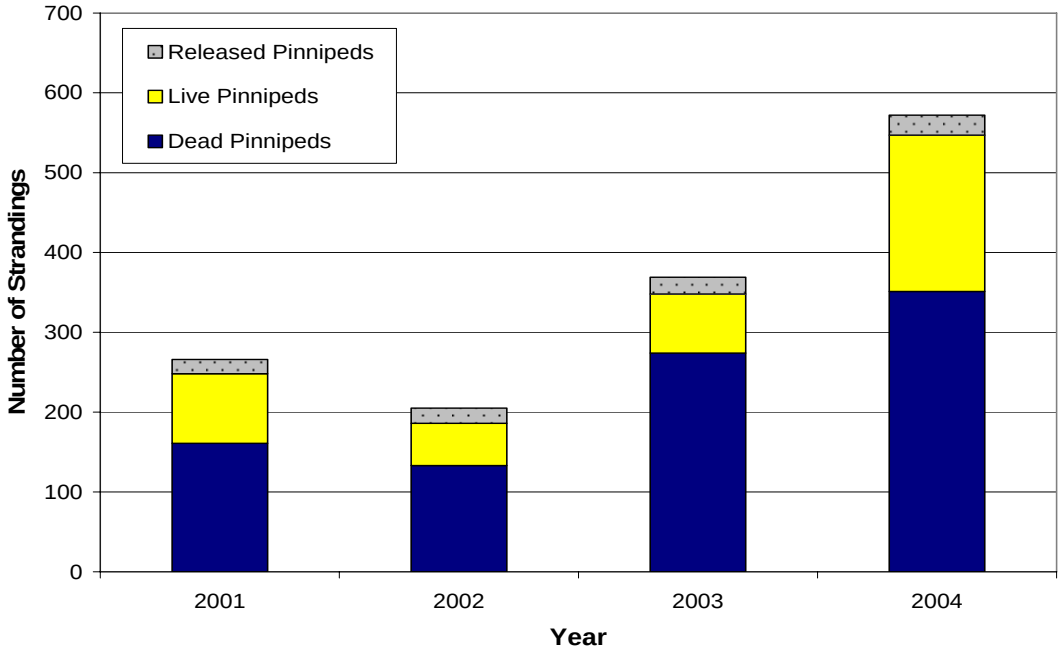

Figure 3-10. Northwest Region Pinniped Strandings 2001-2004

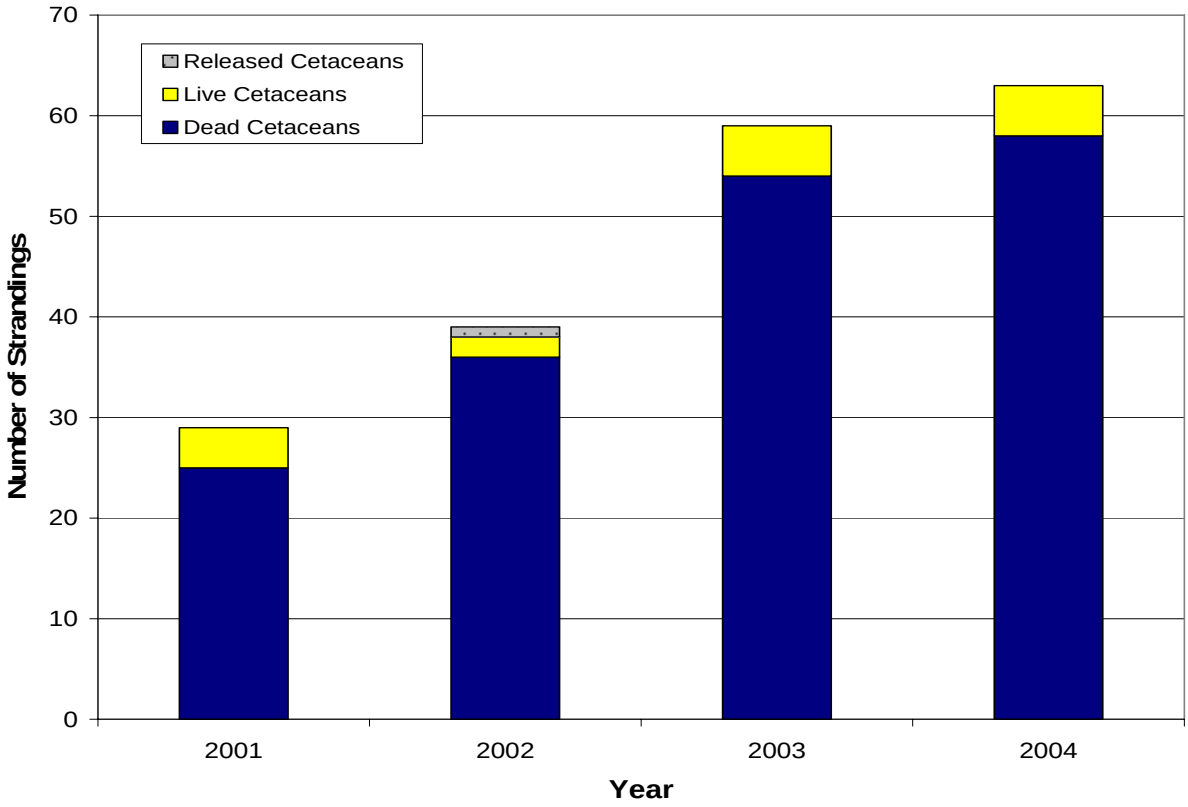

Figure 3-11. Northwest Region Cetacean Strandings 2001-2004

NMFS Alaska Region. Twenty-eight species of marine mammals have the potential to occur in the Alaska Region (Appendix E, Table E-18) (Geraci and Lounsbury 2005). Threatened species include the southwest Alaska DPS of the northern sea otter (*Enhydra lutris kenyoni*) and the eastern DPS of the Steller sea lion. Endangered species include the western DPS of Steller sea lions, bowhead (*Balaena mysticetus)*, blue, humpback, fin, sei, sperm, and North Pacific right whales. All threatened and endangered species are listed as depleted under the MMPA. The Cook Inlet stock of beluga whales (*Delphinapterus leucas*) and the Eastern Pacific Stock of northern fur seals are also 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 Alaskan 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 include harbor seal, Steller sea lion, ringed seal, bearded seal, spotted seal, and elephant seal. On average, from 2001-2004, five harbor seal pups a year were brought to the rehabilitation facility in Alaska. Figure 3-12 depicts the number of reported pinniped strandings in the Alaska Region during from 2001-2004.

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 2001-2004, two beaked whale strandings were reported each year. Figure 3-13 depicts the number of reported cetacean strandings in the Alaska Region from 2001-2004.

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.

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. From 2001-2004, approximately four Steller sea lion strandings per year involved net entanglement or fishing lure/line in mouth.

Temporal Changes. Most stranding reports are received during the warmer months (May-October). No reported strandings appear to be from temporal or ice changes.

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 have declined 5.6 percent a year since 1994 (NMFS unpublished data). 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.

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.

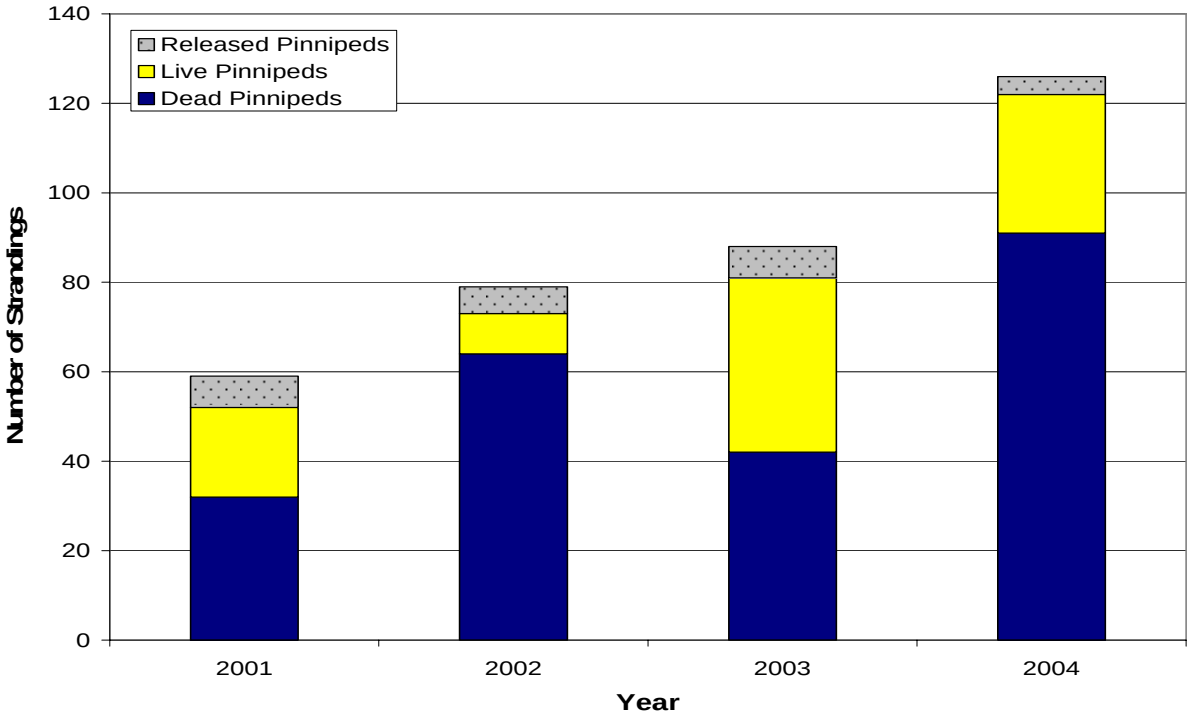

Figure 3-12. Alaska Region Pinniped Strandings 2001-2004

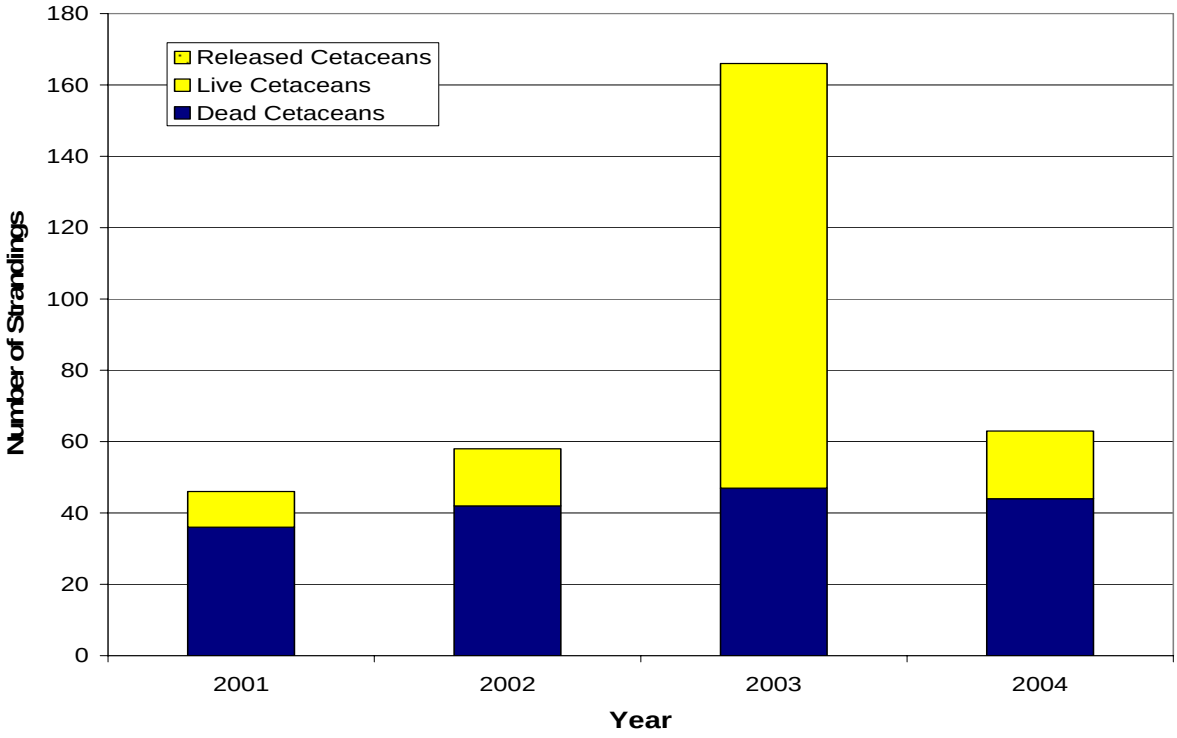

Figure 3-13. Alaska Region Cetacean Strandings 2001-2004

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 2001-2004.

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 2001-2004.

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.

UMEs. A monk seal UME occurred from 2001 to 2002 due to starvation (WGMMUME 2005).

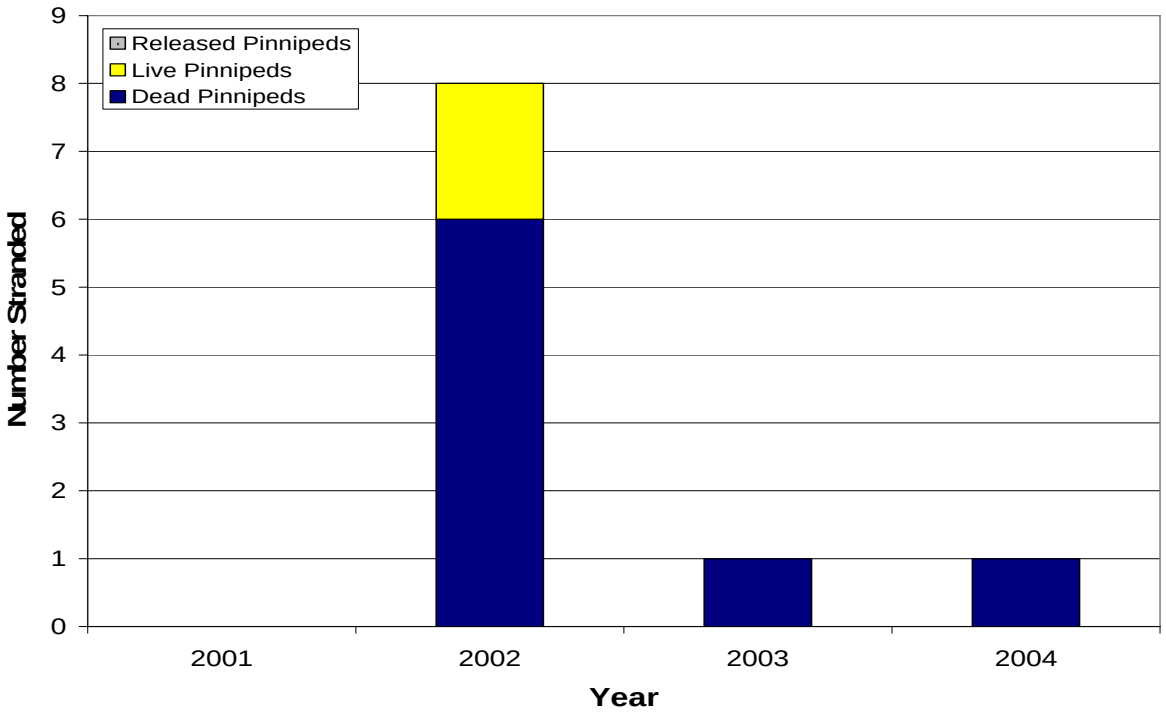

Figure 3-14. Pacific Islands Region Pinniped Strandings 2001-2004

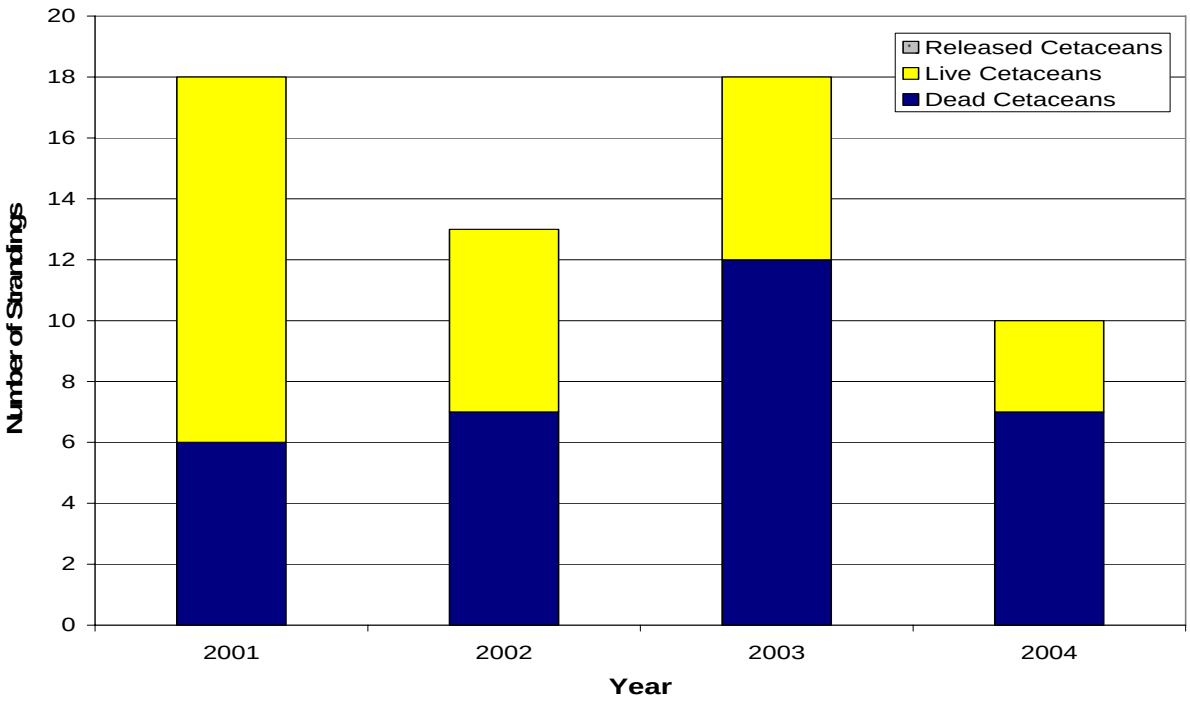

Figure 3-15. Pacific Islands Region Cetacean Strandings 2001-2004

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 2004).

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 2004).

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 2004).

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 2004).

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 2004).

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 2004). 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 2004).

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 2004). 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 2004).

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 2004). 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 2004). 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 ROI 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 affect marine mammal workers 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 in the ROI 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. Human health and safety concerns on the beach and in the ocean are similar in all of the ROIs.

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 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.

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). Reports of human illnesses from contact with marine mammals are rare, but have occurred. 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 ROI 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 are not expected to affect population levels within the ROI; 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 in the ROI 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 will be 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.

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4. Environmental Consequences

4.1 Introduction

This section evaluates the potential direct and indirect environmental and socioeconomic impacts of the alternatives. Table 4-1 lists the alternatives considered in detail and their descriptions. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are reasonably foreseeable effects caused by an action, but occur later in time or farther removed in distance from the action. CEQ regulations define the significance of impacts in terms of context and intensity. Context refers to the geographic area of effect, which varies with the setting of the alternatives and with each resource area being analyzed. Intensity refers to the severity of the impact and considers whether the effect would be negligible, minor, moderate, or major. Negligible impacts would not be detectable and would have no discernible effect. Minor impacts would be slightly detectable and would not be expected to have an overall effect. Moderate impacts would be clearly detectable and could have an appreciable effect. Major impacts would be clearly detectable and would have a substantial, highly noticeable effect. Duration, short-term or long-term, must be considered in the assessment of the environmental impacts. Short-term impacts are temporary and would generally end once the proposed activities have stopped. Long-term impacts are typically those effects that would last several years or more or would be permanent. Impacts were also evaluated in terms of whether they would be beneficial and/or adverse.

Mitigation measures are methods to avoid, minimize, rectify, or reduce the adverse environmental impacts of an action. Mitigation measures are discussed in Section 5. These are measures that would be taken, if necessary, to alleviate any adverse environmental effects.

1 **Table 4-1. Alternatives Considered in Detail**

Alternative	Description
Stranding Agreements and Response	
Alternative A1	No Action- SAs expire, stranding response would end.
Alternative A2	Status Quo- Current SAs would be renewed, current stranding response activities continue. Final SA criteria would not be issued.
Alternative A3	SAs issued to any applicants after review, new SA template would not be utilized. Final SA criteria would not be issued. Current and future activities included.
Alternative A4 (Preferred)	Final SA criteria would be implemented, new SA template would be utilized, current and future activities included.
Alternative A5	Final SA criteria would be implemented, new SA template would be utilized, and response to threatened, endangered or rare animals would be required.
Carcass Disposal	
Alternative B1	No Action- SAs expire, no carcass disposal would occur, carcasses would be left where stranded.
Alternative B2	Status Quo- Current methods of carcass disposal continue.
Alternative B3 (Preferred)	Recommendation to transport chemically euthanized animal carcasses off-site.
Rehabilitation Activities	
Alternative C1	No Action- Current SAs would expire, stranding response would cease, and animals would not be rehabilitated.
Alternative C2	Status Quo- Current rehabilitation activities would continue. Final Rehabilitation Facility Standards would not be implemented.
Alternative C3 (Preferred)	New SAs would be issued, rehabilitation activities continue. Final Rehabilitation Facility Standards would be implemented.
Alternative C4	New SAs would be issued, rehabilitation activities would continue. Rehabilitation of threatened, endangered, and rare animals would be required; response to other animals would be optional. Final Rehabilitation Facility Standards would be implemented.
Release of Rehabilitated Animals	
Alternative D1	No Action- Current SAs would expire, stranding response and rehabilitation would cease, and therefore there would be no animals to release.
Alternative D2	Status Quo- Current release activities would continue. Adaptive changes to release activities would not be permitted. Final release criteria would not be implemented.
Alternative D3 (Preferred)	New SAs would be issued, release activities continue. Final Release criteria would be implemented.
Disentanglement Activities	
Alternative E1	No Action- No disentanglement network.
Alternative E2	Status Quo- Disentanglement network would continue current activities, no modifications or new members added.

Table 4-1. Alternatives Considered in Detail (continued)

Alternative	Description
Disentanglement Activities	
Alternative E3 (Preferred)	Disentanglement network would continue current activities on East Coast with modifications to West Coast network. The Disentanglement Guidelines and training prerequisites would be implemented.
Biomonitoring and Research Activities	
Alternative F1	No Action- Biomonitoring and research activities would not occur.
Alternative F2	Status Quo- New ESA/MMPA permit would continue current biomonitoring and research activities.
Alternative F3 (Preferred)	New ESA/MMPA permit would be issued to include current and future biomonitoring and research activities.

4.2 Biological Resources

This section evaluates the potential impacts on biological resources as a result of the alternatives. Impacts on biological resources are evaluated in context and intensity on a population or species-wide scale. Therefore, while more significant impacts may occur on individual animals, the overall impact on the population or species may still be considered minor.

4.2.1 Stranding Agreements and Response Alternatives

4.2.1.1 Alternative A1- No Action

Moderate, long-term, adverse effects on marine mammals would be expected to occur under Alternative A1. Stranding response from current SA (formerly LOA) holders would end once all agreements have expired. Federal (not including NMFS), state, and local agencies authorized under MMPA 109(h) would still be able to conduct emergency response to non-ESA listed species, and those ESA-listed species for which response is part of the 4(d) rule (see 50 CFR 223.202(b)(2)). However, response activities would likely be limited and localized in extent, and would consist mostly of carcass disposal for the protection of public health and safety. The authorized level of stranding response would greatly decrease, ESA-listed marine mammals would not be responded to, animals in peril would not be hazed away from hazards, and more animals would likely perish. These animals would be removed from the population, which might have an adverse affect on species, especially those that are depleted, threatened, or endangered. There would be a lack of detection and notification of morbidity and mortality. The valuable information on marine mammal populations, such as biology, health, and disease detection, collected during the examination of stranded animals

would no longer occur. Scientists would not be able to study why strandings occur, which could indirectly affect future marine mammal populations.

In addition, the ability of the stranding network to act as a surveillance network would be eliminated. This could result in the emergence and spread of marine mammal diseases, or the use and spread of fishery practices that were harmful to marine mammals, without any possibility for human intervention or mitigation until population-level effects were observed. At that point, it would likely be too late for any quarantine, vaccination, or translocation program to halt the spread of disease or for a fishery modification to occur. This could have adverse impacts on marine mammal populations, particularly those that are threatened or endangered, where the loss of a relatively small number of individuals represents a greater proportion of the species. One example would be the early detection of a disease such as *Morbillivirus* in the highly endangered Hawaiian monk seal (a naïve population). This outbreak could be mitigated by a large-scale vaccination campaign or isolation/translocation/captivity of affected individuals, but only if it was detected early in the spread of the disease, when few individuals had contracted the virus.

In addition, other environmental conditions have been first detected in marine mammals or beach-cast seabirds, including oil spills and HABS. Early detection of these circumstances also allows the potential for human intervention (finding the source of the oil spill) and reducing the overall number of affected biological resources. When a significant number of strandings occur that share the same findings of fishery interaction, this information can be used to manage the fishery to reduce the impacts on marine mammals. Gear modifications, geographic changes (area closures), and temporal changes (season dates) may all be changed so that the probability of fishery interactions with marine mammal populations (particularly those that are threatened or endangered) is reduced. The stranding network provides critical information about potential issues when first observed, which allows for response and management before the problem becomes widespread and costly or impossible to ameliorate.

No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds would be expected to occur under this alternative. Effects from leaving a carcass on the beach are described in Section 4.2.2.1, Carcass Disposal.

4.2.1.2 Alternative A2- Status Quo

Potential minor, short-term, adverse effects on all biological resources could occur from vessel and vehicle uses, but these impacts are expected to be negligible when compared to other inputs of

hazardous materials from vessels, sewage outfalls, runoff, industrial operations, and other beach vehicle uses. Spills of hazardous materials or wastes from vessels or a vessel accident during response to free-swimming animals could impact biological resources. Some materials could be diluted quickly by currents, only causing temporary impacts. Other materials could linger in the water column or adhere to sediment particles, causing slightly longer impacts. As with any activity, vehicular transport, heavy equipment, or medical equipment used during beach response activities could leak oil or other materials into sand and nearshore waters. These would likely be small amounts that would be flushed out and/or diluted rapidly, causing a minor and temporary impact.

Minor, short- and long-term adverse effects on protected and sensitive habitats could occur during response activities. Equipment used for transport or response may traverse protected habitats to access a stranded animal. An animal may be stranded in a protected habitat and equipment might be needed for the response. Response activity could damage sand dunes and associated vegetation. Equipment may also cause compaction of the beach. Response equipment could also disturb or injure nesting sea turtles, depending on the location and time of year. Disturbance of a nesting sea turtle would likely be a short-term, minor impact. Injuring a nesting sea turtle and/or their eggs could produce minor, long-term effects, as all sea turtles are endangered species.

Minor, short-term adverse effects on shellfish and other invertebrates living in the beach and intertidal environment could occur during response activities. The traversing of heavy equipment over shellfish beds could damage or kill shellfish. Digging with a shovel or spade to allow room for an animal's flukes and flippers could also damage shellfish.

Minor to moderate, short-term adverse effects on coastal and marine birds could occur during response activities. The use of equipment and the presence of people could disturb birds nesting or roosting in trees or small bushes, and may cause them to temporarily leave the area. Ground nesting birds could be adversely affected by response activities. Heavy equipment could crush nests and response personnel could disturb or damage a nest. Response activities conducted in shallow waters could disturb foraging birds. This impact would be minimal, as birds could forage in nearby areas and would likely return once response activities ended.

Live stranded animals would most likely experience stress and pain due to the stranding event itself that could be decreased or increased by stranding response activities. The effects of stranding response activities on cetaceans would depend on the condition, species, and history of the animal. An alert and responsive animal may panic when responders approach. Mothers separated from their

calves may become aggressive, and members of social species may experience negative effects from being separated from conspecifics. Debilitated animals that are weakly responsive or non-responsive animals may not physically, but may physiologically, react to responders.

Healthy animals may be released immediately from the stranding site. Tagging may occur before the release in order to monitor the animal's movements. Roto-tags would most commonly be used, but radio tags could be attached if available. During the attachment of the roto-tag, pain would only last during the application, and sedatives or local anesthetic would be used. The tag site could become infected, causing pain to the animal. Tissue damage or infection could occur when the tag is shed. For pinnipeds, animal movement may prolong or prevent healing by producing repetitive stress on the tag site. Epoxy would be used to attach radio tags to pinnipeds and should not cause pain if done properly. However, it may result in discomfort if the placement of the instrument causes pulling of the hair or skin during animal movement. In addition, if the ratio of resin and hardener is not correctly measured, the resulting heat-producing reaction could burn the animal's skin. Both the resin and hardener could cause skin irritation, such as itching, rashes, hives, and dermatitis. The instrument could be knocked or torn off, pulling out hair and possibly some of the underlying skin, which would then be open to infection.

During mass strandings, animals may be marked with a grease pen, crayon, or zinc oxide to keep track of each animal. These materials would not cause an impact on marine mammals.

Handling, lifting, and moving an animal may cause injuries to the animal, including stress and increased shock. Flippers may be crushed or the animal may overheat if stretchers do not have openings for them. Creases or seams in stretchers and transport equipment may press into the skin, causing discomfort, pain, and possible temporary or permanent injuries. Chemical immobilization of a cetacean can be life threatening, if not administered and monitored correctly. When anesthetized, an animal may go into a dive reflex, which would include breath holding, slowing of the heart rate, and the pooling of blood from peripheral vessels. While under anesthesia, a cetacean may develop hypothermia. If the animal is not in water, improper body support could compromise cardiac and respiratory functions (Haulena and Heath 2001). During transport to a rehabilitation facility, animals may overheat in direct sun and heat without protection. Depending on body condition, cetaceans may overheat (hyperthermia) or develop hypothermia during transport. Body surfaces may be exposed to the drying effects of air. Animals may also be knocked around, causing muscle damage or they may inhale exhaust fumes. Improper transport of cetaceans may cause abrasions, pressure necrosis, thermoregulatory problems, and respiratory problems. Muscular stiffness may occur from transport,

but most accepted transport methods try to minimize or avoid this entirely. Stiffness would disappear within a few hours to a few days, unless there was permanent muscle damage (Antrim and McBain 2001).

Beach response activities for live stranded pinnipeds would require physical capture of the animal. Captures may disrupt other animals, including conspecifics, if the capture occurs at a haul-out site or any other area where animals were located. Impacts would be expected, as non-target animals may flee into the water. Pups and young animals may be trampled or abandoned. Juvenile and adult animals may be trampled and killed during stampedes or injured on rocks and cliff faces. If animals were not injured, impacts would be minor and short-term as animals would likely return once responders have left. Handling and restraint, if not properly executed, may further injure or kill a pinniped (*e.g.* suffocation under the weight of a handler). Chemical immobilization (anesthesia or sedation) of a pinniped has risks, especially in ill or injured animals, if not administered and monitored correctly. When anesthetized or sedated, an animal may go into a dive reflex, which would include breath holding, slowing of the heart rate, and the pooling of blood from peripheral vessels. Pinnipeds may develop hypo- or hyperthermia while anesthetized. Transport to a rehabilitation facility may cause muscular stiffness or damage. Stiffness would disappear within a few hours to a few days, unless there was permanent muscle damage (Antrim and McBain 2001). Without protection, animals may overheat in direct sun and heat or develop hypothermia or frostbite in freezing temperatures. Inhalation of exhaust fumes and jolting during transport could injure pinnipeds.

Response may also include the harassment and/or capture of free-swimming animals that are trapped, out of habitat, extralimital, or exhibiting abnormal behavior. Reactions to vessel close approaches and hazing activities from cetaceans may include swimming faster, breaching, diving, tail and fin slapping, or moving away from the vessel. Pinniped reactions to vessels are highly variable, depending on the species (Calkins and Pitcher 1982). Behaviors in response to close approaches by vessel would generally be short-term, with a minimal effect on the animal.

Any capture and/or restraint procedure would likely have some effect on the behavior or activities of marine mammals. The method(s) of restraint, as well as the age and general condition of the animal are all factors that would affect an animal's response to capture. Animals could incur contusions, concussions, lacerations, nerve injuries, hematomas, and fractures in their attempts to avoid capture or escape restraint (Fowler 1978). The stress response could change an animal's reaction to many drugs, including those commonly used for chemical restraint, which could have lethal consequences.

Stress could also alter an animal's immune system. It may also lead to behavioral changes including increased aggressive and antisocial tendencies (Fowler 1986). Stress from capture and restraint could cause capture myopathy, which occurs when an animal cannot cool itself (Fowler 1978). Capture myopathy is characterized by degeneration and necrosis of striated and cardiac muscles and usually develops within 7 to 14 days after significant trauma, stranding, transport, or capture. Animals could also become entangled in the capture net, which may result in injuries or death. Animals may become stressed during handling and restraint. Signs of stress in cetaceans include reduced respiration, prolonged struggling while being held, and arching. Impacts on pinnipeds from capture and restraint are described above.

Response would include hazing an animal(s) when necessary to move it away from a possible health hazard. Potential adverse effects of hazing would likely be from the close approach of vessels, either used to deploy hazing methods or as a method itself. The intent of the activities would be to cause the animal to change their behavior and move away from a potential threat. No significant, long-term impacts to behavior would be expected. Acoustic deterrents may cause temporary physical discomfort, but would not cause long-term injuries. Exclusion devices used for pinnipeds would not have a significant impact, as animals would not become trapped or entangled. A beneficial impact would be expected from hazing because it would likely prevent an animal from being harmed.

Biological samples may be collected from a stranded animal to help determine the medical and physiological condition of the animal, assess the best course of action, and monitor progress and appropriateness of treatment. Samples would include blood, swabs, biopsies, etc. Sample collection would likely cause minor stress to the animal, beyond the actual stranding event. Response activities would be conducted in an attempt to save an animal's life, to reduce pain and suffering, or to humanely euthanize an animal, which would be deemed in the best interest of the animal. Most adverse impacts on stranded animals would be outweighed by the potential beneficial impacts of saving an animal and/or reducing their pain and suffering.

Response activities would also include euthanasia, when deemed necessary. Euthanasia procedures would be performed by the attending veterinarian or a person acting on behalf of the attending veterinarian. Chemical euthanasia agents may cause hyperexcitability or violent reactions in some species. Intraperitoneal administration of a euthanasia solution may lead to the prolonged onset of action due to differential or slow absorption rates. It may also cause irritation in the surrounding tissues. Improperly administered chemical euthanasia agents or methods of delivery may prolong the pain and suffering of an animal. When done correctly, the use of ballistics should cause

instantaneous unconsciousness followed by respiratory and cardiac arrest. However, improper uses, such as inappropriate caliber of the firearm or untrained personnel, may not cause unconsciousness before death and would then not be considered humane under the American Veterinary Medical Association (AVMA) guidelines. During mass strandings, the use of ballistics may stress and exacerbate fear in the surviving animals. The incorrect charge placement of explosives may not cause instantaneous unconsciousness and may cause tissue destruction (Greer *et al.* 2001). Exsanguination (bleeding) may prolong pain and suffering if done incorrectly.

Minor to moderate, adverse effects on marine mammals would be expected to occur if new SAs are not issued. Issuance of SAs only to current SA holders limits the activities of the stranding network to the geographic area that is currently covered. Animals may strand in areas where response is limited or non-existent. Limited response may increase the pain and suffering of stranded animals, and animals would likely die without response from the stranding network. Limiting the issuance of SAs would not allow for new rehabilitation facilities to be added and would affect the amount of animals that could be accepted for rehabilitation. If current rehabilitation facilities do not have space for an animal, the animal would be euthanized or left on the beach during response activities. Prohibiting new activities could reduce the success of a response, as new tools and techniques would not be available for use.

Minor to moderate, adverse effects on marine mammals would be expected to occur if SA criteria were not implemented. The criteria would ensure that only those individuals, organizations, or institutions qualified and trained to conduct response, assessment, rehabilitation, and/or release of marine mammals would be given SAs. This would reduce the likelihood of increased risks to wild populations with release. Without using the criteria during the review of SA applicants, inexperienced personnel could be issued a SA to respond to and/or rehabilitate stranded animals. Inexperienced personnel could put the animal's health in jeopardy, increase their pain and suffering, and increase the adverse impacts on other biological resources. The potential for an appropriate response (immediate release, animal to rehabilitation, or euthanasia) would decrease. Without a nationwide set of criteria, SA holders in different NMFS regions may not be held to the same standards or require the same minimum experience and qualifications. This would include working with a licensed veterinarian for live animal response and rehabilitation to ensure animals receive adequate and humane care.

4.2.1.3 Alternative A3

Effects on biological resources from stranding response activities under Alternative A3 would be the same as those described under Alternative A2. Effects of not implementing the SA criteria would also be the same as those described under Alternative A2. Under Alternative A3, new techniques and tools would be permitted for use during response activities. This would likely have a beneficial impact on marine mammals as response efforts would be conducted using the best available equipment and methods.

Minor, adverse effects on marine mammals would be expected to occur if new SAs are issued to any applicant after they were reviewed by the appropriate NMFS Regional Office. Some beneficial impacts could come from allowing new SA holders to be added, given that they have the proper experience with marine mammal response, as geographic coverage would increase and new rehabilitation facilities may be added to the Stranding Network.

4.2.1.4 Alternative A4- Preferred Alternative

Effects on biological resources from stranding response activities under Alternative A4 would be the same as those described for Alternative A2. Under Alternative A4, new techniques and tools would be permitted for use during response activities. This would likely have a beneficial impact on marine mammals as response efforts would be conducted using the best available equipment and methods.

Long-term beneficial effects on marine mammals would be expected to occur with the implementation of the SA template and criteria. The template contains the requirement for periodic review and reapplication in order to stay in the stranding network. Reviews would occur by the Regional NMFS Office after the first year for new (probational) network members, every 3 years for members doing live animal response and rehabilitation, and every 5 years for organizations responding solely to dead animals. In addition, the new agreement provides NMFS with the option to place organizations on probation or suspension, or to terminate the SA, for noted deficiencies or failure to comply with the terms and conditions of the SA. The SA criteria would make certain that SA holders in every NMFS region were held to the same standards and require the same minimum experience and qualifications. A licensed veterinarian would be highly recommended during all emergency response activities and during the transport of cetaceans. A licensed veterinarian would be required at all rehabilitation facilities. This attending veterinarian would meet qualifications as set forth in the Minimum Criteria and Rehabilitation Facility Guidelines, including: 1) having an active veterinary license in the U.S. (has graduated from a veterinary school accredited by the AVMA

Council on Education, or has a certificate issued by the American Veterinary Graduates Association's Education Commission for Foreign Veterinary Graduates) or has received equivalent formal education as determined by NMFS; and 2) having the appropriate registrations and licenses (*e.g.*, for handling controlled substances, including registering with the Drug Enforcement Administration [DEA]) to obtain the necessary medications for marine mammal response. This would likely increase the potential for an appropriate response, rehabilitation, and/or release, and may minimize the negative impacts associated with stranding response on biological resources. New SA holders could be added under the alternative, which would be a beneficial impact on marine mammals.

4.2.1.5 Alternative A5

Effects on biological resources from stranding response activities under Alternative A5 would be the same as those described under Alternative A2. Effects on biological resources from the implementation of SA criteria would be the same as those described under Alternative A4.

Requiring response to threatened, endangered, or rare animals would be a positive effect on those populations. However, making response to other animals optional could adversely affect those populations as they could become threatened or endangered in the future. It may also indirectly affect ESA-listed species, as non-listed species often serve as models for other animals. Limiting response to non-listed species would decrease the information gained from strandings that could be beneficial to the survival of threatened and endangered species. Responding to other species allows the detection of new diseases or hazardous conditions in the ocean, which may reduce impacts on threatened and endangered species or species of concern.

4.2.2 Carcass Disposal Alternatives

4.2.2.1 Alternative B1- No Action

Potential adverse effects on biological resources could occur from Alternative B1. Carcasses would remain on the beach to naturally decompose. Federal (not including NMFS), state, and local agencies authorized under MMPA 109(h) would still be able to conduct carcass disposal of non-ESA listed species. Carcass disposal activities would likely be limited and localized, and would likely be removed for the protection of public health and safety, when appropriate and feasible. Animal carcasses may contain POPs, toxic metals, pathogens, and/or biotoxins. Contaminant levels would likely be higher in species that feed at higher trophic levels and/or in areas where prey may be more contaminated. A literature review has been conducted to determine the persistent contaminants found in selected marine mammal species (see Appendix J). Species addressed in the review were based

upon the frequency and patterns with which they strand. The review concluded that there is a limited amount of information on most species and their contaminants. Therefore, the evaluation of the potential toxicological environmental hazards posed by a decomposing carcass cannot be determined at this time. However, the potential does exist for the decay products of carcasses to be released into the surrounding environment or recycled into the food web, with subsequent negative impacts. Decay products could have a minor adverse effect on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds. Scavengers that consume carcasses may also be adversely affected. Scavengers would bioaccumulate POPs and other toxic chemicals over time, with the potential for serious injuries or death.

Uncontaminated carcasses left on-site would be a beneficial impact. Carcasses would provide food for scavengers and recycle nutrients back into the food web.

4.2.2.2 Alternative B2- Status Quo

Current carcass disposal methods under Alternative B2 include on-site burial, transport off-site (for burial, rendering, or composting), disposal at sea, and natural decomposition (left on-site). Spills of hazardous materials or wastes from vessels or a vessel accident during at-sea carcass disposal activities could impact biological resources. Some materials could be diluted quickly by currents, only causing temporary impacts. Other materials could linger in the water column or adhere to sediment particles, causing slightly longer impacts. Biological resources could be injured or killed if they are in the vicinity of a spill or an accident. Equipment used during carcass disposal activities could leak oil or other materials into sand and nearshore waters. Hazardous material leaks from equipment could impact shellfish, other invertebrates, and nearshore fish. However, these would likely be small amounts that would be flushed out and/or diluted rapidly, causing a minor, short-term impact. However, all of these impacts would be negligible when compared to other inputs of hazardous materials from vessels, sewage outfalls, runoff, industrial operations, and other beach vehicle uses.

Minor to moderate, short- and long-term adverse effects on protected and sensitive habitats would be expected from on-site burial operations. Digging may physically alter and disrupt the site. However, these effects would be negligible as on-site burial would not be conducted in these habitats, unless necessary, and not without consulting the proper authorities (see Section 5.2). Potential damage could occur as equipment may need to traverse sensitive habitats to access the carcass for disposal.

Equipment used for disposal at sea and the carcass itself could hit and damage submerged sensitive habitats, such as coral reefs.

Animal carcasses may contain POPs, toxic metals, pathogens, and/or biotoxins. Contaminant levels would likely be higher in species that feed at higher trophic levels and/or in areas where prey may be more contaminated. The evaluation of the potential toxicological environmental hazards posed by a decomposing carcass cannot be determined at this time (see Appendix J). However, the potential does exist for the decay products of carcasses to be released into the surrounding environment or recycled into the food web, with subsequent negative impacts.

Animals may also contain chemical residues from substances administered by stranding response personnel, including chemical euthanasia solution and sedatives. If the animal is a rehabilitated animal that has restranded, it may also contain antibiotics, antifungals, and other medicine. These chemicals persist in the carcass at different concentrations and for different amounts of time. They would not likely create a large-scale environmental hazard, as the levels would be negligible compared to levels found in runoff and sewer discharge, and the compounds are not likely to bioaccumulate through the food web.

Contaminants from toxic carcasses left on site or buried could leach into groundwater and flow into nearshore water, harming sensitive areas in and around the carcass. This impact would be minor and short-term. If contaminants enter groundwater, they would likely be flushed out quickly by tidewater and/or precipitation. Higher concentrations of contaminants may occur in nearshore waters down site from the carcass. These concentrations would be diluted and flushed out by the currents; therefore the impact on biological resources would be temporary and minor. Sediment quality would not likely be impacted by contaminants, as they would be flushed out or diluted before they could adhere to the substrate. Therefore, any organisms using sediment would not be impacted.

SAV and macroalgae could be indirectly affected by on-site burial. Contaminants from chemically euthanized carcasses could leach into groundwater and impact waters used by SAV and macroalgae. Carcass disposal at sea could cause minor, short-term, adverse effects. Equipment used for disposal at sea and the carcass itself could potentially damage SAV and macroalgae or remove SAV from sediment. Impacts would be minor, as SAV and macroalgae would grow back and organisms that use them as habitat would be able to utilize surrounding areas.

On-site carcass burial could adversely affect sea turtles nesting on beaches, depending on the location and time of year. However, carcass burial sites would not be sited near nesting sea turtles, eliminating the potential for adverse effects.

Minor, short-term adverse effects on coastal and marine birds could occur during carcass disposal. The use of equipment and the presence of people could disturb birds nesting or roosting in trees or small bushes, and may cause them to temporarily leave the area. These birds would likely return to the area once response activities ended and impacts would be temporary, as response activities would occur for a short period. Ground nesting birds could be adversely affected by transport and burial activities. Heavy equipment could crush nests and digging for burial could completely remove a nest. Personnel helping with disposal could disturb or damage a nest. Towing a carcass out to sea may disturb birds foraging in nearshore waters. This impact would be minimal, as birds could forage in nearby areas and would likely return once disposal activities ended.

Minor, short-term adverse effects on shellfish and other invertebrates could occur during response activities. The traversing of heavy equipment over shellfish beds to access a carcass could damage or kill shellfish. Shellfish would not be negatively impacted during digging for carcass burial, as burial sites would be chosen well above the high tide line. Other invertebrates could be disturbed and negatively impacted during burial activities. Contaminants from toxic carcasses could leach into groundwater and nearshore waters and impact shellfish. Potential effects on fish may result from contaminants in nearshore waters. Impacts on shellfish and fish from contaminants would be minor, as contaminants would be flushed out and/or diluted rapidly.

Scavengers may be adversely affected if carcasses of chemically euthanized or toxic animals are left to decompose on the beach. Euthanasia solution is toxic and may injure or kill animals feeding on these carcasses, known as secondary toxicosis. In addition, scavengers may consume POPs, other toxic chemicals, and biotoxins which may bioaccumulate over time, with the potential for serious injuries or death. Diseased animal carcasses may also cause serious injuries or death if consumed by scavengers. Likewise, disposal of these carcasses at sea could also affect scavengers, such as sharks and seabirds. Negligible, short-term, adverse effects on scavengers would be expected to occur from the removal of carcasses from beaches. Carcasses provide food many animals, including foxes, coyotes, birds, and polar bears. Threatened bald eagles may feed on marine mammal carcasses left on beaches. California condors, an endangered species recently reintroduced in California, may also feed on marine mammal carcasses. California condors would not be significantly impacted, as most carcasses (mainly pinnipeds that have not been chemically euthanized) are left on beaches in

California where the condors are located. Effects of carcass removal are expected to be negligible because scavengers are not solely dependent on marine mammal carcasses for survival. In most areas, strandings are rare and not a major component of scavengers' diets.

Minor, indirect benefits may occur from carcasses towed out to sea. Disposal at sea of carcasses may create food for other organisms. However, this may lead to recycling of contaminants. Large whale carcasses have been known to become habitat and food for a variety of organisms, such as those as seen on natural whale falls (Smith and Baco 2003). Some stranding network members have coordinated carcass disposal efforts with research groups studying whale falls and the transitory benthic invertebrate communities surrounding them.

4.2.2.3 Alternative B3- Preferred Alternative

Effects from Alternative B3 would be the same as those described under Alternative B2, except for the effects from chemically euthanized animal carcasses. Under Alternative B3, these carcasses would be transported off-site to a proper landfill whenever possible, removing the risk of contamination. This would be a positive effect on protected and sensitive habitats, SAV and macroalgae, fish, shellfish, other invertebrates, and scavengers.

4.2.3 Rehabilitation Activities Alternatives

4.2.3.1 Alternative C1- No Action

Moderate, long-term, adverse effects on marine mammals would be expected to occur under Alternative C1. Under this alternative, no marine mammals would be taken into rehabilitation, and most would likely die from injuries or disease. For populations that are threatened, or endangered, this could greatly affect the survival of the species. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, or birds would be expected to occur from this alternative.

4.2.3.2 Alternative C2- Status Quo

Minor, short- and long-term, beneficial and adverse effects on marine mammals would be expected to occur under Alternative C2. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, or birds would be expected to occur from rehabilitation activities under this alternative.

Stranded animals would be taken into rehabilitation with the intent to release them back to the wild, if possible, once they are healthy. Biological samples may be collected from a stranded animal to help determine the medical and physiological condition of the animal, assess the best course of action, and monitor progress and appropriateness of treatment. Samples would include blood, swabs, biopsies, etc. Sample collection would likely cause minor stress to the animal, beyond the actual stranding event. Handling, lifting, and restraining an animal could cause injuries. When anesthetized or sedated, an animal may go into a dive reflex, which would include breath holding, slowing of the heart rate, and the pooling of blood from peripheral vessels. Anesthetized animals could develop hypothermia or hyperthermia. Administration of drugs and surgical procedures could cause injuries or death. However, all rehabilitation activities would be conducted in an attempt to help sick and injured animals. Rehabilitation would be conducted with proper veterinary oversight and the use of established and accepted methods. Most adverse impacts on animals in rehabilitation would be outweighed by the potential beneficial impact of saving an animal and returning it to the wild.

Animal euthanasia may occur, when deemed necessary by the attending veterinarian. Euthanasia procedures would be carried out by, or under the direction of, the attending veterinarian. Chemical euthanasia agents may cause hyperexcitability or violent reactions in some species. Intraperitoneal administration of a euthanasia solution may lead to the prolonged onset of action due to differential or slow absorption rates. It may also cause irritation in the surrounding tissues. Improperly administered chemical euthanasia agents or methods of delivery may prolong the pain and suffering of an animal.

Minor, long-term, adverse effects on marine mammals would be expected to occur if new rehabilitation facilities cannot join the stranding network. Current facilities may not have enough space or resources to accommodate a stranded animal or may only rehabilitate certain animals. If no rehabilitation facility can take an animal, the animal may be euthanized. Standards for the human treatment of marine mammals would constantly be developed, applied, and re-examined. Practices currently acceptable may not be acceptable in the future. If adaptive changes are not allowed, the success of rehabilitation would not increase. Animals may not able to return to the wild, which may mean the animal would be euthanized or placed into permanent captivity in a public display or research facility. Removal of marine mammals from the wild would negatively effect populations that are depleted, threatened, or endangered.

The Rehabilitation Facility Standards would not be implemented, compromising animal health, the success of rehabilitation, and the potential for release to the wild. Inadequate care may increase pain and suffering of a marine mammal. Pool and pen sizes could be inadequate or contain too many

animals, which would restrict animal movement and may cause aggressive behaviors between animals. New animals may not be placed into quarantine, which could introduce new pathogens to other animals currently in the rehabilitation facility, which are already compromised. Pathogens may also be introduced and spread through contaminated supplies, equipment, and personnel, by mixing of marine mammal species within the rehabilitation setting (particularly species that do not interact or whose ranges do not overlap in the wild), or by encounters between marine mammals and terrestrial mammals (particularly canids, felids, and raccoons). Any pathogen within a rehabilitation "hospital" setting has the potential to mutate or evolve into a novel organism (including those with drug resistant properties), creating a new (or drug-resistant) disease which could then be introduced into the naïve wild population upon the release of an infected animal following rehabilitation, particularly if the animal is not thoroughly evaluated prior to release.

Water temperature may not be adequate for the species of marine mammals in rehabilitation. Animals kept in outdoor pools may not be properly sheltered from weather conditions, which could lead to hypothermia, frostbite, or overheating. Poor water quality could increase the risk of disease transmission between animals or may cause other health problems. Proper salinity levels are dependent on the species and unacceptable levels may cause eye and skin problems. Otariids may develop an ophthalmic injury if they do not have access to salt water (Arkush 2001). Improper sanitation, food handling, and food preparation techniques could cause bacterial and chemical contamination of food. Diets may not contain the amount or types of food necessary for the health of the animal. Improper diets could lead to vitamin deficiencies, hyponatremia (low blood sodium), or other nutritional disorders (Worthy 2001). Without the implementation of veterinary care and program standards, veterinarians and other personnel may not have the appropriate knowledge and experience to properly care for and treat marine mammals.

4.2.3.3 Alternative C3- Preferred Alternative

The effects on marine mammals from rehabilitation activities under this alternative would be the same as those described under Alternative C2. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, or birds would be expected to occur from rehabilitation activities under this alternative.

The Rehabilitation Facility Standards would be implemented, requiring current and future facilities to adhere to the minimum standards as part of their SA. The standards would ensure a healthy environment for animals, maximize the success of rehabilitation, and increase the potential for release

to the wild. The standards cover facilities, housing, space, water quality, quarantine, sanitation practices, food handling and preparation, and veterinary medical care. Long-term beneficial impacts would be expected, as these standards would ensure that safe, healthy, and humane conditions are in place at all facilities. The standards would decrease the risk of disease transmission within the facility with the requirements for quarantine facilities and quarantine protocols for all incoming animals. Minimum quarantine and biosecurity standards include, but are not limited to: having separate filtration and water flow systems; providing sufficient space or solid barriers between animal enclosures to prevent direct contact; and maintaining equipment and tools strictly dedicated to the quarantine area. Additional quarantine standards are described under mitigation in Section 5.2.3.

Veterinary medical care standards (Sections 1.7 [for cetaceans] and 2.7 [for pinnipeds] in the standards) would ensure that veterinarians and other personnel have the appropriate knowledge and experience to properly care for and treat marine mammals. An attending veterinarian would be required to work with staff at all rehabilitation facilities and be involved in making decisions regarding medical care and husbandry of current and incoming animals. Veterinary care standards, including recommended standards, are described under mitigation in Section 5.2.3.

Standards for open ocean/bay net pens reduce the probability of disease transmission to other healthy animals in the pens or the wild population and ensure that good water quality would be maintained. Even with these standards, adverse impacts from the use of net pens may occur. Animals in net pens are still exposed to conditions that cannot be controlled, such as water temperature, HABs, and the elements. The recommended placement of net pens may not always be feasible due to geography, currents, proximity to protected areas, or proximity to economic interests (*e.g.*, aquaculture). The use of temporary pools may adversely affect animal health. Proper water quality and temperature may not be maintainable and disease transmission may occur if more than one animal is housed in a pool. Animals in outside temporary pools would also be exposed to the elements.

4.2.3.4 Alternative C4

The effects on marine mammals from rehabilitation activities under this alternative would be the same as those described under Alternative C2. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, or birds would be expected to occur from rehabilitation activities under this alternative.

Moderate, long-term, beneficial and adverse effects on marine mammals from the implementation of the Rehabilitation Facility Standards would be expected to occur under this alternative. These effects

would be the same as those described under Alternative C3. Adverse impacts would also be expected for animals that are not rare, threatened, or endangered. Rehabilitation of all other animals would not be required, but would be optional depending on facility resources. Animals not taken into rehabilitation would be euthanized on the beach. These animals often serve as models for other species and provide valuable information that could be used during rehabilitation. For example, through the treatment and care of California sea lions (a commonly stranded pinniped along the West Coast) husbandry practices have been refined and are used to the benefit of Steller sea lions (a threatened species), including nutrition; stress reduction; animal monitoring; and veterinary techniques including drugs, sedatives, and anesthetics. Similarly, rehabilitation practices refined on Northern fur seals from the non-listed San Miguel stock off the California coast benefit Northern fur seals from the depleted Eastern Pacific stock, as well as endangered Guadalupe fur seal. Information obtained from California sea lions regarding impacts of disease and environmental conditions, such as domoic acid, provide valuable data regarding food web transfer and exposure routes, possible treatment options, and population-impacts. Due to similar physiology, much of this information may be extrapolated to other otariid species including Steller sea lions and Northern fur seals to determine how these animals may be exposed (via the food web) and affected, as well as treated. In addition, animals from the "common" species are frequently placed with rare, threatened or endangered animal to provide adequate non-human socialization. Absence of common animals, and lack of experience treating them, would lead to difficulties in adequately treating rare, threatened and endangered species. This would be an indirect adverse affect on rare, threatened, and endangered species.

4.2.4 Release of Rehabilitated Animals Alternatives

4.2.4.1 Alternative D1- No Action

Beneficial and adverse effects on marine mammals would be expected to occur under Alternative D1. Animals would not be released back to the wild, which adversely impacts all populations of species, but especially those that are threatened or endangered. However, this alternative would have a beneficial impact on wild populations, as there would no longer be the risk of introducing a diseased animal that could potentially infect other marine mammals. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, or birds would be expected to occur from release activities under this alternative.

4.2.4.2 Alternative D2- Status Quo

Minor, short- and long-term adverse effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, and birds could occur from release activities under this alternative. Spills of hazardous materials or wastes from release vessels or a vessel accident could impact these resources. Some materials could be diluted quickly by currents, only causing temporary impacts but others could linger in the water column or adhere to sediment particles, causing slightly longer impacts on sensitive habitats, SAV, and macroalgae. Hazardous materials could injure or kill sea turtles or marine mammals in the vicinity of a spill or accident. Equipment used for beach release activities could leak oil or other materials into sand and nearshore waters. Sea turtles and birds could be injured and their nests may be damaged. These materials would likely be flushed out and/or diluted rapidly, causing a minor, short-term impact to sensitive habitats, SAV and macroalgae, fish, shellfish, and other invertebrates.

Minor to moderate, short- and long-term, adverse and beneficial effects on marine mammals would be expected to occur under Alternative D2. As required under regulations at 50 CFR 216.27, all animals would be tagged or marked prior to release. Commonly used methods of tagging delphinids include freeze branding on or below the dorsal fin (both sides of the body) and/or the attachment of a roto-tag (cattle ear tag) to the dorsal fin. Freeze branding may cause little or momentary pain during application, which would require 15-20 seconds per brand. Initial discomfort or pain would be relieved by the appropriate anesthetic or analgesic. Discomfort may persist for some time after the procedure, but is expected to be minor. Therefore, impacts would be considered negligible and not significant. However, liquid nitrogen could spill onto an animal during the process, causing more than momentary pain. During the attachment of the roto-tag, pain would only last during the application, and sedatives or local anesthetic would be used. However, the tag site could become infected, causing pain to the animal. When the tag is shed, tissue damage may occur and the site could become infected. NMFS must be contacted if other additional tagging methods may be used, including radio, satellite, or microchip (Passive Integrated Transponder [PIT] tags) (see Section 4.2.6.2 for impacts from other tagging methods). For cetaceans other than delphinids, NMFS must be contacted to determine the appropriate identification method(s).

Pinnipeds would be given flipper tags (roto-tags), with placement dependent on the species. Tags would be attached to the hind flipper of phocids and the foreflipper of otariids (Geraci and Lounsbury 2005). Flipper tagging would cause temporary pain during attachment and the tag site may become infected. The tag may also be ripped out and the site could become infected. Animal movement may

prolong or prevent healing by producing repetitive stress on the wound. Additional tagging may include radio, satellite, or microchip (PIT) tags with a variety of attachment methods (see Section 4.2.6.2 for impacts from other tagging methods).

Tagging allows an individual animal to be monitored after being released and evaluate its success in returning to the wild (Lander *et al.* 2001). If released animals appear to be compromised (*e.g.*, not feeding, ill, or interacting with people) based on tag data, animals could potentially be recaptured for further rehabilitation or permanent captivity. This would be beneficial to the individual animal and may also protect the wild population by preventing disease transmission or transfer of negative behaviors, such as human interaction. Conversely, if the tag data indicates that the animal is behaving "normally" (diving to depths indicative of feeding, swimming in normal patterns, in geographic association with other animals of the same species, avoiding people), the rehabilitation may be deemed a success, and the tag can provide basic biological data about the animal and species. For instance, the first rehabilitation and release of a Risso's dolphin occurred at the Riverhead Foundation for Marine Research and Preservation in New York (DiGiovanni *et al.* 2005). After release, this animal was tracked for 67 days. Aerial overflights showed that it was in the vicinity of other Risso's dolphins and that it was diving up to a maximum of 600 m depth for a maximum duration of 15 minutes. This rehabilitation effort was deemed to be a success, based on this follow-up information. This is also some of the first information that has been collected on a free-ranging Risso's dolphin, so it is beneficial to basic scientific inquiries about marine mammals. For some marine mammal species, particularly those that are offshore or cryptic, tagging may be the only way to monitor these animals and gather necessary life history data (Wilson and McMahon 2006). Over time, data may be collected from a significant number of released animals (particularly those that commonly strand) that can provide population-level insights into species movement and behavior patterns.

Tagging and post-release monitoring is also beneficial in the evaluation and improvement of response, rehabilitation, and release procedures. For example, cetaceans that mass strand in the Northeast U.S. (particularly Cape Cod) are not typically rehabilitated, and are either euthanized or refloated and released off the beach. While animals that are pushed out are not generally observed restranded in the area, their ultimate fate has been unknown. Recently, satellite transmitters were deployed on two beach-released Atlantic white-sided dolphins that were part of separate mass stranding events (Rice and Cooper 2005). Both animals were tracked for over 30 days, and the tracks indicated survivorship as well as vigorous swim and dive behavior following return to offshore habitats. Some studies are also being done on classes or groups of animals that strand due to a

common etiology (cause), such as domoic acid in California pinnipeds. California sea lions that have been deemed successfully rehabilitated (passed all of the pre-release screening tests) have been tracked post-release and determined to have long-term medical and behavioral problems that persist from the domoic acid intoxication, including seizures, disorientation, isolation, and not reacting to approach from humans and dogs (Thomas and Harvey 2005). Several animals restranded, and the behavior of others made survivability questionable. As a result, rehabilitation decisions are being re-examined for this and other species, including the definition of a "successful" rehabilitation.

Transport of animals to release sites could cause stress or injuries to an animal. During transport to the release site, animals may overheat in direct sun and heat without protection. Cetaceans may overheat (hyperthermia) or develop hypothermia during transport. Body surfaces may be exposed to the drying effects of air. Animals may also be knocked around, causing muscle damage or they may inhale exhaust fumes. Improper transport of cetaceans may cause abrasions, pressure necrosis, thermoregulatory problems, and respiratory problems. Muscular stiffness may occur from transport, but most accepted transport methods try to minimize or avoid this entirely. Stiffness would disappear within a few hours to a few days, unless there was permanent muscle damage (Antrim and McBain 2001).

The release of pinnipeds on rookeries or haul-out sites could disrupt other animals. When pinnipeds are startled and disperse from rookeries, pups may be trampled or abandoned. Juvenile and adult animals may be trampled during stampedes or injured on underwater rocks and cliff faces.

Animals deemed releasable after rehabilitation would be returned to the wild, which may have a positive or negative impact on marine mammal populations. Without the use of release criteria, animals that are not medically, developmentally, or behaviorally cleared for release could be released. Releasing unhealthy animals could increase their pain and suffering. An animal that is not healthy or has behavioral issues could re-strand or die, which would counteract the care it received in rehabilitation. Animals that are not healthy could transmit diseases to wild populations (Cunningham 1996, Measures 2004). An animal that is not behaviorally ready for release may not have the skills needed to survive in the wild. The animal may not be able to forage or avoid predators. An animal may have abnormal breathing and may be unable to swim or dive properly. Animals with behavioral issues could also approach, interact, and be aggressive with people, creating hazard to themselves and public safety.

4.2.4.3 Alternative D3- Preferred Alternative

Effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, birds, and marine mammals from release activities under Alternative D3 would be the same as those described under Alternative D2, except for the impacts on marine mammals. Beneficial effects would be expected for marine mammals because adaptive changes would be permitted and the release criteria would be implemented. Adaptive changes would allow future use of new procedures and technology that may increase the success of a release and the survival of an animal.

Under the release criteria, animals would be medically cleared by the attending veterinarian and their assessment team before a release determination is made. The medical assessment would include a hands-on physical examination and a review of the animal's complete history, diagnostic test results, and medical and husbandry records. These procedures would minimize the risk of disease introduction or transmission to the wild population.

Animals would also be developmentally and behaviorally cleared before release occurred, enhancing their chance for survival. Developmental clearance would ensure that the animal has attained a sufficient age to be nutritionally independent, including the ability to forage and hunt. Behavioral clearance would include an assessment of an animal's breathing, swimming, diving, locomotion on land (pinnipeds) foraging, and hunting abilities. An evaluation of an animal's visual and auditory functions would be conducted. For cetaceans, any behavioral conditioning would be eliminated prior to release such that the association of food rewards with humans is diminished.

4.2.5 Disentanglement Alternatives

4.2.5.1 Alternative E1- No Action

No significant effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, or birds would be expected to occur from Alternative E1. However, gear on an entangled animal may be shed and become marine debris, which could potentially harm biological resources. The amount that may be shed would be negligible compared to the amount of gears already in the ocean.

Major, long-term, adverse effects on marine mammals would be expected to occur as a result of ending the disentanglement network. Lines and gear may cause serious injuries to animals and restrict their ability to move, dive, and feed. If an animal cannot free itself from the entangling material it would most likely die. Without disentanglement efforts, animals would likely suffer a

slow, painful death. North Atlantic right whales would be greatly affected if disentanglement efforts ceased, as entanglements are known to be a significant source of mortality. The North Atlantic right whale population is estimated at 300 animals (NMFS 2005c). Recent models indicate that this population is likely declining, rather than remaining static or increasing (Caswell *et al.* 1999). The loss of one individual, especially a female, from an entanglement would be a major impact on the species. For biological reasons, the number of reproductive-age females is more essential to a species' ability to maintain itself or grow than the number of males. The premature death of a single mature female could make recovery of the species untenable. Humpback whales and other large endangered whales would also be negatively affected if disentanglement activities ended.

4.2.5.2 Alternative E2- Status Quo

Minor, short-term adverse effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds could occur from this alternative. Spills of hazardous materials or wastes from vessels or a vessel accident could impact these biological resources. Some materials could be diluted quickly by currents, only causing temporary impacts. Other materials could linger in the water column or adhere to sediment particles, causing slightly longer impacts. No impacts would be expected to occur during pinniped disentanglements on land.

Moderate, short- and long-term, beneficial and adverse effects on marine mammals would be expected under Alternative E2. The disentanglement network would continue to disentangle or attempt to disentangle animals. Removal of life-threatening gear would not only increase the chance of survival for the individual animal, but would have a positive impact on those species that are threatened and endangered.

Adverse effects on marine mammals could occur during disentanglement activities. Takes of entangled animals would occur during close approaches by aircraft (to locate entangled animals or for photo-identification) or by vessel (for documentation, general assessment, photo-identification, and disentanglement attempts). Incidental takes from close approaches are likely if other animals are in the vicinity of the entangled animal. Aerial surveys to locate entangled animals would be of a short-duration and aircraft would circle at an altitude ranging from 300-1,000 feet (91-305 m) above the animal. Harassment of marine mammals could occur if the aircraft operated below a certain altitude. Aerial surveys may cause an animal to change its behavior, such as diving rapidly. However, this change in behavior would be short-term, with a minimal effect on the animal. Responders have

reported that whales they have encountered have not exhibited evasive behavior in response to aerial approaches for the purpose of photo-identification and basic sighting data.

Animal reactions to close approaches may include swimming faster, breaching, diving, tail and fin slapping, or moving away from the vessel. Responders have reported that some whales encountered for assessment and documentation have not exhibited evasive behavior. Whales encountered closely (within 30 m) for the purpose of tagging and disentanglement efforts did exhibit evasive behavior in response to vessel approaches. These behaviors would generally be short-term, with a minimal effect on the animal. Response of the entangled animal to disentanglement attempts depends upon the species. Humpback whales are relatively easy to handle, especially if they have been entangled for a prolonged period of time. Experience has indicated that humpbacks are unlikely to be evasive or aggressive during disentanglement efforts, however there are always exceptions. Right whales tend to respond with aggressive behavior and are uncooperative. To decrease reactions from animals, approaches would be slow and from the side or behind, with minimal noise. Standby vessels maintain some distance to minimize potential whale disturbance.

During attempts to physically restrain whales, floats, buoys, and control lines would be attached. Right whales have been known to tow numerous floats and drag moderate-sized vessels. Physical restraint of the animal may increase stress or pain. Physical restraint of a pinniped may also cause injuries or death. Chemical restraint may lower a free-swimming whale's respiratory rate, slow their breeching, and decrease their swimming strength. Sedatives may be delivered through a blow-dart style syringe, which may startle the animal and cause it to react. Chemical restraint of a pinniped may initiate the dive reflex, which would include breath holding, slowing of the heart rate, and the pooling of blood from peripheral vessels. The short-term effects from physical and chemical restraints would be outweighed by the potential beneficial outcomes.

Potential injuries may occur when cutting line and gear off the animal. Unintentional injuries may occur as an animal moves while cutting or if control of the equipment is lost. Responders may intentionally injure an animal, when no options to safely remove gear exist and only after consideration of the possible damage. The potential for a positive outcome outweighs the short-term effects of these injuries. Potential injuries could also occur if there are hazardous material spills from vessels or vessel accidents, including stand-by vessels, during disentanglement activities. These occurrences could cause injury or death to marine mammals in the vicinity.

During large whale disentanglement, biopsy sampling may occur via remote dart. Animal reactions to remote biopsy darting are discussed under Section 4.2.6.2, biopsy sampling. Responders report that while there is typically a low level of evasive response to the close approach for the biopsy sample, there have not been obvious reactions to the biopsy dart itself. Samples of skin or other tissue may be recovered from removed fishing gear and would have no impacts on animals.

During small cetacean disentanglement, the animal typically must be captured utilizing in-water capture techniques, such as encirclement via hoop net, followed by physical restraint. Additional animals may be captured or harassed during the rescue attempt. During pinniped capture and disentanglement activities, non-entangled animals may be disturbed off a haul-out site.

Potential adverse effects could occur, as the addition of new network members would not be allowed. Without the addition of new members, entangled animals may not be responded to, decreasing their chance of survival and increasing their pain and suffering. Modifications are not allowed, including new techniques and tools which could increase the success of disentanglement. Guidelines and training prerequisites which are currently utilized on the East Coast would not be implemented nationwide, which may mean inexperienced people could be conducting disentanglement activities on the West Coast. This would likely increase risks to already vulnerable entangled animals and the surrounding environment, as well as decrease the success of a disentanglement attempt.

4.2.5.3 Alternative E3- Preferred Alternative

Effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, and birds from Alternative E3 would be the same as those described under Alternative E2. Effects on marine mammals from close approaches, physical restraint, chemical restraint, and cutting of lines would be the same as those described under Alternative E2.

Major, long-term beneficial effects on marine mammals would be expected under Alternative E3. The disentanglement network would continue to disentangle or attempt to disentangle whales. Removal of life-threatening gear would not only increase the chance of survival for the individual animal, but would have a positive impact on those species that are threatened and endangered. New members could be added to the network which would increase the number of animals responded to. Modifications are allowed, including new techniques and tools which could increase the success of disentanglement. Guidelines and training prerequisites would be implemented nationwide, helping ensure that only experienced and qualified individuals are engaged in disentanglement activities.

This would likely increase the success of disentanglement and decrease the potential risk to entangled animals and the surrounding environment.

4.2.6 Biomonitoring and Research Activities Alternatives

4.2.6.1 Alternative F1- No Action

No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, or birds would be expected to occur from Alternative F1. Both beneficial and adverse effects on marine mammals would be expected. Biomonitoring and research activities would end and therefore takes of marine mammals would also end. This would be beneficial to animals, as they would no longer experience any negative impacts from these activities. However, without these research activities, important health and exposure data on marine mammal populations would no longer be collected. This would limit information on exposure of marine mammals to chemical and biological toxins. It would also hinder some research on the adverse health effects of toxin exposure for marine mammals and would restrict investigations into factors for UMEs. This could impede future conservation and management actions and ultimately result in detrimental impacts on marine mammal populations, especially those that are threatened and endangered.

4.2.6.2 Alternative F2- Status Quo

Potential minor, short-term, adverse effects on all biological resources could occur from vessel and vehicle uses. Spills of hazardous materials or wastes from vessels or a vessel accident could impact biological resources. Some materials could be diluted quickly by currents, only causing temporary impacts. Other materials could linger in the water column or adhere to sediment particles, causing slightly longer impacts. Equipment used during beach research activities could leak oil or other materials into sand and nearshore waters during beach releases. These would likely be small amounts that would be flushed out and/or diluted rapidly, causing a minor, short-term impact. However, all of these impacts would be negligible when compared to other inputs of hazardous materials from vessels, sewage outfalls, runoff, industrial operations, and other beach vehicle uses.

Potential minor, short-term, adverse effects on protected and sensitive habitats could include damage from vessels or researchers in the water or on the beach. Coral reefs and other habitats may be damaged from contact with a vessel or a person.

Negligible, short-term adverse effects on SAV and macroalgae could occur during research activities. Vessels used during research activities conducted in shallow waters may damage SAV and

macroalgae with their propellers. Vessel operators would be aware of this potential impact and would avoid these areas, where feasible. Any damage to SAV and macroalgae would be negligible and short-term, as only a minimal amount would be disturbed and would grow back.

Minor to major, short- and long-term adverse effects on sea turtles could occur during research activities. Activities conducted on beaches could disrupt nesting sea turtles or damage their nests.

Negligible, short-term adverse effects on fish could occur during research activities. Fish may be disturbed by research vessels or the presence of researchers in the water. Impacts would be short-term and negligible, as fish would be able to use surrounding areas and would likely return to the area once vessels and researchers have left. There would be a small possibility that larger fish species may get caught in the net during capture activities. This fish would likely be released by researchers back into the water without any long-term impacts.

Minor, short-term adverse effects on coastal and marine birds could occur during research activities. The close approach by vessels or aircraft, the use of equipment, or the presence of researchers on beaches could disturb birds nesting or roosting in trees or small bushes, and may cause them to temporarily leave the area. Ground nesting birds could be adversely affected by research activities. Equipment could crush nests and research personnel could disturb or damage a nest. Research conducted in nearshore waters could disturb foraging birds. This impact would be minimal and temporary, as birds could forage in nearby areas and would likely return once research activities ended.

Beneficial and adverse effects on marine mammals would be expected to occur from Alternative F2. Indirect beneficial effects would occur because valuable information on marine mammals and marine mammal health trends would be collected. This information would be used to understand stranding events, UMEs, and basic biological processes. Under this alternative, new research activities could not be conducted. This would limit the ability to collect information in areas not currently studied or to utilize new technologies and techniques during research activities. This would likely have a negative impact on marine mammals.

Adverse effects on marine mammals from biomonitoring and research activities would be expected to occur under this alternative. Takes of marine mammals would occur from close approaches, euthanasia, capture and restraint, tagging, marking, and biological sampling. General methodologies

used for biomonitoring and research are described in Appendix H and their impacts are described below. The numbers of estimated takes are listed in Appendix I.

Close Approach. Takes of animals would occur during close approaches by vessel or aircraft. Close approaches would occur during numerous research activities such as health assessment, biopsy sampling, breath sampling, tagging, photo identification, and collection of sloughed skin and feces. Incidental takes of non-targeted animals from close approaches are likely if they are in the vicinity of the targeted animal(s). Reactions from cetaceans may include swimming faster, breaching, diving, tail and fin slapping, or moving away from the vessel. Cetacean reactions to aerial surveys depend on the aircraft's altitude, length of pass, and species or individual behaviors. Approaches to marine mammals below certain altitudes may harass marine mammals and cause a change in behavior, or elicit behaviors, such as diving rapidly. Behaviors in response to close approaches by vessel and aircraft would generally be short-term, with a minimal effect on the animal or the population.

Pinniped reactions to vessels and aircraft are highly variable, depending on the species (Calkins and Pitcher 1982). In Steller sea lion studies, reactions ranged from none to complete and immediate departure from the haul-out site. In most cases, the potential impact to the animal is limited to disturbance; with the animal remaining at the haul-out site. When pinnipeds are startled and disperse from rookeries, pups or young may be trampled or abandoned. Juvenile and adult animals may be trampled during stampedes or injured on underwater rocks and cliff faces. The incidence of stampedes in response to aerial surveys at specific altitudes is unknown. Disturbance from aerial surveys would be dependent on plane specifications, flight patterns, and the altitude.

Capture and Restraint. Any capture and/or restraint procedure would likely have at least some short-term effect on the behavior or activities of marine mammals. The number of times an animal would be captured, the method(s) of restraint, as well as the age and general condition of the animal are all factors that would affect an animal's response to capture. Animals could incur contusions, concussions, lacerations, nerve injuries, hematomas, and fractures in their attempts to avoid capture or escape restraint (Fowler 1978). The stress response could change an animal's reaction to many drugs, including those commonly used for chemical restraint, which could have lethal consequences. Stress could also alter an animal's immune system. Stress from capture and restraint could cause capture myopathy, which occurs when an animal cannot cool itself (Fowler 1978). Capture myopathy is characterized by degeneration and necrosis of striated and cardiac muscles and usually develops within 7 to 14 days after significant trauma, stranding, transport, or capture.

Potential effects from anesthesia used for chemical restraint are described above. Physical restraint of a pinniped, if not properly executed, may injure or kill an animal (*e.g.* suffocation under the weight of a handler). Mechanical restraint methods may pose some risk to pinnipeds. Excessive pressure is possible using squeeze cages, which may cause trauma or interfere with adequate ventilation. Restraint boards may use a hinged guillotine to secure an animal's neck, which could obstruct the airway (Gulland *et al.* 2001).

During health assessments animals could become entangled in the capture net, which may result in injuries or death. During a health assessment study in St. Joseph Bay, FL (July 2006), a bottlenose dolphin became entangled deep in capture net and was found dead during the extrication of other dolphins from the net. Animals may also become stressed during handling and restraint. Signs of stress include reduced respiration, prolonged struggling while being held, and arching.

Tagging/Attachment of Scientific Instruments- Cetaceans. No tagging would occur on young of the year animals. Mothers accompanying these animals would not specifically be targeted. However, they may be tagged if accidentally captured during health assessments. Tagging would include reactions to the close approach and the physical attachment of the tag. Reactions to close approaches are described above. Free-swimming cetaceans often react when hit by tags delivered by remote devices, such as tagging guns and crossbows. Cetaceans may also react when tags miss the animal and hit the water nearby. In most cases, the reactions of the remotely tagged animal and non-target animals last little more than a few minutes, after which behavior appears to return to normal (Watkins and Tyack 1991, Goodyear 1993, Hooker et al. 2001). The physical presence of a tag may lead to an alteration in the normal behavior of tagged animals, including a temporary disruption of feeding or mating activities. The hydrodynamic drag created by the presence of the tag on the animal should not cause an adverse impact. The proportion of the hydrodynamic drag from the tag package to the animal's size and weight is such that the energetic demand on the animal would likely be insignificant. Potential adverse effects would be minimized by using the smallest possible instrument package and the smallest spear tip practicable. Therefore, animal disturbance would only occur during the close approach and the moment of attachment.

Suction cup tagging procedures have been analyzed by NMFS PR1 in several environmental assessments (EAs) and biological opinions, where findings resulted in no significant impact on the animals (NMFS 2004). The possibility of injury to an animal comes from the remote risk of the suction cup landing in or striking a sensitive part of the animal, such as the eye, mouth, or blowhole. However, given the skills of the experienced researchers, this risk would be minimal or non-existent.

The non-invasive nature of suction cup tags eliminates the threat of infection, but not inflammation. The suction cup would not remain attached to the whale for any significant length of time (typically not longer than 48 hours), and likely releases within a few hours. The animal can easily dislodge the tag by rolling, breaching, or rubbing. An animal could sustain injuries while trying to remove the tag by rubbing against the sea floor or other animals. The tag may migrate along the skin of the animal but would not cover the blowhole, as drag would move it away from the blowhole. The ease and speed with which some animals can remove a tag indicates that it is unlikely that an animal would endure long-term stress from the attachment. Vessel strikes pose a risk with suction cup tagging, as the animal must be followed for the duration of attachment. Vessels would be close to animals and may strike both target and non-target animals.

Implantable tags are have a greater potential for disturbance in application and would be more invasive than suction cup tags. NMFS PR1 concluded, after review of annual reports of this type of research, that the effects of implantable tags are insignificant (NMFS 2004). Implantable tags typically penetrate the surface of the blubber layer. Tags generally work their way out of the blubber after weeks or months (Watkins *et al.* 1981), but some new satellite tags may remain implanted for over a year. Disturbance of the animal would mainly occur during the close approach and attachment of the tag. Humpback whales in Alaska exhibited a sudden startle response with tag implantation. The response was a rapid vertical wave of the flukes in the air, as if the whales were trying to hurry their dive (Watkins *et al.* 1981). This disturbance would not likely injure individuals. The implanted tag would not be expected to alter the behavior of the whale, particularly with regard to feeding, reproduction, or migratory behavior. Potential adverse effects are minimized by using the smallest possible instrument package, a smaller spear tip to minimize penetration into the blubber, and minimizing the velocity of the package at impact. Inflammation would be expected to occur after tag implantation and infection would be possible. There would be a low potential for an abscess or septicemia to occur after implantation. Post-tagging swelling or indentations may occur after the tags are lost, extruded, or migrate out. However, there is no evidence that these swellings are signs of infection of the epidermis or poor health (NMFS 2006b). A NMFS PR1 EA (NMFS 2006b) states that past research and permit annual reports have shown that the chance of infection from the break in the epidermis from an implantable tag is likely to be extremely low and therefore not significant.

During health assessment captures, animals would be tagged with either a roto-tag or radio tag on the trailing edge of the dorsal fin. No tagging would occur on young of the year animals. Mothers accompanying these animals would not specifically be targeted. However, they may be tagged if

accidentally captured so that they may be monitored and/or more readily identified and avoided for future net sets. The attachment of the roto-tag or radio tag would not be considered significant, as pain would only last during the application, and local anesthesia may be used. Little tissue damage to the trailing edge of the dorsal fin would occur when the tag is released.

Tagging/Attachment of Scientific Instruments- Pinnipeds. Tagging of pinnipeds would cause temporary stress during capture and restraint to attach the tag. Invasive tags would cause temporary pain during attachment or implantation. Animal movement may prolong or prevent healing of flipper tags by producing repetitive stress on the wound. Infection of the wound site would be possible. The tag may pull out of the flipper during swimming or moving on a rookery or haul-out site. The site where the tag was could become infected. There is no quantitative information on the rate of infection caused by flipper tagging (NMFS 2004). Incision sites from implanted tags could become infected. Animals may have some discomfort after intra-abdominal implantation. These tags have been used in sea otters for over 20 years, and the typical reactions to the tag, both behaviorally and physically, are innocuous (Lander *et al.* 2001).

Attachment of scientific instruments to pinnipeds may have both short- and long-term adverse effects, in addition to the effects of capture and restraint. Possible short-term impacts can include a reduction in foraging activity or an increase in grooming, at the expense of other behaviors (Kenward 1987). These types of impacts would likely be present after most tagging events and may be as much a delayed result of the capture and handling as of the tag's presence. Some pinnipeds fitted with crittercams reacted during deployment (tagging) and for a short period after deployment. Few pinnipeds exhibited curiosity about the crittercam or had aggressive reactions toward it for short periods (Marshall 1998). The hydrodynamic drag created by the instrument could exert an additional energetic demand on an animal. Over time, this drag may result in reduced foraging success, increased metabolic load, and stress to the animal.

The attachments of instruments to the hair with epoxy should not cause pain if done properly. However, it may result in discomfort if the placement of the instrument causes pulling of the hair or skin during animal movement. In addition, if the ratio of resin and hardener is not correctly measured, the resulting heat-producing reaction could burn the animal's skin and pelage (Lander *et al.* 2001). Both the resin and hardener could cause skin irritation, resulting in itching, rashes, hives, and dermatitis. The instrument could be knocked or torn off, pulling out hair and possibly some of the underlying skin, which would then be open to infection.

Marking. Freeze branding may cause little or momentary pain to cetaceans during application, which would require 15-20 seconds per brand (typically six brands per animal). Initial discomfort or pain would be relieved by the appropriate anesthetic or analgesic. Discomfort may persist for some time after the procedure, but is expected to be minor. Therefore, impacts would be considered negligible and not significant. However, liquid nitrogen could spill onto an animal during the process, causing more than momentary pain.

Marking pinnipeds with paint applied remotely using a paint gun may stun an animal and cause momentary stress and a startle reaction. If the target animal is hit or missed, other non-target animals may be temporarily disturbed. Capturing and restraining animals for marking with paint, bleach, or dye would likely involve more stress than remote marking and may cause incidental disturbance of nearby animals. A pinniped may also be marked by gluing a tag to their fur. The epoxy could cause burns, skin irritation, or an allergic reaction. Infection would be possible if the tag was torn off.

Biopsy Sampling. The effects of close approaches needed to conduct biopsy sampling are discussed above. A careful approach generally elicits, at most, a minimal and short-lived response from whales; even those subjected to invasive biopsy procedures (NMFS 1992). A NMFS PR1 EA (NMFS 2004) concluded that, based on existing data and published research, biopsy sampling on large cetaceans (via crossbow, compound bow, dart guns, or pole spears) would not have long-term adverse effects on the target species. Published research has shown that short-term effects of biopsy darting on cetaceans would be startling or momentarily painful to the animal. No evidence of infection at the sight of penetration or elsewhere has been seen among whales resighted in days following biopsy sampling (NMFS 1992).

Minke, fin, blue, and humpback whales showed no behavioral reactions to about 45 percent of successful biopsies, taken with punch-type tips fired from crossbows (Gauthier and Sears 1999). Behavioral responses in the remainder of the biopsies ranged from tail flicks, hard tail flicks, submerging below the water surface, or some combination of these responses. Most individuals of these species resumed their normal behavior within a few minutes of the sample collection. A study by Clapham *et al.* (1993) noted that studies on biopsy procedures showed no evidence of short- or long-term significant impacts on cetaceans.

Surgical biopsy sampling of epidermis and blubber also occur during health assessment captures. Animals may exhibit signs of stress due to capture and restraint, as discussed above. Animals may experience momentary pain during the administration of local anesthesia. In rare occurrences, the

biopsied area may become infected. Animals may have some soreness or pain with healing, but other adverse impacts would not be expected from blubber biopsies (Wells *et al.* 2005).

Effects of skin and blubber biopsy samples on pinnipeds would include the effects of the capture and restraint necessary for obtaining these samples are described above. In addition, there would be the potential for an infection after any of these procedures, given the unsanitary environment of rookeries. Healthy animals should be able to heal and recover from a properly performed procedure. Animals with compromised immune systems may develop major complications. The procedures may also cause more than momentary pain.

Breath Sampling/Ultrasound Sampling. Breath and ultrasound sampling activities on free-swimming cetaceans would include close approaches by vessels. Impacts from close approaches are described above. The use of the extended pole and the quick physical contact of the ultrasound device or vacuum cylinder may affect an animal. The reaction of cetaceans to physical contact for breath sampling and ultrasound sampling has not been adequately studied. However, the contact of either apparatus on animals is very brief, lasting only a few seconds. This physical contact is not likely to disrupt the behavior of marine mammals and would not have a significant effect on an individual.

Ultrasound sampling may occur on animals captured for other research, such as health assessments. These impacts are described above. The ultrasound procedure itself would pose minimal to no risk of injury to an animal.

Other Sampling. Other sampling that could occur includes tooth extraction in cetaceans; blood sampling; swabs; and the collection of feces, sloughed skin, urine, and other bodily fluids. Hair, nails, and vibrissae (whiskers) could be collected from pinnipeds. Potential adverse effects from tooth extraction relate to the risks of capture, restraint, anesthesia, and the possibility of infection following the extraction. The procedure may result in more than momentary pain, which could temporarily interfere with foraging.

The risks of blood collection would be largely incidental to capture and restraint. Multiple attempts to obtain a blood sample would not only be stressful and cause some degree of pain; they may result in damage to the vein, clotting, and an abscess. Removing a volume of blood too large relative to the animal's mass and ability to replace the amount can result in fatigue, anemia, weakened immunity, and problems with clotting. It is important to note that stress from capture may change some blood

chemistry parameters, raising questions about the validity of the test results gained from wild animal capture. However, this data is crucial to examination of the health of wild, free-ranging (presumably healthy) marine mammals. It may be compared to samples collected from captive animals or stranded and rehabilitated animals to aid in interpretation.

The close approach of free-swimming cetaceans to collect feces and sloughed skin would have a minor impact on the animals. The collection of pinniped feces may disturb animals on haul-out sites or rookeries. Animals may rapidly depart the area, which could result in injury or death. Skin swabs, feces, urine, and other bodily fluids may be collected from animals during health assessments. Potential adverse effects from this sampling would likely result from capture and restraint and not from sampling itself. Efforts would be made to reduce the animal holding time.

Clipping hair, nails, and whiskers would not likely result in pain. The effects on the animal from clipping are probably incidental to the effects of capture and restraint. Pulling a whisker may cause more than momentary pain, due to the highly sensitive nature of the snout and because the hair bulb is surrounded by blood and neurons.

Auditory Brainstem Response (ABR)/Auditory Evoked Potential (AEP). Potential adverse effects from ABR and AEP procedures would be as a result of capture, restraint, and holding described above. The maximum sound levels presented would be lower than sound levels produced by animal whistles and echolocation clicks. Sounds may be quieter than those animals are normally exposed to on a daily basis. Therefore, impacts from the procedures themselves would not be considered significant. Short-term impacts, including inflammation and hyperemia, would be expected from the suction cups used to attach electrodes to the animal.

Diagnostic Testing and Analysis of Specimens. Diagnostic testing and the analysis of specimens would have no impact on marine mammals. Specimens would be archived in the NMMTB or other authorized laboratory and would not have any adverse impacts.

Import/Export of Marine Mammals or Marine Mammal Parts. Import and export of specimens would not have an impact on marine mammals. All specimens would be collected legally in the U.S. or other foreign countries and meet the other conditions required by the MMPA, and may be subject to additional requirements and evaluation under the Animal Welfare Act. Potential adverse effects of importing or exporting marine mammals in rehabilitation would be the result of restraint and transport. Handling, lifting, and moving an animal could cause injuries. Cetacean flippers may be

crushed or overheat if stretchers do not have openings for them. Creases or seems may press into the skin, causing discomfort and possible injury. Transport of animals could cause stress or injuries to an animal. Depending on the mode of transportation, animals may overheat in direct sun and heat without protection. Animals may develop hypothermia and frostbite if transport occurs during freezing temperatures. Cetaceans may be exposed to the drying effects of air. Animals may also be knocked around in the vehicle or vessel or inhale exhaust fumes. Improper transport of cetaceans may cause abrasions, pressure necrosis, thermoregulatory problems, and respiratory problems. Cetaceans transported on airplanes are susceptible to the effects of high-altitude sickness. Most impacts during transport would be minor and temporary and would end once the animal reached its destination.

The impacts of restraint and transport would also apply to import and export of permanently captive marine mammals (for instance, from a foreign public display facility) for health research purposes under the ESA/MMPA permit. However, the care and handling of captive animals falls under the purview of the USDA/APHIS. Any import/export activities for captive marine mammals would meet the conditions for import or export under the MMPA and would be subject to additional requirements and evaluation under the Animal Welfare Act.

4.2.6.3 Alternative F3- Preferred Alternative

Effects on biological resources from Alternative F3 would be the same as those described under Alternative F2, with some exceptions for new research activities.

Passive Acoustic Recording. Passive acoustic recording would not have an adverse effect on marine mammals. The actual presence of the hydrophone in the water would not be expected to have any impact on marine mammals. A NMFS EA (NMFS 2004) noted that, on some occasions, researchers have noted instances of animals investigating the hydrophone. However there is no known documentation of the presence of a hydrophone, or a similar recording device, resulting in any adverse impact.

Active Acoustic Playbacks. Active acoustic playbacks would involve close approaches by one or more vessels and would have negligible adverse behavioral impacts on marine mammals, as described in Section 4.2.6.2. The source levels of the sounds produced under the proposed activities would be sufficiently low and produced at a large enough distance from the animal (minimum 100 m) to not result in levels that would be painful or overly disruptive to the animals. Previous tests indicate that sounds produced by these proposed playback equipment would be less powerful and attenuate

more rapidly than other anthropogenic sources in the ROI (*i.e.* cruise ships, fishing vessels, and large pleasure craft) (NMFS 2004).

Vaccination Program. Adverse and beneficial effects on marine mammals could be expected during vaccination trials on captive and wild populations. Vaccination trials could result in the serious injury or death of captive and wild animals. The use of a vaccine in a species for which it was not developed initially may not be effective and may result in side effects and possibly disease. Risks to the vaccinated individual include: the introduction of disease where none existed; immunosuppression and increased risk of secondary infection; local tissue reactions; and stress or disturbance caused by close approach, capture, restraint, and/or handling. Immunosuppression can increase an animal's susceptibility to other diseases. Risks to the wild population include: vaccine virus shedding from vaccinated animals and the spread of the virus via fomites (substances that absorb, hold, and transport infectious disease agents). Potential risks to non-targeted species include fomites, vaccine virus shedding, and cross-species infections (HSWRI 2006).

Beneficial effects on marine mammals could occur if successful vaccines were developed. The vaccines could be used to protect wild populations and prevent the spread of disease, enhancing the survival of all marine mammals.

4.3 Water and Sediment Quality

This section evaluates the potential impacts on water and sediment quality as a result of the alternatives. Impacts on water and sediment quality are evaluated in context and intensity on a wide geographic scale. Therefore, while more significant impacts may occur in localized areas, the overall impact on the watershed, beach, coastline, ocean, etc. would be considered minor.

4.3.1 Stranding Agreements and Response Alternatives

4.3.1.1 Alternative A1- No Action

No effects on water and sediment quality would be expected to occur under Alternative A1, as stranding response activities would end.

4.3.1.2 Alternative A2- Status Quo

Minor, short-term adverse effects on water and sediment quality could occur under Alternative A2. Equipment used for transport could leak oil or other materials into sand and nearshore waters. This would likely be localized and flushed out and/or diluted rapidly, causing a minor impact. Tissue,

blood, and other body fluids may contain euthanasia solution, other drugs, POPs, toxic metals, pathogens, and/or biotoxins. Chemical residues from euthanasia solution and other drugs persist in the carcass at different concentrations and for different amounts of time. They would not likely create an environmental hazard, as they would be broken down quickly and would not persist in the surrounding environment. Contaminants would also be localized and flushed out of the sand and groundwater by the tides and/or precipitation. Any contaminants entering the nearshore waters would be diluted quickly by the currents, and impacts would be minor and temporary.

Animals may also contain chemical residues from substances administered by stranding response personnel, including chemical euthanasia solution and sedatives. If the animal is a rehabilitated animal that has restranded, it may also contain antibiotics, antifungals, and other medicine. These chemicals persist in the animal at different concentrations and for different amounts of time. They would not likely create an environmental hazard, as they would be broken down quickly and would not persist in the surrounding environment.

4.3.1.3 Alternative A3

Effects on water and sediment quality from stranding response activities under Alternative A3 would be the same as those described under Alternative A2.

4.3.1.4 Alternative A4- Preferred Alternative

Effects on water and sediment quality from stranding response activities under Alternative A4 would be the same as those described under Alternative A2.

4.3.1.5 Alternative A5

Effects on water and sediment quality from stranding response activities under Alternative A5 would be the same as those described under Alternative A2.

4.3.2 Carcass Disposal Alternatives

4.3.2.1 Alternative B1- No Action

Minor, short-term adverse effects on water and sediment quality could be expected to occur under Alternative B1, as carcasses would be left on the beach to naturally decompose. Carcasses left on the beach to naturally decompose would not cause an impact, unless the animal contained contaminants. Body fluids may contain POPs, toxic metals, pathogens, and/or biotoxins could seep into the sand beneath the animal or leach into groundwater and flow into nearshore waters. If contaminants enter

groundwater, they would likely be flushed out quickly by tidewater and/or precipitation. The impact on water quality would likely be temporary and minor. Sediment quality would not likely be impacted by contaminants, as they would be localized and flushed out or diluted before they could adhere to the substrate.

4.3.2.2 Alternative B2- Status Quo

Minor, short-term adverse effects on water and sediment quality would be expected to occur under Alternative B2. Potential effects depend on the method of carcass disposal and if the carcass was toxic from the use of euthanasia solution. Carcasses left on the beach to naturally decompose would not cause an impact, unless the animal had been chemically euthanized or contains contaminants. The evaluation of the potential toxicological environmental hazards posed by a decomposing carcass cannot be determined at this time (see Appendix J). Additionally, the types and levels of contaminants in a carcass are generally not known at the time of disposal because of the time delay in processing analytical lab tests. However, the remote potential does exist for decay products of carcasses to be released into the surrounding environment or recycled into the food web, with subsequent negative impacts. Chemical residues from euthanasia solution and other drugs persist in the carcass at different concentrations and for different amounts of time. They would not likely create an environmental hazard, as they would break down quickly and would not persist in the surrounding environment. Body fluids containing POPs, toxic metals, pathogens, and/or biotoxins could seep into the sand beneath the animal or leach into groundwater and flow into nearshore waters. If contaminants enter groundwater, they would likely be localized and flushed out quickly by tidewater and/or precipitation. Higher concentrations of contaminants may occur in nearshore waters down site from the carcass. These concentrations would be diluted and flushed out by the currents. The amount of time for contaminants to flush out of groundwater would depend upon the amount of precipitation, tides, and the permeability of the sand/sediment. The size and number of carcasses would also factor into the amount of time for contaminants to disperse. The impact on water quality would likely be localized, temporary, and minor. Sediment quality would not likely be impacted by contaminants, as they would be flushed out or diluted before they could adhere to the substrate.

Burial of carcasses could increase erosion, but this would be a negligible impact. The burial site would only be disturbed for a short-period of time and would be refilled with sand to match the surrounding ground level. Burial does not inactivate all pathogens in the carcass. Some carcasses may contain POPs, toxic metals, pathogens, and/or biotoxins; however the specific types and levels of contaminants are typically not known at the time of burial. As these carcasses decay, body fluids may

leach into the sand and groundwater, potentially impacting the adjacent coastal waters and sediments. As described above, contaminants would be flushed out of groundwater and diluted in nearshore waters by the currents. Carcasses containing euthanasia solution or other drugs would not likely persist in the environment. Impacts to water and sediment quality would be temporary and minor.

Disposal of carcasses at sea may negatively impact water and sediment quality. Carcasses of euthanized animals could release POPs, toxic metals, pathogens, and/or biotoxins into the water or food web during decomposition. However, the impact would be minor as the contaminants would dilute rapidly in the water. The material used to sink the carcass may have an adverse effect, if it could be considered a contaminant. However, Jersey (concrete) barriers would generally be used to sink a carcass and these would have no impact on water or sediment quality. Transport of the carcass offsite could temporarily increase erosion, due to the use of heavy equipment. This would be a negligible impact as equipment would only be used for a short time period (hours). Spills of hazardous materials or wastes from transport vessels or a vessel accident could impact water and sediment quality. Impacts would be considered minor to major, depending on the material, type of accident, size of spill, location, and/or vicinity of these resources. Some materials could be diluted quickly by currents, causing localized, temporary impacts. Other materials could linger in the water column or adhere to sediment particles, causing slightly longer but still localized impacts.

Heavy equipment or vehicles may be necessary to transport a carcass off-site. Equipment used to transport animals could leak oil or other materials into sand and nearshore waters during operations. These would likely be small amounts that would be localized, flushed out and/or diluted rapidly, causing a minor, short-term impact. Other materials could linger in the water column or adhere to sediment particles, causing slightly longer but still localized impacts.

Burial in a landfill would not create any negative impacts for non-toxic carcasses. If carcasses are known or assumed (based upon test results or prior knowledge of the species) to have contaminant levels that meet or exceed the local definition of hazardous waste, they would be taken to a hazardous waste landfill for proper disposal. Carcasses may be taken to a licensed rendering or incineration facility. Because the landfill, rendering, or incineration facilities have been previously licensed, all environmental impacts from these facilities have already been considered. Any impacts from these activities would be covered by the individual rendering or incinerating facility and their permits, not the MMHSRP or stranding network members.

By-products and finished products from composting a carcass would have little or no adverse effects on water quality or the surrounding environment (Mukhtar *et al.* 2004). Temperatures during the composting process are high enough to kill pathogens and breakdown contaminants and euthanasia solution (Geraci and Lounsbury 2005).

4.3.2.3 Alternative B3- Preferred Alternative

The effects on water and sediment quality under Alternative B3 would be the same as those described under Alternative B2.

4.3.3 Rehabilitation Activities Alternatives

4.3.3.1 Alternative C1- No Action

No effects on water or sediment quality would be expected to occur under Alternative C1. Rehabilitation would no longer occur and therefore potential risks to water and sediment quality would be removed.

4.3.3.2 Alternative C2- Status Quo

Minor adverse effects could occur under Alternative C2. Rehabilitation facilities that discharge directly to surface waters would have the required National Pollutant Discharge Elimination System (NPDES), state, and local permits for facility discharges. Any wastewater effluent discharged to a publicly owned treatment works (POTWs) would be required to meet municipal wastewater treatment standards and have any necessary effluent discharge permits under the Clean Water Act. Impacts from permitted discharges would already be accounted for under the respective Federal, state, and/or local regulations. Facilities discharging to POTWs would have a pretreatment plan in place if necessary, as POTWs do not remove toxic organics or metals.

Net pens could pose minimal adverse impacts to water quality because they are open to ocean and bay waters. Water and sediment near the pen would be exposed to any medicines, materials, or equipment used in rehabilitation. There would also be an increase in pathogen and fecal exposure. Temporary pools would not have any means to treat effluent. Temporary pools could leak water containing wastes, pathogens, or other contaminants into the soil and groundwater. Temporary pools could also contaminate water and sediment when they are emptied, if the water is discharged into surface waters.

4.3.3.3 Alternative C3- Preferred Alternative

Effects on water and sediment quality from rehabilitation activities under Alternative C3 would be the same as those described under Alternative C2.

4.3.3.4 Alternative C4

Effects on water and sediment quality from rehabilitation activities under Alternative C4 would be the same as those described under Alternative C2.

4.3.4 Release of Rehabilitated Animals Alternatives

4.3.4.1 Alternative D1- No Action

No effects on water or sediment quality would be expected to occur under Alternative D1. Release of rehabilitated animals would not take place and there would be no risks to water and sediment quality.

4.3.4.2 Alternative D2- Status Quo

Minor, short-term, adverse effects on water and sediment quality could occur under Alternative D2. Release of rehabilitated animals would not intentionally generate any pollutants or disturb sediment. However, spills of hazardous materials or wastes from release vessels or a vessel accident could impact water and sediment quality. Some materials could be diluted quickly by currents, causing temporary impacts. Other materials could linger in the water column or adhere to sediment particles, causing slightly longer impacts. Equipment to transport animals could leak oil or other materials into sand and nearshore waters during beach releases. These would likely be small amounts that would be localized, flushed out, and/or diluted rapidly, causing a minor, short-term impact. Other materials could linger in the water column or adhere to sediment particles, causing slightly longer but still localized impacts.

4.3.4.3 Alternative D3- Preferred Alternative

Effects on water and sediment quality from Alternative D3 would be the same as those described under Alternative D2.

4.3.5 Disentanglement Alternatives

4.3.5.1 Alternative E1- No Action

No effects on water or sediment quality would be expected to occur under Alternative E1, as disentanglement activities would no longer occur.

4.3.5.2 Alternative E2- Status Quo

Minor, short-term, adverse effects water or sediment quality could occur under Alternative E2. Disentanglement activities would not intentionally generate any pollutants or disturb sediment. However, spills of hazardous materials or wastes from disentanglement vessels or a vessel accident could impact water and sediment quality. Some materials could be diluted quickly by currents, causing localized, temporary impacts. Other materials could linger in the water column or adhere to sediment particles, causing slightly longer but still localized impacts.

4.3.5.3 Alternative E3- Preferred Alternative

Effects on water or sediment quality from Alternative E3 would be the same as those described under Alternative E2.

4.3.6 Biomonitoring and Research Activities Alternatives

4.3.6.1 Alternative F1- No Action

No effects on water and sediment quality would be expected to occur under Alternative F1. Biomonitoring and research activities would no longer occur and therefore potential risks to water and sediment quality would be removed.

4.3.6.2 Alternative F2- Status Quo

Minor, short-term, adverse effects on water and sediment quality could occur under Alternative F2. Biomonitoring and research activities would not intentionally generate any pollutants or disturb sediment. Spills of hazardous materials or wastes from vessels, the loss of research materials overboard, or a vessel accident could impact water and sediment quality. Some materials could be diluted quickly by currents, only causing localized, temporary impacts. Other materials could linger in the water column or adhere to sediment particles, causing slightly longer but still localized impacts. Equipment used for beach research activities could leak oil or other materials into sand and nearshore

waters. These would likely be small amounts that would be flushed out and/or diluted rapidly, causing a minor, short-term impact.

Any hazardous or non-hazardous wastes from laboratories used for diagnostic testing and analyses would be covered under those laboratories and their hazardous wastes and wastewater permits, not the MMHSRP.

4.3.6.3 Alternative F3- Preferred Alternative

Effects on water and sediment quality from Alternative F3 would be the same as those described under Alternative F2.

4.4 Cultural Resources

This section evaluates the potential impacts on cultural resources as a result of the alternatives.

4.4.1 Stranding Agreements and Response Alternatives

4.4.1.1 Alternative A1- No Action

No effects on cultural resources would be expected to occur from Alternative A1. Stranding response activities would end, removing any potential risk to cultural resources.

4.4.1.2 Alternative A2- Status Quo

Minor, adverse effects on cultural resources could be expected to occur under this alternative. The use of equipment and vehicles on the beach, as well as digging, may affect cultural resources buried in sand or dunes. Equipment used in nearshore waters may affect submerged cultural resources. However, the potential for impact would be minor, as stranding events are scattered along the entire U.S. coastline. The probability that these events, and therefore response activities, may be located on a beach or in water containing cultural resources is small.

Stranding response on Native American/Alaska Native lands would be coordinated with Native American tribes, Alaska Natives, or other aboriginal peoples to accommodate cultural uses of marine mammals. Responders would also be sensitive to the fact that tribal cultures often involve ceremonial, medicinal, or subsistence uses or plants, animals (including marine mammals), and specific geographic locations. There would not be any effects on Alaska Natives, Native American tribes, or other aboriginal people's cultural uses of coastal resources.

4.4.1.3 Alternative A3

The effects on cultural resources from Alternative A3 would be the same as those described under Alternative A2.

4.4.1.4 Alternative A4- Preferred Alternative

The effects on cultural resources from Alternative A4 would be the same as those described under Alternative A2.

4.4.1.5 Alternative A5

The effects on cultural resources from Alternative A5 would be the same as those described under Alternative A2.

4.4.2 Carcass Disposal Alternatives

4.4.2.1 Alternative B1- No Action

No effects on cultural resources would be expected to occur from Alternative B1. Carcass disposal activities would end, removing any potential risk to cultural resources.

4.4.2.2 Alternative B2- Status Quo

Minor, adverse effects on cultural resources could be expected to occur under Alternative B2. Carcass burial could damage resources located on or beneath the beach. Digging may unearth artifacts and equipment used for digging could physically impact buried resources. This would negatively impact areas such as the Pacific Islands area, where many known artifacts and habitation sites are buried on beaches. Transporting the carcass off-site has the potential to damage resources, as the equipment used could crush buried resources. However, the potential for impact would be minor, as stranding events are scattered along the entire U.S. coastline. The probability that these events, and therefore disposal activities, may be located on a beach or in water containing cultural resources is small.

Carcass disposal on Native American/Alaska Native lands would be coordinated with Native American tribes, Alaska Natives, or other aboriginal peoples to accommodate cultural uses of marine mammals. Responders would also be sensitive to the fact that tribal cultures often involve ceremonial, medicinal, or subsistence uses or plants, animals (including marine mammals), and

specific geographic locations. There would not be any effects on Alaska Natives, Native American tribes, or other aboriginal people's cultural uses of coastal resources.

4.4.2.3 Alternative B3- Preferred Alternative

The effects on cultural resources from Alternative B3 would be the same as those described under Alternative B2.

4.4.3 Rehabilitation Activities Alternatives

4.4.3.1 Alternative C1- No Action

No effects on cultural resources would be expected to occur under Alternative C1. Rehabilitation activities would end, removing any potential risk to cultural resources.

4.4.3.2 Alternative C2- Status Quo

Potential minor, adverse effects on cultural resources could be expected to occur under Alternative C2. The use of temporary pools could damage cultural resources, depending on where they are sited. The use of net pens may disturb or damage submerged cultural resources.

4.4.3.3 Alternative C3- Preferred Alternative

The effects on cultural resources from Alternative C3 would be the same as those described under Alternative C2.

4.4.3.4 Alternative C4

The effects on cultural resources from Alternative C4 would be the same as those described under Alternative C2.

4.4.4 Release of Rehabilitated Animals Alternatives

4.4.4.1 Alternative D1- No Action

No effects on cultural resources would be expected to occur from Alternative D1. Release of rehabilitated animals would end, removing any potential risk to cultural resources.

4.4.4.2 Alternative D2- Status Quo

Minor, adverse effects on cultural resources could be expected to occur from Alternative D2. The use of equipment and vehicles on the beach during release activities may affect cultural resources buried

in sand or dunes. However, the potential for impact would be minor, as release activities are scattered along the entire U.S. coastline. The probability that these activities may be located on a beach containing cultural resources is small. Archaeological studies have not been conducted in most coastal areas. Release activities conducted at sea would not affect any submerged cultural resources.

4.4.4.3 Alternative D3- Preferred Alternative

The effects on cultural resources from Alternative D3 would be the same as those described under Alternative D2.

4.4.5 Disentanglement Alternatives

4.4.5.1 Alternative E1- No Action

No effects on cultural resources would be expected to occur from Alternative E1. Disentanglement activities would end, removing any potential risk to cultural resources.

4.4.5.2 Alternative E2- Status Quo

No effects on cultural resources would be expected to occur from Alternative E2. Disentanglement activities would generally occur in open ocean areas and would not be near or in contact with any submerged cultural resources. Pinniped disentanglements may occur on beaches, but impacts to cultural resources would not be expected.

4.4.5.3 Alternative E3- Preferred Alternative

No effects on cultural resources would be expected to occur from Alternative E3. Disentanglement activities would generally occur in open ocean areas and would not be near or in contact with any submerged cultural resources. Pinniped disentanglements may occur on beaches, but impacts to cultural resources would not be expected.

4.4.6 Biomonitoring and Research Activities Alternatives

4.4.6.1 Alternative F1- No Action

No effects on cultural resources would be expected to occur from Alternative F1. Biomonitoring and research activities would end, removing any potential risk to cultural resources.

4.4.6.2 Alternative F2- Status Quo

Adverse effects on cultural resources would not likely occur from this alternative. Research activities conducted on beaches could potentially disturb buried resources if vehicles or other equipment is used. Research activities conducted in the water, such as health assessment captures, could damage submerged cultural resources. Activities may involve anchoring boats or nets to the bottom and positioning researchers in the water. Activities in shallow areas could potentially disturb or come in contact with artifacts and other resources. Research activities in open ocean areas would not be near or in contact with any submerged cultural resources. However, the potential for impact would be minor as research activities are scattered along the entire U.S. coastline. The probability that these activities may be located on a beach or in water containing cultural resources is small.

4.4.6.3 Alternative F3- Preferred Alternative

The effects on cultural resources from Alternative F3 would be the same as those described under Alternative F2.

4.5 Human Health and Safety

This section evaluates the potential impacts on human health and safety as a result of the alternatives.

4.5.1 Stranding Agreements and Response Alternatives

4.5.1.1 Alternative A1- No Action

Minor, short-term, adverse effects on human health and safety would be expected to occur from under Alternative A1. Response to all stranded animals, alive or dead, would not occur and animals would be left on beaches. Without response activities, people would likely approach the animal or carcass either out of curiosity or in an attempt to help. Animal carcasses and live animals may contain contaminants or zoonotic diseases that people or domestic animals may come in contact with through tissues, fluids, bites, or scratches. Live animals may bite, roll, or thrash around, causing physical injuries to people who attempt to interact with the animals.

Direct, beneficial effects would be expected for stranding response personnel. As response to stranded animals ends, the safety risks for response personnel would no longer exist.

4.5.1.2 Alternative A2- Status Quo

Minor, short-term, adverse effects on human health and safety would be expected to occur from under Alternative A2. The general public would be impacted if they approached the carcass or live animal out of curiosity or in an attempt to help. Animal carcasses and live animals may contain contaminants or zoonotic diseases that people or domestic animals may come in contact with through tissues or fluids. People may have allergic reactions to animal blubber and oils. Serious infections may occur from contact with animals. Pathogens encountered may be antibiotic resistant, making treatment more difficult. Live animals may bite, roll, or thrash around, causing physical injuries. However, the potential for adverse effects is less under this alternative than Alternative A1, as responders would be on scene, reducing the ability for the public to come into contact with an animal.

Risk to responders would also include contaminants, zoonotic diseases, and physical injuries. Contaminants, including biotoxins and petroleum products, may produce short-term affects, such as respiratory problems, lightheadedness, nausea, eye irritation, or skin irritation. Responders may have allergic reactions to animal blubber and oils. Serious infections may occur from contact with animals. Pathogens encountered may be antibiotic resistant, making treatment more difficult. Zoonotic diseases may have short-term affects including swelling, joint pain, skin lesions, and flu-like symptoms. Long-term effects from zoonotic diseases could occur, especially if they are not diagnosed properly. Physical injuries may include strains or bruises from moving an animal or from slips, trips, or falls. 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. Accidental injections or exposure to euthanasia solution could cause adverse effects, depending on the chemical(s) used. Etorphine can be absorbed through broken skin and mucous membranes (*e.g.* eyes, nose, and mouth). Accidental injections of paralytic agents are considered life-threatening (Greer *et al.* 2001). Responses in or close to water could result in drowning if proper safety measures are not taken. Responders in water may come into contact with sharks, jellyfish, rays, and other venomous fish.

4.5.1.3 Alternative A3

Effects on human health and safety from Alternative A3 would be the same as those described under Alternative A2.

4.5.1.4 Alternative A4- Preferred Alternative

Effects on human health and safety from Alternative A4 would be similar to those described under Alternative A2. However, the implementation of SA criteria would ensure that responders are experienced and therefore have the knowledge to avoid or minimize health and safety risks.

4.5.1.5 Alternative A5

Effects on human health and safety from Alternative A5 would be the same as those described under Alternative A4.

4.5.2 Carcass Disposal Alternatives

4.5.2.1 Alternative B1- No Action

Minor, short-term, adverse effects on human health and safety would be expected to occur under Alternative B1. Carcasses of most stranded animals would be left on beaches and would naturally decompose (limited carcass disposal may still occur from Federal (not including NMFS), state, and local agencies authorized under MMPA 109(h)). People would likely approach and touch the carcass out of curiosity. Animal carcasses may contain contaminants or zoonotic diseases that people may come in contact with through tissues or fluids. Contaminants, including biotoxins and petroleum products, may produce short-term affects, such as respiratory problems, lightheadedness, nausea, eye irritation, or skin irritation. People may have allergic reactions to animal blubber and oils. Serious infections may occur from contact with carcasses. Pathogens encountered may be antibiotic resistant, making treatment more difficult. Zoonotic diseases may have short-term affects including swelling, joint pain, skin lesions, and flu-like symptoms. Long-term effects from zoonotic diseases could occur, especially if they are not diagnosed or treated properly.

Contaminated carcasses left on the beach could potentially contaminate the groundwater and/or nearshore water. Impacts would be minor and temporary, as contaminants in groundwater would likely be flushed out quickly by tidewater and/or precipitation. Contaminants in nearshore waters would rapidly be diluted and flushed out by currents. Risks to human health could occur if toxic carcasses were consumed.

The alternative would have a beneficial effect, as personnel involved in carcass disposal would no longer be exposed to health and safety risks.

4.5.2.2 Alternative B2- Status Quo

Minor, short-term, adverse effects on human health and safety would be expected to occur under Alternative B2. Carcasses of stranded animals may be left to naturally decompose, buried, towed to sea, or transported off-site to a rendering facility, landfill, or compost facility. Animal carcasses may contain euthanasia solution, contaminants, or zoonotic diseases that people may come in contact with through tissues or fluids, if the carcasses are left to naturally decompose. Contaminants, including biotoxins and petroleum products, may produce short-term affects, such as respiratory problems, lightheadedness, nausea, eye irritation, or skin irritation. People may have allergic reactions to animal blubber and oils. Serious infections may occur from contact with carcasses. Pathogens encountered may be antibiotic resistant, making treatment more difficult. Zoonotic diseases may have short-term affects including swelling, joint pain, skin lesions, and flu-like symptoms. Long-term affects from zoonotic diseases could occur, especially if they are not diagnosed or treated properly.

Carcasses containing environmental contaminants left on the beach or buried could potentially contaminate the groundwater and/or nearshore water. Impacts would be minor and temporary, as contaminants in groundwater would likely be flushed out quickly by tidewater and/or precipitation. Contaminants in nearshore waters would rapidly be diluted and flushed out by currents. Chemically euthanized carcasses left on the beach or buried would not likely effect human health. Risks to human health could occur if toxic or chemically euthanized carcasses were consumed.

Persons involved with the disposal risk physical injuries from using equipment to bury, transport off-site, or tow the carcass out to sea. Persons could be hit or crushed by equipment or may risk drowning when towing the carcass out to sea. Carcasses that are disposed in shipping lanes or resurface could cause vessel accidents.

4.5.2.3 Alternative B3- Preferred Alternative

Effects on human health and safety under Alternative B3 would be the same as those described under Alternative B2, with one exception. Chemically euthanized animal carcasses would not be buried on the beach whenever possible, minimizing the risk of humans coming in contact with these carcasses. This would be a beneficial impact on health and safety. However, carcasses containing environmental contaminants could still be buried and contaminate the groundwater and/or nearshore water. Impacts would be minor and temporary, as contaminants in groundwater would likely be flushed out quickly

by tidewater and/or precipitation. Contaminants in nearshore waters would rapidly be diluted and flushed out by currents. Risks to human health would still exist if toxic carcasses were consumed.

4.5.3 Rehabilitation Activities Alternatives

4.5.3.1 Alternative C1- No Action

A beneficial effect on human health and safety would be expected to occur from Alternative C1. Rehabilitation of marine mammals would no longer occur and risks to marine mammal workers would end.

4.5.3.2 Alternative C2- Status Quo

Minor, short-term, adverse effects on human health and safety could be expected to occur from under Alternative C2. Animal induced injuries would include bites or physical injuries from being hit by a fin, tail, or other body part. Working on wet surfaces may cause bruises, slips, trips, or falls. Drowning is a possibility as work would occur around or in pools and pens. Physical injuries may occur from the use of other equipment.

Rehabilitation staff may be exposed to contaminants, potential zoonotic pathogens, euthanasia solution, animal drugs, and chemicals used for sanitation purposes. Contaminants, including biotoxins and petroleum products, may produce short-term affects, such as respiratory problems, lightheadedness, nausea, eye irritation, or skin irritation. Serious infections may occur from contact with animals. Pathogens encountered may be antibiotic resistant, making treatment more difficult. Zoonotic diseases may have short-term affects including swelling, joint pain, skin lesions, and flu-like symptoms. Long-term affects from zoonotic diseases could occur, especially if they are not diagnosed properly.

Accidental injections or exposure to euthanasia solution could cause adverse effects, depending on the chemical(s) used. Etorphine can be absorbed through broken skin and mucous membranes (*e.g.* eyes, nose, and mouth). Accidental injections of paralytic agents are considered life-threatening (Greer *et al.* 2001). Accidental injections and exposure to other drugs used in animal treatment could occur and affects would depend upon the drug. Facility personnel may come into contact with harmful chemicals used for cleaning or maintaining pool water quality. Improperly stored or handled pool chemicals can be highly reactive and may generate high temperatures, release toxic vapors, or ignite nearby combustible materials. Reactivity may be triggered by the inadvertent mixing of a pool chemical with an incompatible material or wetting the chemical with water (EPA 2001).

4.5.3.3 Alternative C3- Preferred Alternative

Effects on human health and safety from Alternative C3 would be the same as those described under Alternative C2, with one exception. The Rehabilitation Facility Standards would be implemented under Alternative C3, which would have a beneficial effect on health and safety. While some of these measures may currently occur at rehabilitation facilities, the standards would ensure that all facilities would be implementing the most effective safety measures. The standards would require safety plans for the direct handling of all species seen at the facility. Personnel would be trained to identify potential zoonotic diseases and prevent their transmission from animal to human. Staff would also be trained to properly handle contaminated equipment and proper sanitation techniques. Safety equipment such as eye protection, protective clothing, and eye flushing stations, would be provided.

4.5.3.4 Alternative C4

Effects on human health and safety from Alternative C4 would be the same as those described under Alternative C3.

4.5.4 Release of Rehabilitated Animals Alternatives

4.5.4.1 Alternative D1- No Action

A beneficial effect on human health and safety would be expected from Alternative D1. Release activities would cease and risks to marine mammal workers would end.

4.5.4.2 Alternative D2- Status Quo

Minor, short-term, adverse effects could be expected from Alternative D2. Physical injuries, such as strains, cuts, and bruises, may occur while lifting and moving an animal for transport. Injuries from animals, such as bites or being hit by flukes may occur. Exposure to liquid nitrogen, used for freeze branding, may occur while pouring liquid nitrogen or coming in contact with the brand. Liquid nitrogen can cause rapid freezing and tissue damage to skin, eyes, and other exposed body parts. Vessel collisions, fire, capsizing, running aground, and inclement weather during cetacean release activities can result in injuries, including bruises, cuts, drowning, and lightning strikes.

4.5.4.3 Alternative D3- Preferred Alternative

Effects on human health and safety from Alternative D3 would be the same as those described under Alternative D2.

4.5.5 Disentanglement Alternatives

4.5.5.1 Alternative E1- No Action

A beneficial effect on marine mammal responder health and safety would be expected under Alternative E1. Disentanglement operations would end and responders would no longer be at risk of injury. However, adverse impacts on public health and safety could occur if individuals attempted to disentangle an animal themselves. Risks would include serious physical injuries and drowning.

4.5.5.2 Alternative E2- Status Quo

Responders put themselves at risk during all disentanglements. The boat could become entangled in the lines connected to the whale. Animal movements may cause serious physical injuries, knock a person overboard, or capsize the boat. Drowning is a very real threat to responders. Responders could also become entangled in restraint lines onboard the boat or while attempting to cut lines from the animal. Responders could come into contact with drugs used for the chemical restraint of animals. Under this alternative, no responders would enter the water to cut lines.

Modifications, including new techniques and tools, are not allowed. Without modifications, hazards to responders would still occur and could feasibly increase. Human safety risks would also increase without the implementation of disentanglement guidelines and training prerequisites. Less experienced individuals would not have the skills and knowledge to avoid or minimize dangerous situations, putting themselves and others at risk.

Potential adverse effects on public health and safety could occur. Individuals may attempt to disentangle an animal, putting themselves at risk of serious physical injuries and drowning.

4.5.5.3 Alternative E3- Preferred Alternative

Risks to responders and safety measures would be the same as those described under Alternative E2. However, there would be less risk under this alternative, as modifications which could reduce threats to responders, would be allowed. New techniques and tools could decrease the time necessary for disentanglements, therefore reducing the time responders are on the water and in contact with animals. Modifications of safety measures would also reduce threats to responders. Implementation of disentanglement guidelines and training prerequisites would increase the number of experienced responders. Experienced responders would have the skills and knowledge to avoid or minimize dangerous situations. Even with experienced responders and safety measures, there would still be potential for adverse effects on human health and safety.

Potential adverse effects on public health and safety could occur. Individuals may attempt to disentangle an animal, putting themselves at risk of serious physical injuries and drowning. However, the public may decide not to interfere if they know there are qualified, experienced, and authorized individuals to conduct disentanglement activities. This may reduce some of the potential health and safety impacts.

4.5.6 Biomonitoring and Research Activities Alternatives

4.5.6.1 Alternative F1- No Action

A beneficial effect on human health and safety would occur under Alternative F1. Biomonitoring and research activities would cease and risks to researchers would end.

4.5.6.2 Alternative F2- Status Quo

Personnel working on sample analyses in laboratories may come into contact with harmful chemicals. Physical injuries may be sustained from the use of laboratory equipment or sharp instruments.

All researchers conducting activities outdoors, either on land or vessel, risk sunburn, heat exhaustion, or heat stroke in hot weather or hypothermia in cold weather. Researchers conducting activities on pinniped rookeries and haul-out sites risk attacks by the animals. Besides a physical injury, bites or other contact may expose researchers to zoonotic diseases.

Sampling animals from vessels pose a variety of safety hazards. The use of crossbows, poles, and other equipment used for tagging and sampling could cause serious physical injuries. Risks would also include vessel collisions, capsizing, and drowning. Walking on wet boat decks increases the chance of slips, trips, and falls.

Cetacean capture-release health assessments create many scenarios where human health and safety may be adversely impacted. Bruises, cuts, drowning, and other physical injuries could occur from vessel collisions, fire, capsizing, running aground, and inclement weather. Entanglement in the capture net may lead to cuts, bruises, and drowning. Physical injury may occur if appendages or a person becomes caught between rafted boats. Exposure to liquid nitrogen, used for freeze branding, may occur while pouring liquid nitrogen or coming in contact with the brand. Liquid nitrogen can cause rapid freezing and tissue damage to skin, eyes, and other exposed body parts. Restraint and handling of the animal may expose personnel to zoonotic diseases. Physical injuries may result if the animal thrashes around during restraint and sampling activities. Accidental needle sticks and

exposure to chemicals may occur during the sampling process. Activities in water may expose individuals to harmful animals, such as venomous rays and skates, sharks, jellyfish, and sea lice. Shallow environments may have shells and other hard parts that can scrape or cut skin.

4.5.6.3 Alternative F3- Preferred Alternative

Effects on human health and safety from Alternative F3 would be the same as those described under Alternative F2.

4.6 Socioeconomics

This section evaluates the potential impacts on socioeconomics as a result of the alternatives.

4.6.1 Stranding Agreements and Response Alternatives

4.6.1.1 Alternative A1- No Action

Moderate, long-term beneficial direct effects to current stranding network members would be expected to occur under Alternative A1. Allowing SAs to expire would mean that network members would no longer respond to stranding events, leading to a reduction, if not an elimination, of costs incurred from response activities. However, businesses or individuals whose only function is stranding response would be adversely affected. Businesses would close and individuals would lose their jobs. There may also be minor to moderate indirect adverse effects to those SA holders whose response and/or rehabilitation activities attract external funding.

Negligible adverse effects may be borne by accommodations and restaurants adjacent to stranding sites. The alternative would reduce the occurrences of temporary local beach closures associated with stranding activities. However, the elimination of SAs would reduce response activities and increase the instances of dead marine mammals left to decompose on the beach (either by not removing carcasses and/or the increased likelihood of stranded animals being left to die). Carcasses may be removed by other Federal, state, or local governments authorized under the MMPA Section 109(h). Decomposing carcasses left on-site would remain in an unsightly state for longer durations without assistance in their removal, and the duration would increase for larger sized animals. The unappealing sight and smell could reduce tourism activity at that particular beach, as visitors may choose to spend their money at other beaches or alternative recreation sites located further inland. However, tourists may want to see a live stranded animal or a carcass, which could create a beneficial impact on surrounding business.

4.6.1.2 Alternative A2- Status Quo

Minor to moderate, long-term adverse effects to stranding network members would be expected to occur under Alternative A2. Current SA holders would continue their response activities and would continue to incur operating costs associated with these activities. However, SA holders whose response activities attract external funding may see minor to moderate, indirect beneficial impacts.

Negligible adverse effects to tourism businesses, such as accommodations and restaurants, could be expected from Alternative A2. Some carcasses may still be left on-site to decompose naturally. The unappealing sight and smell could reduce tourism activity at that particular beach, as visitors may choose to spend their money at other beaches or alternative recreation sites located further inland. However, tourists may want to see a live stranded animal, a carcass, or the response activities, which could create a beneficial impact on surrounding business.

4.6.1.3 Alternative A3

Minor to moderate, long-term, adverse effects on current stranding network members would likely occur under Alternative A3. While members would continue to bear operating expenses due to participation in response activities, adding new SA holders to the network would offset the levels of activities and expenses. As new SA holders are added to the network, their involvement with response activities would help offset the time and expense of these activities incurred by the current stranding network members. As the number of SA holders increases, travel time and expense should reduce, as there would be greater coverage for a particular geographic area. New SA holders would likely bear minor to moderate adverse impacts due to the increased operating costs related to their new response activities. The extent of the impact would depend on the nature of the new SA holders' existing capacity and functions, as well as the activities authorized under the SA (dead animal response, live animal response, and/or rehabilitation).

Negligible beneficial effects on tourism businesses would likely occur under Alternative A3. Maintaining the current stranding network and adding new participants would enhance responsiveness to nearby live and dead marine mammals.

4.6.1.4 Alternative A4- Preferred Alternative

Alternative A4 is similar to Alternative A3, but under Alternative A4 the Final SA criteria would be implemented. Moderate to major, adverse effects to the current SA holders would be expected to occur. As the Final SA criteria is more stringent than what is currently in place, existing SA holders

may need more training or may need to alter existing practices in order to meet the new criteria. However, the level of impacts would depend on the current practices of SA holders. For SA holders who would require no or few changes to meet the new criteria, impacts would be small. Similarly, larger facilities who engage in a wide variety of activities, in addition to stranding response and rehabilitation activities would bear a relatively lower burden in terms of costs. New SA holders would bear moderate to major, adverse impacts depending on their ability to take on new response and rehabilitation activities.

Negligible beneficial effects on tourism businesses would likely occur under Alternative A4, similar to those described under Alternative A3.

4.6.1.5 Alternative A5

Minor to major, long-term adverse effects to SA holders would be likely to occur. These impacts are similar to those described in Alternatives A3 and A4, but they would also depend on the proportion of stranded marine mammals that are not rare, threatened, or endangered and whether or not the network member chooses to continue responding to those animals. While implementation of the Final SA criteria may increase operating costs, the impact may be offset if there was a reduction in responses to stranding events under Alternative A5. The reduction in responses could occur if new SA holders covered geographic areas previously covered by another network member.

Negligible beneficial effects on tourism businesses would likely occur under Alternative A5, similar to those described under Alternative A3.

4.6.2 Carcass Disposal Alternatives

4.6.2.1 Alternative B1- No Action

Carcasses would be left wherever they naturally occurred. Removal of non-ESA listed carcasses could be conducted by Federal (not including NMFS), state, and local agencies authorized under MMPA 109(h), but this would likely be localized and limited. Minor to moderate beneficial effects are likely to occur for existing stranding network members that participate in other activities besides response and carcass disposal. The elimination of carcass disposal activities would lower operating costs for these members.

Carcasses left on-site to decompose would remain in an unsightly state for a longer period of time without assistance in their removal. The duration would increase for larger sized animals. Some

strandings sites may be in areas of human activity, including commercial areas such as beachfront hotels, casinos, businesses, or natural areas (national parks, seashore, or NERRs). This could result in negligible, adverse impacts in terms of lost revenues, restaurants, and parks in the immediate vicinity of the carcass(es), if the public chose to avoid the area. The resulting unappealing sight and odors could reduce tourism activity at that particular beach, as visitors may choose to spend their money at other beaches or alternative recreation sites further inland. However, negligible, short-term beneficial effects on surrounding businesses may occur if people visit the area to view the carcass.

4.6.2.2 Alternative B2- Status Quo

Negligible adverse effects on tourism activities could occur from Alternative B2. Under current response activities, some carcasses may be left on beaches. Carcasses may be left in areas of recreational and tourism activities, such as beachfront hotels or natural areas. However, carcasses would not be left on actively used beaches. Carcasses could be left on remote beaches that may be part of a national park, seashore, or NERR. The foul odors and the sight of a decomposing animal may result in visitors avoiding the area. This impact would be negligible, as visitors could still participate in activities within the area not located near the carcass. However, negligible, short-term beneficial effects on surrounding businesses may occur if people visit the area to view the carcass.

Stranding network participants currently authorized for dead marine mammal response would likely bear minor to moderate adverse effects due to continued time and expense associated with carcass disposal activities.

4.6.2.3 Alternative B3- Preferred Alternative

Alternative B3 is similar to Alternative B2, except that Alternative B3 recommends (but would not require) the removal of chemically euthanized carcasses to an off-site location. The economic impacts from Alternative B3 would be the same as those described under Alternative B2, with one exception. Chemically euthanized carcasses would be removed and towed off-site to a hazardous waste landfill. Towing animals off-site would be expensive and the cost would be incurred by the stranding network member. The adverse effect on individual members would be negligible, minor, or major, depending on the number of animals chemically euthanized. The costs of transporting the chemically euthanized carcass off-site could vary depending on the size of the animal, transport distance, or the means of transport. Some stranding network members may bear a greater cost burden if stranding events tend to involve large animals, multiple carcasses, or if the carcass needs to be transported a great distance for disposal. Adverse effects could also occur due to increased costs affiliated with rendering or

incinerating activities or fees imposed by the disposal site, including the need to obtain local or state permits for beach or at sea disposal.

Negligible negative impacts on local tourism businesses could occur under Alternative B3. Transporting chemically euthanized carcasses off-site would reduce the instances when an unsightly carcass would deter visitors from a particular location. However, other carcasses may be left at stranding sites.

4.6.3 Rehabilitation Activities Alternatives

4.6.3.1 Alternative C1- No Action

Major, long-term, adverse effects on facilities that focus primarily on rehabilitation activities could occur under Alternative C1. Many facilities in this category may cease operation, unless their activities could be shifted (*e.g.*, they are able to redirect rehabilitation efforts to animals other than marine mammals). Larger facilities that also engage in other activities may experience a minor, long-term positive effect in terms of the reduced operating costs from the elimination of rehabilitation activities.

4.6.3.2 Alternative C2- Status Quo

Minor to moderate, adverse effects on rehabilitation facilities would be expected, as continued expenses would be incurred from rehabilitation activities. Rehabilitation facilities would operate as they currently do and therefore continue to incur supply, equipment, personnel, and maintenance expenses.

4.6.3.3 Alternative C3- Preferred Alternative

Alternative C3 would be the same as Alternative C2, with two exceptions. Alternative C3 would issue new SAs and implement the Rehabilitation Facility Standards. Minor to major, adverse effects on rehabilitation facilities would be expected to occur from this alternative. The Rehabilitation Facility Standards would be implemented and facilities would need to upgrade to comply with the minimum standards, in order to maintain or obtain their SAs. The level of impact would depend on each facility, if they need to upgrade, and how much they would need to upgrade to meet the minimum standards. Current rehabilitation facilities were contacted to determine the estimated costs of upgrading each facility. The East Coast facility that responded to NMFS' request for information estimated that it would cost $75,000 to upgrade its pinniped rehabilitation facilities. Of the West Coast facilities that responded, the total estimated costs to upgrade facilities ranged from $0 (a facility

where the standards were already met) and $48,000 (cetacean and pinniped facility) on the low end to $1.9 million and $7 million (both pinniped facilities) on the high end. Excluding the facility that reported $7 million in impacts, the average impact among the facilities that responded is estimated to be $518,334.

4.6.3.4 Alternative C4

Alternative C4 would be the same as Alternative C3, with the exception that the rehabilitation of non-ESA and non-rare marine mammals would be optional. Alternative C4 would adversely affect rehabilitation facilities in the same manner as Alternative C3. Alternative C4 could adversely affect facilities to a lesser extent, however, since under the rehabilitation of non-rare and non-ESA species would only be optional.

4.6.4 Release of Rehabilitated Animals Alternatives

4.6.4.1 Alternative D1- No Action

Under Alternative D1, release activities would cease as stranding response and rehabilitation activities ended. Eliminating activities related to the release of rehabilitated marine mammals would eliminate the expenses related to these activities.

4.6.4.2 Alternative D2- Status Quo

Minor to moderate, adverse effects on rehabilitation facilities would be expected, as continued expenses would be incurred from release activities. Facilities that release more animals, larger species of marine mammals, or those that need to travel greater distance to release animals would incur a greater share of expenses.

4.6.4.3 Alternative D3- Preferred Alternative

Alternative D3 would be the same as Alternative D2, except that new SA holders could be added and the release criteria would be implemented. Minor to moderate, adverse effects may be borne by rehabilitation facilities. Costs may increase at each facility in order to comply with the release criteria. However, the possible addition of rehabilitation facilities could help offset the release activities and costs for some facilities.

4.6.5 Disentanglement Alternatives

4.6.5.1 Alternative E1- No Action

Under Alternative E1, the disentanglement network would be terminated. Minor to moderate, beneficial effects on current participants could occur from the elimination of expenses incurred from disentanglement activities.

4.6.5.2 Alternative E2- Status Quo

Under Alternative E2, the disentanglement network would continue as it currently does. Minor to moderate, adverse effects would continue to be borne by participants engaged in disentanglement activities.

4.6.5.3 Alternative E3- Preferred Alternative

Under Alternative E3, the disentanglement network would continue current operations on the East Coast and modify West Coast operations. In addition, the Disentanglement Guidelines and training prerequisites would be implemented nationwide. East Coast participants already follow these guidelines and training prerequisites, and therefore no additional impacts would be expected. Minor to moderate, adverse effects would be borne by West Coast participants due to modifications of current operations and training expenses.

4.6.6 Biomonitoring and Research Activities Alternatives

4.6.6.1 Alternative F1- No Action

No effects on socioeconomics would be expected to occur under Alternative F1.

4.6.6.2 Alternative F2 Status Quo

Minor to moderate, adverse effects could occur under Alternative F2 depending on the nature of current biomonitoring and research activities and the ongoing personnel and research expenses.

4.6.6.3 Alternative F3- Preferred Alternative

Minor to moderate, adverse effects could occur under Alternative F3 depending on the nature of new biomonitoring and research activities and the ongoing personnel and research expenses.

1 **Table 4-2. Summary Matrix of Impacts**

Alternatives	Impact Area: Biological Resources	Water & Sediment Quality	Cultural Resources	Human Health & Safety	Socioeconomics
Stranding Agreements & Response					
Alternative A1- No Action	Moderate, adverse effects on marine mammals, as stranded animals would be removed from the population. Valuable information on marine mammal health would not be collected. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds.	No effects on water and sediment quality.	No effects on cultural resources.	Minor, short-term adverse effects as the public interact with stranded animals. Beneficial effects as response personnel no longer needed.	Moderate, long-term beneficial direct effects on stranding network members, as there would be reduction, if not an elimination, of costs. Minor to moderate indirect adverse effects to SA holders whose activities attract external funding. Negligible adverse effects to businesses adjacent to stranding sites. Potential beneficial effects if people come to see stranding event.
Alternative A2- Status Quo	Minor, short-term adverse effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, shellfish, and birds from equipment use or leaks on beaches/nearshore waters and the presence of responders. Minor to moderate, adverse effects on marine mammals would be expected from response activities and if new SAs are not issued.	Minor, short-term adverse effects on surrounding sand and nearshore waters could occur from equipment leaks and euthanasia solution or other environmental contaminants in tissue, blood, and other body fluids.	Potential minor, adverse effects on submerged cultural resources or resources buried in sand from equipment and vehicle use on beaches and nearshore waters. There would not be any effects on Alaska Natives, Native American tribes, or other aboriginal people's cultural uses of coastal resources.	Minor, short-term adverse effects on the public (interacting with a stranded animal) and stranding responders (*e.g.*, physical injury and zoonotic diseases).	Minor to moderate, long-term adverse effects to stranding network members from operating costs associated with these activities. Negligible adverse effects to businesses adjacent to stranding sites. Potential beneficial effects if people come to see stranding event.
Alternative A3	Same effects on biological resources as Alternative A2. Some beneficial impacts could come from allowing new SA holders to be added, given that they have the proper experience with marine mammal response, as geographic coverage would increase and new rehabilitation facilities may be added.	Same effects as Alternative A2.	Same effects as Alternative A2.	Same effects as Alternative A2.	Minor to moderate, long-term adverse effects on network members from operating expenses. New involvement with response activities would help offset expense of these activities. Negligible adverse effects to businesses adjacent to stranding sites. Potential beneficial effects if people come to see stranding.
Alternative A4 (Preferred)	Same effects on biological resources as Alternative A2. Beneficial impacts from use of new techniques and tools during response activities and ability to add new SA holders. Long-term beneficial effects on marine mammals would be expected to occur with the implementation of SA criteria.	Same effects as Alternative A2.	Same effects as Alternative A2.	Same effects as Alternative A2, with one exception. SA criteria would ensure that responders are experienced and have the knowledge to avoid or minimize health and safety risks.	Alternative A4 is similar to Alternative A3, but under Alternative A4 the Final SA criteria would be implemented. Moderate to major, adverse effects to the current SA holders would be expected to occur, as existing SA holders may need more training or may need to alter existing practices in order to meet the new criteria. Negligible adverse effects to businesses adjacent to stranding sites. Potential beneficial effects if people come to see stranding event.

Table 4-2. Summary Matrix of Impacts (continued)

Alternatives	Impact Area: Biological Resources	Water & Sediment Quality	Cultural Resources	Human Health & Safety	Socioeconomics
Stranding Agreements & Response					
Alternative A5	Same effects from stranding response activities as Alternative A2, with two exceptions. Beneficial effect on threatened, endangered, or rare animals and an adverse effect on other species. Same effects from the implementation of SA criteria as Alternative A4.	Same effects as Alternative A2.	Same effects as Alternative A2.	Same effects as Alternative A4.	Minor to major, long-term adverse effects to SA holders similar to those described in Alternatives A3 and A4, but they would also depend on the proportion of stranded marine mammals that are not rare, threatened, or endangered and whether or not the network member chooses to continue responding to those animals. Negligible adverse effects to businesses adjacent to stranding sites. Potential beneficial effects if people come to see stranding event.
Carcass Disposal					
Alternative B1- No Action	Potential adverse effects could occur from leaving carcasses on the beach to naturally decompose. Animal carcasses may contain contaminants, which could negatively impact the surrounding environment. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds.	Potential adverse effects could occur from leaving carcasses on the beach to naturally decompose. Animal carcasses may contain contaminants, which could negatively impact the surrounding water and sediment quality.	No effects on cultural resources.	Minor, short-term adverse effects as the public interact with stranded animals. Contaminated or chemically euthanized carcasses could potentially contaminate the groundwater and/or nearshore water. Beneficial effect on personnel involved in carcass disposal, as they would no longer be exposed to risks.	Negligible adverse impacts in terms of lost revenues, restaurants, and parks in the immediate vicinity of the carcass(es), if the public chose to avoid the area. Potential beneficial effects if people come to see stranding event
Alternative B2- Status Quo	Minor to moderate, short- and long-term adverse effects, as animal carcasses may contain persistent environmental contaminants or euthanasia solution, which could negatively impact the surrounding environment. Other adverse effects from burial, equipment use, spills of hazardous materials or wastes from equipment, vessels, or vessel accidents. Beneficial effect of carcass disposal at sea, as it may provide food for organisms.	Minor, short-term adverse effects on water and sediment quality could occur from equipment leaks; euthanasia solution or other contaminants in tissue, blood, and other body fluids; spills of hazardous materials or wastes from vessels; or a vessel accident. Burial and equipment use may have a negligible impact on erosion.	Potential minor, long-term, adverse effects on submerged cultural resources or resources buried in sand from beach burial, and equipment and vehicle use on beaches and nearshore waters. There would not be any effects on Alaska Natives, Native American tribes, or other aboriginal people's cultural uses of coastal resources.	Minor and major, short- and long-term adverse effects as the public interacts with a stranded animal. Contaminated or chemically euthanized carcasses left on the beach or buried could potentially contaminate the groundwater and/or nearshore water, making it unhealthy for humans to swim near the carcass site. Workers involved in disposal could be exposed to zoonotic diseases, contaminants, and euthanasia solution.	Negligible adverse impacts in terms of lost revenues, restaurants, and parks in the immediate vicinity of the carcass(es), if the public chose to avoid the area. Potential beneficial effects if people come to see stranding event
Alternative B3 (Preferred)	Same effects as Alternative B2, with one exception. Chemically euthanized carcasses would not be buried on-site, minimizing some of the adverse effects.	Same effects as Alternative B2.	Same effects as Alternative B2.	Same effects as Alternative B2 with one exception. Recommended that chemically euthanized animal carcasses not be buried on the beach, which would minimize the health and safety risks associated with beach burial.	Effects would be the same as those described under Alternative B2, except that chemically euthanized carcasses would be moved off-site and the cost would be incurred by the stranding network member. Adverse effects would be negligible, minor, or major, depending on the number of carcasses.

Table 4-2. Summary Matrix of Impacts (continued)

Alternatives	Impact Area: Biological Resources	Water & Sediment Quality	Cultural Resources	Human Health & Safety	Socioeconomics
Rehabilitation Activities					
Alternative C1- No Action	Moderate, long-term, adverse effects as marine mammals would not be taken into rehabilitation and most would likely die from injuries or disease. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds.	No effects on water and sediment quality.	No effects on cultural resources.	Beneficial effects would be expected as risks to rehabilitation personnel would end.	Potential major, long-term, adverse effects on facilities that focus primarily on rehabilitation activities. Facilities may cease operation, unless their activities could be shifted. Larger facilities that engage in other activities may experience a minor, long-term positive effect in terms of the reduced operating costs from the elimination of rehabilitation activities.
Alternative C2- Status Quo	Minor to major, short- and long-term, beneficial and adverse effects on marine mammals. Potential adverse effects from sampling, anesthesia, disease, euthanasia, and not implementing the Rehabilitation Facility Standards No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds.	Minor adverse effects due to use of open ocean/bay net pens and temporary pools and contamination from wastes, pathogens, etc. Rehabilitation facilities would have necessary permits for wastewater discharges.	Potential minor to major adverse effects on from the use of temporary pools and net pens, depending on where they are sited. Net pens may disturb or damage submerged cultural resources.	Minor, short-term, direct adverse effects on rehabilitation personnel, including physical injuries, exposure to chemicals, and exposure to zoonotic diseases.	Current rehabilitation facilities would continue to bear minor to major, long-term adverse effects. Rehabilitation facilities would operate as they currently do and therefore continue to incur supply, equipment, personnel, and maintenance expenses.
Alternative C3 (Preferred)	Same effects as Alternative C2, with one exception. Rehabilitation Facility Standards would decrease the risk of disease transmission ensure a healthy environment, maximize the success of rehabilitation, and increase the potential for release to the wild. Would reduce animal pain and suffering.	Same effects as Alternative C2.	Same effects as Alternative C2.	Same effects as Alternative C2, with one exception. Health and safety standards in the rehabilitation facility standards would have a beneficial effect.	Minor to major, adverse effects on rehabilitation facilities. Facilities would need to upgrade to comply with the minimum facility standards. Level of impact would depend on each facility, if they need to upgrade, and how much they would need to upgrade to meet the minimum standards.
Alternative C4	Same effects as Alternative C3, with a few exceptions. Adverse effects on animals that are not rare, threatened, or endangered. These animals often serve as models for other species and this would be an indirect adverse affect on rare, threatened, and endangered species.	Same effects as Alternative C2.	Same effects as Alternative C2.	Same effects as Alternative C3.	Alternative C4 would adversely affect rehabilitation facilities in the same manner as Alternative C3. Alternative C4 could adversely affect facilities to a lesser extent, however, since under the rehabilitation of non-rare and non-ESA species would only be optional.
Release of Rehabilitated Animals					
Alternative D1- No Action	Adverse effects as marine mammals would not be released back to the wild, which negatively impacts all species, but especially threatened or endangered species. Beneficial effect on wild populations, as there would not be the risk of introducing a diseased animal that could potentially infect other marine mammals. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds.	No effects on water and sediment quality.	No effects on cultural resources.	Beneficial effects would be expected as risks to release personnel would end.	Beneficial effects as the end of release activities would eliminate the expenses related to these activities.

Table 4-2. Summary Matrix of Impacts (continued)

Alternatives	Impact Area: Biological Resources	Water & Sediment Quality	Cultural Resources	Human Health & Safety	Socioeconomics
Release of Rehabilitated Animals					
Alternative D2- Status Quo	Minor, short- and long-term, adverse and beneficial effects on marine mammals. Release activities (tagging, marking, and transport) may have adverse effects. Released animal could carry a zoonotic disease and infect wild population. Adverse effects on all biological resources from equipment use, spills of hazardous materials or wastes from equipment, vessels, or vessel accidents.	Minor, short-term, direct adverse effects could occur from spills of hazardous materials or wastes from release vessels; a vessel accident; or leaks from equipment into sand or surrounding waters.	Minor, long-term, adverse effects on cultural resources buried in sand from equipment and vehicle use on beaches.	Minor, short-term, direct adverse effects on release personnel, including physical injuries and exposure to chemicals.	Minor to moderate, adverse effects as continued expenses would be incurred from release activities. Facilities that release more animals, larger species of marine mammals, or those that need to travel greater distance to release animals would incur a greater share of expenses.
Alternative D3 (Preferred)	Same effects as Alternative D2, with one exception. Release criteria would be implemented and may reduce the effects on marine mammals.	Same effects as Alternative D2.	Same effects as Alternative D2.	Same effects as Alternative D2	Minor to moderate, adverse effects as costs may increase at each facility in order to comply with the release criteria. Possible addition of facilities could help offset the release activities and their costs.
Disentanglement Activities					
Alternative E1- No Action	Major, long-term adverse effects on marine mammals from ending the Disentanglement Network as animals would have increased pain and suffering and would most likely die. No significant effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds. Gear on an entangled animal may be shed and become marine debris, which could potentially harm biological resources.	No effects on water and sediment quality.	No effects on cultural resources.	Beneficial effects would be expected as risks to responders would end. Potential adverse impacts on public health if individuals attempt to disentangle an animal.	Minor to moderate, beneficial effects on current participants could occur from the elimination of expenses incurred from disentanglement activities.
Alternative E2- Status Quo	Minor, short-term adverse effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, birds, and marine mammals from spills of hazardous materials or wastes from vessels or a vessel accident. Minor to major, short- and long-term, beneficial and adverse effects on marine mammals. Disentanglement would continue; new responders could not be added. Animal adverse reactions to close approaches, physical/chemical restraint, or be injured during the process.	Minor, short-term, adverse effects could occur from spills of hazardous materials or wastes from release vessels or a vessel accident.	No effects on cultural resources.	Adverse effects on responders, including physical injuries, exposure to chemicals, potentially death. Potential adverse impacts on public health if individuals attempt to disentangle an animal.	Minor to moderate, adverse effects would continue to be borne by participants engaged in disentanglement activities.

Table 4-2. Summary Matrix of Impacts (continued)

Alternatives	Impact Area				
	Biological Resources	**Water & Sediment Quality**	**Cultural Resources**	**Human Health & Safety**	**Socioeconomics**
Disentanglement Activities					
Alternative E3 (Preferred)	Same effects as Alternative E2, except that new responders and techniques could be added and Disentanglement Guidelines/training would be in place to reduce adverse effects.	Same effects as Alternative E2.	No effects on cultural resources.	Same effects as Alternative E2. There would be less risk under this alternative, as modifications new tools and techniques and the Disentanglement Guidelines/training could reduce safety risks.	No impacts to East Coast participants. Minor to moderate, adverse effects would be borne by West Coast participants due to modifications of current operations and training expenses.
Biomonitoring & Research Activities					
Alternative F1- No Action	Adverse effects on marine mammals as important health information would no longer be collected. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds.	No effects on water and sediment quality.	No effects on cultural resources.	Beneficial effects would be expected as risks from research activities would end.	No effects on socioeconomics.
Alternative F2- Status Quo	Minor, short-term adverse effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, birds, and marine mammals from spills of hazardous materials or wastes from vessels; a vessel accident; or leaks from equipment into sand or surrounding waters. Protected and sensitive habitats and SAV and macroalgae could be damaged by vessels/researchers. Sea turtles/birds and their nests could be disturbed/ damaged. Fish may be caught in nets or disturbed. Minor to major, short- and long-term, adverse effects on marine mammals from close approach, tagging, marking, restraint, handling, capture, transport, sampling, and other activities. Long-term beneficial effects from collection of health information.	Minor, short-term, direct adverse effects could occur from spills of hazardous materials or wastes from release vessels; a vessel accident; or leaks from equipment into sand or surrounding waters.	Adverse effects would not likely occur. Potential effects on submerged cultural resources or resources buried in sand from equipment and vehicle use on beaches and vessel use in nearshore waters.	Minor, short-term, direct adverse effects on research personnel, including physical injuries, exposure to chemicals, and exposure to zoonotic diseases.	Minor to moderate, adverse effects could occur depending on the nature of biomonitoring and research activities and the ongoing personnel and research expenses.
Alternative F3 (Preferred)	Same effects as Alternative F2, with other adverse effects from new research activities.	Same effects as Alternative F2.	Same effects as Alternative F2.	Same effects as Alternative F2.	Minor to moderate, adverse effects could occur depending on the nature of new biomonitoring and research activities and the ongoing personnel and research expenses.

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5. Mitigation

5.1 Introduction

The purpose of mitigation is to avoid, minimize, or eliminate negative impacts on the affected resources from a proposed action. Mitigation measures have been developed for alternatives where a significant impact would likely occur. Measures are described under each resource area and alternative, as necessary.

5.2 Biological Resources

5.2.1 Stranding Agreements and Response Alternatives

Under Alternatives A2, A3, A4, and A5, measures would be taken to avoid protected and sensitive habitats, where feasible. However, many strandings occur in protected areas, including: national parks, monuments, seashores, and forests; NMSs; NERRs; wilderness areas; fishery management areas; and state and local parks. When response activities must occur in these areas, the proper authorities would be contacted to coordinate the response activities, to determine the manner in which a response may occur (if it is permitted at all), and to minimize impacts of a response. Nesting sea turtles and birds would be avoided during responses, and response activities would be coordinated with the USFWS and/or appropriate state agency/agencies to ensure there would be no adverse impacts. Article II, Part C, Number 2 of the SA template requires stranding network participants to coordinate with Federal, state, and local officials and employees in matters supporting the purposes of their SA (see Appendix C). The SA template (Article III and Article IV, Part B, Number 4) would require SA holders to make every reasonable effort to assist in the clean-up of beach areas where activities such as necropsy or specimen collection were conducted, by removing trash and other debris, and disposing of or assisting in the disposal of offal and other waste parts from the carcass. These measures would help protect the surrounding biological resources, particularly when the response was conducted in a sensitive area.

Capture and restraint procedures would be performed or directly supervised by qualified personnel and if possible, an experienced marine mammal veterinarian would be present to carry out or provide direct on-site supervision of all activities involving the use of anesthesia and sedatives. Only personnel experienced in capture and sampling techniques would be used to complete the activities as quickly as possible. For pinnipeds, responders would carry out activities efficiently, such that the total time they are occupying beach haul-out areas, and total number of times a site is disturbed, are

minimized. Response to stranded pinnipeds in a rookery situation would not be authorized under a SA, but would only be performed under the authority of the MMHSRP MMPA/ESA permit in coordination with the Permit Holder/PI. Experienced personnel would be used during capture and restraint to complete the activities as quickly as possible.

Tagging animals for immediate release would be performed or directly supervised by qualified personnel. Pinniped flipper tags would be placed appropriately, so animals would not walk on or be irritated by them. The tag and/or instrument size and weight would be kept to the minimum needed to collect the desired data to minimize the potential for increased energetic costs of or behavioral responses to larger tags. Tag placement would be selected so that it will not interfere significantly with an animal's ability to forage or conduct other vital functions.

Potential adverse impacts from euthanasia would be minimized by the measures described below. Under Article IV, Part A, Number 1 of the SA template (Appendix C), euthanasia of animals would only be performed by the attending veterinarian or by a person acting on behalf of the attending veterinarian (*i.e.,* under direct coordination or supervision). Euthanasia procedures would follow approved guidelines, such as those listed in the 2000 Report of the AVMA on Euthanasia (AVMA 2001) or the CRC Handbook of Marine Mammal Medicine (Greer *et. al* 2001). Persons using controlled drugs would comply with all applicable Federal and state laws and regulations. This would include DEA regulations and any applicable state veterinary practice laws and regulations. Stranding network members would be authorized to euthanize ESA-listed species under the MMHSRP ESA/MMPA permit. In addition to the previous measures, euthanasia of ESA-listed species would require authorization and coordination with the appropriate NMFS regional stranding coordinator.

Potential impacts from the transport of animals to rehabilitation facilities could be minimized by following the APHIS "Specifications for the Humane Handling, Care, Treatment, and Transportation of Marine Mammals" (9 CFR Ch 1, Subpart E). If a commercial vehicle is used to transport an animal, these standards should be complied with. The "Live Animal Regulations" published by the International Air Transport Association (IATA) may also be used to minimize transport impacts (IATA 2006). Both sets of standards have specifications for containers, food and water requirements, methods of handling, and care during transit.

The Marine Mammal Oil Spill Response Guidelines (Appendix L) would be followed to prevent any potential impacts during response. The guidelines include information on data collection and chain-

of-custody procedures. Stranding responders would work with the Federal On-Scene Coordinator (FOSC) for oil spill response and consult with NMFS on appropriate response measures.

The MMHSRP would follow all mitigation measures for response to threatened and endangered species set forth by NMFS PR1 as conditions of their ESA/MMPA permit.

5.2.2 Carcass Disposal Alternatives

Under Alternatives B2 and B3, stranding network members would contact and coordinate with Federal, State, and/or local agencies prior to carcass disposal. Article II, Part C, Number 2 of the SA template requires stranding network participants to coordinate with Federal, state, and local officials and employees in matters supporting the purposes of their SA (see Appendix C). Beach burial and disposal in State waters would only occur after state and/or local authorities have given permission to conduct such activities. If necessary, stranding network members would obtain a permit to conduct these disposal activities. Burial in shoreline areas may be restricted for the protection of sensitive habitats, such as nesting shorebirds, vegetation, or dunes. Carcasses may be buried in upland areas where body fluids would not likely leach into groundwater. Burial would also be deep enough so that carcasses would not be dug up by scavengers or uncovered by wave action.

If carcasses are known or assumed (based upon test results or prior knowledge of the species) to have contaminant levels that meet or exceed the definition of hazardous waste under EPA, state, and/or local regulations, they would be taken to an EPA-designated hazardous waste landfill for proper disposal.

Non-toxic carcasses may be disposed in Federal waters without a permit. At-sea disposal of carcasses that are known to be hazardous waste may require EPA approval and a permit. These carcasses would be disposed of in an EPA designated ocean dumping site. All EPA dumping sites are managed to avoid or minimize impacts to the marine environment. Materials used to sink carcasses would be chosen to avoid or minimize any impacts to the marine environment.

During carcass disposal and removal activities, measures would be taken to avoid protected and sensitive habitats. When these areas cannot be avoided, the proper authorities would be contacted to coordinate the disposal activities and minimize impacts. Activities would also be coordinated with State and/or local agencies to avoid or minimize impacts to nesting sea turtles or birds.

5.2.3 Rehabilitation Activities Alternatives

If NMFS selects Alternative A3 or A4 for SAs and response, it would implement the Final SA criteria (Appendix C) as mitigation for Alternatives C3 and C4. Under the SA criteria (Part C, Number 3) the rehabilitation facility should have and maintain an attending veterinarian experienced in marine mammal care that would be willing to assume responsibility for diagnosis, treatment, and medical clearance for release or transport of marine mammals in rehabilitation. Also, the attending veterinarian should provide a schedule of veterinary care that includes a review of the husbandry records; visual and physical examinations of all marine mammals in rehabilitation; and a periodic visual inspection of the facilities, protocols, Standard Operating Procedures, and case records. All documentation of the attending veterinarian's experience would be submitted to NMFS for review prior to issuing an SA. Under Part C, Number 4 of the SA criteria the rehabilitation facility should have sufficient physical and financial resources to maintain appropriate animal care. The stranding network participant would have to submit a facility operation manual to NMFS for review prior to the issuance of an SA. All operations would be consistent with NMFS and other applicable Federal and State policies, guidelines, directives, regulations, and laws. Facilities would be reviewed by NMFS for compliance with their SA every 3 years, and may be put on probation, suspended, or have their SA terminated for any violations or non-compliance.

Veterinary medical care standards (Sections 1.7 [for cetaceans] and 2.7 [for pinnipeds] in the standards) would ensure that veterinarians and other personnel have the appropriate knowledge and experience to properly care for and treat marine mammals. Veterinarians must have: arrangements to obtain and store medications required for the animals housed at the rehabilitation facility; access to a list of expert veterinarians to contact for assistance; and a minimum skill level to treat species most commonly encountered at the facility. Veterinary care would comply with any applicable state veterinary practice laws and regulations for the state in which the facility is located. Examples of the recommended standards for veterinarians include: completion of a course offering basic medical training with marine mammals; one year of clinical experience working with the marine mammal(s) most frequently admitted to the facility; one year of clinical veterinary experience post graduation; and membership in the International Association for Aquatic Animal Medicine.

Potential adverse impacts under Alternative C3 and C4 from disease transmission would be minimized by measures in the Rehabilitation Facility Standards. Under Section 1.4 (cetaceans) and Section 2.4 (pinnipeds), quarantine facilities would be available and quarantine protocols would be in place for all incoming animals. Minimum quarantine standards include, but are not limited to: having

separate filtration and water flow systems; providing sufficient space or solid barriers between animal enclosures to prevent direct contact; and maintaining equipment and tools strictly dedicated to the quarantine area. An evaluation and written veterinarian approval would be required before placing animals together after the quarantine period has been met. Standards include measures to reduce the spread of disease from open ocean/bay pens. Standards also include measures to prevent disease transmission from domestic and wild terrestrial animals to marine mammals and vice versa. All quarantine standards are described in Section 1.4 (for cetaceans) and Section 2.4 (for pinnipeds) of the standards.

Handling and restraint procedures would be performed or directly supervised by qualified personnel and if possible, an experienced marine mammal veterinarian would be present to carry out or provide direct on-site supervision of all activities involving the use of anesthesia and sedatives. Only personnel experienced in handling and sampling techniques would be used to complete the activities as quickly as possible.

Potential adverse impacts from euthanasia under Alternative C3 and C4 would be minimized by the measures described below. Under Article IV, Part A, Number 1 of the SA template (Appendix C) and Section 9.0 of the Rehabilitation Facility Standards, euthanasia of animals would only be performed by the attending veterinarian or by a person acting on behalf of the attending veterinarian (*i.e.*, under direct authorization or supervision). Persons administering the euthanasia should be knowledgeable and trained to perform the procedure, and competent in the performance of the technique. Each facility would have a written euthanasia protocol signed and periodically reviewed by the attending veterinarian. Euthanasia procedures would follow approved guidelines, such as those listed in the 2000 Report of the AVMA on Euthanasia (AVMA 2001) or the CRC Handbook on Marine Mammal Medicine (Greer *et. al* 2001). Persons using controlled drugs would comply with all applicable Federal and state laws and regulations. This would include DEA regulations and any applicable state veterinary practice laws and regulations. In addition to the measures listed above, rehabilitation personnel would require further authorization to euthanize ESA-listed species under the MMHSRP ESA/MMPA permit. Euthanasia of ESA-listed species would require authorization and coordination with the appropriate NMFS regional stranding coordinator.

The Marine Mammal Oil Spill Response Guidelines (Appendix L) would be followed to ensure that rehabilitation facilities that accept oiled animals are properly equipped to handle their care. The guidelines specify housing requirements and considerations, including ventilation, quarantine, water supply, and waste water. The guidelines include information on data collection and chain-of-custody

procedures. Rehabilitation facilities would work with the FOSC for oil spill response and consult with NMFS on appropriate rehabilitation measures.

5.2.4 Release of Rehabilitated Animals Alternatives

If NMFS selects Alternative A3 or A4 for SAs and response, it would implement the Final SA criteria (Appendix C) as mitigation for Alternative D3. Under the SA criteria (Part C, Number 3) the rehabilitation facility should have and maintain an attending veterinarian, on staff or consulting, experienced in marine mammal care that would be willing to assume responsibility for diagnosis, treatment, and medical clearance for release. All documentation of the attending veterinarian's experience would be submitted to NMFS for review prior to issuing an SA. Part C, Number 4 of the SA criteria requires the rehabilitation facility to have sufficient physical and financial resources to maintain appropriate animal care, including release activities.

Potential adverse impacts under Alternative D3 from disease transmission would be minimized by measures in the release criteria (Appendix C). Animals would be medically cleared by the attending veterinarian and their assessment team before a release determination is made. The medical assessment would include a hands-on physical examination. A review of the animal's complete history, including all stranding information, diagnostic test results, and medical and husbandry records would also occur. NMFS would require some diagnostic testing to determine the risk to the health of wild marine mammal populations. Additional testing would be required if the animal was part of a UME. These procedures would minimize the potential for disease transmission from a released animal to the wild population.

Other potential impacts to released animals would be mitigated by the release criteria. In addition to a medical assessment, behavioral and developmental assessments would be conducted before a release determination. Developmental clearance would reasonably ensure that the animal has attained a sufficient age to be nutritionally independent, including the ability to forage and hunt. Behavioral clearance would include an assessment of an animal's breathing, swimming, diving, locomotion on land (pinnipeds) foraging, and hunting abilities. An evaluation of an animal's visual and auditory functions should be conducted if possible. Any behavioral conditioning must be eliminated prior to release such that the association of food rewards with humans is diminished.

Handling and restraint procedures necessary for release would be performed or directly supervised by qualified personnel and if possible, an experienced marine mammal veterinarian would be present to carry out or provide direct on-site supervision of all activities involving the use of anesthesia and

sedatives. Only personnel experienced in handling and sampling techniques would be used to complete the activities as quickly as possible. The veterinarian would also provide emergency procedures if necessary. For pinnipeds, personnel would carry out release activities efficiently, to minimize the total time spent on the rookery/haul-out. Experienced personnel would be used during handling and restraint to complete the release activities as quickly as possible. Potential impacts from the transport of animals from rehabilitation facilities to release sites could be minimized by following the APHIS "Specifications for the Humane Handling, Care, Treatment, and Transportation of Marine Mammals" (9 CFR Ch 1, Subpart E). If a commercial vehicle is used to transport an animal, these standards should be complied with. The "Live Animal Regulations" published by the IATA may also be used to minimize transport impacts (IATA 2006). Both sets of standards have specifications for containers, food and water requirements, methods of handling, and care during transit.

The weight and dimensions of the instrument package relative to the animal's size and mass, and duration of attachment, are important considerations in choosing a tag (Wilson and McMahon 2006). The tag size would be kept to the minimum needed to collect the desired data to minimize the potential for increased energetic costs of or behavioral responses to larger tags, but ensuring an adequate battery life to sustain the tag over the expected tag attachment duration (tags are expected to fall off after the failure of a corrodible link or the molt of a pinniped). Tag placement should be selected that will not interfere significantly with an animal's ability to forage or conduct other vital functions. Pinniped flipper tags would be placed appropriately, so animals would not walk on or be irritated by them. A local anesthetic or analgesic would be administered prior to tagging or freeze branding an animal to minimize pain during application.

5.2.5 Disentanglement Alternatives

Under Alternative E3, impacts to all biological resources from a potential vessel accident or hazardous material spill would be mitigated by the implementation of training prerequisites and the Disentanglement Guidelines. The use of trained personnel and proper equipment and protocols would reduce the potential for spills and accidents.

Disentanglements of ESA-listed cetaceans and pinnipeds would be authorized under the MMHSRP ESA/MMPA permit, with express consent of the Permit Holder/PI. The MMHSRP would follow all mitigation measures set forth by NMFS PR1 as conditions of their ESA/MMPA permit, and all activities will be conducted in consultation with and with the consent of the Permit Holder/PI. For large whale disentanglements, responders would approach animals gradually, with minimal noise to

reduce any reaction. Responders would approach at slow speeds, avoid making sudden changes in speed or pitch, and avoid using reverse gear. Additional caution would be taken when approaching mothers and calves. Only responders with extensive experience operating vessels near large whales would be involved in the vessel approaches. Responders would only include those individuals who have been sufficiently trained in large whale disentanglement according to the Disentanglement Guidelines (Appendix C). NMFS should develop more comprehensive guidelines for large whale disentanglement, as the current guidelines focus primarily on criteria for responder levels. Additional guidelines should include general protocols, policies, and procedures. NMFS should develop a database or other way to track qualifications of personnel.

Small cetacean and pinniped disentanglement activities would be authorized under an SA. Only personnel experienced in small cetacean capture techniques would perform rescue activities. For disentanglements of pinnipeds on beach sites, responders would carry out activities efficiently, to minimize disturbance and the amount of time responders occupy the haul-out.

For both small cetacean and pinniped disentanglements, NMFS should develop standard disentanglement protocols for these species and a training program similar to the Large Whale Disentanglement Network. In addition, NMFS may develop an additional Article or multiple Articles to be incorporated into the SA to authorize certain facilities (with personnel that have been trained and certified) to conduct capture/rescue and disentanglement activities.

5.2.6 Biomonitoring and Research Alternatives

The following mitigation measures are for actions proposed under Alternatives F2 and F3.

5.2.6.1 Existing Mitigation Measures in NMFS PR1 Permits

The MMHSRP would follow all mitigation measures set forth by NMFS PR1 as conditions of their ESA/MMPA permit. All NMFS PR1 marine mammal permits contain conditions intended to minimize the potential adverse effects of the research activities on the animals. These conditions are based on the type of research authorized, the species involved, information in the literature and from researchers themselves about the effects of particular research techniques and the responses of animals to these activities. Specifically, the following conditions would be stated as requirements in the MMHSRP's ESA/MMPA permit:

- ***General Approach Measures, Including Precautionary Measures for Young and Females with Young.*** Researchers would exercise caution when approaching animals and must retreat

from animals if behaviors indicate the approach may be interfering with reproduction, feeding, or other vital functions. For females with young, researchers would immediately terminate efforts if there is any evidence that the activity may be interfering with pair-bonding or nursing and would not position the research vessel between the female and calf/pup. Researchers may not biopsy sample or tag cetacean calves less than six months of age or females attending calves less than six months of age.

- ***Photography and Filming.*** The Permit Holder/PI and all researchers/CIs working under the proposed permit would obtain prior approval by NMFS PR1 for non-research related use of photographs, video, and/or film that were taken to achieve the research objectives, that such activities would not influence the conduct of research in any way, and any film approved for use would include a credit, acknowledgement, or caption indicating that the research was conducted under a permit issued by NMFS under the authority of the MMPA and/or ESA.
- ***Research Personnel.*** The Permit Holder/PI would ultimately be responsible for all activities of any individual who is operating under the authority of the proposed permit. Addition of CIs would be approved by the Permit Holder/PI after reviewing their qualifications and research plans. All research personnel would be required to serve a research function and would be qualified to perform that function.
- ***Reporting Conditions.*** An annual report would be submitted and reviewed by NMFS PR1 for each year the permit is valid. For each marine mammal part taken, imported, exported, or affected, the annual report would include: a description of the part and its assigned identification number; source, collector, country of origin, and authorizing government agency (for imported samples) for each sample reported; a summary of the research analysis conducted on the samples; and a description of the disposition of any marine mammal parts. For live animal activities, the report would include a description of the species, numbers of animals, locations of activities, and types of activities for: live captures; stranding response/disentanglement of marine mammals and endangered/threatened species; specimen collections; euthanasia (including reason for euthanasia and the drugs used); and incidental harassment during activities. The report would include descriptions of the animals' reactions, measures taken to minimize disturbance, research plans for the forthcoming year, and an indication as to when or if any results have been published or otherwise disseminated during the year. At the end of the proposed permit, a final report would be submitted that includes: a reiteration of the objectives, a summary of the research results and how they pertain to or

further the research goals stated in the permit application and NMFS conservation plans; and an indication of where and when the research results would be published.

- ***Research in Cooperation with Commercial Vessels.*** The permit specifically would not authorize the conduct of research activities aboard or in cooperation with commercial marine mammal viewing vessels or aircraft while they are engaged in such commercial activity. Further, the permit would not authorize cooperation with any vessel or aircraft carrying any non-essential passengers (*i.e.* not essential for the conduct of the research) who either pay a fee in return for being allowed onboard the vessel or aircraft, or who, prior to or after the trip, give "donations" to the PI, CI(s) or Research Assistant(s).
- ***Research Coordination.*** The Permit Holder/PI would be required to notify the appropriate NMFS Regional office at least two weeks in advance to coordinate the dates and locations of the authorized activities. The permit holder would also be required to coordinate with other researchers conducting the same or similar studies on the same species, in the same locations, and at the same time.
- ***Import/Export of Marine Mammal Parts.*** No animal would be harassed or killed for the express purpose of providing specimens to be obtained and/or imported under the proposed permit actions. Parts imported under the authority of the proposed permit would be taken in a humane manner, and in compliance with the ESA, MMPA, Fur Seal Act, and any applicable foreign law. Importation of marine mammal parts is subject to the provisions of 50 CFR parts 14, 216, and 222. Any specimen(s) of species listed in the Appendices to CITES would be accompanied by valid CITES documentation from the exporting country, and, in the case of Appendix-I species, from the USFWS.
- ***Biological Samples.*** All specimen materials collected or obtained under this authority would be maintained according to accepted curatorial standards. After completion of initial research goals, any remaining samples would be deposited into a *bona fide* scientific collection which meets the minimum standards of collection curation and data cataloging as established by the scientific community.
- ***Additional Required Permits.*** The Permit Holder/PI would be required to obtain appropriate authorizations needed from other state or Federal agencies and would be reminded that the NMFS PR permit does not provide authorization for requirements under another state or Federal agencies' jurisdiction. This would include obtaining necessary permits for research conducted in a NMS, national park, foreign country, etc.

5.2.6.2 Mitigation Measures Common to Specific Research Activities

A number of "good practice or protocol" measures are commonly followed by qualified, experienced personnel to minimize the potential risks associated with some of the research activities under the proposed permit actions. Consistent with the NMFS PR1 issuance criteria requiring personnel authorized to take marine mammals under a permit to have qualifications commensurate with their duties, only qualified, experienced personnel would be allowed to perform intrusive procedures such as remote biopsy sampling and attachment of intrusive tags. Efforts would be made to avoid duplicate sampling of known animals through sharing of sighting and photo-identification information among permit holders. The following outlines common mitigation measures associated with specific research activities and/or species.

Mitigation for Close Approach. To minimize disturbance and ensure adequate opportunities for photo-identification, tagging, and sampling, the researchers would approach animal(s) gradually from behind or alongside, rather than head on. An approach is defined as a continuous sequence of maneuvers involving a vessel, aircraft, or researcher's body in the water, including drifting, directed toward an animal(s) for the purposes of conducting authorized research which involves one or more instances of coming closer than 100 yards (91.4 m) to a large whale(s) or 50 yards (45.7 m) to a small cetacean (s), seal(s), or sea lion(s). Researchers would approach at slow speeds, avoid making sudden changes in speed or pitch, and avoid using reverse gear. The amount of time spent in close proximity to an animal(s) would be limited to the minimum necessary to meet research objectives. Whenever possible, four-stroke engines would be used, as they are quieter than two-stroke engines. Researchers would leave the vicinity of an animal(s) if the animal(s) shows a response to the presence of the research vessel or aircraft. Approaches to an individual animal would be limited and efforts to approach an individual would be discontinued of the animal displays avoidance behaviors, such as a change in its direction of travel or departures from normal breathing and/or dive patterns. Only personnel with extensive experience operating vessels and aircraft near animals would be involved in close approaches.

Mitigation for Capture and Restraint. These procedures would be performed or directly supervised by qualified personnel and an experienced marine mammal veterinarian would be present to carry out or provide direct on-site supervision of all activities involving the use of anesthesia and sedatives. Only personnel experienced in capture and sampling techniques would be used to complete the activities as quickly as possible.

Pinniped research activities would be carried out efficiently, to minimize the total time researchers are occupying the rookery/haul-out and the total number of times a site is disturbed. Stays on rookeries longer than five hours are justified only when it prevents additional disturbance of the site on subsequent days. To avoid respiratory distress, ischemia (restricted blood flow), or nerve damage, animals would be positioned properly (*i.e.*, ventrally recumbent) during anesthesia (Dierauf 1990). Respiration and pCO_2 (measure of carbon dioxide in the blood) would be monitored and oxygen administered, as needed to avoid prolonged breath holding during gas anesthesia, which can result in cardiac hypoxia (lack of oxygen to the heart muscle). Qualified personnel would be prepared to control or assist ventilations when using sedatives. An emergency kit would be readily available to respond to complications or emergencies. The animal's body temperature would be closely monitored and steps would be taken to avoid hypo- and hyperthermia. Drug doses would be calculated on the researcher's best estimate of an animal's lean body mass and metabolic rate.

Mitigation for Attachment of Tags and Scientific Instruments. Pinniped flipper tags would be placed appropriately, so animals would not walk on be irritated by them. Care would be when attaching scientific instruments to pinnipeds to prevent thermal burns. The correct proportions of epoxy hardener and resin catalyst would be used to prevent a "hot" mix and the minimum practical amount of epoxy would be used to prevent burning the animal.

Measures to minimize the effects of attaching scientific instruments to cetaceans would include the use of stoppers to reduce the force of impact and limit the depth of penetration of the tips of subdermal tags. Arrow tips would be disinfected between and prior to each use, to minimize the risk of infection and cross-contamination. Suction cup mounted tags would be placed behind a cetacean's blowhole so that there is no risk of any migration of the suction cup resulting in obstruction of the blowhole. A take would be considered to have occurred with any attempt made to tag an animal from a crossbow, air gun, or pole, even if that attempt is unsuccessful. No tagging takes would occur on large cetacean calves less than six months of age or females accompanying such calves. For small cetaceans, no tagging would occur for calves less than one year of age.

The tag and/or instrument size and weight would be kept to the minimum needed to collect the desired data to minimize the potential for increased energetic costs of or behavioral responses to larger tags. Tag placement would be selected so that it will not interfere significantly with an animal's ability to forage or conduct other vital functions. All tagged animals should receive follow-up monitoring, including visual observations where feasible, to evaluate any potential effects from tagging activities.

Mitigation for Marking. A local anesthetic or analgesic would be administered prior to freeze branding an animal to minimize pain during application.

Mitigation for All Sampling Procedures. These procedures would be performed or directly supervised by qualified personnel and an experienced marine mammal veterinarian would be present to carry out or provide direct on-site supervision of all activities involving the use of anesthesia and sedatives. A marine mammal veterinarian or other qualified personnel would monitor the physiologic state of each animal (*e.g.*, by monitoring respiratory rate and character, heart rate, body temperature, and behavioral response to handling and sampling procedures). Animals that are physically restrained but continue to struggle or show signs of stress would be released immediately to minimize the risk that continued stress would lead to capture myopathy.

During cetacean biopsy sampling, a take would be considered to have occurred with any attempt made to biopsy dart an animal from a crossbow, air gun, or pole, even if that attempt is unsuccessful. In addition, no biopsy sampling takes would occur on large cetacean calves less than six months of age or females accompanying such calves. For small cetaceans, no biopsy sampling would occur for calves less than one year of age.

The volume of blood taken from individual animals at one time would not exceed more than 0.5-1 percent of its body weight, depending on taxa (Dein et al. 2005). Qualified researchers should not need to exceed three attempts (needle insertions) per animal when collecting blood. If an animal cannot be adequately immobilized for blood sampling, efforts to collect blood would be discontinued to avoid the possibility of serious injury or mortality from stress.

Sterile, disposable needles, biopsy punches, etc. would be used to minimize the risk of infection and cross-contamination. Where disposable equipment is not available, liquid chemical sterilants would be used with adequate contact times (as indicated on the product label) to affect proper sterilization. Instruments should be rinsed with sterile water or saline before use on animals. Care would be taken to avoid contact of equipment disinfectants with an animal's skin, and disinfectant agents would be changed periodically to avoid growth of resistant strains of microorganisms.

Mitigation for Incidental Mortality. To ensure that the total number of observed mortalities does not exceed permitted levels, the Permit Holder/PI would notify NMFS PR1 of research-related mortalities by phone as soon as possible after the incident, preferably within 24-72 hours. Within two weeks of the incident, unless other arrangements have been made, the Permit Holder/PI must submit a written

report that includes a complete description of the events surrounding the incident and identification of steps that will be taken to reduce the potential for additional accidents.

Mitigation for Exposure to Playbacks and Other Acoustic Research. A particular playback trial would be suspended if the exposed cetaceans show strong reactions, as indicated by sustained breaching and other activities commonly associated with stressed or agitated cetaceans. Other mitigation for this research would be included as conditions of the ESA/MMPA permit.

5.2.6.3 Mitigation Measures for Other Biological Resources

Measures would be taken to avoid protected and sensitive habitats during research projects. If activities would occur within the boundaries of a federally protected area, the appropriate personnel would be notified. Notification would include specific dates, locations, and participants involved in the activities. If necessary, permits would be obtained to conduct research in these areas.

Nesting sea turtles and birds would be avoided during activities. If necessary, activities would be coordinated with the appropriate State agency/agencies to ensure there would be no adverse impacts.

5.3 Water and Sediment Quality

5.3.1 Stranding Agreements and Response Alternatives

The SA template (Article III and Article IV, Part B, Number 4) would require SA holders to make every reasonable effort to assist in the clean-up of beach areas where their activities, such as necropsy or specimen collection, contributed to the soiling of the site. These measures would help protect the surrounding environment, including water and sediment quality.

5.3.2 Carcass Disposal Alternatives

Carcass burial on beaches and disposal in State waters would only occur after state and/or local authorities have given permission to conduct such activities. Stranding network members, in coordination with NMFS (if necessary), would obtain any permits necessary and follow any conditions or mitigation set forth in the permits. Approval from state and/or local authorities would ensure that impacts to water and sediment quality would be minimal. The SA template (Article III and Article IV, Part B, Number 4) would require SA holders to make every reasonable effort to assist in the clean-up of beach areas where their activities, such as necropsy or specimen collection, contributed to the soiling of the site. These measures would help protect the surrounding environment, including water and sediment quality.

If carcasses are known or assumed (based upon test results or prior knowledge of the species) to have contaminant levels that meet or exceed the definition of hazardous waste under EPA, state, and/or local regulations, they would be taken to an EPA-designated hazardous waste landfill for proper disposal.

Non-toxic carcasses may be disposed in Federal waters without a permit. Disposal of carcasses that are known to be hazardous waste at sea may require EPA approval and a permit. These carcasses would be disposed of in an EPA designated ocean dumping site. All EPA dumping sites are managed to avoid or minimize impacts to the marine environment. Materials used to sink carcasses would be chosen to avoid or minimize any impacts to the marine environment.

5.3.3 Rehabilitation Activities Alternatives

Rehabilitation facilities would have any required NPDES, state, and local permits, for facility discharges directly to surface waters. Facilities discharging to POTWs would have any necessary effluent discharge permits and a pretreatment plan in place to meet municipal wastewater treatment standards. Water used in temporary pools would be discharged into a sewer drain, where available, and would be taken to a wastewater treatment plant. No mitigation measures are in place for water drainage into nearshore waters or the use of net pens. Development of a monitoring plan to determine impacts and potential mitigation measures is recommended.

5.3.4 Release of Rehabilitated Animals Alternatives

If hazardous materials or wastes were discharged during release activities, stranding network members would notify the appropriate Federal, state, or local authorities.

5.3.5 Disentanglement Alternatives

If hazardous materials or wastes were released during disentanglement activities, responders would notify the appropriate Federal, state, or local authorities.

5.3.6 Biomonitoring and Research Alternatives

If hazardous materials or wastes were released during biomonitoring and research activities, personnel would notify the appropriate Federal, state, or local authorities.

5.4 Cultural Resources

5.4.1 Stranding Agreements and Response Alternatives

Under Alternatives A2, A3, A4, and A5, potential damage to cultural resources during stranding response may be avoided by contacting the appropriate State SHPO or other local authorities prior to any major land disturbance. Known cultural resources would be avoided during transport and removal activities. If cultural resources are discovered during response operations, all work would cease and the State SHPO would be contacted.

Stranding response on Native American/Alaska Native lands would be coordinated with Native American tribes, Alaska Natives, or other aboriginal peoples to accommodate cultural uses of marine mammals. Responders would also be sensitive to the fact that tribal cultures often involve ceremonial, medicinal, or subsistence uses or plants, animals (including marine mammals), and specific geographic locations. These measures would be taken to minimize or eliminate any potential impacts on Alaska Natives, Native American tribes, or other aboriginal people's cultural uses of coastal resources.

The SA template (Article III and Article IV, Part B, Number 4) would require SA holders to make every reasonable effort to assist in the clean-up of beach areas where their activities, such as necropsy or specimen collection, contributed to the soiling of the site. These measures would help protect the surrounding environment, which may include undiscovered cultural resources.

5.4.2 Carcass Disposal Alternatives

Under Alternatives B2 and B3, potential damage to cultural resources would be avoided by contacting the appropriate State SHPO or other local authorities before selecting a beach burial site. The proximity of cultural resources to a site may change the method of carcass disposal, if necessary. Known cultural resources would be avoided during transport and removal activities. If cultural resources are discovered during burial operations, all work would cease and the State SHPO would be contacted.

Carcass disposal on Native American/Alaska Native lands would be coordinated with Native American tribes, Alaska Natives, or other aboriginal peoples to accommodate cultural uses of marine mammals. Responders would also be sensitive to the fact that tribal cultures often involve ceremonial, medicinal, or subsistence uses or plants, animals (including marine mammals), and specific geographic locations. These measures would be taken to minimize or eliminate any

potential impacts on Alaska Natives, Native American tribes, or other aboriginal people's cultural uses of coastal resources.

5.4.3 Rehabilitation Activities Alternatives

If cultural resources are discovered during activities under Alternatives C2 and C3, all activities would cease and the State SHPO would be contacted. Known cultural resources would be avoided during rehabilitation activities.

5.4.4 Release of Rehabilitated Animals Alternatives

If cultural resources are discovered during release activities under Alternatives D2 and D3, all activities would cease and the State SHPO would be contacted. Known cultural resources would be avoided during release activities.

5.4.5 Disentanglement Alternatives

No mitigation measures are necessary, as impacts would not be expected under the disentanglement alternatives.

5.4.6 Biomonitoring and Research Alternatives

Under Alternatives F2 and F3, impacts to cultural resources during biomonitoring and research activities would be avoided by contacting the appropriate State SHPO or other local authorities prior to any projects that may disturb or damage resources. Known cultural resources would be avoided during research activities. If cultural resources are discovered during these activities, all work would cease and the State SHPO would be contacted.

5.5 Human Health and Safety

5.5.1 Stranding Agreements and Response Alternatives

For Alternatives A4 and A5, the SA template (Article II, Part C, Number 5) recommends Stranding Network participant organizations to take precautions against injury or disease to any network personnel, volunteers, and the general public when working with live or dead marine mammals. The SA template also requires the stranding network participant to notify the NMFS Regional coordinator within 24 hours of detecting and/or confirming any zoonotic diseases in an animal which could affect human health. In addition, the SA template (Article III and Article IV, Part B, Number 4) would require SA holders to make every reasonable effort to assist in the clean-up of beach areas where their

activities, such as necropsy or specimen collection, contributed to the soiling of the site. These measures would help protect the surrounding environment and public health.

All SA holders engaged in stranding response would have a health and safety plan that is presented to and reviewed by NMFS as part of their application for a new or renewal SA. Measures that may be utilized by SA holders to reduce health and safety risks during responses include, but are not limited to, the use of protective clothing, face protection, and eye protection. Other elements that may be included in a health and safety plan where feasible are: the use of life jackets and wet or dry suits during water responses; rotation of responders to minimize the amount of exposure and reduce fatigue; availability of first-aid kits and facilities for clean-up; and training for responders in first-aid and CPR. A proper first-aid kit and a person trained in the treatment of drug accidents should be present if etorphine or paralytic agents are used for euthanasia.

Risks from the consumption of marine mammal meat would be reduced by continuing to inform Alaska Natives on the potential for contaminants and disease. This is currently done by NMFS through the co-management process with Alaska Natives.

Marine mammal oil spill response guidelines have been developed for the MMHSRP (Appendix L). The guidelines would serve as mitigation for impacts under Alternatives A2, A3, A4, and A5. Personnel involved in spill response activities would have to comply with all applicable worker health and safety laws and regulations. The primary Federal regulations are the OSHA standards for Hazardous Waste Operations and Emergency Response (HAZWOPER) (29 CFR 1910.120). Oil spill response personnel may be required to have HAZWOPER training, depending on the extent of their involvement and state regulations. Recommended training for response includes first-aid, Cardio Pulmonary Resuscitation (CPR), the Incident Command System (ICS), aircraft and boating safety, and general oil spill response. Recommended personal protective equipment includes full eye protection, oil resistant clothing, gloves, ear protection, and respiratory protection. The Material Safety Data Sheet (MSDS) for the spilled material would be reviewed and all recommended precautions would be followed. Response personnel would be periodically monitored to determine exposure. Marine mammal stranding network members would be responsible for training and certifying their employees and volunteers.

5.5.2 Carcass Disposal Alternatives

For Alternatives B2 and B3, the SA Template (Article II, Part C, Number 5) recommends Stranding Network participant organizations to take precautions against injury or disease to any network

personnel, volunteers, and the general public when working with live or dead marine mammals. The SA template also requires the Stranding Network participant to notify the NMFS Regional coordinator within 24 hours of detecting and/or confirming any diseases of concern in an animal which could affect human health. Response workers would be required to have sufficient protection against infection with zoonotic pathogens, contaminants, and other risks associated with handling decomposing carcasses. Workers would be required to wear, as necessary, protective clothing, gloves, face masks and safety goggles. Equipment used to move and dispose of carcasses would be cleansed and disinfected to reduce the risk of zoonotic pathogens or other possible contaminants. The marine mammal oil spill response guidelines (Appendix L) would serve as mitigation for impacts under Alternatives B2 and B3. These mitigation measures would be the same as those discussed above for oil spill response to stranded animals.

The burial or disposal at sea (in state waters) of a carcass would only occur after state and/or local authorities have given permission to conduct such activities. Stranding network members would obtain any permits necessary to conduct carcass burial on beaches or other suitable locations and disposal in state waters. This would include any permits or coordination with the State's health department, to ensure that public health and safety would be protected.

5.5.3 Rehabilitation Activities Alternatives

For Alternatives C3 and C4, the SA template (Article II, Part C, Number 5) recommends Stranding Network participant organizations to take precautions against injury or disease to any network personnel, volunteers, and the general public when working with live or dead marine mammals. The SA template also requires the stranding network participant to notify the NMFS Regional coordinator within 24 hours of detecting and/or confirming any diseases of concern in an animal which could affect human health. The implementation of the Rehabilitation Facility Standards would also serve as mitigation for Alternatives C3 and C4. Section 10 of the standards would require health and safety plans that identify all of the safety issues that may be a factor when working closely with wild marine mammals. Plans would include specific information for the direct handling of all species seen at the facility. Personnel would be trained to identify potential zoonotic diseases and prevent their transmission from animal to human. Staff would be trained to properly handle contaminated equipment and proper sanitation techniques (Section 4).

Rehabilitation facilities would follow OSHA regulations regarding personnel protective equipment (29 CFR 1910, subpart I). Safety equipment would be provided, including eye protection, protective

clothing, and eye flushing stations. OSHA regulations (29 CFR 1910, subpart D) provide measures to reduce slips, falls, and other physical injuries in the workplace. Protocols for appropriate handling of chemicals would be available, including all MSDS. Hazardous materials and toxic substances would be handled and stored according to OSHA regulations (29 CFR 1910, subpart H and subpart Z). A proper first-aid kit and a person trained in the treatment of drug accidents would be present if etorphine or paralytic agents were used for euthanasia.

The marine mammal oil spill response guidelines would serve as mitigation for impacts under Alternatives C2, C3, and C4. Personnel involved in the rehabilitation of oiled marine mammals should have HAZWOPER training. Training on the ICS, first-aid, CPR, crisis management, marine mammal oil spill response, and hazard communication are recommended. Recommended personal protective equipment includes full eye protection, oil resistant clothing, gloves, ear protection, and respiratory protection. The MSDS for the spilled material would be reviewed and all recommended precautions would be followed. Rehabilitation personnel and facilities would be periodically monitored to determine exposure. Facilities would have adequate ventilation to protect against the toxic effects of volatile agents. Marine mammal stranding network members would be responsible for training and certifying their employees and volunteers.

5.5.4 Release of Rehabilitated Animals Alternatives

For Alternatives D2 and D3, the SA template (Article II, Part C, Number 5) recommends Stranding Network participant organizations to take precautions against injury or disease to any network personnel, volunteers, and the general public when working with live marine mammals. Under Alternatives D2 and D3, all SA holders involved in the release of rehabilitated animals would have a health and safety plan. All release personnel would be trained appropriately to avoid or minimize health and safety hazards.

5.5.5 Disentanglement Alternatives

Under Alternatives E2 and E3, safety measures utilized by responders would include immersion suits, life jackets, helmets, and a small closed knife that is available to cut lines and gear in an emergency situation. Typically, a standby vessel (usually a USCG or NOAA vessel) would accompany the responders in case additional assistance is required. Experienced responders would not attempt disentanglement, or would end an attempt, if it was too dangerous. Under Alternative E2, training would be required for East Coast responders in order to be certified for disentanglement. Under Alternative E3, training would be required for responders nationwide in order to be certified for

disentanglement. Training would depend upon their level of involvement (see Appendix C, Disentanglement Guidelines). The appropriate training would ensure that responders know the potential safety risks and the methods to avoid or minimize these risks. While these safety measures may reduce some risks, there would always be potential for adverse effects on human health and safety.

5.5.6 Biomonitoring and Research Alternatives

Safety protocols have been developed for health assessment studies. The use of life vests would be required, in order to comply with NOAA's Small Boat Safety Program and policies (NAO 217-103). Gloves and other protective clothing would be used during sampling. Gloves and protective eyewear would be required during the use of liquid nitrogen. It is recommended that at least one emergency medical technician would be present for health assessment activities conducted in water or offshore. If possible, USCG personnel would accompany the research vessels to assist in an emergency and to keep other vessels away from the site.

Health and safety plans would be developed for all permitted research actions. Only experienced personnel would be conducting research, which would reduce health and safety risks. NOAA's Small Boat Safety Program and policies (NAO 217-103) and policies on NOAA employees on non-NOAA vessels (NAO 209-115, as applicable) would be followed to reduce risks during vessel operations. NOAA's Aviation Safety Policy (NAO 209-124) would be followed to minimize hazards during aircraft operations.

For diagnostic testing and specimen analyses, each individual laboratory should have a Chemical Hygiene Plan, as described in 29 CFR 1910.1450. A Chemical Hygiene Plan would contain work practices, policies, and procedures that ensure a safe environment. Researchers would receive training on the hazards of chemicals used in the laboratory and be provided with the proper equipment for their safe handling, including respiratory protection. These measures would eliminate most of the risks associated with laboratory work.

5.6 Socioeconomics

5.6.1 Stranding Agreements and Response Alternatives

Stranding network members may be able to use available funds from the Prescott Grant Program to help offset costs incurred by response activities.

5.6.2 Carcass Disposal Alternatives

Stranding network members may be able to use available funds from the Prescott Grant Program to help offset costs incurred by carcass disposal activities.

5.6.3 Rehabilitation Activities Alternatives

To minimize the impacts of implementing the Rehabilitation Facility Standards, NMFS would provide a reasonable process for facilities to be upgraded to meet the minimum standards. Substandard facilities may be improved using funds that may be available through the Prescott Grant Program. Prescott funds may also be used to improve facilities that meet the minimum standards, with the goal to achieve or exceed the recommended standards.

5.6.4 Release of Rehabilitated Animals Alternatives

Stranding network members may be able to use available funds from the Prescott Grant Program to help offset costs incurred by release activities.

5.6.5 Disentanglement Alternatives

Disentanglement training expenses would be covered by the MMHSRP. This would eliminate most expenses associated with training.

5.6.6 Biomonitoring and Research Alternatives

Some biomonitoring and research expenses would be covered by the MMHSRP, eliminating some of the socioeconomic impact to personnel.

6. Cumulative and Other Impacts

6.1 Resource Specific Cumulative Impact Analysis

A cumulative impact is defined as the incremental impact of the Proposed Actions and alternatives when added to past, present, and reasonably foreseeable actions. Reasonably foreseeable future actions consist of activities that have been approved and can be evaluated with respect to their impacts. Cumulative impacts can result from individually minor, but collectively significant, actions occurring over a period of time.

The cumulative impacts analysis considers past, present, and planned or reasonably foreseeable programs and projects that could affect each resource area and may add to the incremental impacts of the Proposed Actions and alternatives in the ROIs. Because the size of the ROIs is extensive, local projects will not be analyzed; instead general threats to each resource area will be analyzed. Future, reasonably foreseeable MMHSRP actions that are not fully analyzed in the PEIS are listed in Table 6-1. For the purposes of this PEIS, only those resources identified in Section 3.0 that might be impacted by the Proposed Actions and alternatives will be discussed in this section.

Table 6-1. Reasonably Foreseeable MMHSRP Actions

MMHSRP Action	Description	Timeline
Standards for Rehabilitation Facilities/Release Criteria	Currently, these standards and criteria can only be implemented as guidelines. A proposed rule would be written to make these into regulations for all future rehabilitation facilities and activities. At a minimum, an EA would be prepared to assess any impacts associated with the proposed rule that have not been addressed in this PEIS, including a Regulatory Impact Review.	1-2 years (after release of this PEIS)
Rehabilitation Facility Inspection Program	The MMHSRP has an interagency agreement with APHIS to plan and possibly implement an inspection program for rehabilitation facilities, based upon the Standards for Rehabilitation Facilities.	Plan in place by 2007
Public Viewing Guidelines	Public viewing at rehabilitation facilities is not allowed under MMPA regulations (50 CFR 216.27 (c)(5)). Public viewing guidelines would be developed and a proposed rule would be issued to change the MMPA regulations. At a minimum, an EA would be prepared to assess any impacts associated with the proposed guidelines and rule, including a Regulatory Impact	Undetermined

Table 6-1. Reasonably Foreseeable MMHSRP Actions (continued)

MMHSRP Action	Description	Timeline
Disentanglement Network- Use of Divers in Water	A workshop is being planned regarding the use of divers for disentanglement activities. The workshop attendees would include national and international professionals involved in disentanglement activities.	Workshop- within the next year (2007)

6.1.1 Biological Resources

The response, rehabilitation, and release activities of the MMHSRP would have a beneficial cumulative effect on marine mammals. The MMHSRP would continue to rehabilitate and return animals to the wild that would have died otherwise. Returning threatened and endangered animals back to the wild would have a large impact on the survival of these species. With the implementation of the release criteria, the threat of releasing diseased animals would be eliminated or minimized. Without the release criteria, a potential cumulative adverse impact could occur if diseased animals were released and infected wild populations. The MMHSRP, combined with other NMFS activities, would have beneficial cumulative impacts on all marine mammals. Other NMFS activities include: the North Atlantic Right Whale Ship Strike Reduction Strategy; Marine Mammal Conservation Plans; ESA Recovery Plans; and Take Reduction Plans.

Research activities of the MMHSRP, combined with all other past, present, and future marine mammal research authorized by permits from the NMFS PR1, could have cumulative adverse impacts on marine mammals. All research activities include takes of marine mammals. Activities have the potential to interrupt mating, feeding, and diving behaviors as well as injure or kill animals. Takes may be occurring on the same individual or group of animals and could be disrupting essential behaviors. NMFS PR1 currently has 143 scientific research and enhancement permits issued for marine mammals. Of these permits, 34 are general authorizations for Level B Harassment (Hubard pers.comm.). However, the MMHRSP activities and other permitted research activities could result in cumulative beneficial impacts on marine mammals. The information gained from these activities may lead to ways to protect and conserve all marine mammals and increase those animals that are declining.

The Standards for Rehabilitation Facilities and release criteria cannot be enforced unless they are incorporated into regulations. These regulations would have beneficial cumulative impacts on marine mammals. By law, Stranding Network participants would have to adhere to these regulations. Participants who are in violation of these regulations could be put on probation, suspended, or have

their SA terminated, according to the Final SA Criteria (Appendix C). The rehabilitation facility regulations would ensure that rehabilitated animals would have the appropriate veterinary care in a healthy environment, maximizing the success rate of rehabilitation. The release criteria regulations would ensure that only healthy animals are released back to the wild, minimizing potential impacts to the wild population and ensuring a better survival rate for the released animal.

The Rehabilitation Facility Inspection program would complement the rehabilitation facility regulations. Facilities would be inspected to ensure compliance with the regulations. This program along with other MMHSRP activities would have beneficial cumulative impacts on marine mammals.

Currently, public viewing of animals in rehabilitation is not allowed under MMPA regulations (50 CFR 216.27 (c)(5)). The MMHSRP would like to establish guidelines to allow public viewing that would protect the animals as well as the general public. At a minimum, an EA would be prepared to assess any impacts associated with the proposed guidelines and rule, including a Regulatory Impact Review. The guidelines would be designed to protect animal and human health; therefore significant cumulative effects on marine mammals would not be expected.

6.1.2 Water and Sediment Quality

The MMHSRP's activities would not likely add to the cumulative effects on water and sediment quality from other activities. Sewage outfalls, agricultural runoff, stormwater runoff, industrial operations, shipping operations, and coastal development all have an effect on water and sediment quality. The potential impacts from the MMHSRP's activities would be negligible compared to these impacts.

6.1.3 Cultural Resources

The MMHSRP's activities would not contribute to cumulative effects on cultural resources.

6.1.4 Human Health and Safety

Currently, public viewing of animals in rehabilitation is not allowed under MMPA regulations (50 CFR 216.27 (c)(5)). The MMHSRP would like to establish guidelines to allow public viewing that would protect the animals as well as the general public. At a minimum, an EA would be prepared to assess any impacts associated with the proposed guidelines and rule, including a Regulatory Impact Review. The guidelines would be designed to protect animal and human health; therefore significant cumulative effects on public health and safety would not be expected.

The MMHSRP is in the process of planning a workshop to discuss the use of divers in the water during disentanglement activities. The workshop would likely be held sometime in 2007. Workshop attendees will include national and international professionals involved with disentanglement. Other countries have used divers to disentangle animals and the workshop will discuss the potential ways this could be implemented in the U.S. If the Disentanglement Network would decide to use divers in the water, a major amendment to the MMHSRP's ESA/MMPA permit would be necessary. This would require at minimum, an EA to analyze the impacts on human health and safety, biological resources, and any other resource that may be affected.

6.1.5 Socioeconomics

The Rehabilitation Facility Standards and release criteria cannot be enforced unless they are incorporated into regulations. The PEIS has taken a general look at potential impacts of requiring rehabilitation facilities to comply with the standards. However, at minimum, an EA would be necessary to fully assess the socioeconomic impacts of making these standards into regulations. An EA would be prepared to assess any impacts associated with the proposed rule that have not been addressed in this PEIS, including a Regulatory Impact Review. This action is anticipated to happen within one to two years after the release of this PEIS.

Release of pinnipeds on the West Coast could have an adverse cumulative impact. Pinniped conflicts with commercial and recreational fisheries are ongoing. California sea lions and harbor seals remove catch and damage gear in all types of fisheries, including gillnet, purse seine, trap and live bait fisheries. Along the West Coast, seals and sea lions have taken threatened and endangered salmon passing through the fish ladders. The conflict has resulted in economic losses for some commercial fisheries and impaired the recovery of salmon stocks. Recreational fishers frequently move their boats when sea lion are present, and incur additional fuel costs and loss of fishing time. The release of pinnipeds would add individuals to already growing populations and could contribute to an increase in interactions with the commercial and recreational fisheries, causing more economic losses. Space conflicts between pinnipeds and humans have occurred at harbors and beaches, such as Children's Pool in La Jolla, California. More animals hauled out on beaches may deter beach visitors, and impact revenue gained from beachgoers. Currently no released pinnipeds have been documented in any of these conflicts. Released pinnipeds or their offspring could be involved in future conflicts, which may have an adverse cumulative impact on socioeconomics.

6.2 Unavoidable Adverse Impacts

Unavoidable adverse impacts on marine mammals would occur from the MMHSRP's activities. During response and rehabilitation activities, animals may still exhibit adverse reactions, sustain injuries or die, despite the best efforts made by Stranding Network participants and the proposed mitigation measures. Disentanglement activities would always require a vessel close approach, which may produce adverse reactions from animals. However, these activities would be conducted to help animals, and the long-term beneficial impacts would outweigh the short-term adverse impacts. Research activities would impact marine mammals even with the proposed mitigation measures. Animals may have adverse reactions to research activities, or may be injured or die despite the use of best available science and techniques.

Unavoidable impacts on human health and safety would occur from the MMHSRP's activities. Even with the proposed mitigation measures, there would still be a risk to marine mammal personnel safety and public safety. Some risk would always be present when working with wild animals, as their behavior is unpredictable. Disentanglement activities would always be dangerous, due to animal behavior and working on the open ocean. Public safety would be impacted, as there would be a lag time between when an animal is reported and when a Stranding Network participant gets to the scene. Between this time, people could still come in contact with the animal, risking physical injuries or potential zoonotic diseases.

6.3 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments of resources are actions which disturb either a non-renewable resource or a renewable resource to the point that it can only be renewed over a long period of time (*i.e.* decades). Irretrievable commitments are losses of resources that occur for a shorter period of time. For the alternatives, most resource commitments are neither irreversible nor irretrievable. Many potential adverse impacts are short-term and temporary. Others may have a longer effect that can be reduced through the proposed mitigation measures in Section 5.

6.4 Relationship Between Short-term Uses and Long-term Productivity

This NEPA required consideration addresses the question of whether the alternatives would be providing short-term benefits at the cost of future generations. Based on the analyses presented under Section 4, Environmental Consequences, no long-term loss of productivity would be expected. The

MMHSRP's response, rehabilitation, release, and research activities would contribute to the long-term productivity of marine mammals.

7. Preparers

Sarah Howlett
Fishery Biologist
The Granato Group
Vienna, VA
M.M.A. Marine Affairs
B.S. Environmental Resource Management

Michelle McGregor
Economist
Office of Protected Resources
National Marine Fisheries Service/NOAA
Silver Spring, MD
Ph.D. Agricultural Economics
B.S. Zoology and Economics

Janet Whaley
National Stranding Coordinator
Office of Protected Resources
National Marine Fisheries Service/NOAA
Silver Spring, MD
Doctor of Veterinary Medicine
B.S. Biology

Sarah Wilkin
Fishery Biologist
Office of Protected Resources
National Marine Fisheries Service/NOAA
Silver Spring, MD
M.S. Marine Science
B.S. Marine Science

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9. Glossary

Biotoxin- A poisonous substance produced by a living organism (*e.g.* brevetoxin, saxitoxin).

Brucellosis- An infectious disease caused by the bacteria of the genus *Brucella* and may be passed to humans by contact with infected animals or animal products. Human symptoms include fever, sweats, headaches, back pain, and physical weakness.

Caliciviruses- Marine mammals may have the calicivirus San Miguel Sea Lion Virus, which causes skin lesions (skin vesicles) in marine mammals and potential premature births. In humans, caliciviruses cause hepatitis, diarrhea, and hemorrhaging.

Cetacean- A marine mammal of the order Cetacea, including whales, dolphins, and porpoises.

***Clostridium* spp.-** Large genus of Gram-positive bacteria with four main species that can cause diseases in humans. Food poisoning, gangrene, colitis, and death may result from infections.

Conspecifics- Members of the same species.

Critical habitat- Specific areas within the geographical area occupied by the species at the time of listing (under the ESA), if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and specific areas outside the geographical area occupied by the species if the agency (USFWS or NMFS) determines that the area itself is essential for conservation.

Delphinid- Marine mammals of the family Delphinidae, including the killer whale (*Orcinus orca*), bottlenose dolphin (*Tursiops truncatus*), and the long-finned pilot whale (*Globicephala melas*).

Depleted species- Defined by the MMPA as any case in which: (a) the Secretary of Commerce, after consultation with the Marine Mammal Commission and the Committee of Scientific Advisors on Marine Mammals, determines that a species or population stock is below its optimum sustainable population; (b) a State determines that such species or stock is below its optimum sustainable population; or (c) a species or population stock is listed as a threatened species or endangered species under the ESA.

Distinct Population Segment (DPS)- A vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species. Distinct population segments may be listed as threatened or endangered under the ESA.

Endangered species- Defined under the ESA as "any species which is in danger of extinction throughout all or a significant portion of its range."

Endocarditis- Inflammation of the inner lining of the heart due to an infection.

Epizootic- An outbreak of disease in an animal population.

Erysipelothrix rhusiopathiae- A pathogenic bacteria that causes systemic disease which typically causes red, hard patches on the skin, with swelling and pain. More severe cases can result in acute septicemia and death.

Essential Fish Habitat (EFH)- Defined under the Magnuson-Stevens Fishery Conservation and Management Act as waters and substrate that are necessary to the fish species for spawning, breeding, feeding, or growth to maturity.

Etorphine (Immobilon®)- A powerful synthetic narcotic analgesic related to morphine used in veterinary medicine for tranquilizing large animals (e.g. elephants). It is a controlled class II drug under the Drug Enforcement Administration.

Evolutionary Significant Unit (ESU)- A Pacific salmon population or group of populations that is substantially reproductively isolated from other conspecific populations and that represents an important component of the evolutionary legacy of the species.

Exsanguination- The fatal process of total blood loss which may be used as a mode of euthanasia in marine mammals.

Fomites- Substances that absorb, hold, and transport infectious disease agents

Gastroenteritis- Inflammation of the stomach and large and small intestines caused by a virus, resulting in vomiting or diarrhea.

Giardiasis- A diarrheal illness caused by a one-celled, microscopic parasite, which lives in the intestines and is passed in the stool. It is found in drinking and recreational waters.

Harassment- Under the 1994 amendments to the MMPA, harassment is statutorily defined as any act of pursuit, torment, or annoyance which: has the potential to injure a marine mammal or marine mammal stock in the wild (Level A Harassment); or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild (Level B Harassment).

Harmful algal bloom (HAB)- A diverse array of blooms of both microscopic and macroscopic marine algae which produce: toxic effects on humans and other organisms; physical impairment of fish and shellfish; nuisance conditions from odors and discoloration of waters or habitats.

Humane- In the context of euthanasia is defined by the MMPA means "that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved."

Hyperthermia- An acute condition which occurs when the body produces or absorbs more heat than it can dissipate; also referred to as heat stroke or sunstroke.

Hyponatremia- Low blood sodium. In marine mammals it is manifested by anorexia, followed by uncoordinated or spastic movements progressing to a generalized muscle quivering over the entire body, especially the flippers.

Hypothermia- Condition in which body temperature drops below the level required for normal metabolism and/or bodily function to take place.

Immunosuppression- State in which the ability of the body's immune system to fight infections or disease is decreased.

Leptospirosis- An infectious disease caused by the bacteria of the genus *Leptospira* that affects humans and animals. Causes tubular necrosis (kidney disorder) in marine mammals. Human symptoms include high fever, severe headache, muscle ache, chills, and vomiting.

***Morbillivirus*-** A 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.

***Mycobacterium* spp.-** A genus of bacteria that includes many pathogens known to cause serious diseases. In marine mammals, may cause dermal abscesses and pulmonary tuberculosis (infection of the lungs). In humans, may cause skin lesions, pulmonary tuberculosis, and skin tuberculosis.

***Mycoplasma* (Seal Finger)-** Bacteria which may cause mycoplasmal pneumonia (infection of the lungs) in marine mammals. In humans, may cause skin lesions and infection may progress to arthritis, cellulitis (inflammation of the connective tissue of the skin), or tenosynovitis (inflammation of the fluid-filled sheath that surrounds the tendon).

Mysticete- A whale that has baleen (plates of keratinized tissue that hang from the upper jaw) instead of teeth (suborder Mysticeti). Examples include the humpback whale (*Megaptera novaeangliae*), gray whale (*Eschrichtius robustus*), and minke whale (*Balaenoptera acutorostrata*).

Odontocete- Toothed whales (suborder Odontoceti). Examples include the sperm whale (*Physeter macrocephalus*), beluga whale (*Delphinapterus leucas*), harbor porpoise (*Phocoena phocoena*), and bottlenose dolphin (*Tursiops truncatus*).

Otariid- Sea lions and fur seals (family Otariidae). Examples include the Steller sea lion (*Eumetopias jubatus*) and the Northern fur seal (*Callorhinus ursinus*).

Pathology- The scientific study of the nature of disease and its causes, processes, development, and consequences.

Persistent Organic Pollutant (POP)- Chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in fatty tissue of living organisms, and are toxic to humans and wildlife.

Phocid- True or earless seals (family Phocidae). Examples include the Hawaiian monk seal (*Monachus schauinslandi*), and the harbor seal (*Phoca vitulina*).

Pinniped- Marine mammals in the suborder Pinnipedia with all four limbs modified into flippers, including seals, sea lions, and walruses.

Polychlorinated Biphenyls (PCBs)- A group of toxic, carcinogenic organic compounds previously used for industrial purposes.

Polycyclic Aromatic Hydrocarbon (PAH)- Chemical compounds that consist of fused aromatic rings; many are known or suspected carcinogens.

Rehabilitation- Treatment of beached and stranded marine mammals taken with the intent of restoring the marine mammal's health and, if necessary, behavioral patterns.

Salmonellosis- Infection caused by the bacteria *Salmonella* with symptoms including fever, abdominal cramps, and diarrhea.

Seal poxvirus- Virus in pinnipeds which causes skin nodules which may ulcerate, spread rapidly, and persist for months. In humans, may cause swollen, red skin nodules.

Septicemia- Disease caused by the spread of bacteria and their toxins in the bloodstream, also known as blood poisoning.

Shigellosis- Disease caused by a group of bacteria (*Shigella*) with symptoms including diarrhea, fever, and stomach cramps

Stranding- Defined under the MMPA as "an event in the wild in which (A) a marine mammal is dead and is (i) on a beach or shore of the United States; or (ii) in waters under the jurisdiction of the United States (including any navigable waters); or (B) a marine mammal is alive and is (i) on a beach or shore of the United States and is unable to return to the water; (ii) on a beach or shore of the United States and, although able to return to the water, is in need of apparent medical attention; or (iii) in the waters under the jurisdiction of the United States (including any navigable waters), but is unable to return to its natural habitat under its own power or without assistance."

Take- Defined under the MMPA as "to harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." Defined under the Endangered Species Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct."

Threatened species- Defined under the Endangered Species Act as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."

Unusual mortality event (UME)- Defined under the Marine Mammal Protection Act as "a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response."

***Vibrio* spp.-**

West Nile Virus- Virus spread by mosquitoes that causes encephalitis (inflammation/swelling of the brain).

Zoonotic- Any infectious disease that can be transmitted from animals to humans.

10. Index