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

Cooperating Agency:
U.S. Department of Agriculture (USDA)
Animal and Plant Health Inspection Service (APHIS)

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

Final Programmatic Environmental Impact Statement

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ABBREVIATIONS AND ACRONYMS

ABR	Auditory Brainstem Response
AEP	Auditory Evoked Potential
APA	Administrative Procedure Act
APE	Area of Potential Effect
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
AWA	Animal Welfare Act
BLM	Bureau of Land Management
CBC	Complete Blood Count
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CI	Co-Investigator
CITEs	Convention on International Trade in Endangered Species
CNMI	Commonwealth of the Marianas Islands
COSE	Certificate of Scientific Exchange
CPR	Cardiopulmonary Resuscitation
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DIN	Dissolved Inorganic Nitrogen
DIP	Dissolved Inorganic Phosphorus
DO	Dissolved Oxygen

DOC	Department of Commerce
DOI	Department of the Interior
DPS	Distinct Population Segment
DTAG	Digital Acoustic Recording Tag
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FMP	Fishery Management Plan
FR	Federal Register
FONSI	Finding of No Significant Impact
FSA	Fur Seal Act
GPS	Global Positioning System
HAB	Harmful Algal Bloom
HAPC	Habitat Areas of Particular Concern
HAZWOPER	Hazardous Waste Operations and Emergency Response
HI	Human Interaction
IACUC	Institutional Animal Care and Use Committee

ICS	Incident Command System
IM	Intramuscular
IV	Intravenous
IWC	International Whaling Commission
LHX	Life History Transmitter
LIMPET	Low Impact Minimally Percutaneous Electronic Transmitter
MBTA	Migratory Bird Treaty Act
MHI	Main Hawaiian Islands
MMC	Marine Mammal Commission
MMHSRP	Marine Mammal Health and Stranding Response Program
MMPA	Marine Mammal Protection Act
MPA	Marine Protected Area
MPRSA	Marine Protection Research and Sanctuaries Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NAO	NOAA Administrative Order
NCCA	National Coastal Conditions Assessment
NCI	Non-Compliance Issue
NEPA	National Environmental Policy Act
NERR	National Estuarine Research Reserve

NGO	Non-Governmental Organization
NHPA	National Historic Preservation Act
NIST	National Institute of Standards and Technology
NM	National Monument
NMFS	National Marine Fisheries Service
NMMTB	National Marine Mammal Tissue Bank
NMSA	National Marine Sanctuaries Act
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOS	National Ocean Service
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRDA	Natural Resource Damage Assessment
NRHP	National Register of Historic Places
NWHI	Northwestern Hawaiian Islands
NWR	National Wildlife Refuge
OHC	Office of Habitat Conservation
OPR	Office of Protected Resources
OSHA	Occupational Safety Health Administration

PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCR	Polymerase Chain Reaction
PEA	Programmatic Environmental Assessment
PEIS	Programmatic Environmental Impact Statement
PI	Principal Investigator
PIT	Passive Integrated Transponder
POP	Persistent Organic Pollutant
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
RFID	Radio Frequency Identification
RSC	Regional Stranding Coordinator
SA	Stranding Agreement
SAV	Submerged Aquatic Vegetation
SDS	Safety Data Sheets

SEA	Supplemental Environmental Assessment
SHPO	State Historic Preservation Officer
SREP	Scientific Research and Enhancement Permit
TCP	Traditional Cultural Property
TDR	Time Depth Recorder
THPO	Tribal Historic Preservation Officer
UAS	Unmanned Aerial System
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
VHF	Very High Frequency
WGMMUME	Working Group on Marine Mammal Unusual Mortality Events

Executive Summary

ES-1 INTRODUCTION

As set forth in the Marine Mammal Protection Act of 1972, as amended, (16 U.S.C. 1361 et seq.; MMPA), the Department of Commerce's (DOC) National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) is responsible for implementing the Marine Mammal Health and Stranding Response Program (MMHSRP). Under this program, NMFS coordinates responses to sick, injured, distressed, imperiled, or dead marine mammals under NMFS jurisdiction (all cetaceans (whales, dolphins, and porpoises) and most pinnipeds (seals and sea lions))[1], investigates health and health trends of wild marine mammal populations, and implements policies and procedures to carry out statutory obligations under Title IV of the MMPA in an effective and efficient manner. As outlined in statute, the goals of the MMHSRP are to: (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. The information obtained by the MMHSRP is of great benefit to numerous programs inside and outside of the agency that require data on the health and health trends of marine mammals for research and management purposes. For example, data from the MMHSRP inform marine mammal conservation and recovery plans, Stock Assessment Reports, Take Reduction Plans, Biological Opinions, analyses of permit applications, Natural Resource Damage Assessment, enforcement and litigation actions, etc.

Activities conducted, authorized, or funded by NMFS in support of the implementation of the MMHSRP and the Office of Protected Resource's Permits and Conservation Division are considered a major federal action subject to the requirements of the National Environmental Policy Act (42 U.S.C. § 4321, et seq.; NEPA), the Council on Environmental Quality Regulations (CEQ) (40 Code of Federal Regulations (CFR) Parts 1500 -1508[2]) and NOAA policy and procedures. This executive summary provides an overview of the MMHSRP's final Programmatic Environmental Impact Statement (PEIS). The final PEIS presents:

[1] Under the MMPA, DOC/NOAA/NMFS has jurisdiction for most species of marine mammals including all cetaceans (whales, dolphins, and porpoises) and most pinnipeds (seals and sea lions). The Department of the Interior's U.S. Fish and Wildlife Service has jurisdiction for four species: manatees, sea otters, walrus, and polar bears.

[2] All the citations in this document reference the 1978 NEPA regulations.

- The purpose and need for the proposed primary and secondary (connected) federal action;
- A reasonable range of alternatives that fulfill the purpose and need for the proposed federal actions;
- An evaluation of the potential impacts of six program activities on the human environment; and
- Mitigation measures, including best practices documents and updated standards, designed to avoid, minimize, or eliminate adverse impacts on the affected resources from the proposed federal actions.

This PEIS is being prepared using the 1978 CEQ NEPA Regulations. NEPA reviews initiated prior to the effective date of the 2020 CEQ regulations may be conducted using the 1978 version of the regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020. This review began on April 2, 2018 (83 FR 13955) and the agency has decided to proceed under the 1978 regulations.

ES-2 PROPOSED ACTIONS

This final PEIS presents two proposed actions (one primary action and one secondary "connected" action (as defined in 40 CFR 1508.25(a)(1)). The action area includes all areas where MMHSRP activities may occur, which encompasses the shorelines and coastal waters, estuarine and adjacent inland waters, and the Exclusive Economic Zone (EEZ) of the United States, its territories, and possessions, and adjacent marine waters, as well as inland areas where marine mammals may be out of habitat (*e.g.*, up rivers), and terrestrial sites where marine mammal rehabilitation is conducted.

Primary Action: NMFS would continue the implementation of the MMHSRP. The NMFS Office of Protected Resources' (OPR's) Marine Mammal and Sea Turtle Conservation Division provides national oversight and coordination of MMHSRP efforts as mandated by Title IV of the MMPA, and is responsible for developing and implementing policies that streamline and enhance stranding response, carcass disposal, rehabilitation and release of marine mammals, entanglement response, and biomonitoring activities (including both enhancement and research, hereafter, referred to as "biomonitoring and research" or "research"), as well as the administration of the John H. Prescott Marine Mammal Rescue Assistance Grant Program (Prescott Grant Program). NMFS Regions will implement these policies and ensure national consistency, including the implementation of Stranding Agreements (SAs) and authorizing the use of parts from stranded marine mammals within their geographic area.

Secondary ("Connected") Action: OPR's Permits and Conservation Division's consideration whether to issue a new scientific research and enhancement permit (MMPA/ESA permit) to the MMHSRP pursuant to Section 104 of the MMPA and 50 CFR 216; Section 10(a)(1)(A) of the Endangered Species Act (ESA) and 50 CFR 222; and Section 104 of the Fur Seal Act (FSA). The permit, if issued, will exempt the MMHSRP from the take prohibitions under the MMPA, ESA, and FSA for harassment, capture, collection, harm, wounding, pursuit, and mortality of marine mammals, including threatened or endangered species, at the levels authorized in the permit. The Permits and Conservation Division's action is a direct outcome of the MMHSRP's request for a permit for direct take of marine mammals during the conduct of: (1) response (including carcass disposal), rehabilitation, and release of marine mammal species, including those listed as threatened or endangered under the ESA, (2) marine mammal entanglement response, (3) marine mammal biomonitoring and research activities, and (4) unintentional (incidental) harassment of non-target marine mammal and other ESA-listed species while conducting these activities.

ES-3 PURPOSE AND NEED

Primary Action: NMFS' responsibilities under Title IV of the MMPA (see above) and its mission to recover, protect, and conserve marine mammals under NMFS jurisdiction, including threatened and endangered species, establish and frame the purpose and need. The purpose for continuing to implement the MMHSRP is for the Marine Mammal and Sea Turtle Conservation Division to continue collecting, investigating, and disseminating data on marine mammal health; investigating marine mammal unusual mortality events (UMEs); administering the Prescott Grant Program; developing and implementing policies that streamline and enhance stranding response, carcass disposal, rehabilitation and release of marine mammals, entanglement response, and biomonitoring and research activities; implementing SAs; authorizing the use of parts from stranded marine mammal; and carrying out the mandates of Title IV of the MMPA. The need for the Marine Mammal and Sea Turtle Conservation Division's action is to ensure that the goals of Title IV of the MMPA are met through effective coordination of response to marine mammals in distress or imperiled, including those that are stranded, entangled, ill, injured, oiled, and out-of-habitat; to administer the Prescott Grant Program; and to answer research and management questions about marine mammal health (including authorizing the use of parts from stranded marine mammals) to inform the Agency's management decisions.

Secondary Action: The purpose of the Permits and Conservation Division's action—which is a direct outcome of the MMHSRP's request for take of marine mammals in connection with emergency response to ESA-listed species (including carcass disposal), entanglement response of ESA-listed and non-listed species, and biomonitoring and scientific research activities—is to evaluate the MMHSRP permit application pursuant to Section 104 of the MMPA and 50 CFR 216; Section 10(a)(1)(A) of the ESA and 50 CFR 222; and Section 104 of the FSA, as applicable, and issue a permit, if appropriate. The need for the Permits and Conservation Division's action is to meet its obligation to grant or deny the permit request under the MMPA, ESA, and FSA. NMFS evaluates scientific research and enhancement permit applications to determine if statutory and regulatory criteria are met, including that the proposed research activities will be conducted for bona fide scientific research purposes and that the research activities and methods are "humane." NMFS also evaluates the best available scientific information to determine whether the mitigation proposed by the applicant will minimize the impacts of the proposed import and research, and whether any additional mitigation measures are required to ensure that the proposed activity will not result in unnecessary risks to the health or welfare of the subject animals. NMFS must also assess, among other things, whether the applicant has demonstrated that the proposed activity, by itself or in combination with other activities, will not likely have a significant adverse impact on the species or stock, will contribute to the recovery of depleted, threatened or endangered species, and will not result in a disadvantage to endangered species. In addition, the permit would set forth the permissible methods of taking, as well as requirements for monitoring and reporting, as well as any other terms and conditions that NMFS deems appropriate.

ES-4 PUBLIC INVOLVEMENT

The NEPA process is intended to enable NMFS to make decisions based on an understanding of the environmental consequences to the proposed actions. Public involvement is an essential part of this process under NEPA. Early public involvement facilitates the development of a NEPA document, in this case, a final PEIS, and informs the scope of issues to be addressed in the analysis.

A Notice of Intent (NOI) was published in the *Federal Register* (FR) on April 2, 2018 (83 FR 13955), which announced NMFS' decision to prepare a new draft PEIS and conduct public scoping meetings. The notice provided the public with all information relevant to the public review process as required by NEPA — including background, a summary of the proposed actions, relevant dates related to the public review period and scoping meetings, and how to submit comments or contact NMFS. The scoping meetings, in the form of three webinars held online and one in-person meeting held in Silver Spring, Maryland, were completed in May 2018. Comments received during the scoping process were considered and incorporated (as appropriate) in the development of this draft PEIS.

A Notice of Availability (NOA) was published in the FR on May 14th, 2021 (86 FR 26514), which announced the availability of the draft PEIS and a 45-day public comment period. Another NOA was published on June 25, 2021, to extend the public comment period for a further 30 days (ending on July 28, 2021) for a total public comment period of 75 days. Additionally, copies of the draft PEIS were submitted to all State Historic Preservation Offices and Tribal Historic Preservation Offices as well as the Environmental Protection Agency, the Marine Mammal Commission, the Office of National Marine Sanctuaries, the National Park Service, and the U.S. Fish and Wildlife Service. In total, 382 comments were submitted by agencies, organizations, and members of the public. Some of these comments were similar and have been combined as NMFS prepared the final PEIS. The majority of the comments were focused on the best practices in the appendices. Comments received during the public comment period were considered and incorporated (as appropriate) in the development of this final PEIS.

ES-5 ALTERNATIVES

Criteria were developed to determine whether an alternative was realistic or reasonable and therefore analyzed in the document. Alternatives were eliminated from further analysis if they violated at least one of five criteria:

1. Consistency with law; if an alternative presented a situation that would prevent the MMHSRP from meeting its mandate under Title IV of the MMPA.
2. Human Health and Safety; if an alternative presented a situation that put human health and safety at unnecessary risk.
3. Animal Welfare; if an alternative presented a situation that was unnecessarily detrimental to the welfare of a marine mammal.
4. Operational Needs; if an alternative presented a situation that was not feasible in a geographic region.
5. Permit Requirements, Laws, and Regulations; if an alternative presented a situation that violated permitted actions, laws, or regulations under the MMPA or ESA, including permit issuance criteria (50 CFR 216 and 50 CFR 222).

Two action alternatives (improved and enhanced implementation of the MMHSRP) and a no action alternative (continue implementation at current level) were developed and carried forward to be analyzed in this final PEIS.

Alternative 1 – Continue Program Implementation at Current Activity Levels and Denial of a New Scientific Research and Enhancement Permit (No Action Alternative).

Under Alternative 1, NMFS OPR Marine Mammal and Sea Turtle Conservation Division and Regional Offices would continue to implement the MMHSRP in the same manner as they do currently. Activities currently permitted that would continue under Alternative 1 are described in Table ES-1 below.

Table ES-1. Description of activities under Alternative 1.

Activity	Description
Stranding Response	Continue to use current SA criteria and issue SAs on a case-by-case basis to those entities requesting authorization that were determined to meet the SA criteria (including renewal and new applications). SA template would not be modified to include any new activities. Continue to award grants under the John H. Prescott Marine Mammal Rescue Assistance Grant Program. Continue to issue letters to researchers and educators for use of marine mammal parts sourced from stranded animals. Response to ESA-listed species would only continue until the current MMPA/ESA permit expires (no new permit issued).
Carcass Disposal Activities	Continue to recommend removal and disposal of all chemically-euthanized carcasses off-site. Animals that die naturally or are euthanized by other means may be disposed of by whatever means feasible and allowed. Disposal of ESA-listed species would only continue until the current MMPA/ESA permit expires (no new permit issued).
Rehabilitation Activities	Continue the rehabilitation activities of the Stranding Network with the current facility standards in place. New rehabilitation facilities could be added to the Stranding Network. Rehabilitation of ESA-listed species would only continue until the current MMPA/ESA permit expires (no new permit issued).
Release of Rehabilitated Animals	The Stranding Network would continue to need prior approval for all animal releases, unless a regional waiver already exists. Minor adaptive changes to release activities could be made, as needed. Release of ESA-listed species would only continue until the current MMPA/ESA permit expires (no new permit issued).
Entanglement Response	Continue the current activities of the Large Whale Entanglement Response Program, until the expiration of the MMPA/ESA permit. No formalized process to add new entanglement responders to the Entanglement Response Networks.

	Current SAs would continue to allow responses to a small number of entangled pinnipeds and small cetaceans. Entanglement response by government employees could continue under Section 109(h) of the MMPA and 50 CFR 17.21. Entanglement response by non-governmental employees would only be possible under the auspices of a SA (which would only cover a limited number of cases for non-listed species), and no ESA-listed species entanglement responses authorized by the MMPA/ESA permit could occur after the current MMPA/ESA permit expires (no new permit issued).
Biomonitoring and Research	Biomonitoring including research and enhancement activities conducted under the current MMPA/ESA permit will continue, without modification, until the current permit expires and then will cease (no new permit issued).

For the OPR Permits and Conservation Division, denial of a MMPA/ESA permit constitutes the No Action Alternative (Alternative 1). This would be consistent with NMFS statutory obligation under the MMPA and ESA to either: (1) deny the requested permit, or (2) grant the requested permit and prescribe mitigation, monitoring, and reporting requirements. Thus, under the No Action Alternative, OPR Permits and Conservation Division would not issue a new MMPA/ESA permit pursuant to MMPA Section 104 and its implementing regulations (50 CFR 216) and ESA Section 10(a)(1)(A) and its implementing regulations (50 CFR 222) to the MMHSRP, and all the biomonitoring and research activities would cease after the existing permit expires on December 31, 2022. This includes ceasing prospective health assessments and research projects relating to marine mammal health, National Marine Mammal Tissue Bank (NMMTB), and other services through partner institutions.

Alternative 2 – Improved Program Implementation and Issuance of a New Scientific Research and Enhancement Permit (Preferred Alternative).

Under Alternative 2, NMFS OPR Marine Mammal and Sea Turtle Conservation Division and Regional Offices would continue to implement the MMHSRP, and NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit. This would allow the MMHSRP to continue currently permitted activities (*i.e.*, response (including carcass disposal) to ESA-listed species, entanglement response, and biomonitoring and scientific research activities). Alternative 2 would also allow the MMHSRP to implement some operational improvements to a subset of programs and activities, and these are described in Table ES-2 below.

Table ES-2. Description of activities under Alternative 2.

Activity	Description
Stranding Response	Additional SA articles (*e.g.*, short-term holding facilities, temporary response participants). Modification of current SA articles (*e.g.*, oil spill response). New SA criteria corresponding to new SA articles. Updated SA criteria for pre-existing articles. Issuance of best practices documents (*e.g.*, euthanasia, small cetacean intervention, large whale emergency response, cetacean mass stranding). Response to ESA-listed species would continue under the new permit.
Carcass Disposal Activities	Issuance of carcass disposal best practices. Allow for modification of carcass disposal activities. Recommend that marine mammals euthanized using drugs shown to cause secondary poisoning of scavengers be disposed of off-site. Disposal of ESA-listed species would continue under the new permit.
Rehabilitation Activities	Update Standards for Rehabilitation Facilities and include new sections on ESA-listed species, short-term holding, and emergency temporary holding facilities. New rehabilitation best practices documents such as marine mammal transport and rehabilitation of dwarf (*Kogia sima*) and pygmy sperm whales (*Kogia breviceps*) would also be issued. Rehabilitation of ESA-listed species would continue under the new permit.
Release of Rehabilitated Animals	Update Standards for Release for rehabilitated animals, and issuance of a national release plan template. The Stranding Network would continue to need prior approval for all animal releases, unless a regional waiver already exists. Release of ESA-listed species would continue under the new permit.
Entanglement Response	Entanglement response best practice documents for large whales, small cetaceans, and pinnipeds, would be issued nationwide. All entanglement response (including responses to ESA-listed species) would continue under the new permit.
Biomonitoring and Research	The new permit would authorize current and new biomonitoring, research, and tool development activities.

Alternative 3 – More Stringent Protocols and Best Practices and Issuance of a New Scientific Research and Enhancement Permit.

Under Alternative 3, NMFS OPR Marine Mammal and Sea Turtle Conservation Division and Regional Offices would continue to implement the MMHSRP as described in Alternative 2 and allow the MMHSRP to require more stringent protocols and best practices (Table ES-3). Under Alternative 3, NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit.

Table ES-3. Description of activities under Alternative 3.

Activity	Description
Stranding Response	Response to threatened and endangered species is required as part of the terms and conditions of the SA (response to non ESA-listed species is highly encouraged).
Carcass Disposal Activities	All chemically-euthanized animals are required to be transported off-site. Incineration, or other methods of disposal that eliminate the risk of secondary poisoning, is required for all animals euthanized with barbiturate drugs.
Rehabilitation Activities	Update Standards for Rehabilitation Facilities and include new sections on ESA-listed species, short-term holding, and emergency temporary holding facilities. New rehabilitation best practices documents such as marine mammal transport and rehabilitation of dwarf and pygmy sperm whales would also be issued. Rehabilitation of ESA-listed species would continue under the new permit.
Release of Rehabilitated Animals	The Stranding Network would continue to need prior approval for all animal releases, unless a regional waiver already exists, but release of threatened and endangered species would be required. All ESA-listed animals are required to be released with VHF or satellite-linked tags. All non-listed animals released after rehabilitation or relocation would need to be tagged with a Passive Integrated Transponder (PIT) tag.
Entanglement Response	Entanglement response activities for pinnipeds or small cetaceans could not be conducted unless responders meet formalized training prerequisites.
Biomonitoring and Research	Health assessment projects would only be conducted on ESA-listed species.

<u>Alternatives Not Carried Forward for Analysis</u>

Two additional alternatives were considered for analysis but did not meet the purpose and need of the proposed federal actions. These additional alternatives were deemed not realistic or reasonable, and were therefore not carried forward for further analysis:

- Additional Alternative 1: Completely ceasing the MMHSRP
- Additional Alternative 2: Restricting specific activities of the MMHSRP including some, but not all, of the following possibilities:
    - SA holder response curtailed immediately
    - Carcass disposal activities are restricted
        - All carcasses are buried on site

        - All animals are transported off-site for burial
        - No animals are chemically euthanized
    - Rehabilitation activities curtailed immediately for SA holders
    - All animals are released after rehabilitation
    - Entanglement response activities are curtailed immediately
    - Biomonitoring and research activities are restricted
        - Health assessment captures would not occur
        - Piggybacking sample collection would be required from all NMFS permitted researchers.

ES-6 SUMMARY OF ENVIRONMENTAL IMPACTS

The resource areas that are potentially subject to direct, indirect, and cumulative impacts (beneficial and adverse) from the proposed federal actions, and were analyzed for each alternative include:

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

Given the size of the action area, local projects were not analyzed in this final PEIS; instead overarching threats to each resource area were analyzed. Table ES-4 summarizes the potential impacts associated with the six program activities under each proposed alternative. Mitigation measures have been developed to avoid, minimize, or eliminate the potential adverse effects on the affected resources areas from the proposed federal actions.

Table ES-4. Summary of Environmental Impacts

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
Biological Resources			
Stranding Response Activities	Minor, short-term adverse effects on all biological resources could occur during responses, particularly from vessel, vehicle, and equipment use. Minor, short- and long-term adverse effects on individual marine mammals could be expected during the course of stranding response, rehabilitation, and release if individuals are injured or killed. However, major long-term beneficial effects on individual marine mammals also could be expected, as many marine mammals would be helped. These direct effects may indirectly have beneficial impacts on marine mammal populations. Stranding response by SA holders would end for ESA-listed species; however, under ESA regulations (50 CFR 17.21(c)(3) and 17.31(a)), employees of the USFWS, NMFS, and any other federal land agency, or state conservation agency, may also continue to respond to ESA-listed species.	Same as Alternative 1, except that the addition of new SA articles to the SA template, the implementation of updated SA criteria corresponding to the new SA articles, and the issuance of new best practices documents would have a direct minor beneficial impact on marine mammal health, welfare, and safety. Effects on protected and sensitive habitats and other biological resources would be the same as Alternative 1.	Minor to major short- and long-term impacts are expected to occur. The requirement to respond to all ESA-listed marine mammals could have major beneficial impacts at both the individual and population levels. Minor to major adverse impacts may also be felt by individual target animals if responders feel compelled to respond in more risky, sub-optimal circumstances. However, minor adverse impacts are expected for non-listed species at the individual and population level, as they won't be priority species for assistance. This could have an indirect minor adverse impact on ESA-listed animals. Minor to major adverse impacts to protected and sensitive habitats and other biological resources could be expected.
Carcass Disposal Activities	Minor to major, short- and long-term beneficial effects are expected when *remain in the environment* methods are used. Some temporary adverse effects could occur if carcasses contain toxic metals, pathogens, biotoxins, chemical residues, etc. Negligible, indirect, short-term adverse effects on scavengers could be expected from the removal of carcasses from beaches. On-site carcass burial	Same as Alternative 1, except that the issuance of best practices documents for carcass disposal could have a minor positive effect on protected and sensitive habitats, SAV and macroalgae, and other biological resources by helping to mitigate adverse impacts on these resources.	Same as Alternative 2, except that removing all chemically euthanized carcasses from the environment would have a minor indirect positive effect on protected and sensitive habitats, SAV and macroalgae, and other biological resources. Conversely, direct, minor short-term negative effects could occur as Alternative 3 would increase the frequency of heavy equipment use and

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
	and/or removal could have minor or major direct and indirect impacts on other biological resources.		cost, therefore increasing the impacts from heavy equipment.
Rehabilitation Activities	Minor to major, long-term beneficial effects on marine mammals are expected for those marine mammals that are successfully rehabilitated. Temporary adverse impacts on individual marine mammals may be expected during the course of treatment. No effects on other biological resources would be expected. After expiration of the MMPA/ESA permit, minor to major long-term negative impacts would occur to listed species as rehabilitation of ESA-listed species would cease.	Same as Alternative 1, except that implementation of updated Standards for Rehabilitation Facilities and issuance of best practices would have minor beneficial impacts on marine mammal health. No effects on other biological resources would be expected.	Same as Alternative 2.
Release of Rehabilitated Animals	Minor, short-and long-term beneficial impacts could occur. Animals released back to the wild could contribute to population growth, genetic diversity, and have a positive impact on ecosystem health. Temporary adverse effects on marine mammals could result from tagging and marking methods. Minor, indirect, temporary and short-term adverse effects on protected and sensitive habitats and other biological resources could also occur during the release.	Same as Alternative 1, except that the implementation of updated Standards for Release would have a minor beneficial impact on marine mammals, as it would improve marine mammal health, welfare, and safety. Effects on protected and sensitive habitats and other biological resources would be the same as Alternative 1.	The requirement to release all ESA-listed animals would have adverse animal welfare implications at both the individual and population level. Animals would be released that would most likely die due to existing illness or injuries. Conversely, a few animals that are assessed as being non-releasable may, against expectations, survive and may contribute to the growth and genetic diversity of a population, which would be a minor to major beneficial impact. Release of ESA-listed ice seals that were rehabilitated beyond the geographical areas where they were stranded in the Arctic could have an indirect adverse impact on wild populations if they are carriers of pathogens not normally encountered by wild populations. The requirement to tag released marine mammals could cause

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
			temporary pain, but would provide greater surveillance. Effects on protected and sensitive habitats and other biological resources would be the same as Alternative 2.
Entanglement Response	Major, long-term, beneficial effects on marine mammals would be expected. Removal of life-threatening gear would increase individual survival and could have a positive impact on populations (especially ESA-listed species). Minor, adverse effects on marine mammals could occur from close approaches, tagging, in-water capture techniques, restraint, unintentional injuries, and stress. Short-term adverse effects would be outweighed by potential short- and long-term direct and indirect beneficial outcomes. Non-target animals may be captured or harassed during capture activities. Minor, short-term, indirect, adverse effects on protected and sensitive habitats and other biological resources could occur. After expiration of the MMPA/ESA permit, minor to major long-term negative impacts would occur to listed species as entanglement response to ESA-listed species would be severely curtailed.	Same as Alternative 1, except that the issuance of best practices documents would help ensure that experienced and qualified individuals are aware of the most effective tools and techniques available. This would likely increase the success of entanglement response efforts, and have a minor positive impact on animal safety (for both the entangled animal as well as nearby non-target animals of all species).	While training programs and prerequisites are developed, pinniped and small cetacean entanglement response would effectively cease. This would decrease potential beneficial impacts as described under Alternative 1. Once training programs and prerequisites are established for small cetacean and pinniped entanglement response, the impacts would be the same as Alternative 2. Large whale entanglement response activities would have the same effects as Alternative 2.
Biomonitoring and Research	Long-term, major beneficial effects on marine mammal populations could occur, as biomonitoring and research may improve our understanding of marine mammal health. Minor to major short-term and long-term adverse effects on individual marine mammals could occur during biomonitoring and research	Same as Alternative 1, except that the issuance of a new MMPA/ESA permit would lead to the continuation of biomonitoring and research activities. The effects from continuing these activities would be the same as those described for Alternative 1.	Similar to Alternative 2, except that biomonitoring and research activities would be focused exclusively on ESA-listed species. Therefore, long-term major beneficial impacts on ESA-listed populations are expected. Indirect adverse impacts on ESA-listed species would arise from fewer opportunities to test new tools

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
	activities, if animals are accidentally injured or killed while conducting activities. Minor, short-term indirect adverse effects on all biological resources could also occur from vessel, vehicle, and equipment use. After the MMPA/ESA permit expires, and biomonitoring and research activities cease, no effects on protected and sensitive habitats and other biological resources would be expected.		and techniques. Long-term adverse impacts on non-listed species would occur as biomonitoring and research activities would cease for these species.
Water and Sediment Quality			
Stranding Response Activities	Minor, indirect short-term adverse effects could occur. Response activities would not intentionally generate pollutants or disturb sediment, however, accidental spills could occur resulting in indirect impacts. Heavy equipment in addition to human traffic could increase erosion or compact the sediment. The level of impact (temporary or short-term) would vary by site, and would depend on sediment, type of equipment used, and duration of equipment use.	Same as Alternative 1, except that the issuance of euthanasia best practices could help mitigate some adverse impacts, and reduce the minor, indirect short-term adverse impacts on water and sediment quality.	Same as Alternative 2.
Carcass Disposal Activities	Potential effects depend on the method of carcass disposal and if the animal was administered medications or drugs before it died, including euthanasia drugs. Impact on water quality would likely be localized, temporary, and minor. Burial of carcasses could increase erosion, but this would be a negligible adverse impact. Disposal of carcasses at sea may have indirect, minor adverse impacts on water and sediment quality, but conversely could have long-	Same as Alternative 1, except that the MMHSRP would recommend that marine mammal carcasses euthanized with drugs known to cause secondary poisoning be removed. This would prevent longer-term adverse impacts to water and sediment quality as it would remove the risk of contamination from some chemicals known to persist for a long time in the aquatic environment. Additionally, the issuance of best practices would further	Same as Alternative 2, except that the requirement to transport all euthanized animals off-site would remove the risk of contamination from both euthanasia chemicals and contaminants in the carcass. This would prevent longer-term adverse impacts to water and sediment quality.

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
	term beneficial minor impacts as carcasses could become an important food source for other organisms. Carcasses removed from the environment would not have any impacts on water and sediment quality, but removal involving heavy equipment may have indirect temporary and short-term adverse impacts.	reduce adverse impacts to nearshore waters from land-based disposal methods.	
Rehabilitation Activities	Minor adverse effects could occur, however, some impacts would already be accounted for under respective federal, state, and/or local regulations.	Same as Alternative 1, except that adding new articles to the SA template might result in additional facilities. The effects of these additional facilities are not expected to be different than the minor adverse effects described for Alternative 1.	Same as Alternative 2.
Release of Rehabilitated Animals	Minor, indirect short-term adverse effects could occur. Response activities would not intentionally generate pollutants or disturb sediment, however, accidental spills could occur resulting in indirect impacts. Heavy equipment in addition to human traffic could increase erosion or compact the sediment. The level of impact (temporary or short-term) would vary by site, and would depend on sediment, type of equipment used, and duration of equipment use.	Same as Alternative 1.	Same as those described for Alternative 2, and impacts may slightly increase due to more release events.
Entanglement Response	Indirect, minor, temporary or short-term adverse effects could occur. Response activities would not intentionally generate pollutants or disturb sediment, however, accidental spills could occur. These are likely to cause short-term adverse impacts and would be localized. Further, indirect, minor short-term adverse effects could	Same as Alternative 1, except that issuance of a new permit would authorize response activities to continue at current or increased levels, which could increase the likelihood of indirect, minor adverse effects.	While training programs and prerequisites are developed, pinniped and small cetacean entanglement response would effectively cease. This would decrease potential impacts as described under Alternative 1. Once training programs and prerequisites for small cetacean and pinniped entanglement response are

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
	occur during remote delivery of sedatives or antibiotics if the dart misses the animal and is lost.		established, the impacts would be the same as Alternative 2. Large whale entanglement response activities would have the same effects as Alternative 2.
Biomonitoring and Research	Indirect, minor, short-term, adverse effects could occur. Biomonitoring and research activities would not intentionally generate any pollutants or disturb sediment, however, accidental spills could occur. After the current MMPA/ESA permit expires, no effects would be expected as activities would cease.	Same as Alternative 1, except that the issuance of a new MMPA/ESA permit would lead to the continuation of biomonitoring and research activities. Therefore, the indirect, minor, short-term adverse effects, described for Alternative 1, could also continue.	Same as Alternative 2.
Cultural Resources			
Stranding Response Activities	Minor to major, short-term and long-term adverse effects could occur. Vehicle and equipment could disturb resources buried on or beneath the beach. Minor to major, short-term and long-term adverse effects could also occur if Stranding Network responders do not coordinate with indigenous peoples to facilitate their involvement with some marine mammal strandings. However, minor to major long-term direct and minor long-term indirect beneficial effects would result from stranding response activities. Individual marine mammals would directly benefit and marine mammal populations would indirectly benefit, which in turn would be beneficial for indigenous peoples that place a cultural significance on marine mammals.	Same as Alternative 1, except that stranding response activities for ESA-listed species could continue with the issuance of a new MMPA/ESA permit. Therefore, the minor to major, short-term to long-term adverse effects, as well as the minor to major direct and minor indirect beneficial impacts described for Alternative 1, could also continue.	Same as Alternative 2, except that the requirement to respond to all ESA-listed species could negatively impact known cultural sites, depending on the stranding location and equipment used.

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
Carcass Disposal Activities	Minor to major, short-term and long-term adverse effects on cultural resources could be expected. Carcass transport and burial could damage cultural resources buried on or beneath the beach. Minor to major, short-term and long-term adverse effects could also occur if cultural uses (*e.g.*, ceremonies, medicines, burial practices, subsistence use) of marine mammals are not considered, or are not able to be incorporated in a manner consistent with MMPA and other applicable authorities.	Same as Alternative 1.	Same as Alternative 2.
Rehabilitation Activities	Potential minor, adverse effects could occur. Use of emergency temporary pools could damage cultural resources, depending on location.	Same as Alternative 1.	Same as Alternative 2.
Release of Rehabilitated Animals	Minor, short-term adverse effects could occur. Release vehicles and equipment could disturb resources buried on or beneath the beach. Release of animals could impact some cultural customs from being performed (*e.g.*, ceremonies at the release site). By not allowing the release of ice seals rehabilitated from the Arctic into Alaskan waters, the potential for introducing novel pathogens into the environment and potential contamination of marine resources used by Alaska Natives is reduced.	Same as Alternative 1.	Same as Alternative 2, except that the requirement to release all ESA-listed species could pose additional adverse impacts as it would allow for ice seals rehabilitated outside of their natural range to be released. This could have an adverse impact on coastal Alaska Natives if the rehabilitated ice seal is taken for subsistence purposes, as ice seals rehabilitated outside of their home ranges could be carriers of pathogens not normally encountered by local wild populations.
Entanglement Response	No impacts would occur during entanglement response activities for large whales and small cetaceans using remote disentanglement techniques. However, activities in shallow water such as net capture and physical restraint could	Same as Alternative 1, except that issuance of a new MMPA/ESA permit would authorize response activities to continue at current or increased levels. The impacts of response activities at increased levels are not expected to be	While training programs and prerequisites are developed, pinniped and small cetacean entanglement response would effectively cease. This would decrease potential impacts as described under Alternative 1. Once training programs and

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
	potentially disturb cultural resources, resulting in minor short-term adverse impacts. Short-term, minor, adverse impacts may occur if remote sedation is used for pinniped entanglement response, as some Alaska native communities may be temporarily unable to harvest and consume pinnipeds that had sedatives or antibiotic drugs administered.	different than the minor, short-term adverse impacts described for Alternative 1.	prerequisites for small cetacean and pinniped entanglement response are established, the impacts would be the same as Alternative 2. Large whale entanglement response activities would have the same effects as Alternative 2.
Biomonitoring and Research	Minor to major, short-term and long-term adverse effects could occur. Vehicle and equipment use could disturb resources buried on or beneath the beach. Research activities in the water could damage submerged resources, resulting in minor, temporary or short-term adverse impacts. Minor to major, short-term and long-term adverse effects could also occur if researchers do not coordinate with indigenous peoples when conducting research on some marine mammal species. After the current MMPA/ESA permit expires, no effects would be expected as activities would cease.	Same as Alternative 1, except that the issuance of a new MMPA/ESA permit would lead to the continuation of biomonitoring and research activities. The effects of continuing biomonitoring and research activities are not expected to be different than the minor to major, temporary, short-term, and long-term adverse effects described for Alternative 1.	Same as Alternative 2.
Human Health and Safety			
Stranding Response Activities	Minor to major short-term and long-term adverse effects could occur such as physical injuries and potential exposure to contaminants and infectious pathogens. After the current MMPA/ESA permit expires, stranding response by SA holders would end for ESA-listed species. This would have a beneficial effect as responders would no longer be conducting response activities as frequently.	Same as Alternative 1, except that the implementation of updated SA criteria for the new SA articles, and issuance of best practices documents would standardize stranding response protocols, and ensure that participants are experienced and qualified to conduct authorized activities. This would reduce the likelihood of the adverse impacts listed under Alternative 1.	Same as Alternative 2, except that the requirement to respond to all ESA-listed species could adversely impact responder health and safety as responders may feel compelled to act in potentially more risky situations, increasing the likelihood of the adverse impacts listed under Alternative 1. Potential minor beneficial effects on public health and safety could occur, as the general public may choose not to

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
	However, if response to ESA-listed animals stops, there would likely be an increase in human-marine mammal interactions by the general public, which may result in an increase in indirect, minor, short-term adverse impacts.		intervene if they know there are qualified, experienced, and authorized individuals to conduct stranding response activities. However, if fewer responders conduct activities on non ESA-listed animals (due to prioritization of ESA-listed animals), the public may choose to intervene in these cases, thereby increasing the likelihood of minor, indirect adverse impacts listed under Alternative 1.
Carcass Disposal Activities	Minor, short-term, adverse effects would be expected. Carcasses may contain drugs, contaminants, or infectious diseases that people may come in contact with through tissues or fluids if left to naturally decompose, and persons involved in disposal risk physical injuries from working with heavy equipment. After the MMPA/ESA permit expires, there would be a beneficial effect as personnel would no longer be conducting carcass disposal activities as frequently. However, if carcasses were not disposed of properly, major long-term adverse impacts could occur as there may be an increase in human-marine mammal carcass interactions by the general public.	Same as Alternative 1, except that carcasses may be buried or moved according to the best practices, and no additional impacts to human health and safety would be expected.	Same as Alternative 2, except that carcasses of chemically euthanized animals would be required to be transported off-site. This would remove the risk of contamination from both euthanasia chemicals and any contaminants in the carcass. This would have a positive effect on human health and safety, as there would be less chance for human contact between contaminants and euthanasia chemicals. However, requiring all chemically euthanized marine mammals be transported off-site would potentially increase the number of physical injuries from using heavy equipment, as removing carcasses from the beach would become more frequent.
Rehabilitation Activities	Minor, short-term adverse effects could occur such as animal-induced injuries, physical injuries, environmental injuries, infectious diseases (long-term effects from certain infectious diseases could occur, especially if not diagnosed or treated properly). However, current Standards for Rehabilitation Facilities would be followed under this alternative, which	Same as Alternative 1, except that the implementation of updated Standards for Rehabilitation Facilities and issuance of best practices would put additional measures in place to safeguard personnel, which would reduce the likelihood of the adverse impacts listed under Alternative 1.	Same as Alternative 2.

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
	would ensure that all facilities are implementing the most effective safety measures. This would have a minor long-term beneficial effect on health and safety.		
Release of Rehabilitated Animals	Minor, short-term, adverse effects could occur such as animal-induced injuries, physical injuries, and environmental injuries. By not allowing the release of ice seals from the Arctic into Alaskan waters, the potential for introducing novel pathogens into the environment and potential contamination of marine resources used by coastal Alaska Natives is reduced. However, it eliminates the potential contribution of those rehabilitated animals into the population for contributing to population growth and genetic diversity of the species used for subsistence, which will indirectly result in minor or major long-term adverse impacts.	Same as Alternative 1, except that updated Standards for Release and issuance of a release plan template would provide guidance for planning animal releases, which in turn would have an overall minor positive impact on human health and safety.	Same as Alternative 2, except that the requirement to release all ESA-listed species could pose additional adverse effects. Release of ESA-listed ice seals that were rehabilitated beyond the geographical areas in the Arctic where they were stranded could have a minor, indirect adverse impact on human health and safety for food security reasons, as marine mammals are harvested year round in coastal Alaska communities.
Entanglement Response	Minor to major short-term and long-term adverse effects could occur such as physical injuries, accidental contact with drugs used for chemical sedation, drowning, and death to responders. Similar minor or major adverse impacts on public health and safety could occur if members of the public attempt to disentangle an animal. However, the public may not intervene if they know that there are qualified, experienced, and authorized responders to conduct entanglement response activities.	Same as Alternative 1, except that best practices documents would be issued and would help ensure that experienced and qualified individuals have appropriate information to operate in a safe and effective manner. This would reduce the likelihood of the adverse impacts listed under Alternative 1.	While training programs and prerequisites are developed, pinniped and small cetacean entanglement response would effectively cease. This would decrease potential impacts as described under Alternative 1. Once training programs and prerequisites for small cetacean and pinniped entanglement response are established, the impacts would be the same as Alternative 2, except that there could be less risk to human health and safety. Large whale entanglement response activities would have the same effects as Alternative 2.

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
Biomonitoring and Research	Minor, short-term adverse effects could occur, including animal-induced injuries and physical injuries. Impacts would only affect researchers and not the general public. After the current MMPA/ESA permit expires, all biomonitoring and research activities would cease, and therefore there would be no impacts.	Same as Alternative 1, except that the issuance of a new MMPA/ESA permit would lead to the continuation of biomonitoring and research activities. The effects of continuing biomonitoring and research activities are not expected to be different than the minor, short-term adverse effects described for Alternative 1.	Same as Alternative 2.
Socioeconomics			
Stranding Response Activities	Minor, short-term, beneficial effects could occur as stranding response activities can generate cooperation between Stranding Network participants, provide valuable educational outreach opportunities, and promote data sharing across regions. Recovery of live animals and carcasses from high-use areas would have a negligible positive impact on tourism activities. After the MMPA/ESA permit expires, carcasses of ESA-listed animals would remain at stranding sites to naturally decompose. This could have negligible adverse impacts on tourism.	Same as Alternative 1, except that the issuance of new mass stranding and large whale guidelines recommend that a Stranding Network participant liaise with the public and handle media enquiries for those types of stranding events. This would have minor beneficial impacts as it would provide an educational outreach service, and would promote increased transparency and communication.	Costs associated with responding to all threatened and endangered species could put a financial strain on many Stranding Network partners, and represent a major long-term adverse impact on these organizations. ESA-listed animals may strand in locations that are logistically challenging to access. Response to live stranded large whales (many of which are ESA-listed) would require larger volumes and concentrations of sedatives and euthanasia solution (if needed); necropsy of large whales would require additional heavy machinery.
Carcass Disposal Activities	Negligible adverse impacts on tourism activities could occur. Carcasses may be left in areas of recreational and tourism activities. The odors and sight of a decomposing animal may result in visitors avoiding the area. However, short-term, negligible beneficial effects may occur if people visit the area to view the carcass. After the permit expires, minor to moderate effects are likely for existing Stranding Network members that	Minor to moderate beneficial effects are likely to occur for existing Stranding Network members that participate in other activities besides response and carcass disposal. Stranding Network members mostly already use euthanasia methods that would not require them to remove a carcass from the environment. As *remove from the environment* methods are generally more costly than *remain in the environment* methods, fewer carcasses that	Major long-term negative effects are likely to occur for existing Stranding Network members that participate in other activities besides response and carcass disposal. *Remove from the environment* methods are more costly, and the requirement to remove them would add a large financial burden to these organizations. Additionally, Stranding Network members may have to transport marine mammal carcasses a greater

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
	participate in activities besides carcass disposal. The elimination of carcass disposal activities for ESA-listed species would lower operating costs for these members.	need to be removed from the environment would lower operating costs for these members.	distance before disposing of carcasses in a manner consistent with the requirement. Some disposal facilities may not be able to handle larger carcasses, requiring even more transport.
Rehabilitation Activities	Minor to major, short- and long-term beneficial effects could occur, as rehabilitation centers often attract tourists to the local area.	Same as Alternative 1, except that the issuance of standard marine mammal transport best practices and protocols could increase regional efficiencies and lower costs, resulting in minor beneficial impacts. There could be some cost associated with upgrading equipment and procedures.	Same as Alternative 2.
Release of Rehabilitated Animals	Minor, short-term beneficial impacts could occur. Release events can provide an enriching educational service to the community, and can generate visitation and tourism to an area. However, minor, short-term adverse impacts could occur as an unexpected increased visitation could require additional resources.	Same as Alternative 1.	Same as Alternative 2, except that the requirement to release all ESA-listed animals with a VHF or satellite-linked tag (and all other animals with a PIT tag) would be expensive. This may result in minor long-term adverse impacts on these facilities. Further, release of inappropriate candidates could lead to animals stranding again in the future. This would put an additional strain on the Stranding Network in both time and resources, and may result in major or minor long-term indirect adverse impacts.
Entanglement Response	Minor to moderate, adverse effects may be borne by participants engaged in entanglement response activities. As new tools and techniques are developed, responders may be required to upgrade and/or purchase new equipment. No impact is expected for the public.	Same as Alternative 1, except that issuance of a new MMPA/ESA permit would authorize response activities to continue at current or increased levels. The effects of response activities at increased levels are not expected to be different than the minor to moderate, adverse effects described for Alternative 1.	Same as Alternative 2, except that there are no formal training programs and no training prerequisites identified for pinniped or small cetacean entanglement response. Once small cetacean and pinniped entanglement response training prerequisites are developed, there may be some adverse impacts on responders, if

Activity	Alternative 1: No Action	Alternative 2: Improved Implementation (Preferred Alternative)	Alternative 3: More Stringent Protocols
			they have to cover costs to receive training.
Biomonitoring and Research	No impacts are anticipated.	Same as Alternative 1, except that the issuance of a new MMPA/ESA permit would lead to the continuation of biomonitoring and research activities. No impacts are anticipated from continuing these activities.	Same as Alternative 2.

Cumulative Impacts

The cumulative impacts analysis considers past, present, and planned or reasonably foreseeable programs, projects, and activities that could affect each resource area, and may add to the incremental impacts of the proposed actions and alternatives in the action area. Reasonably foreseeable actions that were not analyzed along with the proposed alternatives include the issuance of public viewing guidelines for rehabilitation facilities, issuance of marine mammal parts transfer regulations, and future development of new, and adaptive management of existing, best practices documents.

The cumulative impacts of MMHSRP activities under all of the alternatives are anticipated to have beneficial impacts on marine mammals, as the MMHSRP's activities will ultimately benefit marine mammal populations, particularly ESA-listed species. While individual marine mammals and other biological resources may experience adverse impacts during some MMHSRP activities, the issuance of the MMHSRP's new and revised best practices documents and guidelines is expected to have a cumulative beneficial effect on individual marine mammals and non-marine mammal biological resources, as they can help to mitigate the adverse impacts on these biological resources. Similarly, the issuance of these documents is expected to have a beneficial cumulative impact on human health and safety, as they can help to mitigate risks to human health and safety, especially risks to marine mammal responders and researchers. Conversely, the continued rescue, rehabilitation, and release of some pinniped species may have a cumulatively adverse impact on human health and safety and socioeconomics, as an increase in conflicts between pinnipeds and humans may occur (*e.g.*, harassment of animals by members of the public, pinniped and commercial and recreational fisheries conflicts, etc.). No cumulative impacts to water and sediment quality and cultural resources are anticipated.

Unavoidable adverse impacts on individual marine mammals could occur during the MMHSRP's activities. During response and rehabilitation activities, animals may exhibit adverse reactions, sustain injuries, or die, despite the best efforts made by Stranding Network participants and the implementation of the proposed mitigation measures. However, all response activities are intended to help animals, and the long-term beneficial impacts are expected to outweigh the short-term adverse impacts. Unavoidable impacts on human health and safety could also occur from the MMHSRP's activities, even with the issuance of the proposed mitigation measures. Some risks are inherent when working with wild animals, as their behavior is unpredictable.

For all proposed alternatives, no resource commitments are irreversible or irretrievable. Many potential adverse impacts are temporary and/or short-term, while most long-term adverse impacts can be reduced through the proposed mitigation measures outlined in this final PEIS. Based on the analyses presented, the MMHSRP's stranding response, carcass disposal, rehabilitation, release, entanglement response, and biomonitoring and research activities would contribute to the long-term productivity of marine mammal populations.

ES-7 NEPA COMPLIANCE, IMPLEMENTATION, AND RECOMMENDATIONS

This final PEIS addresses current and reasonably foreseeable activities of the MMHSRP. All MMHSRP activities identified and analyzed in this final PEIS will be subject to NEPA compliance review on a regular basis to determine whether activities conducted are within the scope of activities analyzed in this final PEIS. Any activities not analyzed in the chosen alternative will be subject to a separate NEPA compliance review and preparation of supplemental NEPA analyses, as appropriate.

Comments received during the public comment period will be reviewed and considered when developing the final PEIS.

At least 30 days after the release of the final PEIS, NMFS will publish a notification in the *Federal Register* announcing the issuance of the ROD to the public. This decision document will conclude the NEPA process on the proposed actions.

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Chapter 1 Purpose and Need for the Proposed Actions

As set forth by the Marine Mammal Protection Act of 1972, as amended, (16 U.S.C. 1361 et seq.; MMPA), the Department of Commerce's (DOC) National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) is responsible for implementing the Marine Mammal Health and Stranding Response Program (MMHSRP). Under this program, NMFS coordinates emergency responses to sick, injured, distressed, imperiled, or dead marine mammals under NMFS jurisdiction[3] and implements policies and procedures to carry out statutory obligations under Title IV of the MMPA in an effective and efficient manner. NMFS Office of Protected Resources (OPR) Marine Mammal and Sea Turtle Conservation Division is the lead within NMFS to implement this program nationally, and coordinate related activities.

Activities conducted or funded by NMFS in support of the implementation of the MMHSRP are considered a major federal action subject to the requirements of the National Environmental Policy Act (42 U.S.C. § 4321, et seq.; NEPA), the Council on Environmental Quality Regulations (CEQ) (40 Code of Federal Regulations (CFR) Parts 1500 -1508)[4] and NOAA policy and procedures[5]. NMFS prepared and published a final PEIS[6] in 2009, which evaluated the potential environmental effects associated with the implementation of the MMHSRP. Since the initial PEIS was published in 2009, NMFS identified the need to change and improve certain implementation efforts of this program, including updates to policies and best practices for marine mammal stranding response and rehabilitation. In addition, certain activities conducted under this program require a research and enhancement permit under other Sections of the MMPA, the Endangered Species Act (ESA; 16 U.S.C. 1531 et seq.), and the Fur Seal Act (FSA; 16 U.S.C. 1151 et seq.), and the permit currently issued to the MMHSRP is expiring. NMFS issuance of a new permit

[3] Under the MMPA, NMFS has jurisdiction over all cetaceans and most pinnipeds (all seals and sea lions). The Department of the Interior's U.S. Fish and Wildlife Service has jurisdiction over walrus, polar bears, sea otters, and manatees.

[4] This Programmatic Environmental Impact Statement (PEIS) is being prepared using the 1978 CEQ NEPA Regulations. NEPA reviews initiated prior to the effective date of the 2020 CEQ regulations may be conducted using the 1978 version of the regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020. This review began on April 2, 2018 (83 FR 13955) and the agency has decided to proceed under the 1978 regulations.

[5] NOAA Administrative Order (NAO) 216-6A "*Compliance with the National Environmental Policy Act*, *Executive Orders 12114*, *Environmental Effects Abroad of Major Federal Actions; l1988 and 13690*, *Floodplain Management and 11990*, *Protection of Wetlands*" issued April 22, 2016 and the Companion Manual for NAO 216-6A "*Policy and Procedures for Implementing the National Environmental Policy Act and Related Authorities*" issued January 13, 2017.

[6] https://repository.library.noaa.gov/view/noaa/4939

is also considered a major federal action requiring compliance with NEPA. Specifically, the activities conducted by the MMHSRP that require a NMFS research and enhancement permit include:

1. Emergency response involving rescue, rehabilitation, release, including entanglement response, of ESA-listed threatened and endangered marine mammals under NMFS jurisdiction;
2. Conducting health-related, bona fide scientific research and biomonitoring studies on marine mammals and marine mammal parts under NMFS jurisdiction;
3. Method and tool development for emergency response and scientific research and biomonitoring;
4. Unintentionally harassing non-target marine mammal species under NMFS jurisdiction during MMHSRP activities; and
5. Collecting, salvaging, receiving, possessing, transferring, importing, exporting, analyzing, and curating marine mammal parts under NMFS jurisdiction.

See section 1.1.2 for additional details.

Therefore, NMFS has prepared this PEIS to provide a programmatic-level analysis of MMHSRP activities and environmental impacts associated with a primary action (continued implementation of the MMHSRP) and a secondary action (issuance of a Scientific Research and Enhancement Permit) and to address potential impacts of changes to the program not previously analyzed. In addition, NMFS intends to rely on this document to fund site-specific actions under the John H. Prescott Marine Mammal Rescue Assistance Grant Program (Prescott Grant Program), provided that the activity proposed is within the range of alternatives and scope of potential environmental consequences analyzed in this final PEIS. The Prescott Grant Program provides funds to eligible members of the Stranding Network (see section 1.2.5).

This Chapter presents the establishment and background of the MMPA and NMFS' statutory obligations and authorities (section 1.1), an overview of the MMHSRP (section 1.2), and identifies the proposed actions and purpose and need (section 1.3). This Chapter also provides the scope of the PEIS analysis (section 1.4) and NMFS' environmental review process and relevant statutes (section 1.5). The remainder of this final PEIS is organized in the following manner:

- **Chapter 2:** Description of the alternatives, including the no action and preferred alternatives and detailed explanations of the MMHSRP's activities.
- **Chapter 3:** Description of the affected environment, including the existing environmental conditions of resources in the action area.

- **Chapter 4:** Description of stranding response activities as well as an analysis of the environmental consequences of alternatives and mitigation as they pertain to stranding response.
- **Chapter 5:** Description of carcass disposal activities as well as an analysis of the environmental consequences of alternatives and mitigation as they pertain to carcass disposal.
- **Chapter 6:** Description of rehabilitation activities as well as an analysis of the environmental consequences of alternatives and mitigation as they pertain to rehabilitation activities.
- **Chapter 7:** Description of release of rehabilitated animals activities as well as an analysis of the environmental consequences of alternatives and mitigation as they pertain to release of rehabilitated animals.
- **Chapter 8:** Description of marine mammal entanglement response activities as well as an analysis of the environmental consequences of alternatives and mitigation as they pertain to marine mammal entanglement response.
- **Chapter 9:** Description of biomonitoring and research activities as well as an analysis of the environmental consequences of alternatives and mitigation as they pertain to biomonitoring and research.
- **Chapter 10:** Analysis of the cumulative environmental consequences of the alternatives and mitigation measures.
- **Chapters 11 and 12:** Provides a list of this document's preparers and references.
- **Chapter 13:** Provides an Index.
- **Appendices:** Appendix I – Appendix XXI.

1.1 Marine Mammal Protection Act and Related Authorities

When the MMPA was enacted in 1972, Congress made several findings concerning the protection and preservation of marine mammals. This includes, but is not limited to, indicating that "certain species and population stocks of marine mammals are or may be in danger of extinction or depletion as a result of man's activities" (16 U.S.C. 1361(1)) [and] "such species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part […]" (16 U.S.C. 1361(2)) [and that] "marine mammals…[are] resources of great international significance… [that] should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management and the primary objective of their management should be to maintain the health and stability of the marine ecosystem […]" (16 U.S.C. 1361(6)). These and other findings in Section 2 of the MMPA speak to the need to maintain a broad scope of marine mammal protection that considers species and ecosystem level impacts.

The MMPA was the first legislation to mandate an ecosystem-based approach to marine resource management and establish a national policy to protect wild marine mammal species and their habitat. Three federal entities share responsibility for implementing the MMPA:

1. NMFS, which is responsible for the protection and conservation of wild whales, dolphins, porpoises, seals, and sea lions, and their habitat.

2. The U.S. Fish and Wildlife Service (USFWS), which is responsible for the protection and conservation of wild walrus (*Odobenus rosmarus*), manatees (*Trichechus manatus)*, sea otters (*Enhydra lutris*), and polar bears (*Ursus maritimus)* and their habitat.

3. The Marine Mammal Commission (MMC), which provides independent, science-based oversight of domestic and international policies and actions of federal agencies addressing impacts on marine mammals and the marine environment.

The full text of the MMPA is available on the Internet at https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act. The following subsections discuss the relevant statutory mandates and authorities associated with the primary and secondary federal actions addressed in this final PEIS.

1.1.1 Establishment of the Marine Mammal Health and Stranding Response Program

Public concern about, and response to, marine mammals in distress or imperiled, particularly those that are on the beach or "stranded," has occurred in various forms for thousands of years (Geraci and Lounsbury 2005). Over the past several decades in the United States, private and non-profit organizations were established to help respond to stranded marine mammals. Many of the first organized efforts were conducted or coordinated by museums seeking 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, and were able to accommodate cetaceans, which typically require large pools. Prior to the 1970s, response was extremely localized, relatively inconsistent, and occurred with little federal involvement. Communication between different groups responding to stranding events was minimal, and accounts of single stranding events were not integrated into any sort of meaningful analysis or overall picture that reflected animal stranding patterns or distributions.

The MMC sponsored a workshop in 1977 which brought scientists together to discuss marine mammal stranding events. One recommendation from that workshop was to establish a framework for a National

Marine Mammal Stranding Network (hereafter “Stranding Network” or “Network”) with regional centers and a centralized data file, coordinated by NMFS. The Network was formally established and organized as independent volunteer organizations coordinated through each of the NMFS jurisdictional regions (described in section 1.4.3).

Throughout the 1980s, the Stranding Network grew across the United States. Information, mostly from stranded animals, began to accumulate on marine mammal deaths caused by human interactions, such as bycatch in fisheries. In the late 1980s, a number of mass mortality events occurred in the United States, gaining significant public attention. A mass die-off of humpback whales (*Megaptera novaeangliae*) in the Northeast United States was linked to saxitoxin, resulting from a harmful algal bloom (HAB). Hundreds of bottlenose dolphins (*Tursiops truncatus*) stranded dead in the Southeast United States due to *Morbillivirus* infection. The investigations of these events were impeded by a lack of baseline data on marine mammal health, and efforts to formalize the health and stranding program were initiated to fill the data gaps. High levels of anthropogenic contaminants, such as persistent organic pollutants, were sometimes found in the tissues of stranded animals, raising concerns about the overall health of marine mammal populations and the marine environment as a whole. Interest in marine mammal health and stranding 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 in 1992, as an amendment to the MMPA, which became Title IV of the MMPA and directs the Secretary of Commerce, in consultation with the Secretary of the Interior, the MMC, and others with developing a program with three primary 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.**

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.**

Additional information regarding Title IV and the background and establishment of the MMHSRP is available on the Internet at:

- https://www.fisheries.noaa.gov/national/marine-life-distress/marine-mammal-health-and-stranding-response-program

- https://www.fisheries.noaa.gov/resource/document/marine-mammal-health-and-stranding-response-program-program-development-plan

1.1.2 Authorizations and Permits

Under Section 109(h) of the MMPA, a federal, state, or local government official or employee or a person designated under Section 112(c)[7] may take[8], in the course of his or her duties as an official, employee, or designee, a marine mammal in a humane manner (including euthanasia) if such taking is for the protection or welfare of the mammal, the protection of the public health and welfare, or the nonlethal removal of nuisance animals.

NMFS' statutory responsibility to protect and conserve marine mammals and ESA-listed threatened and endangered species also includes the issuance of permits authorizing take[9] of marine mammals. As applicable, scientific research and enhancement permits are issued pursuant to: (1) Section 104 of the MMPA and the implementing regulations governing the taking and importing of marine mammals (50 CFR Part 216); (2) Section 10(a)(1)(A) of the ESA (16 U.S.C. 1531 et seq.) and the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR Parts 222); and (3) Section 104 of the FSA (16 U.S.C. 1151 et seq.). These sections of the laws and regulations provide exceptions to the moratorium and prohibition of take, import, and export of marine mammals and threatened and endangered species for bona fide[10] scientific research and enhancement. In addition,

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[7] See section 1.2.1 regarding Stranding Agreements pursuant to MMPA Section 112(c).

[8] Under the MMPA, "take" is defined as to "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." [16 U.S.C. 1362(18)(a)] by regulation (50 CFR §216.3), take is further defined as: to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal. This includes, without limitation, any of the following: the collection of dead animals, or parts thereof; the restraint or detention of a marine mammal, no matter how temporary; tagging a marine mammal; the negligent or intentional operation of an aircraft or vessel, or the doing of any other negligent or intentional act which results in disturbing or molesting a marine mammal; and feeding or attempting to feed a marine mammal in the wild. "Harass" is further defined by MMPA regulation (50 CFR §216.3) as "any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (level a harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing a disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but does not have the potential to injure a marine mammal or marine mammal stock in the wild (level b harassment)."

[9] In addition, the ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The term "harm" is further defined by regulations (50 CFR §222.102) as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including breeding, spawning, rearing, migrating, feeding, or sheltering." A take or taking under the FSA means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill. The FSA authorizes the taking, transportation, importation, exportation, or possession of northern fur seals or their parts for educational, scientific, or exhibition purposes.

[10] The MMPA [16 U.S.C. 1362(22)] defines bona fide research as "scientific research on marine mammals, the results of which – (A) likely would be accepted for publication in a refereed scientific journal; (B) are likely to contribute to the basic knowledge of marine mammal biology or ecology; or (C) are likely to identify, evaluate, or resolve conservation problems."

issuance of these permits is dependent on criteria to ensure all scientific research and enhancement is consistent with the purposes of these laws and regulations and will not have a significant adverse impact on the target species or stock.

Response, rescue, rehabilitation of non-listed marine mammals are conducted pursuant to MMPA Section 109(h) and 112(c). In addition, MMHSRP permitted activities include:

1. Conducting:
   a. Emergency response related enhancement and research activities involving response, rescue, rehabilitation and release of threatened and endangered marine mammals under NMFS jurisdiction, including research that may involve compromised animals from emergency response evets;
   b. Entanglement response of all listed and non-listed marine mammals under NMFS jurisdiction and;
   c. Method and tool development and testing for emergency response, entanglement response, and biomonitoring and research.
   d. These activities would be authorized pursuant to Sections 104(c), 109(h), 112(c), and Title IV of the MMPA; and Section 10(a)(1)(A) of the ESA.
2. Conducting:
   a. Health-related, bona fide scientific research studies on marine mammals and marine mammal parts under NMFS jurisdiction, including research that may involve compromised animals, and research on healthy animals that have not been subject to emergency response (*e.g.*, biomonitoring and research for baseline health studies); and
   b. Method and tool development and testing for biomonitoring and research.
   c. These activities would be authorized pursuant to Sections 104(c) and Title IV of the MMPA and Section 10(a)(1)(A) of the ESA.
3. Unintentionally harassing non-target marine mammal species under NMFS jurisdiction during MMHSRP activities.
4. Collecting, salvaging, receiving, possessing, transferring, importing, exporting, analyzing, and curating marine mammal parts under NMFS jurisdiction for purposes delineated in numbers (1) and (2).

1.2 Marine Mammal Health and Stranding Network Program Overview

The MMHSRP comprises program areas with multiple activities that are coordinated nationally and implemented regionally. The program areas are summarized in the following subsections and may conduct overlapping activities (*e.g.*, stranding response activities are conducted as part of the National Marine Mammal Stranding Response Network (Stranding Network) and under the UME program). Therefore, this final PEIS analyzes the MMHSRP through six broad activity categories. As these activity categories directly pertain to the selected alternatives, they are defined and discussed in Chapter 2. The environmental impacts and mitigation for these broad activity categories are analyzed in Chapters 4 - 10.

1.2.1 National Marine Mammal Stranding Response Network

The Stranding Network consists of more than 100 organizations nationwide that respond to stranded[11], ill, injured, distressed, imperiled, and entangled (including gear ingestion) cetaceans and pinnipeds (except walrus) within U.S. waters. As discussed in section 1.1.2, Network members are authorized by the MMHSRP to respond to non ESA-listed marine mammals under the MMPA, utilizing the authority of either Section 112(c) or Section 109(h). Organizations operating under Section 112(c) authority have entered into formal agreements with NMFS for stranding response. These agreements are known as Stranding Agreements (SAs), and authorize individuals, organizations, or institutions to respond to reports of marine mammals that are stranded or in distress/imperiled in a specific geographic response area. SA authorizations are issued under the authority of the NMFS Regional Administrators. Issuance and periodic review of these SAs is undertaken by the MMHSRP through the Regional Stranding Coordinators (RSC), located in each NMFS jurisdictional region. Additionally, each RSC is also listed as a Co-Investigator (CI) under a NMFS MMPA/ESA permit (section 1.5.4.2). Under the permit, as CIs, RSCs can also authorize local colleagues to respond to ESA-listed species on a case-by-case basis. Organizations holding SAs are required to share basic information from each response with NMFS to fulfill the statutory mandates of Title IV of the MMPA.

[11] A stranding is defined in the MMPA (16 United States Code [U.S.C.] 1421h) as an event in the wild in which:

1) a marine mammal is dead and is-
   a) on a beach or shore of the United States; or
   b) in waters under the jurisdiction of the United States (including any navigable waters); or
2) a marine mammal is alive and is-
   a) on a beach or shore of the United States and is unable to return to the water;
   b) 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
   c) 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

All data is required to be submitted to the National Marine Mammal Stranding Database within 30 days of collection.

As mentioned in section 1.1.2 above, Section 109(h) of the MMPA allows federal, state, local, or tribal government officials or 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 animal, the protection of public health and welfare, or the nonlethal removal of nuisance animals. Individuals acting under Section 109(h) authority have 6 months to submit a report, in writing, on each take under that Section to NMFS (50 CFR 216.22b). For both 109(h) and 112(c), the salvage of a specimen must be reported to the appropriate NMFS Regional Office within 30 days after the taking or death occurs (50 CFR 216.22 c2). Appendix I lists the current (2020) members of the Stranding Network.

Although the majority of stranding responses involve species and populations that are not considered threatened or endangered (*e.g.*, bottlenose dolphins, harbor seals (*Phoca vitulina*), and California sea lions (*Zalophus californianus*)), each response by the Network provides important opportunities for Network members to hone their skills and apply lessons learned from those cases to provide increased humane care when the time comes to respond to threatened or endangered species (*e.g.*, Southern resident killer whales (*Orcinus orca*), Hawaiian monk seals (*Neomonachus schauinslandi)*, and Guadalupe fur seals (*Arctocephalus townsendi*)).

1.2.2 Unusual Mortality Event Response

The Marine Mammal Unusual Mortality Event (UME) program was established in 1991 to investigate die-offs of marine mammals. An 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 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 who assist in determining whether an UME is occurring and helps direct the response and investigations into the causes of mortality or morbidity. The WGMMUME also evaluates the environmental factors associated with UMEs, provides training and resources (when possible), and oversees management of the Marine Mammal UME Fund (which reimburses some of the expenses incurred responding to, and investigating, UMEs). As of 2022, there have been 72 formally recognized UMEs in the United States involving a variety of marine mammal species. UMEs have occurred along the U.S. coasts of the Atlantic, Gulf of Mexico, and Pacific, including Alaska and Hawaii. Further details on UMEs, broken down by NMFS region, can be found in Appendix II.

1.2.3 National Marine Mammal Entanglement Network

The MMHSRP coordinates entanglement response activities for large whales, small cetaceans, and pinnipeds. Entanglement responders are authorized under the current MMHSRP research and enhancement MMPA/ESA permit (Permit No. 18786-06). The Large Whale Entanglement Response Network is the most structured Entanglement Response Network as responders are trained and progressively promoted with corresponding authorization as Co-Investigators under the Permit, allowing them to increasingly conduct more technically challenging aspects of large whale entanglement response, which is inherently the most risky compared to small cetacean and pinniped entanglement response given the animals' size and mass. Many members of this Network work solely on large whale entanglement response and do not participate in the overall Stranding Network. Unlike the Stranding Network, individuals, not organizations or institutions, are authorized as large whale entanglement responders.

Pinniped and small cetacean entanglement response is less formalized, as there are currently no formal training programs or authorization levels based upon knowledge and skill. In many cases, the response to entangled pinnipeds and small cetaceans is conducted by members of the Stranding Network, and depending upon the particular circumstances of the entanglement, some of the responses are conducted under Section 112(c) agreements or by 109(h) responders (including NOAA employees), while other responses are conducted under the NMFS MMPA/ESA permit.

Although the majority of entanglement responses involve species and populations that are not considered threatened or endangered (*e.g.,* certain stocks of humpback or gray whales (*Eschrichtius robustus*)), each rescue attempt by the Large Whale Entanglement Response Network provides an important opportunity for responders to hone their skills and apply lessons learned from those cases to provide increased humane care when responding to threatened and endangered species (*e.g.*, North Atlantic right whales (*Eubalaena glacialis)* or blue whales (*Balaenoptera musculus))*.

Appendix I lists the current (2022) members of the Large Whale Entanglement Response Network.

1.2.4 Marine Mammal Health Biomonitoring, Research, and Development

The MMHSRP, often in partnership with other scientists, conducts many biomonitoring projects (including research and enhancement; hereafter "biomonitoring and research" or "research") to assess and better understand health in stranded and wild marine mammals. Research activities may be in response to UMEs, mortality and morbidity events, disease outbreaks, known health concerns or in areas of previous health concerns, toxin exposure, and emerging threats. Biomonitoring and research may be conducted through the MMHSRP directly or in cooperation with other scientists already conducting permitted research.

Biomonitoring and research activities conducted by MMHSRP staff include wild animal capture health assessments. Marine mammals that are captured for health assessments may have visible health problems (*e.g.*, skin lesions, etc.), been exposed to known toxins, or been exposed to other physical, chemical, or biotic stressors that are known to produce adverse health outcomes in marine mammals. Many diagnostic and research laboratories are permitted and/or contracted by the MMHSRP to process and analyze biological/medical samples collected from stranding/entanglement cases. Services provided may include histopathology, virology, bacteriology, toxicology (contaminant and biotoxin analyses), and acoustic diagnostics. Additional health research projects are conducted in partnership with scientists who are already sampling marine mammals for other purposes; in these instances, the MMHSRP may collect additional samples beyond those in the protocol of the primary research project (*i.e.*, "piggybacking"). Many of these research projects allow the MMHSRP to use controlled experimental designs (*i.e.*, age classes, sex, location, etc.) in areas where there is a specific health question or concern, and to collect samples from species that are rarely reported stranded on beaches.

1.2.5 John H. Prescott Marine Mammal Rescue Assistance Grant Program

The Prescott Grant Program was established under the Marine Mammal Rescue Assistance Act of 2000, an amendment to the MMPA, and codified into Title IV along with the other MMHSRP mandates. The Prescott Grant Program is administered by the MMHSRP, and funds some of the activities of the Stranding and Entanglement Networks through competitive grants and cooperative agreements. Prescott funds are available for: the rescue, recovery, and treatment of stranded or entangled marine mammals (*e.g.*, transportation, equipment, supplies, and salary), data collection from living and dead stranded marine mammals for scientific research regarding marine mammal health, and facility operations directly related to those purposes. Non-emergency awards are made during an annual competition, contingent on annual Congressional appropriation, which disburses up to $4 million per year to Stranding and Entanglement Network members and researchers. Given that appropriations for this program vary annually and could be reduced in any fiscal year, recipients should consider Prescott Grant funds as supplemental to their operational budgets.

The awarding of competitive grants is a multi-step process which addresses compliance with NEPA and other applicable laws and regulations. A complete application must contain enough information on the potential environmental impacts of the project for NMFS to make a NEPA compliance determination. These applications are evaluated through technical peer-review and internal NMFS program review panels, in which the reviewers take into consideration the environmental information that was provided. After projects have been selected to receive funding, the Prescott Grant Program staff will assess the activities contained within each proposal to ensure that they have been analyzed in this PEIS. These activities may include stranding response, rehabilitation, release of rehabilitated animals, and scientific research activities that are authorized under the MMHSRP's NMFS 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.

When possible, the Prescott Grant Program sets aside a portion of appropriated funds for emergency assistance to help support Stranding Network members when unforeseen or catastrophic events occur throughout the year. These emergency funds allow organizations to be reimbursed for the immediate responses they conduct to events such as mass strandings, out of habitat animals, or natural disasters that occur outside of the competition application period, outside their typical response duties, or might otherwise be impossible to conduct without financial assistance. The applications for emergency funding are reviewed similarly to those received during the annual competition, and a complete application must contain enough information on the potential environmental impacts of the project for NMFS to make a NEPA compliance determination. The Prescott Grant Program staff will assess the activities contained within the emergency proposal to ensure that they have been addressed in this PEIS.

A list of all projects previously funded by Prescott Grant funds, with recipient and title, is in Appendix III.

1.2.6 Communication and Information Dissemination

Under Title IV of the MMPA, the MMHSRP is charged with the dissemination of reference data on the health of marine mammals and health trends of marine mammal populations in the wild (16 U.S.C. 1421). This is accomplished in several ways: publishing formal reports (*i.e.*, peer-reviewed publications, technical memoranda), contributing to stock assessment reports, producing guidance documents (*i.e.*, policies and best practices, and procedural directives), developing web stories and other web content, organizing trainings, workshops, and conferences, and updating media.

1.2.7 Information Management and Databases

The National Marine Mammal Stranding Database was mandated under the MMPA (16 U.S.C. 1421f(c)(1)) to contain marine mammal health reference data that would allow comparison of the causes of illness and death of stranded marine mammals with physical, chemical, and/or biological environmental parameters. Standardized datasheets to record stranding information have been developed and are revised periodically. Data collected from stranded animals may be basic ("Level A data"), supplemental, including additional information about the stranding event and life history data ("Level B data"), or detailed data and results from tissues collected and analyzed ("Level C data"). At the very minimum, a Level A data sheet is completed by a member of the Stranding Network to document each response to a stranded marine mammal. The Human Interaction (HI) form, a component of the Level A data collection, is required for all condition code 1 (alive), condition code 2 (fresh dead), and condition code 3 (moderately decomposed) cases to the extent that the animal can be examined. The Rehabilitation Disposition form, a component of the Level A data collection, is also required for all stranded marine mammals transferred to a rehabilitation center. At this time, access to the National Marine Mammal Stranding Database is only permitted to active participants of the Stranding Network, although NMFS fills requests for data from the public.

1.2.8 National Marine Mammal Tissue Bank and Quality Assurance Program

The development of the National Marine Mammal Tissue Bank (NMMTB) at the National Institute of Standards and Technology (NIST) was mandated by the MMPA (16 U.S.C. 1421f), and formally established in 1992. The NMMTB provides a long-term and quality controlled archive for marine mammal tissue samples to permit retrospective analyses for the purpose of determining environmental trends and conducting analyses using new and innovative analytical techniques (Pugh *et al.* 2010). The MMHSRP oversees the collection and maintenance of marine mammal tissue samples in the NMMTB. Sources of marine mammal tissues include: samples from stranded animals, samples from Natural Resource Damage Assessment projects; samples from marine mammals incidentally caught during commercial fishing operations, samples from marine mammals taken for subsistence, and any other samples properly and legally collected.

1.2.9 Organization of the MMHSRP

All of the program areas described above are coordinated at the national level at the NMFS headquarters in Silver Spring, Maryland. Headquarters staff include the MMHSRP Coordinator, the National Stranding Response Coordinator, the National Entanglement Coordinator, the Veterinary Medical Officer, the Prescott Grant Program Manager and additional program staff. As all of the program areas are carried out in all five NMFS regions (Table 1-1) to some degree, headquarters staff ensure national consistency across all program areas. Additionally, all marine mammal health biomonitoring, research, and development activities conducted by the MMHSRP, UME investigations, and the NMMTB are directed by headquarters staff.

Table 1-1 NMFS Regions

NMFS Regions	States/Territories
Greater Atlantic	ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, VA
Southeast	NC, SC, GA, FL, AL, MS, LA, TX, PR, VI
West Coast	CA, OR, WA
Alaska	AK
Pacific Islands	HI, GU, AS, CNMI, U.S. Minor Outlying Islands[12]

There are also staff in each NMFS region and some of the NMFS science centers who work on MMHSRP issues. The RSCs work and coordinate closely with Stranding Network organizations within their regional network to effectively respond to stranded marine mammals and entangled pinnipeds and small cetaceans in their geographic area. Similarly, entanglement coordinators work with members of the National Large Whale Entanglement Response Network to effectively respond to entangled large whales. Regional staff also work to ensure effective communication and information dissemination within their regions and confirm that data are collected and properly stored in the relevant databases. The Prescott Grant Program is administered by headquarters staff with input and assistance from regional staff.

1.3 Proposed Actions, Purpose, and Need

1.3.1 Description of Proposed Actions

Primary Action: The primary action is the continued implementation of the MMHSRP. OPR's Marine Mammal and Sea Turtle Conservation Division provides national oversight and coordination of MMHSRP efforts as mandated by Title IV of the MMPA, and is responsible for developing and implementing policies that streamline and enhance stranding response, carcass disposal, rehabilitation and release of marine mammals, entanglement response, and biomonitoring activities (including both enhancement and research, hereafter, referred to as "biomonitoring and research" or "research"), as well as the administration of the Prescott Grant Program. NMFS Regions will implement these policies and ensure national consistency,

[12] The minor outlying islands and groups of islands consist of eight U.S. insular areas in the Pacific Ocean: Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Midway Atoll, Palmyra Atoll, and Wake Island.

including implementation of SAs and authorizing the use of parts from stranded marine mammals within their geographic area.

Secondary Action: A secondary action (also called a connected action[13]) is OPR's Permits and Conservation Division's consideration of whether to issue a scientific research and enhancement permit (MMPA/ESA permit) to the MMHSRP (Responsible party: Ms. Sarah Wilkin, Coordinator of the MMHSRP), pursuant to Sections 109(h), 112(c), and 104 of the MMPA and 50 CFR 216, Section 10(a)(1)(A) of the ESA and 50 CFR 222, and Section 104 of the FSA. The permit, if issued, will provide an exception to the take prohibitions under the MMPA, ESA, and FSA for harassment, capture, collection, harm, wounding, pursuit, and mortality of marine mammals, including threatened or endangered species. The Permits and Conservation Division's action is a direct outcome of the MMHSRP's request for a permit for direct take of marine mammals during the conduct of: (1) response (including carcass disposal), rehabilitation, and release of marine mammal species, including those listed as threatened or endangered under the ESA, (2) marine mammal entanglement response, (3) marine mammal biomonitoring and research activities, (4) method and tool development for emergency response and scientific research and biomonitoring, and (5) unintentional (incidental) harassment of non-target marine mammal and other ESA-listed species while conducting these activities.

1.3.2 Purpose and Need

Primary Action: NMFS' responsibilities under Title IV of the MMPA and its mission to recover, protect, and conserve marine mammals under NMFS jurisdiction, including threatened and endangered species, establish and frame the purpose and need. The purpose for continuing to implement the MMHSRP is for the Marine Mammal and Sea Turtle Conservation Division to continue collecting, investigating, and disseminating data on marine mammal health; investigating marine mammal UMEs; administering the Prescott Grant Program; developing and implementing policies that streamline and enhance stranding response, carcass disposal, rehabilitation and release of marine mammals, entanglement response, and biomonitoring and research activities; implementing SAs; authorizing the use of parts from stranded marine mammals; and carrying out the mandates of Title IV of the MMPA. The need for the Marine Mammal and Sea Turtle Conservation Division's action is to ensure that the goals of Title IV of the MMPA are met

[13] 40 CFR 1508.25(a)(1) "Connected actions are closely related and therefore should be discussed in the same impact statement. Actions are connected if they: (i) Automatically trigger other actions which may require environmental impact statements. (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously. (iii) Are interdependent parts of a larger action and depend on the larger action for their justification".

through effective coordination of response to marine mammals in distress or imperiled, including those stranded, entangled, ill, injured, oiled, and out-of-habitat; to administer the Prescott Grant Program; and to answer research and management questions about marine mammal health (including authorizing the use of parts from stranded marine mammals) to inform the Agency's management decisions.

Secondary Action: The purpose of the Permits and Conservation Division's action—which is a direct outcome of the MMHSRP's request for take of marine mammals in connection with emergency response to ESA-listed species (including carcass disposal), entanglement response of ESA-listed and non-listed species, and biomonitoring and scientific research activities—is to evaluate the MMHSRP permit application pursuant to Section 104 of the MMPA and 50 CFR 216; Section 10(a)(1)(A) of the ESA and 50 CFR 222; and Section 104 of the FSA, as applicable, and issue a permit, if appropriate. The need for the Permits and Conservation Division's action is to meet its obligation to grant or deny the permit request under the MMPA, ESA, and FSA. NMFS evaluates scientific research and enhancement permit applications to determine if statutory and regulatory criteria are met, including that the proposed research activities will be conducted for bona fide scientific research purposes and that the research activities and methods are "humane." NMFS also evaluates the best available scientific information to determine whether the mitigation proposed by the applicant will minimize the impacts of the proposed import and research, and whether any additional mitigation measures are required to ensure that the proposed activity will not result in unnecessary risks to the health or welfare of the subject animals. NMFS must also assess, among other things, whether the applicant has demonstrated that the proposed activity, by itself or in combination with other activities, will not likely have a significant adverse impact on the species or stock, will contribute to the recovery of depleted, threatened or endangered species, and will not result in a disadvantage to endangered species. In addition, the permit would set forth the permissible methods of taking, as well as requirements for monitoring and reporting, as well as any other terms and conditions that NMFS deems appropriate.

1.4 Scope of Environmental Analysis

1.4.1 Programmatic Approach and Scope

This final PEIS was prepared in accordance with NEPA (42 USC 4321, et seq.), 40 CFR 1500-1508 (also referred to as the 1978 CEQ Regulations) and NOAA policy and procedures (*i.e.*, the NOAA Administrative Order (NAO) 216-6A[14] and the Companion Manual for NAO 216-6A). NMFS prepared this final PEIS to

[14] NAO 216-6A was Issued 04/22/2016; Effective 04/22/2016; and Last Reviewed: 1/14/2020

describe and evaluate planned actions and potential environmental impacts of activities conducted, authorized, or funded for the implementation of the MMHSRP as well as the consideration whether to issue a new MMPA/ESA permit.

A programmatic approach is appropriate when addressing broad agency action(s) and when the action(s) being considered falls into one of the four major categories of actions to which NEPA applies (see 40 CFR 1508.18(b)):

1. Adopting official policy (*e.g.*, national or regional rulemaking, adoption of an agency-wide policy, or redesign of an existing program);
2. Adopting formal plans (*e.g.*, strategic planning linked to agency resource allocation or adoption of an agency plan for a group of related projects);
3. Adopting agency programs (*e.g.*, new agency mission or initiative or proposals to substantially redesign existing programs); or
4. Approving multiple actions (*e.g.*, several similar actions or projects in a region or nationwide, a suite of ongoing, proposed, or reasonably foreseeable actions that share common geography or timing).

The concept of "programmatic" analyses included in the 1978 CEQ Regulations applies to the analyses of these "broad actions" and the "tiering process." In addition, CEQ interprets its regulations as allowing for the use of a programmatic approach in developing Environmental Assessments (EAs) and Environmental Impact Statements (EISs). Programmatic NEPA reviews add value and efficiency to the decision-making process when they inform the scope of decisions and subsequent, tiered NEPA reviews. A programmatic EA (PEA) or PEIS also facilitates decisions on agency actions that precede site-or project-specific decisions and actions. A PEA/PEIS would allow NMFS to address NEPA compliance at a broad, programmatic level. PEAs/PEISs that are broad in scope address a number of related actions or projects, an entire program, or a broad action. Before a federal agency implements policies, programs, plans, and projects, NEPA requires documented, formal consideration of major federal actions and analyses of potential impacts associated with alternatives to the action. Most NEPA documents focus on site-specific projects. However, by changing the scope of analysis, federal agencies can assess potential impacts stemming from policies, programs, and plans. They also provide information and analysis that can be incorporated by reference in future, tiered, NEPA reviews or assessments.

NMFS determined a programmatic approach was appropriate because the continued implementation of the MMHSRP occurs over multiple geographical areas for multiple marine mammal species for a wide-range of projects and activities, and because there is a separate but connected action to the primary action: the issuance of a MMPA/ESA permit. In addition, there is some level of uncertainty regarding the timing and implementation of subsequent projects and activities by other entities funded by the Prescott Grant Program (*e.g.*, certain details such as the specific location and site conditions are not known until NMFS receives proposals for review during the financial assistance award process). Thus, the analysis in this PEIS supports the planning-level decisions for funding future actions (*i.e.*, the range of projects and activities described in Chapter 2) and establishes the framework and parameters for subsequent analyses based on this programmatic review, which examines the reasonably foreseeable impacts of implementing the MMHSRP. This PEIS will be used to guide decision-making and streamline the overall NEPA review process associated with both the primary and secondary action as described in section 1.3. In addition, MMHSRP staff will periodically review the PEIS and relevant environmental concerns to determine whether its scope and analysis remain applicable to the MMHSRP.

1.4.2 Analysis Approach and Scope

The analysis in this final PEIS addresses potential direct, indirect, and cumulative impacts (described below) to the human environment and natural resources, resulting from both the primary and secondary proposed actions. Therefore, the scope of NMFS' analysis pertaining to MMHSRP implementation addresses activities carried out directly by the MMHSRP, the authorization of other organizations to carry out these activities on behalf of the MMHSRP, and the administration of the Prescott Grant Program. The activities analyzed include marine mammal stranding and entanglement response, carcass disposal, rehabilitation and release, and research and biomonitoring activities on marine mammals. The final PEIS is intended to provide focused information on the primary issues, impacts of environmental concern (which include impacts to biological resources, water and sediment quality, human health and safety, cultural resources, and socioeconomics), and the mitigation and monitoring measures to minimize the effects of response and rehabilitation of stranded and entangled marine mammals, as well as the effects of research on the health of marine mammal populations. Given the size of the action area, local projects were not analyzed in this final PEIS; instead overarching threats to each resource area were analyzed.

1.4.2.1 Types of Potential Impacts

As required by NEPA, known or potential impacts are described in terms of type (beneficial or adverse and direct, indirect, or cumulative), context (site-specific, local, or regional), level of intensity (negligible, minor, moderate, or major), and duration (temporary, short-term, or long-term). In this analysis, the terms "effects" and "impacts" are used interchangeably. The following terms are used throughout this document to discuss potential impacts to the human environment and natural resources resulting from the primary and secondary proposed actions:

Direct Impact. A known or potential impact caused by the proposed actions that occurs at the same time and place as the action (40 CFR 1508.8).

Indirect Impact. A known or potential impact caused or induced by the proposed actions that occurs later than the action or is removed in distance from it, but reasonably foreseeable (40 CFR 1508.8).

Cumulative Impact. A known or potential impact resulting from the incremental effect of the proposed actions added to other past, present, or reasonably foreseeable future actions (40 CFR 1508.7). Cumulative impacts are further discussed in Chapter 10.

CEQ regulations also define the significance of impacts in terms of their context and intensity. Context refers to the geographic reach of effect, which varies with the setting of the alternatives and with each resource area being analyzed. Intensity refers to the magnitude of the impact:

Negligible Impact. A known or potential impact that would not be detectable and would have no discernible effect.

Minor Impact. A known or potential impact that would be slightly detectable and would not be expected to have an overall effect.

Moderate Impact. A known or potential impact that would be clearly detectable and could have an appreciable effect.

Major Impact. A known or potential impact that would be clearly detectable and would have a substantial, highly noticeable effect.

Duration (temporary, short-term, or long-term) is also considered in the assessment of the environmental impacts. Duration takes into account the permanence of an impact or the potential for natural attenuation of an impact:

Temporary Impact. A known or potential impact that is temporary and would generally end once the proposed activities have stopped.

Short-Term Impact. A known or potential impact with effects that typically last several days or weeks, after which the affected resources revert to a "normal" condition.

Long-Term Impact. A known or potential impact of extended duration with effects that typically last several years or more or would be permanent.

Mitigation measures are methods to avoid, minimize, rectify, or reduce the adverse environmental impacts of an action. Appropriate mitigation measures not already included in the proposed actions or alternatives are discussed in Chapters 4-9. These are measures that would be taken to avoid or minimize adverse effects of the proposed actions.

There are some standard mitigation measures already included under the MMHSRP research and enhancement permit, as set forth by the Permits and Conservation Division. There are additional standard mitigation measures for some MMHSRP activities in our Stranding Agreement Template (Appendix VIII), Evaluation Criteria for Marine Mammal Stranding Agreements (Appendix IX), Standards for Rehabilitation Facilities (Appendix XVII), and Standards for Release of Marine Mammals following Rehabilitation (Appendix V). In addition, there is required mitigation for certain events including sampling of animals during research under the NMFS IACUC policy (NMFS-PD 04-112-01), responding to animals during an oil spill through HAZWOPER training, and use of UAS following the NOAA UAS Policy 220-1-5. The standard mitigation measures are discussed further in Chapters 4-9, when applicable.

There are also other (optional) mitigation measures that the MMHSRP could implement to further reduce significant impacts on marine mammals while conducting activities. These are identified in the relevant Best Practices appendices in the PEIS and are discussed further in are discussed in Chapters 4-9.

1.4.2.2 Steps for Determining Level of Impact

The 1978 CEQ regulations implementing NEPA state that an EIS should discuss the significance, or level of impact, of the direct, indirect, and cumulative effects of the proposed alternatives (40 CFR 1502.16).

- Significance is determined by considering both the context in which the action will occur and the intensity of the action (40 CFR 1508.27).
- Context can be referred to as the extent of the effect (geographic extent or extent within a species, ecosystem, or region) and any special conditions, such as endangered species status or other legal status.

- Intensity of an impact is the result of its magnitude and duration. Actions may have both adverse and beneficial effects on a particular resource. A component of both the context and the intensity of an effect is the likelihood of its occurrence.

The combination of context and intensity is used to determine the level of impact on each type of resource. Analysts follow these steps to accomplish this analysis:

1. Examine the mechanisms by which the proposed actions could affect the particular resource.
2. For each type of effect, develop a set of criteria to distinguish between major, moderate, minor, or negligible impacts (defined in section 1.4.2.1).
3. Use these impact criteria to estimate the expected magnitude, extent, duration, and likelihood of each type of effect under each alternative.

This does not imply that the analysts performed a formal probability calculation but, in their professional judgment, the probability of the effect occurring is more likely than not. As many of the MMHSRP activities analyzed in this PEIS occur in response to marine mammal strandings and other emergencies, and are highly localized, qualitative thresholds are used, as the potential effects are difficult to predict. For this qualitative assessment, the analysts used professional judgment about where a particular effect falls in the continuum from "negligible" to "major."

1.4.2.3 Incomplete and Unavailable Information

The 1978 CEQ regulations require that:

“When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking (40 CFR 1502.22).”

In the event that there is relevant information, but “the overall costs of obtaining it are exorbitant or the means to obtain it are not known” (40 CFR 1502.22), the regulations instruct that the following should be included:

- A statement indicating that such information is unavailable;
- A statement of the relevance of such unavailable information to evaluate reasonably foreseeable significant adverse impacts;
- A summary of existing information that is relevant to evaluating the adverse impacts; and

- The agency's evaluation of adverse impacts based on generally accepted scientific methods.

This final PEIS identifies those areas where information is unavailable to support a thorough evaluation of the environmental consequences of the alternatives. In particular, the analysis of potential effects on cultural and historic properties is based on known properties listed in the National Register of Historic Places (NRHP) and other data publicly available. While additional cultural and historic properties may exist, the assessment presented in this final PEIS is based only on publicly available information and, where data gaps still exist, the implication is that these areas fall within the CEQ regulations described above.

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings on any historic properties located within the action area (described in section 1.4.3). These effects may be either direct or indirect. Impacts to historic and cultural resources, including historic structures, archaeological sites, and traditional cultural properties, would be considered significant if they result in adverse effects to the integrity of historic properties that are listed or are eligible for listing on the NRHP.

Integrity can be considered to mean not simply the physical integrity of a structure, but "the integrity of [its] location, design, setting, materials, workmanship, feeling, and association" (Title 36 C.F.R. § 60.4). Adverse effects are those that detract from the qualities that give a property its importance and contribute to its NRHP eligibility. Direct effects are those that physically alter the historic property in some way. Indirect effects diminish some important aspect of the historic property, but do not physically alter it.

1.4.3 Action Area Summary and Scope

The action area includes all areas where MMHSRP activities may occur, which encompasses the coastal waters, estuarine and adjacent inland waters where marine mammals may occur out of habitat, and the Exclusive Economic Zone (EEZ) of the United States, its territories, and possessions, and adjacent marine waters. The coastal zone includes coastal waters, adjacent shores, intertidal areas, salt marshes, wetlands, and beaches. The action area also includes the marine mammal rehabilitation facilities of the Stranding Network. Since this final PEIS also considers MMHSRP activities within NMFS regions, the analysis of marine mammals also addresses regional differences in marine mammal species and stranding events. The states and territories included in each region are depicted in Table 1-1 and additional details about the action area are discussed in Chapter 3.

1.5 Environmental Review Process and Background

Under NEPA, federal agencies are required to examine the environmental impacts of their proposed actions within the United States and its territories. A NEPA document[15] provides an assessment of the potential effects a major federal action may have on the human environment. Major federal actions include activities that federal agencies fully or partially fund, regulate, conduct, or approve. As noted earlier, NMFS' OPR Marine Mammal and Sea Turtle Division's implementation of the MMHSRP and OPR Permits and Conservation Division's issuance of a permit are major federal actions subject to NEPA and CEQ Regulations. Therefore, NMFS analyzes the environmental effects associated with its proposed actions and prepares the appropriate NEPA documentation. In addition, NMFS, to the fullest extent possible, integrates the requirements of NEPA with other regulatory processes required by law or agency practice so that all procedures run concurrently, rather than consecutively. This includes coordination within NOAA (*e.g.*, Office of National Marine Sanctuaries) and with other agencies (*e.g.*, USFWS), as appropriate, during NEPA reviews prior to implementation of the proposed actions to ensure that requirements are met.

When making decisions to authorize or fund other entities, the overall environmental review entails making a determination of the appropriate analysis under NEPA, 40 CFR 1500-1508, and the Companion Manual for NAO 216-6A. This includes whether activities are addressed in the final PEIS or if a tiered analysis is needed and evaluation of the applicability of other environmental protection laws and regulations. For example, when considering Prescott grants, NMFS is responsible for obtaining this information; therefore, as part of the environmental review, NMFS may request or require grant applicants to provide additional information about the proposed project to assist in the determination of applicable environmental compliance requirements during the application process for financial assistance. Where compliance with environmental laws and regulations will be necessary, such as consultations, these requirements may be achieved through a Special Award Condition or required as part of the application submission.

1.5.1 Prior Analysis

The MMHSRP is currently operating under a PEIS that was completed in 2009 (NMFS 2009). The 2009 document is available at: https://repository.library.noaa.gov/view/noaa/4939. The stated purposes of the proposed action for the 2009 PEIS were "to respond to marine mammals in distress or imperiled, including those stranded, entangled, and out of habitat, and to answer research and management questions about

[15] For the purposes of this explanation, a NEPA document is an environmental assessment or environmental impact statement. An environmental assessment is more concise and less detailed than an environmental impact statement.

marine mammal health." As part of the proposed action for the PEIS, several MMHSRP national guidelines were included as appendices:

- Policies and Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release
    - Evaluation Criteria and National Template for Marine Mammal Stranding Agreements
    - Standards for Rehabilitation Facilities
    - Standards for Release
- Large Whale Disentanglement Guidelines
- Marine Mammal Oil Spill Response Guidelines
- Carcass disposal information

The Record of Decision (ROD) for the PEIS concluded that by implementing the preferred alternative, which included the issuance of the above standards and guidelines, the actions conducted would effectively meet the MMHSRP's mandates under Title IV of the MMPA while minimizing the potential environmental impacts from the proposed actions.

In 2012, NMFS Policy Directive 02-308 was issued regarding the MMHSRP along with two implementing NMFS Policy Directives: 02-308-01, "NMFS Facility Standards for Rehabilitating ESA-Listed Species" and 02-308-02 "NMFS Placement Process for Non-Releasable Marine Mammals." Both directives can be found at: https://www.fisheries.noaa.gov/national/laws-and-policies/protected-resources-policy-directives.

In 2015, a supplemental environmental assessment (SEA) was prepared when the MMHSRP applied for the current MMPA/ESA research and enhancement permit (Permit No. 18786-06). This SEA considered three activities that were not considered in the 2009 PEIS: (1) hot branding, (2) unmanned aerial systems (UAS), and (3) administering vaccinations. All other permitted activities were analyzed in the 2009 PEIS, and thus required no further analysis. A Finding of No Significant Impact (FONSI) determined that implementing the preferred alternative (Alternative 2 – Issuance of the permit) was not reasonably expected to significantly impact the quality of the human environment.

1.5.2 Public Involvement

The NEPA process is intended to enable NMFS to make decisions based on an understanding of the environmental consequences to the proposed actions. Public involvement is an essential part of this process under NEPA. Early public involvement facilitates the development of a NEPA document, in this case, a PEIS, and informs the scope of issues to be addressed in the analysis.

A Notice of Intent (NOI) was published in the *Federal Register* (FR) on April 2, 2018 (83 FR 13955)[16]. The NOI announced NMFS' decision to prepare a new draft PEIS and conduct public scoping meetings. The notice provided the public with all information relevant to the public review process as required by NEPA — including background, a summary of the proposed actions, relevant dates related to the public review period and scoping meetings, and how to submit comments or contact NMFS. The scoping meetings, in the form of three webinars and one in-person meeting, were held in Silver Spring, MD during May 2018. Comments received during the scoping process were considered and incorporated (as appropriate) in the development of this draft PEIS. An explanation of the scoping process and a summary of comments received is included in a Scoping Report (Appendix IV).

A Notice of Availability (NOA) was published in the FR on May 14th, 2021 (86 FR 26514), which announced the availability of the draft PEIS and a 45 day public comment period. Another NOA was published on June 25, 2021 to extend the public comment period for a further 30 days (ending on July 28, 2021) for a total public comment period of 75 days (86 FR 33705). Additionally, copies of the draft PEIS were submitted to all State Historic Preservation Offices and Tribal Historic Preservation Offices as well as the Environmental Protection Agency, the Marine Mammal Commission, the Office of National Marine Sanctuaries, the National Park Service, and the USFWS. In total, 382 comments were submitted by agencies, organizations, and members of the public. Some of these comments were similar and have been combined as NMFS prepared the final PEIS. The majority of the comments were focused on the best practices in the appendices. Comments received during the public comment period were considered and incorporated (as appropriate) in the development of this final PEIS (Appendix IV).[17] A summary of the common types of comments follows:

- Comments to improve readability, including 26 comments regarding spelling and grammatical errors, 4 comments related to formatting, and 3 comments highlighting broken links.
- Comments on the alternatives. Few comments were received on the alternatives. Most of the comments received that related to alternatives supported Alternative 2, and a few comments supported any of the alternatives.

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[16] A Correction Notice was published in the FR on April 24, 2018 (83 FR 18507) to correct the date and time of one of the scoping meetings.

[17] A full description of the comments received as well as how NMFS responded to public comments can be found at:

https://www.fisheries.noaa.gov/resource/document/programmatic-environmental-impact-statement-mmhsrp

- Comments on Cultural Impacts. Comments were received about the analysis on cultural impacts for stranding response (Chapter 4), carcass disposal (Chapter 5), and biomonitoring and research (Chapter 9).
- Comments on the Policies and Best Practices. Comments were received on the Standards for Release of Marine Mammals following Rehabilitation, and were primarily concerned about a perceived change in NMFS' policy regarding the releasability of young California sea lion pups. Minor comments were also received on the SA Template, the SA criteria, and all best practices documents.
- Comments on the future direction for the MMHSRP, including ideas on development for training programs for small cetacean and pinniped entanglement response, as well as other areas for enhancement. While not part of this PEIS, NMFS appreciates the comments and will consider them for future implementation.

A 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 will be prepared, detailing NMFS' decision regarding the MMHSRP and the alternatives.

1.5.3 Cooperating Agencies

NMFS invited the USFWS and the U.S. Department of Agriculture (USDA) - Animal and Plant Health Inspection Service (APHIS) to be cooperating agencies in the development of this final PEIS. The USFWS declined to be a cooperating agency; however, they reviewed and provided input to NMFS during the development of the draft PEIS. APHIS is serving as a cooperating agency for this final PEIS as they jointly issued Standards for Rehabilitation Facilities with NMFS in 2009.

1.5.4 Compliance with Other Environmental Laws and Consultations

NMFS must comply with all applicable federal environmental laws and regulations necessary to implement a proposed action. NMFS evaluation of and compliance with environmental laws and regulations is based on the nature and location of the applicant's proposed activities and NMFS' proposed actions. Therefore, this section only summarizes environmental laws and consultations applicable to NMFS projects or activities implemented under the MMHSRP.

1.5.4.1 Endangered Species Act

The ESA (16 U.S.C. l53l et seq.) was established in 1973 to conserve and protect threatened and endangered species. Section 2 of the ESA sets forth the purposes and policy of the Act, which includes providing a means to conserve endangered and threatened species' ecosystems and providing programs for the conservation of such species. It is the policy of the ESA that all federal agencies must seek to conserve threatened and endangered species and use their authorities to further the purposes of the ESA. Under ESA regulations at 50 CFR 17.21(c)(3) and 17.31(a), employees of the USFWS, NMFS, any other federal land management agency, or state conservation agency, may respond to stranded ESA-listed species.

Section 7 of the ESA requires consultation with the appropriate federal agency (either NMFS or USFWS) for federal actions that "may affect" a threatened or endangered listed species or adversely modify critical habitat (further described in section 3.2.1). NMFS issuance of a permit and carrying out research and enhancement activities affecting ESA-listed species or designated critical habitat, directly or indirectly, are federal actions subject to these consultation requirements. Section 7 requires federal agencies to use their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species. NMFS is further required to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of critical habitat for such species. Such determinations must be made using the best scientific and commercial data available.

Section 9 of the ESA prohibits the take of endangered species unless a lawful exception is made, such as by issuance of a permit. Under Section 10(a)(1)(A) of the ESA and 50 CFR 222, NMFS may grant permits to take ESA-listed species for scientific purposes, or for the purpose of enhancing the survival of the species. Section 10(d) of the ESA also requires that such permits must be applied for in good faith, will not operate to the disadvantage of the endangered species, and will be consistent with the purposes and policy of the ESA.

The MMHSRP is authorized to conduct its actives under MMPA Sections 109(h) and 112(c), and by a MMPA/ESA permit issued pursuant to MMPA Section 104 and ESA Section 10(a)(1)(A) to carry out emergency response to ESA-listed species, entanglement response, and scientific research activities (further described in Chapter 2). As part of the permit application process, the MMHSRP and the Permits and Conservation Division consulted with NMFS as required by Section 7 of the ESA, and the Biological Opinion issued in 2015 concluded the activities conducted by the MMHSRP were not likely to jeopardize the existence of endangered species or result in the destruction or alteration of critical habitat (NMFS 2015). Consultation with NMFS was reinitiated twice, in 2016 and 2017, as modifications to the permit required further analysis, but the analyses came to the same no jeopardy conclusions as the 2015 Biological Opinion

(NMFS 2016 and NMFS 2017). If the secondary proposed action is implemented (as described in both Alternatives 2 and 3), the MMHSRP would apply for a new scientific research and enhancement permit (MMPA/ESA permit) before the current permit expires on December 31, 2022. The permit application would request the continuation of most or all of the activities currently authorized under Permit No. 18786-06, and would also include new research and enhancement activities not currently analyzed in the Biological Opinion for the permit. During the application process, the MMHSRP and the Permits and Conservation Division would again consult with the appropriate federal agencies as required by Section 7 of the ESA.

The NMFS permit does not authorize the take of USFWS marine mammal species. Therefore, the MMHSRP maintains a separate permit issued by the USFWS (currently Permit No. MA009526-3) that allows the MMHSRP to collect, receive, preserve, label, import, export, and transport marine mammal carcasses, hard parts, tissue, and fluid samples for physical, chemical, or biological analyses. The current and any future permit to the MMHSRP would include mitigation measures and requirements for minimizing incidental take and effects on non-target species, including conditions to minimize the risk of accidental captures of USFWS species.

1.5.4.2 Marine Mammal Protection Act

The MMPA (16 U.S.C. 1361 et seq.) was established in 1972, and prohibits take of all marine mammals in the United States (including territorial seas) with a few exceptions. Permits for scientific research on marine mammals and permits to enhance the survival or recovery of a species, issued under Section 104 of the MMPA and its implementing regulations at 50 CFR 216, are two such exceptions. The MMHSRP is authorized to conduct its actives under MMPA Sections 109(h) and 112(c), and by a permit issued pursuant to Section 104 of the MMPA, Section 10(a)(1)(A) of the ESA, and Section 104 of the FSA, to carry out the activities described in Chapter 2 including activities directed towards threatened and endangered species. As noted above, the MMHSRP intends to apply for a new permit before the current permit expires on December 31, 2022.

As part of the application process, applications for MMPA permits must be reviewed by the MMC. NMFS may issue a permit if the activities are consistent with the purposes of the MMPA and applicable regulations at 50 CFR Part 216. NMFS must also find that the manner of taking is “humane”[18] as defined in the MMPA. If lethal taking of a marine mammal is requested, the applicant must demonstrate that using a non-lethal

[18] The MMPA defines humane in the context of taking a marine mammal as “that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved.”

method is not feasible. For depleted species, NMFS must also determine activities resulting in lethal take will directly benefit the species or otherwise fulfill a critically important research need. Persons permitted to take marine mammals must submit reports on activities undertaken each year. As mentioned above, the NMFS permit does not authorize takes of USFWS marine mammal species, and the MMHSRP maintains a separate permit issued by the USFWS (Permit No. MA009526-3). This USFWS permit allows the MMHSRP to collect, receive, preserve, label, import, export, and transport marine mammal carcasses, hard parts, tissue, and fluid samples for physical, chemical, or biological analyses.

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. These agreements are known as SAs, and authorize persons, organizations, or institutions to respond to reports of marine mammals that are stranded, in distress, or otherwise imperiled. SA authorizations are issued under the authority of the NMFS Regional Administrators. Issuance and periodic review of these SAs is undertaken by the MMHSRP through the RSC, located in each NMFS jurisdictional region. Each RSC is also listed as a Co-Investigator (CI) under MMPA/ESA Permit 18786-06 described above. As CIs, RSCs can also authorize response to ESA-listed species on a case-by-case basis under the authority of the permit. Organizations holding SAs are required to share basic information from each response with NMFS to fulfill the statutory mandates of Title IV of the MMPA.

Section 109(h) of the MMPA allows federal, state, local, or tribal government officials or 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 animal, the protection of public health and welfare, or the nonlethal removal of nuisance animals. Individuals acting under Section 109(h) authority have 6 months to submit, in writing, a report on each take under that Section to NMFS (50 CFR 216.22b). For all members of the Stranding Network (federal, state, tribal, and local government officials authorized under either 109(h) and non-government officials authorized under 112(c)), the salvage of a specimen must be reported to the appropriate NMFS Regional Office within 30 days after the taking or death occurs (50 CFR 216.22 c2). Appendix I lists the current (2022) members of the NMFS National Marine Mammal Stranding Response Network.

1.5.4.3 Fur Seal Act

Congress enacted the FSA (16 U.S.C. 1151 et seq.) in 1966, which prohibits, except under specified conditions, the taking, including transportation, importing, or possession, of Northern fur seals (*Callorhinus ursinus*). The FSA also prohibits humans from entering fur seal rookeries. Exceptions are authorized for

Native Tribes, Aleuts, and Eskimos who dwell on the coasts of the North Pacific Ocean, who are permitted to take fur seals and dispose of their skins. Section 104 of the FSA provides authority for NMFS to permit takes of North Pacific fur seals for scientific research and other purposes in the North Pacific Ocean, as necessary for the United States to meet its obligations under the Interim Convention on the Conservation of North Pacific Fur Seals. The Secretary may permit, subject to necessary terms and conditions, the taking, transportation, import, export, or possession of fur seals or their parts for educational, scientific, or exhibition purposes. Applications for permits under the FSA are processed under MMPA regulations (50 CFR Part 216, Subpart D; 59 FR 50372). The MMHSRP currently conducts some of its work under a MMPA/ESA permit pursuant to Section 104 of the FSA (and Section 104 of the MMPA and Section 10(a)(1)(A) of the ESA) to carry out the activities described in Chapter 2. As noted above, the MMHSRP would apply for a new MMPA/ESA permit as part of the proposed actions if either Alternative 2 or 3 is selected, which would also provide FSA coverage, before the current permit expires on December 31, 2022.

1.5.4.4 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) was enacted in 1976 to address impacts to fisheries on the U.S. continental shelf. It established U.S. fishery management over fishes from the seaward boundary of the coastal states out to 200 nautical miles (*i.e.*, boundary of the U.S. Exclusive Economic Zone). The MSFCMA also established regulations for foreign fishing within the fishery conservation zone and issued national standards for fishery conservation and management to be applied by regional Fishery Management Councils. Each council is responsible for developing fishery management plans (FMPs) for domestic fisheries within its geographic jurisdiction. In 1996, Congress enacted amendments to the MSFCMA known as the Sustainable Fisheries Act (P.L. 104-297) to address substantially reduced fish stocks resulting from direct and indirect habitat loss. Under the MSFCMA, federal agencies are required to consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency which may adversely affect essential fish habitat (EFH) identified under the MSFCMA. EFH is defined as the waters and substrate necessary to fishes or invertebrates for spawning, breeding, feeding and growth to maturity. Areas designated as EFH contain habitat essential to the long-term survival and health of U.S. fisheries. This typically includes aquatic areas and their associated physical, chemical, and biological properties used by fish, and may include areas historically used by fish. Substrate types include sediment, hard bottom, structures underlying the waters, and associated biological communities. If an action is likely to adversely affect EFH, the federal agency must consult with NMFS to identify conservation measures to minimize or avoid adverse impacts. If NMFS identifies conservation measures, the action agency must determine whether it will implement them and provide a formal response if it fails to do so.

To initiate consultation under the MSFCMA, in conjunction with the development of this final PEIS, the NMFS OPR Marine Mammal and Sea Turtle Conservation Division requested technical assistance from the NMFS Office of Habitat Conservation (OHC). During these informal discussions, it was determined that preparation of a separate EFH Assessment would not be required because all impacts on EFH are discussed in this PEIS, and the MMHSRP activities would have only temporary and minimal effects on designated EFH and are not likely to adversely affect EFH. The proposed activities are directed at marine mammals and EFH may only be affected indirectly while conducting the proposed activities. No activities that could permanently alter substrate, such as trawling, would occur. Likewise, OPR Permits and Conservation Division's issuance of a MMPA/ESA permit authorizing direct take of marine mammals is not likely to directly or indirectly reduce the quantity or quality of EFH by affecting the physical, biological, or chemical parameters of EFH. Additionally, marine mammals have not been identified as a prey component of EFH for managed fish species, so authorizing the direct take of marine mammals is not likely to reduce the quantity and/or quality of EFH. If selected, the primary proposed action and the secondary proposed action (issuance of a permit) may result in temporary adverse impacts to EFH, and therefore the NMFS OPR Marine Mammal and Sea Turtle Conservation Division and Permits and Conservation Division and OHC met to discuss formal consultation per Section 305(B)(2) of the MSFCMA as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). Comments provided by OHC were addressed, and suggested mitigation measures provided by OHC were incorporated in the preparation of this PEIS; while MMHSRP activities may result in temporary adverse impacts to EFH, a programmatic formal consultation was not pursued due to the scope of the primary and secondary proposed actions. More specific consultations with OHC may be pursued on a case-by-case basis in the future.

1.5.4.5 Coastal Zone Management Act

Congress enacted the Coastal Zone Management Act (CZMA; 16 U.S.C. 1451 et seq.) in 1972 to protect the coastal environment from growing demands associated with residential, recreational, commercial, and industrial uses (such as, state and federal offshore oil and gas development). Coastal states with an approved Coastal Zone Management Program, which defines permissible land and water use within the state's coastal zone, can review federal actions, licenses, or permits for "federal consistency." Federal consistency is the requirement that those federal permits and licenses likely to affect any land/water use or natural resources of the coastal zone be consistent with the state program's enforceable policies. Following the publication of the NOA for the draft PEIS in the FR, letters were sent to coastal states outlining that implementation of any of the alternatives would be conducted in a manner consistent with the state's Coastal Zone Management Plan in accordance with Section 307(c)(1) of the CZMA.

1.5.4.6 National Marine Sanctuaries Act

The National Marine Sanctuaries Act (NMSA; 16 U.S.C 1431 et seq.) authorizes the Secretary of Commerce to designate and protect areas of the marine environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational or esthetic qualities as national marine sanctuaries. Day-to-day management of national marine sanctuaries has been delegated by the Secretary of Commerce to NOAA's Office of National Marine Sanctuaries. The primary objective of the NMSA is to protect marine resources, such as coral reefs, sunken historical vessels or unique habitats. NOAA's Office of National Marine Sanctuaries serves as the trustee for a network of underwater parks encompassing more than 600,000 square miles of marine and Great Lakes waters from Washington state to the Florida Keys, and from Lake Huron to American Samoa. The network includes a system of 15 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments.

A general permit or authorization from NOAA Office of National Marine Sanctuaries is required when an individual proposes to conduct an otherwise prohibited activity within a national marine sanctuary. The list of activities prohibited within each national marine sanctuary is found in program regulations at 15 CFR Part 922. In addition, Section 304(d) of the NMSA requires federal agencies whose actions are "likely to destroy, cause the loss of, or injure a sanctuary resource," to consult with the program when feasible before taking the action. NOAA Office of National Marine Sanctuaries, in these cases, is required to recommend reasonable and prudent alternatives to protect sanctuary resources. The MMHSRP or our collaborators will apply for all appropriate sanctuary permits for any research activities that would occur within a national marine sanctuary that would involve otherwise prohibited activities.

1.5.4.7 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) was enacted in 1918 to ensure protection of shared migratory bird resources. The MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase, or barter, of any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit. The responsibilities of federal agencies to protect migratory birds are set forth in Executive Order 13186. USFWS is the lead agency for migratory birds. The

USFWS issues permits for takes of migratory birds for activities such as scientific research, education, and depredation control, but does not consider incidental actions to be a take of migratory birds[19]. Thus, no MBTA permits are necessary.

1.5.4.8 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.) was enacted in 1940 and prohibits the take[20] of bald or golden eagles, including their parts, nests, or eggs. This also includes impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment. The MMHSRP will not conduct activities that alter bald or golden eagle nest sites.

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

The Convention on International Trade in Endangered Species (CITES) is an international agreement between governments with the goal of ensuring international trade in specimens of wild animals and plants does not threaten their survival. All import, export, and re-export of species covered by CITES must be authorized through a licensing system. In the United States, the USFWS is the Management Authority for CITES. The MMHSRP currently maintains master file import, export, and re-export permits as well as a certificate of scientific exchange (COSE) issued by the USFWS. These master file permits expire in 2021 and the COSE expires in 2022. The MMHSRP intends to apply for new CITES permits and a new COSE before they expire.

1.5.4.10 Animal Welfare Act

The Animal Welfare Act (AWA; 7 U.S.C. 2131 – 2156) was established in 1966 and sets forth standards and certification requirements for the humane handling, care, treatment, and transportation of mammals. Each research facility is required to establish an Institutional Animal Care and Use Committee (IACUC), which reviews study areas and animal facilities for compliance with the AWA standards. NMFS has

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[19] On December 22, 2017, the Solicitor of the Department of the Interior issued a legal opinion, M-37050, which concluded that the prohibitions of the MBTA apply only to affirmative actions that purposefully take or kill migratory birds, their nests, or their eggs, and thus do not apply to incidental taking or killing. On March 8, 2021, the Solicitor of the Department of the Interior issued a new legal opinion, M-37065, which overturned the previous legal opinion. More information can be found at: https://www.doi.gov/sites/doi.gov/files/permanent-withdrawl-of-sol-m-37050-mbta-3.8.2021.pdf.

[20] The Bald and Golden Eagle Protection Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

organized its research facilities into three IACUC areas: (1) Atlantic and Gulf Coasts; (2) California and Hawaii; and (3) Oregon, Washington, and Alaska. Each IACUC also reviews research protocols and provides written approvals for those that comply with AWA requirements. Enforcement of these requirements for non-federal facilities is under the jurisdiction of APHIS. It is the responsibility of researchers to seek and secure IACUC reviews and approvals for their research and adhere to other requirements of the AWA related to care and transport of marine mammals. NMFS researchers applying for permits must submit verification of IACUC approval and the protocols reviewed by the IACUC. The MMHSRP maintains approvals from all three regional NMFS IACUCs for research activities conducted under NMFS Permit No. 18786-06. The MMHSRP will submit protocols to the three IACUCs before receiving a new MMPA/ESA permit. Rescue, response, and rehabilitation activities are not subject to the AWA.

1.5.4.11 Federal Water Pollution Control Act

The Federal Water Pollution Control Act, also called the Clean Water Act (CWA; 33 U.S.C. 1251 et seq.), was enacted in 1948 and establishes the basic structure for regulating discharges[21] of pollutants[22] into the waters of the United States[23] and regulating quality standards for surface waters. The CWA prohibits discharging pollutants through a point source into surface waters of the United States without a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits are not needed for discharges into a municipal sanitary sewer system, but local municipalities may have their own permitting systems to ensure that the water discharged from those systems complies with the requirements of the CWA. Marine mammal rehabilitation facilities that discharge wastewater into surface waters must abide by the CWA and maintain a NPDES permit if required. Rehabilitation facilities that discharge their wastewater into municipal sanitary sewer systems must comply with all local regulations and permitting requirements.

1.5.4.12 Administrative Procedure Act

The Administrative Procedure Act (APA; 5 U.S.C. 551 et seq.) was established in 1946 and is the law under

[21] Discharges that are regulated are point source discharges, which includes any discernible, confined and discrete conveyance, such as a pipe, ditch, channel, tunnel, conduit, discrete fissure, or container.

[22] Pollutants are any type of industrial, municipal, and agricultural waste discharged into water, including dredged soil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste.

[23] Waters of the United States are defined as navigable waters, tributaries to navigable waters, interstate waters, and the oceans out to 200 miles.

which federal regulatory agencies, including NMFS, create the rules and regulations necessary to implement and enforce major legislative acts such as the MMPA and ESA. The APA also provides for judicial review of agency final actions and regulations. Under the APA, courts may set aside agency actions as arbitrary and capricious, an abuse of discretion, unconstitutional, beyond statutory authority, unsupported by substantial evidence, or unwarranted by the facts.

A decision by NMFS OPR Permits and Conservation Division to issue or deny a permit is subject to judicial review based upon the administrative record under the APA. For this reason, NMFS OPR Permits and Conservation Division maintains a thorough written record documenting the information reviewed and relied upon in making its conclusions, as well as a written record of the process by which the information was used.

1.5.4.13 Executive Orders

An Executive Order (EO) is an order having the force of law issued by the president of the United States to a part of the executive branch of the government. An EO directs federal agencies in the execution of congressionally established laws or executive policies. The following Presidential EOs are relevant to this analysis.

1.5.4.13.1 Executive Order 13089 - Coral Reef Protection

EO 13089 was issued in 1998 and requires federal agencies whose actions may affect U.S. coral reef ecosystems to:

- Identify their actions that may affect U.S. coral reef ecosystems.
- Use their programs and authorities to protect and enhance the conditions of such ecosystems.
- To the extent permitted by law, ensure that any actions they authorize, fund, or carry out will not degrade the conditions of such ecosystems.

Coral species in the action area are described in Chapter 3, and potential impacts from the various alternatives and mitigation to prevent impacts to these species are provided in Chapters 4-10.

1.5.4.13.2 Executive Order 13158 - Marine Protected Areas

EO 13158 was issued in 2000 and requires federal agencies to identify actions that affect natural or cultural resources within marine protected areas (MPAs). It further requires federal agencies, in taking such actions, to avoid harm to the natural and cultural resources that are protected by a MPA. Chapter 3 describes the

MPAs (*i.e.*, protected and sensitive habitats) in the action area. The effects of the various alternatives to the resources within these protected and sensitive areas are described in Chapters 4-10.

1.5.4.13.3 Executive Order 13186 - Responsibilities of Federal Agencies to Protect Migratory Birds

Several international, bilateral conventions on migratory birds, of which the United States is a co-signatory, impose substantive obligations on the United States for the conservation of migratory birds and their habitats. Through the MBTA, the United States has implemented these migratory bird conventions with respect to the United States. This EO was issued in 2001 and directs executive departments and agencies to take certain actions to further implement the MBTA.

Chapter 2 Proposed Actions and Alternatives

The National Marine Fisheries Service (NMFS) Office of Protected Resources (OPR) Marine Mammal and Sea Turtle Division's proposed primary action is to continue implementing the Marine Mammal Health and Stranding Response Program (MMHSRP) and the proposed secondary action (being taken by the OPR Permits and Conservation Division) is consideration of whether to issue a scientific research and enhancement permit (MMPA/ESA permit) pursuant to Section 104 of the Marine Mammal Protection Act (MMPA), Section 10(a)(1)(A) of the Endangered Species Act (ESA), and Section 104 of the Fur Seal Act (FSA) for MMHSRP research and enhancement activities. In accordance with the National Environmental Policy Act (NEPA) and the 1978 Council on Environmental Quality (CEQ) Regulations, NMFS is required to consider a reasonable range of alternatives to the proposed actions, as well as a No Action Alternative. The evaluation of alternatives under NEPA assists NMFS with assessing alternative ways to achieve the purpose and need of the proposed actions, while avoiding or minimizing adverse impacts, or enhancing the quality of the environment. For the purposes of this assessment, an alternative will only meet the purpose and need if it satisfies the requirements under Title IV and Section 104 of the MMPA, Section 10(a)(1)(A) of the ESA, and Section 104 of the FSA. Therefore, NMFS applied the screening criteria and considerations outlined in section 2.1 below to identify which alternatives to carry forward for analysis.

2.1 Considerations for Selecting Alternatives

Criteria were developed to determine whether an alternative was realistic or reasonable and was therefore analyzed in the document. Alternatives were eliminated from further analysis if they violated at least one of five criteria:

1. **Consistency with Law:** If an alternative presented a situation that would prevent the MMHSRP from meeting its mandate under Title IV of the MMPA, it was excluded from further analysis.
2. **Human Health and Safety:** If an alternative presented a situation that put human health and safety at unnecessary risk, it was excluded from further analysis.
3. **Animal Welfare:** If an alternative presented a situation that was unnecessarily detrimental to the welfare of a marine mammal, if an alternative presented a situation that violated permitted actions, laws, or regulations under the MMPA, ESA, or FSA, including permit issuance criteria (50 CFR 216 and 50 CFR 222), it was excluded from further analysis.

4. **Permit Requirements, Laws, and Regulations:** If an alternative presented a situation that violated permitted actions, laws, or regulations under the MMPA or ESA, including permit issuance criteria (50 CFR 216 and 50 CFR 222), it was excluded from further analysis.

Finally, based on the statutory framework explained in Chapter 1, section 1.1.2, OPR Permits and Conservation Division considers a No Action Alternative in which it denies an applicant's request for a permit, and an Action Alternative in which it grants the application and issues a permit to the applicant. Therefore, this PEIS also addresses the Permits and Conservation Division's consideration whether to issue a MMPA/ESA permit under the MMPA, ESA, and FSA; thus alternatives described in sections 2.3-2.5 and the subsequent analyses (Chapters 4-10) support a reasonable range of alternatives.

2.2 Description of Specified Activities

As discussed in Chapter 1, the MMHSRP comprises several program areas, under which six activities, coordinated nationally and implemented regionally, may influence the human environment and natural resources:

1. Stranding Response
2. Carcass Disposal
3. Rehabilitation Activities
4. Release of Rehabilitated Animals
5. Entanglement Response Activities
6. Biomonitoring and Research Activities

These activities may be conducted across several or all of the MMHSRP program areas. Therefore, the alternatives identified in sections 2.3-2.5 below focus on these activities rather than the MMHSRP program areas. Similarly, the environmental impact of each activity category and the associated mitigation measures are analyzed independently in Chapters 4-10. Prescott Grant recipients may conduct any or all of these activities as part of their project proposal. After projects have been selected to receive funding, the Prescott Grant Program staff will assess the activities contained within each proposal to ensure that they are consistent with NMFS policies, and have been analyzed appropriately in this PEIS. If future Prescott Grant 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.

2.2.1 Stranding Response Activities

The NMFS National Marine Mammal Stranding Response Network (Stranding Network) is made up of over 100 organizations nationwide who respond to stranded, ill, injured, distressed, imperiled, or out of habitat cetaceans and pinnipeds (except walrus, *Odobenus rosmarus*) within U.S. waters. The overarching goals of the Stranding Network are to provide for the welfare of live animals; minimize risks to public health and safety; use strandings and stranded marine mammals as a resource for scientific information; advance public education and engagement; and enhance the conservation and management of wild populations and, in turn, marine ecosystems. Response activities may include, but are not limited to, beach assessment, capture, medical treatment, relocation, transportation, rehabilitation, release, transfer, collection of a carcass, field or laboratory necropsy, retention of parts and specimens, and humane euthanasia. For a full description of stranding response activities see Chapter 4.

2.2.2 Carcass Disposal Activities

A large majority of marine mammals that strand are dead, die shortly after coming ashore, or need to be humanely euthanized to alleviate their suffering due to the severity of their injury or illness. Animals also die in rehabilitation facilities. There are several options for carcass disposal that largely depend on the species, the number and size of the animals, location (geography, currents, and state and/or local laws and regulations), logistics (availability of equipment and resources), and whether drugs were administered to the animal before it died (*e.g.*, antibiotics, sedatives, and/or euthanasia solution). Leaving a carcass on-site, to decompose naturally, is possible in uninhabited areas but is less practical in populated areas where the carcass may be a public health and/or aesthetic concern, or if certain chemicals were used to humanely euthanize the animal that could inadvertently poison scavengers. Other options of carcass disposal include burial at site, transportation and burial at a different (*i.e.*, more suitable) location, towing the carcass out to sea, sinking the carcass by attaching heavy materials, or utilizing industrial disposal methods such as incineration, rendering, and composting. For a full description of carcass disposal activities see Chapter 5.

2.2.3 Rehabilitation Activities

Facilities may be authorized under Stranding Agreements (SAs), under 109(h), or as NMFS designees, to conduct marine mammal rehabilitation for species under NMFS jurisdiction (see Appendix I for a list of current rehabilitation facilities). Rehabilitation facilities vary in terms of species treated, capacity, and facility amenities. The length of time that a facility can rehabilitate an animal may depend on the species, available space, medical needs of the stranded animal, funding, and the equipment available. Rehabilitation efforts focus primarily on stabilization, assessment, medical treatment, and preparation for release. The primary goal of rehabilitation is to return healthy marine mammals back into the wild. Animal tagging/marking and post-release monitoring are also conducted on rehabilitated animals, and therefore are also considered rehabilitation activities.

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, and are further outlined in the Standards for Release of Marine Mammals following Rehabilitation (Appendix V). The MMHSRP, and OPR Permits and Conservation Division, work with captive marine mammal facilities to place marine mammals deemed "non-releasable" into permanent managed care. For a full description of rehabilitation activities see Chapter 6.

2.2.4 Release of Rehabilitated Animals

Release of a rehabilitated marine mammal occurs when an attending veterinarian determines that the animal is releasable following the Standards for Release of Marine Mammals following Rehabilitation (Appendix V), and usually after consultation with NMFS. NMFS requires all released animals be marked to facilitate both short- and long-term identification of individuals. Marking methods include, but are not limited to: bleach, crayon, zinc oxide, paintball, notching, plastic livestock ear tags (*e.g.*, Rototags, Allflex tags, etc.), hot branding, and freeze branding. Additionally, scientific instruments may be applied to rehabilitated marine mammals prior to release. These instruments may collect biological, environmental, and location data. These instruments include, but are not limited to: Passive Integrated Transponder (PIT) tags, Low Impact Minimally Percutaneous Electronic Transmitter (LIMPET) tags, satellite-linked tags, Very High Frequency (VHF) tags, Digital Acoustic Recording Tags (DTAG), and Time Depth Recorders (TDRs). The method of marking and application of scientific instruments would be based upon a variety of factors including: the species, the data needs from the marks or scientific instrument, the required mark or instrument duration, and the supplies on hand (including available funding). The least invasive method possible that meets the requirements of the situation would be chosen. For a full description of release activities see Chapter 7.

2.2.5 Entanglement Response Activities

Entanglements occur when foreign material (gear, line, marine debris, etc.) becomes wrapped around, hooked into, or otherwise attached to the body of an animal. Entanglements also include cases when an animal has ingested gear including hooks, line, or other marine debris. Response activities are initiated to document and assess the nature and extent of the entanglement and injuries, and to identify the most appropriate course of action. Full or partial removal of gear (if warranted) can improve the chances of survival, and help the individual continue to function as a member of the population. Responding to entangled marine mammals also provides an opportunity to collect, identify, document entanglement configurations/modifications, and locate the source of gear. These data can be used to assess current management strategies and inform management decisions to prevent or mitigate future marine mammal entanglement.

Entanglement response efforts are conducted on all marine mammal taxa. For large whales, entanglement response may include, but are not limited to, vessel and aerial searches for the affected individual, close approaches, satellite tagging, administration of chemical agents (sedatives and/or antibiotics), cutting of lines and possibly flesh (when the line is embedded), and the use of buoys or sea anchors to slow the animal's movement to enable responders to safely approach the animal to attempt a response. For pinnipeds and small cetaceans, entanglement response may include, but are not limited to, close approach (for remote disentanglement of small cetaceans or remote darting of pinnipeds), capture, restraint, marking/tagging, treatment in the field, surgery, rehabilitation, administration of chemical agents (sedatives, reversals, and/or antibiotics), and release.

The Large Whale Entanglement Response Network operates in all NMFS regions, and is a partnership between NMFS and permitted entanglement responders. These responders are trained and authorized under the current MMPA/ESA permit. Additionally, the National Oceanic and Atmospheric Administration funds some entanglement response activities. Appendix I lists the current (2020) members of the Large Whale Entanglement Response Network.

Pinniped and small cetacean entanglement response networks are less formalized than the Large Whale Entanglement Response Network, and in many cases the response is conducted by members of the Stranding Network. All entanglement response activities of ESA-listed species and those utilizing new tools and techniques are authorized under the current MMHSRP MMPA/ESA permit; entanglement response activities of non-listed species may be conducted under the authority of a current SA, MMPA Section 109(h), or the current MMHSRP MMPA/ESA permit. The context of the entanglement case determines under which authority the response activity is conducted. For a full description of entanglement response activities see Chapter 8.

2.2.6 Biomonitoring and Research Activities

The MMHSRP conducts and partners with scientists to conduct a variety of emergency response-related and baseline research projects relating to marine mammal health. Research activities fall into one of two categories: (1) activities that occur during or after an emergency and directly derive from an emergency event investigation ("emergency response-related research"), or (2) baseline health research that is not related to emergencies. Emergency response-related research projects may include, but are not limited to: conducting captures and sampling of marine mammals for health assessments during or after an Unusual Mortality Event (UME) or oil spill; sampling stranded animals undergoing rehabilitation; or sampling free-swimming injured, ill, or entangled marine mammals. These activities could also include remote sampling (*e.g.*, biopsy, breath, etc.). Baseline health research includes, but is not limited to: monitoring presumed healthy animals to gain reference data on the population; research and development of tools and techniques that would be tested on animals in managed care, rehabilitation, or the wild; or surveillance of presumed healthy animals for the detection of new threats such as infectious diseases. For a full description of biomonitoring and research activities see Chapter 9.

2.3 Alternative 1 – Continue Program Implementation at Current Activity Levels until Current Permit Expires on December 31, 2022 (No Action Alternative)

Under Alternative 1 (No Action Alternative), NMFS OPR Marine Mammal and Sea Turtle Conservation Division and the NMFS Regional Offices would continue to implement the MMHSRP in the same manner as they do currently:

- **<u>Stranding Response</u>:** NMFS would continue to use current SA criteria and issue SAs on a case-by-case basis to those entities meeting the SA criteria (including renewal and new applications). Current SAs would continue to be issued regionally with national programmatic oversight. The SA template would not be modified to include any new articles (*i.e.*, short-term holding facilities; Appendix VIII, Article VI) and temporary participation in the Stranding Network for certain emergencies (*e.g.*, oil spills; Appendix VIII, Article VII). Stranding response activities may be modified, as new techniques and tools become available. As Alternative 1 also includes the denial of a new MMPA/ESA permit, response to ESA-listed species by SA holders would only continue until the current permit expires.
- **<u>Carcass Disposal</u>:** NMFS would continue recommending removal and disposal of all chemically-euthanized carcasses off-site. Animals that die naturally or are euthanized by other means may be disposed of by whatever means feasible and allowed. As Alternative 1 also includes the denial of a new MMPA/ESA permit, disposal of ESA-listed species by SA holders would only continue until the current MMPA/ESA permit expires.
- **<u>Rehabilitation Activities</u>:** NMFS would continue the rehabilitation activities of the Stranding Network with the current facility standards in place. New rehabilitation facilities could be added to the Stranding Network and minor adaptive changes to rehabilitation activities (*i.e.*, issuance of best

practices) could be made, as needed. As Alternative 1 also includes the denial of a new MMPA/ESA permit, rehabilitation of ESA-listed species by SA holders would only continue until the current MMPA/ESA permit expires.

- **Release of Rehabilitated Animals:** The Stranding Network would continue to need prior approval for all animal releases following existing release standards, unless a regional waiver already exists (*e.g.*, release of California sea lions (*Zalophus californianus*) in the West Coast Region). Minor adaptive changes to release activities could be made, as needed. As Alternative 1 also includes the denial of a new MMPA/ESA permit, release of ESA-listed species would only continue until the current MMPA/ESA permit expires.
- **Entanglement Response Activities:** NMFS would continue the current activities of the Large Whale Entanglement Response Program and training prerequisites for large whale network participants would continue. There would be no formalized process to add new participants to the Entanglement Response Networks, or best practices for large whale entanglement response activities. Current SAs would continue to allow responses to entangled pinnipeds and small cetaceans. Under the current MMPA/ESA permit, entanglement response activities may be modified under this alternative, as new techniques, training and tools are developed. As Alternative 1 also includes the denial of a new MMPA/ESA permit, entanglement cases involving non ESA-listed species could only be conducted under the auspices of a SA or 109(h) authority after the current MMPA/ESA permit expires, and ESA-listed species could only be responded to by employees of the USFWS, NMFS, any other federal land management agency, or state conservation agency under ESA regulations 50 CFR 17.21(c)(3) and 17.31(a).
- **Biomonitoring and Research Activities:** Biomonitoring and research activities conducted under the current MMPA/ESA permit will continue, without modification, until the current permit expires.

For the OPR Permits and Conservation Division, denial of a MMPA/ESA permit constitutes the No Action Alternative. This is consistent with NMFS statutory obligation under the MMPA and ESA to either: (1) deny the requested permit or (2) grant the requested permit and prescribe mitigation, monitoring, and reporting requirements. Thus, under the No Action Alternative, OPR Permits and Conservation Division would not issue a new MMPA/ESA permit pursuant to MMPA Section 104 and its implementing regulations (50 CFR 216), ESA Section 10(a)(1)(A) and its implementing regulations (50 CFR 222), and FSA Section 104 and its implementing regulations (50 CFR 216) to the MMHSRP, and all the biomonitoring and research activities would cease after the existing permit expires. This includes ceasing prospective health assessments and research projects relating to marine mammal health, the National Marine Mammal Tissue Bank, and other services through partner institutions.

The No Action Alternative does not meet the purpose and need; however, the No Action Alternative is carried forward for consideration per the 1978 CEQ Regulations for the purposes of presenting a comparative analysis to the action alternatives.

2.4 Alternative 2 – Improved Program Implementation and Issuance of a New Scientific Research and Enhancement Permit (Preferred Alternative)

Under Alternative 2 (Improved Implementation), NMFS OPR Marine Mammal and Sea Turtle Conservation Division and the NMFS Regional Offices would continue to implement the MMHSRP as described in Alternative 1, and NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit. This would allow the MMHSRP to continue currently permitted activities (*i.e.*, emergency response to and rehabilitation of ESA-listed species, entanglement response, and scientific research activities). Alternative 2 would also allow the MMHSRP to implement some operational improvements to a subset of programs and activities:

- **Stranding Respons**e: NMFS would implement updated SA criteria (Appendix IX) and issue SAs on a case-by-case basis to those entities meeting the updated criteria (including renewal and new applicants), utilizing the new SA template (Appendix VIII). In addition to minor modifications to the current SA articles, the updated SA template would include two new articles that authorize additional stranding activities (*i.e.*, short-term holding facilities (Appendix VIII, Article VI) and temporary participation in the Stranding Network for certain emergencies (Appendix VIII, Article VII) (*e.g.*, oil spills)). The new SA template could be modified and updated in the future, as needed. The MMHSRP would also issue new best practices documents (*i.e.*, for conducting euthanasia (Appendix XIII), small cetacean interventions (Appendix XII), large whale emergency responses (Appendix XVI), and cetacean mass strandings (Appendix XV)). Stranding response activities may be modified, as new techniques and tools become available. As Alternative 2 also includes the issuance of a new MMPA/ESA permit, responses authorized by the MMPA/ESA permit would continue under the new permit after the current permit expires on December 31, 2022.
- **Carcass Disposal:** NMFS would release the Marine Mammal Carcass Disposal Best Practices (Appendix XIV), recommend that the best practices for carcass disposal are followed, and allow for the modification of carcass disposal activities as new information is obtained regarding persistent contaminants or as disposal methods are improved or developed. Additionally, NMFS

would recommend that only marine mammals euthanized with chemicals known to cause secondary poisoning (*e.g.*, pentobarbital) be disposed of off-site. As Alternative 2 also includes the issuance of a new MMPA/ESA permit, disposal of ESA-listed species could continue under the new permit after the current permit expires on December 31, 2022.

- **Rehabilitation Activities:** Updated Standards for Rehabilitation Facilities (Appendix XVII) would be implemented and would include new sections on ESA-listed species, short-term holding, and emergency temporary holding facilities. New rehabilitation best practices documents such as marine mammal transport, euthanasia, and rehabilitation of pygmy and sperm whales would be issued (Appendices X, XIII, XVIII). As Alternative 2 also includes the issuance of a new MMPA/ESA permit, rehabilitation of ESA-listed species would continue under the new permit after the current permit expires on December 31, 2022.
- **Release of Rehabilitated Animals:** NMFS would update the Standards for Release of Marine Mammals after Rehabilitation (Appendix V), and issue a national release plan template. As Alternative 2 also includes the issuance of a new MMPA/ESA permit, release of ESA-listed species would continue under the new permit after the current permit expires on December 31, 2022.
- **Entanglement Response Activities:** Entanglement response best practice guidelines for large whales, small cetaceans, and pinnipeds (Appendices XIX, XX, XXI) would be issued nationwide, and new participants would be trained and existing responders could be promoted. As Alternative 2 also includes the issuance of a new MMPA/ESA permit, entanglement response would continue under the new permit after the current permit expires on December 31, 2022.
- **Biomonitoring and Research Activities:** Under this alternative, the NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit. The permit would become effective on January 1, 2023 and would authorize current and new biomonitoring, research, and tool development activities.

2.5 Alternative 3 – More Stringent Protocols and Best Practices and Issuance of a New Scientific Research and Enhancement Permit

Under Alternative 3 (More Stringent Protocols and Best Practices), NMFS OPR Marine Mammal and Sea Turtle Conservation Division and NMFS Regional Offices would continue to implement the MMHSRP as described in Alternative 2 plus allow the MMHSRP to require more stringent protocols and best practices (see below for details about the changes and operational enhancements) and NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit under this alternative.

- **Stranding Response:** NMFS would require response to threatened and endangered animals (where feasible, permitted, and safe) as part of the terms and conditions of the SA. Response to all other animals would be highly encouraged. Stranding participants could respond to these non-listed animals when feasible, based upon the availability of resources. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, response to ESA-listed species could continue under the new permit after the current permit expires on December 31, 2022.
- **Carcass Disposal:** NMFS would require that all chemically-euthanized animals be transported off site. Incineration would be required for all animals euthanized with barbiturate drugs. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, disposal of ESA-listed species could continue under the new permit after the current permit expires on December 31, 2022.
- **Rehabilitation Activities:** There would be no changes from Alternative 2. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, rehabilitation of ESA-listed species would continue under the new permit after the current permit expires on December 31, 2022.
- **Release of Rehabilitated Animals:** NMFS would require all species listed as threatened or endangered under the ESA be released, regardless of whether the animal would normally be deemed releasable (*e.g.*, young animals that may not survive without maternal investment). All ESA-listed animals would be required to be released with VHF or satellite-linked tags, and all other animals released after rehabilitation or translocation would need to be PIT tagged. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, release of ESA-listed species could continue under the new permit after the current permit expires on December 31, 2022.
- **Entanglement Response Activities:** Entanglement response activities to pinnipeds or small cetaceans could not be conducted unless responders meet formalized training prerequisites. Large whale entanglement response activities would be the same as under Alternative 2. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, entanglement response could continue under the new permit after the current permit expires on December 31, 2022.
- **Biomonitoring and Research Activities:** Under this scenario, OPR Permits and Conservation Division would issue a new MMPA/ESA permit. The permit would become effective on January 1, 2023 and biomonitoring, research, and enhancement activities would continue. However, prospective health assessment projects would only be conducted on ESA-listed species and research on non ESA-listed species would cease.

2.6 Mitigation Measures

The purpose of mitigation is to avoid, minimize, or eliminate negative impacts on the affected resources from a proposed action. Mitigation measures, including the issuance of best practices documents and updated standards, are fundamentally tied with NMFS alternatives, and are analyzed concurrently with the alternatives in Chapters 4-10.

2.7 Alternatives Considered but Eliminated

To warrant analysis in this document, an alternative must be reasonable and meet the purpose and need described in section 1.3. If an alternative was considered but deemed to be (1) not realistic or reasonable or (2) not in line with the purpose and need, it was not evaluated in detail in this document. Criteria (section 2.1) were developed to determine whether an alternative was realistic or reasonable and therefore analyzed in the PEIS. The 1978 CEQ Regulations (40 CFR 1502.14(a)) state that for alternatives eliminated from detailed study in the final PEIS, the agency must describe reasons for why alternatives were eliminated. The following subsections list alternatives considered and reasons they were not carried forward for detailed analysis.

2.7.1 Completely Ceasing Implementation of the MMHSRP

Under this alternative, all MMHSRP operations would cease after the current MMPA/ESA permit expires on December 31, 2022, and all biomonitoring and research activities as well as stranding and entanglement response to and rehabilitation of ESA-listed species would cease. As SAs expired, new SAs would not be issued. Without active SAs, most stranding and entanglement response activities to non-listed species would end, including carcass disposal, as outside partners would not be legally authorized to "take" animals during the course of their response activities. Carcasses would remain at stranding sites unless removed by MMPA Section 109(h) responders. Without authorized stranding response, most live animal rehabilitation and release activities would also end. Lastly, Prescott Grants would not be awarded to support these activities.

Under this alternative, NMFS would not fulfill its mandate under Title IV of the MMPA, and there would be a high level of Congressional scrutiny and public controversy, as well as potential human health and safety risks. This alternative would not be feasible or humane and would eliminate the collection of valuable information on marine mammal health and populations gained through the examination of stranded animals. Therefore, NMFS eliminated this alternative.

2.7.2 Restricting Specific Activities of the MMHSRP

2.7.2.1 Stranding Agreement Holder Response Curtailed Immediately

This alternative would immediately stop the Stranding Network response to stranded animals as the Network would cease to exist. Federal, state, local, and tribal agencies authorized under MMPA Section 109(h) would still be able to conduct emergency response to non ESA-listed species, and ESA-listed species under ESA regulations at 50 CFR 17.21(c)(3) and 17.31(a), where applicable. However, response, rehabilitation, and release activities would likely be limited and localized. Most activities would consist of carcass disposal for the protection of public health and safety. No coordinated oversight of emergency response would occur, and some geographic areas without MMPA Section 109(h) responders would be disproportionately impacted.

Under this alternative, NMFS would not fulfill its mandate under Title IV of the MMPA, and there would be a high level of Congressional scrutiny and public controversy, as well as potential human health and safety risks. This alternative would not be feasible or humane and would eliminate the collection of valuable information on marine mammal health and populations gained through the examination of stranded animals and biomonitoring and research would be significantly impacted. Therefore, NMFS eliminated this alternative.

2.7.2.2 Carcass Disposal Activities are Restricted

2.7.2.2.1 All Carcasses are Buried On-site

Under this alternative, all carcasses would be buried where they stranded. This would create operational issues, as burial is not an option in all geographic areas due to substrate conditions (rocks or dense soil, shallow water table, inaccessibility by necessary machinery, etc.), and federal, state, or local laws may prohibit burial of carcasses in some geographic areas. In addition, marine mammal carcasses have the potential to contain toxins, either from biotoxins or other contaminants, and some chemically euthanized animal carcasses may contain high concentrations of chemicals that can lead to secondary poisoning in scavengers. Burying these carcasses could create a serious and high risk to humans, scavengers, water quality, and soils. The option to transport carcasses off-site must be available. Therefore, NMFS eliminated this alternative.

2.7.2.2.2 All Animals are Transported Off-site for Disposal

Under this alternative, all carcasses would need to be removed from the environment and incinerated or disposed of in a landfill, commercial composting facility, or rendering plant. Transporting all carcasses off-site would place an extreme financial burden on Stranding Network participants. In addition, some carcasses may not be transportable for operational reasons: the animal is too large or too heavy to lift, equipment is unavailable or cost prohibitive, equipment is not permitted at the stranding location, or there is no available beach access. Other disposal methods (burial, disposal at sea, natural decomposition) would be more cost-effective and feasible for certain cases. Therefore, NMFS eliminated this alternative.

2.7.2.2.3 No Animals are Chemically Euthanized

Under this alternative, animals would not be chemically euthanized. This would allow carcasses to be left in the environment without releasing drugs (*e.g.*, pentobarbital) into the environment or endangering scavengers. However, chemical injection of drugs is generally the most common humane method of euthanasia for marine mammals. Other physical methods of euthanasia, such as ballistics (shooting) or explosives, may be dangerous to personnel assisting with the process as well as to the public, require expert practitioners to be conducted humanely, and are not effective for certain large whales. Exsanguination could be performed; however, in order to be humane, according to the American Veterinary Medical Association, all marine mammals would need to be heavily sedated or anesthetized first with drugs, as major blood vessels are deeply rooted and surrounded by soft tissue with an abundance of pain receptors. Time to death would vary with exsanguination (dependent on size and species of animal, location of blood vessel, amount of prior blood loss). Prohibiting the use of chemical euthanasia would require stranding personnel to either use physical euthanasia methods or not perform euthanasia. The use of physical euthanasia methods could increase the risks to human health and safety. Additional numbers of animals would be euthanized using physical methods (if appropriate for animal size and location) or left on the beach to die, which could increase the suffering of the animals and potentially create public controversy. Therefore, NMFS eliminated this alternative.

2.7.2.3 Rehabilitation Activities Curtailed Immediately for Stranding Agreement Holders

This alternative would immediately stop the rehabilitation of stranded animals. Animals currently in rehabilitation facilities would be euthanized or released, and no new animals would receive treatment. This alternative would eliminate the collection of valuable information on marine mammal health and populations gained through the examination of rehabilitated animals. Adverse effects could occur to ESA-listed species that have previously benefited from rehabilitation activities (*e.g.*, Hawaiian monk seals, *Neomonachus schauinslandi*). Under this alternative, NMFS would not be fulfilling its mandate under Title IV of the MMPA, and rehabilitation facilities would be required to conduct actions in contradiction to their missions (*i.e.*, end rehabilitation prematurely), which would potentially create public controversy. Therefore, NMFS eliminated this alternative.

2.7.2.4 All Animals are Released After Rehabilitation

Under this alternative, all animals would be released from rehabilitation regardless of whether they would normally be deemed releasable (*e.g.*, an animal with a medical issue that requires regular veterinary care and medication, or an animal that has developed behavioral problems). Currently, non-releasable animals may be placed into permanent managed care if the receiving facility holds a U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) exhibitor's license or research registration or has authorization under the Department of Defense to maintain marine mammals. Facilities with an exhibitor's license must also offer a program for education or conservation purposes (based on professionally recognized standards), and maintain facilities for the public display that are open to the public on a regularly scheduled basis. Animals in managed care may contribute to the education of the general public and to the scientific body of knowledge. Requiring a facility to release animals prematurely or that are deemed non-releasable would be detrimental to the welfare of the animal and possibly to wild populations, as well as human safety; and rehabilitation facilities would be required to conduct actions in contradiction to their missions (*i.e.*, end rehabilitation prematurely), which would potentially create public controversy. Therefore, NMFS eliminated this alternative.

2.7.2.5 Entanglement Response Activities are Curtailed Immediately

Under this alternative, NMFS would immediately terminate the Large Whale Entanglement Response Network. All small cetacean and pinniped entanglement responses conducted under the MMPA/ESA permit or SA would also cease, but responses could continue by MMPA Section 109(h) responders. Animals would likely remain entangled and potentially unable to feed, swim, or reproduce. This would be a detriment to the wild population and would result in needless suffering and death of marine mammals. The cessation of entanglement response activities would also eliminate the collection of valuable information on fisheries interactions with marine mammals. Further, this alternative could create a high level of public controversy and pose a serious risk to human health and safety, as the public may attempt to disentangle animals themselves. Therefore, NMFS eliminated this alternative.

2.7.2.6 Biomonitoring and Research Activities are Restricted

2.7.2.6.1 Health Assessment Captures Would Not Occur

Under this alternative, NMFS would not conduct health assessment captures on any wild populations of marine mammals. Health assessment captures are an integral part of fulfilling NMFS' mandate under Title IV. Additionally, health assessment captures are also used to provide information on animals in areas where UMEs have occurred or are occurring, and significantly contribute to UME investigations. Under this alternative, NMFS would not effectively fulfill its mandates under Title IV of the MMPA to facilitate the collection and dissemination of reference data on the health of marine mammals and health trends of marine mammal populations in the wild or to coordinate effective responses to UMEs. Therefore, NMFS eliminated this alternative.

2.7.2.6.2 Piggybacking sample collection would be required from all NMFS permitted researchers

Under this alternative, NMFS would be required to collect samples from all marine mammal health-related research projects conducted by NMFS-permitted researchers. This would not be feasible and would create various operational issues: significant additional costs would be incurred for preserving and shipping samples, as well as to complete sample analysis; the increase in samples may create storage challenges; and expanding the current archival capacity would also come at a significant cost to the Network. Finally, requiring sample collection on all projects conducted by NMFS-permitted researchers could violate the terms and conditions of their permits or Institutional Animal Care and Use Committee authorizations, or require amendments/modifications. Therefore, NMFS eliminated this alternative.

Chapter 3 Affected Environment

The National Marine Fisheries Service (NMFS) considered all relevant environmental, cultural, historical, social, and economic resources based on the geographic location associated with NMFS primary and secondary proposed actions and alternatives. Based on this review, this Chapter describes the affected environment and existing (baseline) conditions for select resource categories (*e.g.*, marine environment). Where appropriate, NMFS relied on information from previous analyses related to the resource categories carried forward for analysis and incorporated them by reference. Subsequent chapters provide an analysis and description of environmental impacts associated with the affected environment identified in this Chapter.

3.1 Scope

3.1.1 Geographic Scope

The geographic scope includes all areas where Marine Mammal Health and Stranding Response Program (MMHSRP) activities may occur. MMHSRP activities may occur wherever marine mammals are present, such as the coastal waters, estuarine and adjacent inland waters, and the Exclusive Economic Zone (EEZ) of the United States, its territories, and possessions, and adjacent marine waters. The coastal zone includes coastal waters, adjacent shores, intertidal areas, salt marshes, wetlands, and beaches. The geographic scope also includes the marine mammal rehabilitation facilities of the Stranding Network (for location of all rehabilitation facilities see Appendix I). The MMHSRP may also import/export marine mammal parts and samples from/to foreign countries for analysis. All samples imported from foreign countries would be collected legally in the country of origin. Import/export of samples for analysis is discussed in Chapter 9.

3.1.2 Scope of the Affected Environment

Given the broad geographic scope of the proposed action, and in compliance with 40 Code of Federal Regulations (CFR) 1502.15 and the National Oceanic and Atmospheric Administration's (NOAA) policy and procedures for implementing the National Environmental Policy Act (NEPA), the description of the affected environment only focuses on those resource areas that are potentially subject to impacts from the proposed action:

- Biological resources: protected and sensitive habitats, submerged aquatic vegetation (SAV) and macroalgae, reptiles, marine mammals, fish, birds, shellfish, and other wildlife, including Endangered Species Act (ESA)-listed threatened and endangered species

- Water and sediment quality
- Human health and safety
- Cultural resources
- Socioeconomics.

Some environmental resources and conditions that are often analyzed in a Programmatic Environmental Impact Statement (PEIS) have been omitted from this analysis. Effects in the following categories are considered irrelevant to the proposed action, or impacts from the alternatives are not anticipated and are therefore, not analyzed in detail.

Air quality: Alterations of the air quality 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 activities also occur, and would not represent a significant contribution to regional air quality. Aerosolized pathogens spread through treatment or necropsy of sick animals would not be considered air pollution, but are analyzed under human health and safety.

Noise: Most MMHSRP activities would not result in the production of excessive noise, with a few exceptions. The first exception would be the use of heavy machinery in stranding or entanglement response or carcass disposal activities. However, this equipment would produce noise similar to, or below, levels that are allowed under local ordinances governing normal construction activities. Another exception would be the use of acoustic deterrents (to herd animals away from a dangerous situation) or attractants (to bring animals to a specific site). For both of these exceptions, the noise would be localized, of short duration, and would not result in any significant impacts.

The last exception would be acoustic sampling during research activities. Acoustic sampling includes active acoustic playbacks of pre-recorded sounds (*e.g.*, songs, social sounds, feeding calls, etc.). Sounds and songs are projected from an underwater speaker. The physiological and/or physical response of the animals to the sounds and songs is measured, often through behavioral observation and photographs/video recording of the subject animal(s). Playbacks are also used to determine if an animal can hear and assess how they are responding to sounds. Sounds or songs are projected from the speaker at a volume and quality as close to a real sound/song as possible, and therefore this noise would be localized, of short duration, and would not result in any significant 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 generally not considered suitable for agricultural use or housing development.

C***oastal zone management:*** Similar to land use, 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 are expected from these activities.

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 cause any other impact to public services or utilities. No impacts are expected from these activities, and therefore there are not any applicable mitigation measures for public services and utilities.

3.2 Biological Resources

3.2.1 Definition of the Resource

Biological resources include native or naturalized organisms or parts thereof, genetic resources, populations, or any biotic component of an ecosystem with actual or potential value for humanity. Sensitive and protected biological resources include plant and animal species listed as threatened or endangered by NMFS or U.S. Fish and Wildlife Service (USFWS), or are otherwise protected under federal or state laws. The ESA 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[24] portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future throughout all or a significant portion of its range

Critical habitat is also 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 that contain physical or biological features essential to conservation, and which 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. Biological resources

[24] Per NMFS and USFWS policy, (79 FR 37577, July 1, 2014) a portion of the range of a species is defined as "significant" if the species is not currently endangered or threatened throughout all of its range, but the portion's contribution to the viability of the species is so important that, without the members in that portion, the species would be in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range.

evaluated include protected and sensitive habitats (including coral reefs); SAV and macroalgae; reptiles; fish and shellfish; coastal and marine birds; and marine mammals.

3.2.1.1 Protected and Sensitive Habitats

Protected and sensitive habitats are usually defined as those areas that are identified as marine sanctuaries, critical habitats, coral reefs, National Park Service (NPS) units (including national seashores and national monuments), wildlife refuges, national forests, estuarine research reserve sites, and fisheries management areas. These areas are under federal jurisdiction and are managed by NMFS, USFWS, the NPS, the National Ocean Service (NOS), the Bureau of Land Management (BLM), and the U.S. Forest Service (USFS). Wilderness areas are typically designated within current NPS units, national wildlife refuges (NWRs), national forests, and national monuments. Jurisdiction over wilderness areas is divided among USFWS, NPS, BLM, and USFS. Sensitive habitats may also be protected under state and local jurisdiction, 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 fish and invertebrates, and protect shorelines from coastal erosion and storm damage (Ferrario *et al.* 2014). Coral reefs are ecosystems with a high amount of biodiversity, which support commercial and recreational fishing, boating, scuba diving, and pharmaceutical research (Spurgeon *et al.* 1992).

Essential fish habitat (EFH) is defined as waters and substrate that are necessary to the species for spawning, breeding, feeding, or growth to maturity. EFH that is rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area is identified as habitat areas of particular concern (HAPCs) in order to prioritize conservation efforts[25]. 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.

3.2.1.2 Submerged Aquatic Vegetation and Macroalgae

SAV refers to rooted, vascular, flowering plants that live and grow below the water surface (Havel, L.N. and ASMFC Habitat Committee 2018). SAV includes seagrasses and freshwater macrophytes. 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 (Orth *et al.* 2006). SAV and macroalgae are an

[25] Locations of HAPCs can be found at: https://www.habitat.noaa.gov/protection/efh/efhmapper/

important food source and habitat for a variety of juvenile and adult organisms, including species that are important to commercial and recreational fisheries (Beck *et al.* 2001), as well as sea turtles and sirenians. SAV improves water quality, filters nutrients and contaminants, stabilizes sediments, and reduces coastal erosion (Arnold *et al.* 2017).

3.2.1.3 Reptiles

Marine and semiaquatic reptiles include sea turtles and *Crocodilia spp*. The mission of NMFS is to manage, conserve, and protect all living marine resources within the U.S. EEZ, including sea turtles. Threatened and endangered sea turtles are protected under the ESA (16 U.S.C. 1531–1534), which is administered by NMFS and USFWS. All six species of sea turtles that occur in the United States 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.

Crocodilians are semiaquatic reptiles, and inhabit fresh, brackish, or salt water. One crocodilian species in the United States, the American crocodile (*Crocodylus acutus*), is listed as endangered and prefers brackish and salt water habitats. USFWS has the lead responsibility for the conservation and recovery of the American crocodile. Another crocodilian species that is listed as threatened is the American alligator (*Alligator mississippiensis*) due to its similarity of appearance to crocodiles.

A terrestrial, coastal reptile species, the Atlantic salt marsh snake (*Nerodia clarkii taeniata*), inhabits coastal salt marshes and mangrove swamps. Specifically, it occurs along shallow tidal creeks and pools, in a saline environment ranging from brackish to full strength.

3.2.1.4 Fish and Shellfish

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 vertebrate species. NMFS policy (61 FR 4722, February 7, 1996) stipulates that fish populations will be considered “distinct” for purposes of the ESA if the population represents a subspecies of the biological species. To qualify as a DPS, 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.

3.2.1.5 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 the ESA regulations, NMFS is required to analyze the potential impacts its actions may have on threatened, endangered, and migratory birds.

3.2.1.6 Marine Mammals

Threatened and endangered marine mammals are protected under the ESA (16 U.S.C. 1531–1534), which is administered by NMFS and USFWS. Twenty-two marine mammal species (or stocks of species) within the United States are listed as endangered or threatened under the ESA, and 21 foreign species are listed (Appendix VI).

All marine mammals in the United States are protected by the Marine Mammal Protection Act (MMPA) (16 U.S.C. 1361 et seq.), regardless of whether or not they are listed under the ESA. Marine mammals may be designated as "depleted" under the MMPA if the Secretary of Commerce, after consultation with the Marine Mammal Commission (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. To date, 49 species, or stocks of species, have been listed as depleted.

3.2.2 Affected Environment

3.2.2.1 Protected and Sensitive Habitats

Atlantic coast federally protected and sensitive habitats that could be impacted by MMHSRP activities include 14 National Estuarine Research Reserves (NERRs), 59 NWRs, three national marine sanctuaries, and 12 NPS units (four national parks, seven national seashores, three national monuments (NMs), and one national recreation area), 26 HAPCs located within EFH, and eight wilderness areas (which may be part of other federally managed land units) (Wilderness.net 2019[26]). Critical habitat has been designated for the North Atlantic right whale (*Eubalaena glacialis*), West Indian manatee (*Trichechus manatus*), piping plover (*Charadrius melodus*), yellow-shouldered blackbird (*Agelaius xanthomus*), green sea turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead turtle (*Caretta caretta*),

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[26] http://www.wilderness.net/index.cfm?fuse=NWPS

hawksbill sea turtle (*Eretmochelys imbricata*), Altamaha spinymussel (*Elliptio spinosa*), and yellow lance (*Elliptio lanceolata*) (Appendix VI, Table 1).

Caribbean coast federally protected and sensitive habitats that could be impacted by MMHSRP activities include 14 NERR, five NWR, four NPS units (two national parks and two NMs), and 29 HAPCs located within EFH (Wilderness.net 2019). Coral reefs range from the southern tip of South Carolina to the Florida Keys. Gray's Reef, located off of Sapelo Island, Georgia, is one of the largest nearshore live bottom reefs in the southeastern United States. Coral are also widespread in Puerto Rico and the U.S. Virgin Islands. Seven Atlantic corals are listed as endangered: staghorn coral (*Acropora cervicornis*), elkhorn coral (*Acropora palmata*), giant pillar coral (*Dendrogyra cylindrus*), mountainous star coral (*Orbicella faveolata*), lobed star coral (*Orbicella annularis*), *Orbicella franksi*, and rough cactus coral (*Mycetophyllia ferox*) (Appendix VI, Table 2). Critical habitat has been proposed for these species (85 FR 76302). These corals are some of the dominant reef building species and occur throughout Florida, the Bahamas, and the Caribbean. Elkhorn and staghorn coral are found in shallow water reefs in high energy zones, while rough cactus coral and *Orbicella spp.* are found at deeper depths. In the action area, these corals occur in the Florida Keys, Puerto Rico, and the U.S. Virgin Islands. Current threats to the species are climate change, pollution, excess nutrients, pathogens, coastal development, marine debris, arrival of invasive species, and overfishing (NMFS 2006). Critical habitat has also been designated for the yellow-shouldered blackbird in Puerto Rico (42 FR 47840).

Gulf of Mexico federally protected and sensitive habitats that could be impacted by MMHSRP activities include five NERRs, 40 NWRs, two national marine sanctuaries, seven NPS units (four national parks and three national seashores), one HAPC located within EFH, and 11 wilderness areas (which may be part of other federally managed land units) (Wilderness.net 2019). Critical habitat has been designated for the West Indian manatee, piping plover, Gulf sturgeon (*Acipenser oxyrhynchus desotoi*), loggerhead sea turtle, American crocodile, and whooping crane (*Grus americana*). Coral reefs are also found in the Gulf of Mexico, including the Florida Middle Grounds and Flower Garden Banks in Texas. (Appendix VI, Table 3).

Pacific coast federally protected and sensitive habitats that could be impacted by MMHSRP activities include six NERRs, 24 NWRs, five national marine sanctuaries, 12 NPS units (eight national parks, one national seashore, one national recreation area, and two national monuments), one NM that is not a NPS unit, 41 wilderness areas (which may be part of other federally managed land units), 24 HAPCs located within EFH, and one Steller sea lion (*Eumetopias jubatus*) conservation area (Wilderness.net 2019). Critical habitat has been designated for the following species: Steller sea lion western DPS, North Pacific right whale (*Eubalaena japonica*), Southern Resident killer whale DPS (*Orcinus orca*), 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*), black abalone (*Haliotis cracherodii*), eulachon (*Thaleichthys pacificus*), yelloweye rockfish (*Sebastes ruberrimus*), bocaccio (*Sebastes paucispinis*), leatherback sea turtle, bull trout (*Salvelinus confluentus*), polar bear (*Ursus maritimus*), Northern sea otter (*Enhydra lutris kenyoni*), four coho salmon (*Oncorhynchus kisutch*) Evolutionary Significant Units (ESUs), nine chinook salmon (*Oncorhynchus tshawytscha*) ESUs, two chum salmon (*Oncorhynchus keta*) ESUs, two sockeye salmon (*Oncorhynchus nerka*) ESUs, and eleven steelhead (*Oncorhynchus mykiss*) ESUs (Appendix VI, Table 4). Recent revisions expanded the critical for the Southern Resident killer whale DPS (86 FR 41668). Critical habitat has been designated for Central America DPS and Mexico DPS of humpback whales (*Megaptera novaeangliae*).

Pacific Islands federally protected and sensitive habitats that could be impacted by MMHSRP activities include one NERR, eight NWRs, two national marine sanctuaries, five NPS units, four NMs that are not NPS units, one HAPC located within EFH, and one wilderness area (which may be part of other federally managed land units) (DOC/NOAA and DOI 2017;). Critical habitat has been designated for the Hawaiian monk seal (*Neomonachus schauinslandi*). All states and territories in this region contain coral reefs, and eight endangered coral species are found throughout the Pacific Islands region. Critical habitat has been proposed for these coral species (85 FR 76262). The Northwestern Hawaiian Islands Marine National Monument was established in June 2006, significantly expanded, and renamed as Papahānaumokuākea Marine National Monument in 2010. The monument is one of the largest protected areas in the world, encompasses the healthiest and most undisturbed coral reef ecosystem in the United States, and contains many rare, threatened, and endangered species. Three marine NMs were established in 2009 in the Pacific Islands: the Marianas Trench, Pacific Remote Islands, and Rose Atoll Marine National Monuments (Appendix VI, Table 5).

3.2.2.2 Submerged Aquatic Vegetation 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 shoal grass (*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 shoal grass, turtlegrass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and several species of *Halophila* (Short *et al.* 2007). Globally, seagrass meadows are declining due to multiple stressors, such as climate change, increasing turbidity, and eutrophication, and losses have been accelerating since 1990 (Waycott *et al.* 2009; Unsworth *et al.* 2019). Eelgrass, the dominant seagrass species in New England and the Mid-Atlantic, is particularly imperiled as it is uniquely vulnerable to warming temperatures in these regions, and large losses of eelgrass have been reported in many estuaries along the east coast of the United States (Waycott *et al.* 2009; Lefcheck *et al.* 2017; Costello *et al.* 2011).

Macroalgae species on the Atlantic coast include planktonic species such as *Gracilaria spp*. and sea lettuce (*Ulva lactuca*), and sessile species such as rockweed (*Fucus spp.*). Some systems, such as the Indian River Lagoon, have experienced macroalgal blooms due to nitrogen enrichment, which have had a negative impact on SAV communities (Barile 2018).

Macroalgae species in the Gulf of Mexico include Sargassum (*Sargassum fluitans*), forked sea tumbleweed (*Dictyota bartaryresii*), and watercress alga (*Halimeda opuntia*). There are six common SAV species in the Gulf of Mexico, including Cuban shoal grass, turtlegrass, manatee grass, widgeon grass, paddle grass (*Halophila decipiens*), and star grass (*Halophila engelmannii*) (Short *et al.* 2007). While the Gulf of Mexico has the most diverse assemblage of seagrass species in the United States, many areas have experienced a significant change in species composition or significant loss of all seagrass species in recent decades (Pham *et al.* 2014; Hall *et al.* 2016; Wilson and Dunton 2018). Although concerted efforts have helped reverse these declines in some systems (Sherwood *et al.* 2017), seagrass distribution and diversity remains fundamentally altered in many areas of the Gulf of Mexico.

The Pacific coast hosts a similar assemblage of seagrass species as the Atlantic coast, with eelgrass as the dominant species. In addition to widgeon grass and *Halophila spp.*, surfgrass (*Phyllospadix spp.*) and the invasive dwarf eelgrass (*Zostera japonica*) are also commonly found (Harrison and Bigley, 1982). As eelgrass is also the dominant species on the Pacific coast, seagrass declines have occurred in some areas, including the complete collapse and <u>near</u> extirpation of seagrass in some systems, such as Morro Bay, CA (Harenčár *et al.* 2018). However, seagrass populations have been stable in other areas, such as Puget Sound, WA (Christiaen *et al.* 2019).

Macroalgae species along the Pacific coast include giant kelp (*Macrocystis pyrifera*), golden rockweed (*Silvetia compressa*), bull kelp (*Nereocystis leutkeana*), rockweed (*Fucus sp.*), and sea lettuce (OCNMS 2004). Kelp species form important habitats for a range of species, and in general, these habitats are decreasing in the Aleutian Islands, Washington, Oregon, and Northern California, but increasing in Southeast Alaska and the Southern California Bight (Krumhansl *et al.* 2016). Two invasive algae, *Sargassum hornii* and *Undaria pinnatifida* have recently been recorded in Southern California, and may pose a threat to native species and alter habitats.

In the Pacific Islands, only three species of SAV are found; paddle grass, widgeon grass, and Hawaiian paddle grass (*Halophila hawaiiana*) (Short *et al.* 2007). Macroalgae species include *Stypopodium flabelliforme*, *Halitheda opuntia*, *Caulerpa webbiana*, and *Padina australis* (NFMS 2005). While *Halophila* are more diminutive than other seagrass species, limiting their potential as habitat, they serve as important foraging grounds for green, olive ridley (*Lepidochelys olivacea*), and loggerhead sea turtles.

Nineteen species of macroalgae have been introduced to the Hawaiian archipelago since the 1950s. Many of these species have outcompeted native macroalgae as well as coral reefs, and there have been many efforts to control the spread of these invasive species, with varying degrees of success (Conklin and Smith 2005; Neilson *et al.* 2018). Additionally, invasive algae have been recorded in the Commonwealth of the Marianas Islands.

3.2.2.3 Reptiles

Six species of sea turtles have the potential to occur on the Atlantic coast. Threatened species include the loggerhead, green, and olive ridley 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 the Kemp's ridley (*Lepidochelys kempii*), leatherback, and hawksbill sea turtles. Hawksbill sea turtles commonly occur in southern Florida, Puerto Rico, the U.S. 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 VI, Table 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 (77 FR 4169). Additionally, the American crocodile is listed as threatened (50 CFR 17). This species occurs in southern Florida, predominately in brackish and saline waters. Critical habitat has been designated for this species, and includes Florida Bay and southern Biscayne Bay (41 FR 41914). American alligators are listed as threatened under the ESA due to their similarity of appearance to crocodiles, but no critical habitat has been designated for this species. A terrestrial reptile species, the Atlantic salt marsh snake, is listed as threatened under the ESA but also has no designated critical habitat.

Five 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 United States; 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 Pacific coast. Foraging and short-term inter-breeding residency has been recorded for green turtles in southern California, 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 increasing in Oregon and Washington. Olive ridley sea turtle occurrences are rare in Alaska, but have been recorded (Hodge 2001). Loggerheads in Alaska are a rare occurrence and leatherbacks have been found in the Bering Sea.

Five species of sea turtles have the potential to occur in the Pacific Islands. Threatened species include the green and olive ridley sea turtles. The majority of adult green turtles that feed throughout the main Hawaiian Islands migrate to French Frigate Shoals in the Northwest Hawaiian Islands to nest. Endangered species that occur in the Pacific Islands include the leatherback, loggerhead, and hawksbill sea turtles (Appendix VI, Table 6). Between 20-25 female hawksbill sea turtles nest in Hawaii every year. While hawksbill sea turtles have also been known to nest in Guam and American Samoa sporadically, there has been no documented nesting in over a decade in these U.S. territories.

3.2.2.4 Fish and Shellfish

Three mostly pelagic fish species are ESA-listed as threatened or endangered and occur in most regions. Giant manta rays (*Manta birostris*) are listed as threatened throughout their range, which includes the U.S. Atlantic and Gulf coasts, as well as the Pacific Islands Region. Oceanic whitetip sharks (*Carcharhinus longimanus*) are also listed as threatened throughout their range and occur in all pelagic waters of the U.S. except Alaska. Scalloped hammerhead sharks (*Sphyrna lewini*) also occur in U.S. waters; the Eastern Pacific DPS is listed as endangered, while the Central and Southwest Atlantic DPSs are listed as threatened. No critical habitat has been designated for these species.

Twelve species of endangered or threatened fish occur on the U.S. Atlantic coast: the Atlantic salmon (*Salmo salar*), the shortnose sturgeon (*Acipenser brevirostrum*), the five Atlantic sturgeon DPSs (*Acipenser oxyrinchus oxyrinchus*), the smalltooth sawfish (*Pristis pectinata*), the Nassau grouper (*Epinephelus striatus*), and Roanoke logperch (*Percina rex*) (Appendix VI, Table 7). Atlantic salmon in the Gulf of Maine DPS are listed as endangered. Critical habitat is designated for the Gulf of Maine Atlantic salmon DPS (74 FR 29343). The shortnose sturgeon occurs throughout the Atlantic coast and is listed as endangered throughout its range. Atlantic sturgeon occur from Maine through Georgia, in 22 separate river systems. The population is split into five DPSs, all of which are listed under the ESA: Carolinas DPS (endangered), New York Bight DPS (endangered), Chesapeake Bay DPS (endangered), South Atlantic DPS (endangered), and Gulf of Maine DPS (threatened). Critical habitat has been designated in 31 rivers in which Atlantic sturgeon are currently found or have historically occurred (82 FR 39160). While the smalltooth sawfish historically occurred from North Carolina to Florida, its range is now confined to the coasts of Florida, and critical habitat has been designated in southwest Florida for this species, specifically in the Charlotte Harbor Estuary and in the Ten Thousand Islands area of the Everglades (74 FR 45353). Nassau grouper are listed as threatened and occur in southeastern Florida, Puerto Rico, and the U.S. Virgin Islands.

Three species of endangered or threatened shellfish occur on the U.S. Atlantic coast: Altamaha spinymussel, dwarf wedgemussel (*Alasmidonta heterodon*), and yellow lance. Altamaha spinymussel are listed as endangered under the ESA and are endemic to the Altamaha River drainage of southeastern Georgia. The mainstem river channel of the Altamaha River has been designated as critical habitat for this species (76 FR 62928). Dwarf wedgemussel are listed as endangered and occur in fresh and brackish waterways from Connecticut through North Carolina. Yellow lance are listed as threatened and occur in fresh and brackish waterways from Maryland through North Carolina. Critical habitat has been designated for this species, but only includes freshwater streams far from the marine environment (86 FR 18189)

Commercial and recreational fisheries along the Atlantic coast 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*), American lobster (*Homarus americanus*), and striped bass (*Morone saxatilis*). Commercially important shellfish species include blue crab (*Callinectes sapidus*), Atlantic oyster (*Crassostrea virginica*), and hard clams (*Mercenaria mercenaria*).

In the Gulf of Mexico, Gulf sturgeon (*Acipenser oxyrinchus desotoi*) is threatened and the smalltooth sawfish is endangered (Appendix VI, Table 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 (68 FR 13369). Critical habitat has also been designated for smalltooth sawfish along the southwestern coast of Florida (74 FR 45353-45387).

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*), red snapper (*Lutjanus campechanus*), and anchovy. Shellfish species include blue crab, stone crab (*Menippe mercenaria*), and penaeid shrimp.

There are 28 protected salmonid ESUs/DPSs that occur throughout the Pacific coast, including: coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*Oncorhynchus tshawytscha*), sockeye salmon (*Oncorhynchus nerka*), chum salmon (*Oncorhynchus keta*), bull trout and steelhead trout (*Oncorhynchus mykiss*). There are 17 protected Pacific salmon ESUs. The Southern Oregon/Northern California coasts coho salmon ESU, the Oregon coast coho ESU, and Lower Columbia River coho ESU are threatened. The Central California coast coho ESU is endangered. Critical habitat has been designated for each of these coho ESUs. Seven ESUs of Chinook salmon are threatened: the California coastal ESU, the Central Valley spring-run ESU, the Lower Columbia River ESU, and the Puget Sound ESU, the Snake River fall-run ESU, the Snake River spring/summer-run ESU, and the Upper Willamette River ESU. All of these ESUs, except the Snake River spring/summer-run ESU, have critical habitat designated. The Sacramento River winter-run ESU and Upper Columbia River spring-run ESU of Chinook salmon are endangered and critical habitat has been designated for these ESUs. Two ESUs of chum salmon are threatened and have critical habitat: Hood Canal summer-run ESU and the Columbia River ESU. For sockeye salmon, the Snake River ESU is listed as threatened and the Ozette Lake ESU is listed as endangered. Critical habitat has been designated for both listed sockeye salmon species. Threatened chinook salmon ESUs that are anticipated to occur in Alaska include the Snake River fall-run ESU, Upper Willamette River ESU, Puget Sound ESU, and the Lower Columbia River ESU (81 FR 33468). However, there are no threatened or endangered salmonid ESUs that spawn in Alaska.

There are also 11 listed steelhead trout DPSs. Ten DPSs of steelhead are threatened and have critical habitat: the California Central Valley DPS, the Central California coast DPS, the Lower Columbia River DPS, the Middle Columbia River, the Northern California DPS, the Puget Sound DPS, the Snake River Basin DPS, the South-Central California coast DPS, the Upper Columbia River DPS, and the Upper Willamette River DPS. The Southern California DPS of steelhead is endangered and has designated critical habitat. Another salmonid, bull trout, is listed as threatened under the ESA and critical habitat has been designated for bull trout which includes streams, lakes, reservoirs, and marine shoreline in Washington and Oregon (75 FR 63898).

There are several other non-salmonid fish and shellfish species listed as endangered or threatened under the ESA that occur along the West coast and Alaska. The southern DPSs of green sturgeon (*Acipenser medirostris*) and eulachon are both listed as threatened. The eulachon has critical habitat designated in Washington and Oregon (74 FR 3178). Two species of rockfish are also listed; the Puget Sound/Georgia

Basin DPS of yelloweye rockfish is listed as threatened and the Puget Sound/Georgia Basin DPS of bocaccio is listed as endangered. Both share overlapping rockfish critical habitat in Puget Sound (79 FR 68041). Four endangered species that only occur in California are the white abalone (*Haliostis sorenseni*), the black abalone, the gulf grouper (*Mycteroperca jordani*), and the northern tidewater goby (*Eucyclogobius newberryi*). Critical habitat has been designated for the tidewater goby and includes coastal stream segments in California from Del Norte County through San Diego County (Appendix VI, Table 9). This critical habitat includes the stream channels and their associated wetlands, floodplains, and estuaries (78 FR 8745). Critical habitat has also been designated for the black abalone at various locations along the coast from the Del Mar Ecological Reserve south through Santa Clemente Island, CA.

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, market squid (*Loligo opalescens*), California halibut (*Paralichthys californicus*), white croaker (*Genyonemus lineatus*), Pacific herring (*Clupea harengus pallasi*), Atka mackerel (*Pleurogrammus monopterygiusi*), and Pacific cod (*Gadus macrocephalus*) (WDFW 1997; CDFG 2001; 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*).

No nearshore threatened or endangered species of fish occur in the Pacific Islands. Commercial and recreational fisheries are managed by the State of Hawaii, U.S. Territories, the Western Pacific Fishery Management Council, and NMFS. Important commercial, recreational, and/or ecological species include albacore tuna (*Thunnus alalunga*), skipjack tuna (*Katsuwonus pelamis*), wahoo (*Acanthocybium solanchi*), wrasses (*Labridae spp.*), jacks (*Carangidae spp.*), and blue marlin (*Makaira nigricans*). Additionally, a large aquaculture farm that raises kanpachi (*Seriola rivoliana*) is located off the coast of the island of Hawaii.

3.2.2.5 Coastal and Marine Birds

Threatened bird species on the U.S. Atlantic coast include the wood stork (*Mycteria americana*), the red knot (*Calidris canutus rufa*), and the piping plover (*Charadrius melodus*). 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 United States to the Gulf of Mexico. 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 U.S. Virgin Islands. A non-essential experimental population[27] of whooping cranes (*Grus americana*) is located from Virginia to Florida. Individuals of the population are treated as threatened if they occur in a NWR or national park (Appendix VI, Table 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*), and whimbrel (*Numenious phaeopus*) (Clark and Niles 2000).

The piping plover is also listed as threatened in states along the Gulf of Mexico. Piping plover critical habitat has been designated along the coastal shoreline of the Gulf coast, from Texas to Florida. The whooping crane is listed as endangered in Texas and critical habitat has been designated along the Texas Gulf coast (Appendix VI, Table 11). The Mississippi sandhill crane (*Grus canadensis pulla*) is listed as endangered and critical habitat has been designated in the Mississippi NWR (42 FR 39985 39988). 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 Washington include the marbled murrelet and the western snowy plover (Appendix VI, Table 12). Critical habitat for the western snowy plover has been designated in California, Oregon, and Washington. 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 along the southern California coast.

Endangered species on the entire West coast, including Alaska, are the short-tailed albatross (*Phoebastria albatrus*) and the Alaska breeding population of Steller's eider (Appendix VI, Table 12). Occurrences of Steller's eider in California, Oregon, and Washington are rare. Critical habitat for the Steller's eider has been designated in Alaska. The spectacled eider (*Somateria fischeri*), which occurs in Alaska, is listed as threatened under the ESA, and critical habitat has been designated for this species. Endangered bird species only found in California include the California Ridgeway's 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 been reintroduced in Southern California and may be found along the coast.

[27] Designated per Section 10(j) of the Endangered Species Act

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).

Twelve endangered coastal and marine bird species are found in the Pacific Islands region: 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 whiteye (*Zosterops conspicillatus conspicillatus*), Banded-rumped storm-petrel (*Oceanodroma castro*) and Mariana crow (*Corvus kubaryii*) (Appendix VI, Table 13). No critical habitat has been designated for these bird species.

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

3.2.2.6 Marine Mammals

In this section, descriptions of the marine mammals that may occur in each NMFS region are presented. An overview of stranding information, including trends in strandings by numbers, species and seasonality, mass strandings, and Unusual Mortality Events (UMEs) can be found in Appendix II.

While some marine mammals are considered resident, and remain within a relatively localized area, most marine mammal species are wide ranging, and populations of some species routinely cross regional and national boundaries. Some marine mammal species that are found in all NMFS regions include small cetaceans such as harbor porpoise (*Phocoena phocoena*), orca, and common bottlenose dolphins (*Tursiops truncatus*). Large whale species such as fin whale (*Balaenoptera physalus*), blue whale (*Balaenoptera musculus*), sei whale (*Balaenoptera borealis*), minke whale *(Balaenoptera acutorostrata*), and sperm whale (*Physeter macrocephalus*) are also found in all NMFS regions. Fin, blue, sei, and sperm whales are all listed as endangered throughout their range. No pinniped species are found in every region, but harbor seals (*Phoca vitulina*) are found in all but the Pacific Islands Region.

NMFS Greater Atlantic Region. The NMFS Greater Atlantic Region includes ten coastal states from Virginia to Maine. Thirty-eight species of marine mammals have the potential to occur in the Greater

Atlantic Region (Appendix VI, Table 14) (Geraci and Lounsbury 2005). The North Atlantic right whale is listed as endangered under the ESA and as depleted under the MMPA, and critical habitat is designated for a large area within the Gulf of Maine and Georges Bank region, including the large embayments of Cape Cod Bay and Massachusetts Bay (81 FR 4837). The Western North Atlantic coastal migratory stocks of bottlenose dolphins, which range from New Jersey to Florida, are listed as depleted under the MMPA.

The North Atlantic right whale population continues to be critically endangered and has not shown signs of recovery. The population is estimated to have fewer than 350 individuals remaining and has been declining for over a decade (Pace 2021). A recent study suggests that despite efforts to reduce human interaction-caused mortalities (*i.e.*, entanglements and vessel strikes), anthropogenic sources of mortality play an outsized role in preventing the recovery of this critically endangered species (Sharp *et al.* 2019). Since 2017, North Atlantic right whales have experienced an Unusual Mortality Event (UME) in the United States and Canada, which is ongoing. As of August 2022, a total of 53 cases are included in the UME (34 dead and 19 seriously injured whales), which represents over 10% of the population and severe setback to the species' recovery.

Conversely, in 2015, following a review of global humpback whale populations, all humpback whales along the U.S. east coast were determined to be part of the West Indies DPS, and this DPS was removed from the Endangered Species List (Bettridge *et al.* 2015). Recent abundance estimates indicate a continued increase in population growth since that time (Hayes *et al.* 2019). Similarly, populations of gray (*Halichoerus grypus)*, harp (*Pagophilus groenlandicus*), hooded (*Cystophora cristata*), and harbor seals are likely increasing in the U.S. EEZ (Waring *et al.* 2007).

NMFS Southeast Region. Thirty-two species of marine mammals have been reported in the Southeast Region (Appendix VI, Table 15) (Geraci and Lounsbury 2005). The North Atlantic right whale migrates along the U.S. east coast, to breeding grounds off the coast of Georgia and Florida. Therefore, as in the Great Atlantic Region, the North Atlantic right whale is listed as endangered and critical habitat has been designated in the Southeast Region. Critical habitat for the North Atlantic right whale is designated as the nearshore and offshore waters of the southeastern United States, extending from Cape Fear, North Carolina south to approximately 27 nautical miles below Cape Canaveral, Florida (80 FR 9314–9345). Population changes to North Atlantic right whales and West Indies DPS humpbacks are the same as those listed for the Greater Atlantic Region. The West Indian manatee was reclassified from endangered to threatened under the ESA in 2017 (82 FR 16668). Critical habitat for the West Indian manatee is designated within several watersheds along the east and west coast of Florida (42 FR 47840–47845). Rice's whales (*Balaenoptera ricei*) are also listed as endangered (84 FR 15446; 87 FR 8981). All threatened and endangered marine mammal species in the Southeast Region are listed as depleted under the MMPA. The Western North Atlantic coastal migratory stock of bottlenose dolphins are also listed as depleted under the MMPA.

There are few pinnipeds in the Southeast Region, with only harbor seals present in North Carolina. Individuals of other pinniped species are sometimes seen stranded in this region including hooded, harp, and gray seals. However, when these individuals strand, they are considered out of habitat.

NMFS West Coast Region. The NMFS West Coast Region includes three coastal states: Washington, Oregon, and California. Forty-three species of marine mammals have the potential to occur in the West Coast Region (Appendix VI, Table 17). The Mexico humpback whale DPS, southern sea otter (*Enhydra lutris nereis*), and Guadalupe fur seal (*Arctocephalus townsendi*) are listed as threatened. The North Pacific right whale (*Eubalaena japonica*), the Central America humpback whale DPS, and the Southern Resident DPS of killer whales are listed as endangered and these species are known to travel between the United States and Canada. Approximately 2,560 square miles of inland waters of Washington and 15,910 square miles of marine waters between the 20 feet depth (6.1 meter) contour and the 656.2 feet (200 meter) depth contour from the U.S. international border with Canada south to Point Sur, California have been designated as critical habitat for the Southern Resident killer whale DPS (71 FR 69054; 86 FR 41668). Critical habitat has been designated for the Central America DPS and Mexico DPS of humpback whales (86 FR 21082). All threatened and endangered marine mammal species are listed as depleted under the MMPA. The California/Oregon/Washington stock of humpback whales and the Eastern Pacific stock of the northern fur seal (*Callorhinus ursinus*) are also listed as depleted under the MMPA.

Many marine mammal stocks in the West Coast Region are stable and/or increasing. For example, California sea lions (*Zalophus californianus*) have been increasing at 7 percent per year. The eastern DPS of Steller sea lions increased at a rate of 4.76 percent per year between 1989 and 2015, and this DPS (which is the only Steller sea lion DPS found in the West Coast Region) was delisted from the ESA in 2013 (78 FR 66139). One exception is the Southern Resident killer whale DPS, which following the peak census count of 99 animals in 1995 experienced an almost 20 percent decline. The population currently stands at fewer than 80 animals as of a recent census in 2017 (Carretta *et al.* 2019). In addition, some populations of beaked whales are thought to be decreasing in the West Coast Region (Moore and Barlow 2013).

NMFS Alaska Region. The NMFS Alaska Region is the state of Alaska. Twenty-nine species of marine mammals have the potential to occur in the Alaska Region (Appendix VI, Table 18) (Geraci and Lounsbury 2005). Threatened marine mammal species include the southwest Alaska DPS of the northern sea otter, Arctic ringed seal (*Pusa hispida hispida*), Mexico DPS of humpback whale, Berengia bearded seal

(*Erignathus barbatus nauticus*), and the polar bear. Endangered marine mammal species include the western Steller sea lion DPS, western North Pacific gray whale DPS (*Eschrichtius robustus*), Cook Inlet beluga whale DPS (*Delphinapterus leucas*), bowhead whale (*Balaena mysticetus*), Western North Pacific humpback whale DPS, sperm whale, fin whale, blue whale, sei whale, and North Pacific right whale. All threatened and endangered species are listed as depleted under the MMPA. The Eastern Pacific stock of northern fur seals and the AT1 group of transient killer whales (NMFS 2019a) are listed as depleted under the MMPA.

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). Critical habitat is also designated for the polar bear on barrier islands in the Beaufort and Chukchi Seas, as well as denning habitat along the Beaufort Sea coast (75 FR 76085). Critical habitat is also designated for the southwest Alaska DPS of the northern sea otter, from western Cook Inlet through the Aleutians and Bristol Bay (74 FR 51987). Critical habitat has recently been finalized for ringed seals, and comprises an area of marine habitat in the Bering, Chukchi, and Beaufort seas (87 FR 19232). Similarly, critical habitat has also been finalized for the Pacific bearded seal Beringia DPS, and comprises an area of marine habitat in the Bering, Chukchi, and Beaufort seas (87 FR 19180). Lastly, the Mexico and Western North Pacific DPSs of humpback whales critical habitat has been designated for the Mexico DPS in most waters in Southeast Alaska, Prince William Sound, lower Cook Inlet, and Kodiak; critical habitat has been designated for the Western North Pacific DPS in the Aleutians, from Unalaska through the Kodiak archipelago (86 FR 21082).

Some marine mammal populations in Alaska are increasing, including: bowhead whales, the eastern DPS of Steller sea lions, and Bristol Bay beluga whales. At least four humpback whale DPSs occur in Alaska: Hawaii, Mexico, Western North Pacific, and Central North Pacific. The Central North Pacific humpback whale DPS is increasing, and the Western North Pacific DPS is slowly recovering (Muto *et al.* 2019).

Conversely, harbor seal populations have experienced declines in parts of Alaska, notably the Aleutian Islands, Prince William Sound, and Glacier Bay. Cook Inlet belugas were designated as depleted on May 31, 2000 (65 FR 34590) and endangered on October 22, 2008 (73 FR 62919). The Cook Inlet beluga DPS has declined by nearly 75 percent since 1979, from about 1,300 whales to an estimated 279 whales in 2016 (Shelden and Wade 2019). AT1 killer whales were designated as depleted on June 3, 2004 (69 FR 31321), and are not showing signs of recovering (Muto *et al.* 2019). Northern fur seals, which were designated as depleted on May 18, 1988 (53 FR 17888) are not recovering and continue to decline. The size and trend of the Pacific walrus (*Odobenus rosmarus*) population is uncertain. Population point estimates from 1975-1990 ranged between 202,039 to 246,360 walruses, but were not precise enough to accurately reflect a trend. However, a new effort to estimate the population using genetic fingerprints was conducted from 2014-2017, and preliminary estimates suggest that there are 283,000 individuals. The Southern Beaufort Sea population of polar bear is thought to be declining.

NMFS Pacific Islands Region. The NMFS Pacific Islands Region includes the state of Hawaii as well as the territories of Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and other U.S. Pacific Islands. Twenty-three marine mammal species have the potential to occur in the Pacific Islands Region (Appendix VI, Table 19) (Geraci and Lounsbury 2005). Endangered marine mammal species include North Pacific right whales, the Hawaiian monk seal, and the main Hawaiian Islands Insular false killer whale DPS (*Pseduorca crassidens*). All endangered species are listed as depleted under the MMPA. No threatened species occur in the region. Critical habitat for the main Hawaiian Islands Insular false killer whale DPS is designated and defined as waters from the 45 meter depth contour to the 3,200 meter depth contour around the main Hawaiian Islands from Ni'ihau east to Hawaii (83 FR 35062-35095).

The only pinniped species endemic to the Hawaiian Islands is the Hawaiian monk seal. Critical habitat for the Hawaiian monk seal includes 16 occupied areas within the range of the species: 10 areas in the Northwestern Hawaiian Islands (NWHI) and six in the main Hawaiian Islands (MHI). Hawaiian monk seal critical habitat is defined as all beach areas, sand spits, and islets; lagoon waters; inner reef waters; and marine habitat through the water's edge, including the seafloor and all subsurface waters, and marine habitat within 10 meters of the seafloor, out to 200 meter depth in the NWHI. Critical habitat in the MHI include marine habitat from the 200 meter depth contour line, including the seafloor and all subsurface waters and marine habitat within 10 meters of the seafloor, through the water's edge and 5 meters into the terrestrial environment from the shoreline (80 FR 50925-50988). The Hawaiian monk seal population grew at an average rate of approximately 4 percent per year from 2013-2016 (Carretta *et al.* 2019). The species remains well below its optimum sustainable population and has not fully recovered from historical declines, but the population trend is positive. While Hawaiian monk seals are the only pinnipeds endemic to the region, northern elephant seals (*Mirounga angustirostris)* and northern fur seals sometimes strand in the main Hawaiian Islands. However, when these individuals strand, they are considered out of habitat.

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 its 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. The Environmental Protection Agency (EPA) maintains a national coastal monitoring program, the National Coastal Condition Assessment (NCCA)[28], with rigorous quality assurance protocols and standardized sampling procedures designed to produce national and regional estimates of coastal conditions. This program determines water quality by using five indicators: dissolved inorganic nitrogen (DIN), dissolved inorganic phosphorus (DIP), water clarity, chlorophyll *a*, and dissolved oxygen (DO). Water quality does not include a measure of fecal coliforms, per NCCA protocols. Additionally, ocean acidification has not historically been measured by the NCCA, but will be included in future NCCA reports. Ocean acidification is a growing problem due to the increasing levels of carbon dioxide that are dissolving into the ocean and reducing the ocean's pH (Doney *et. al*. 2009). Concentrations of DIN and DIP that indicate poor condition vary according to location. The NCCA considers that water clarity is poor if less than 10 percent of surface light reaches 1 meter. The NCCA considers that DO is poor if concentrations less than 2 mg/L are present. The data below on water quality from the contiguous United States are mainly taken from the NCCA 2010 report (EPA 2015); and data from Alaska, Hawaii, and territories are taken mainly from the National Coastal Condition Report IV (EPA 2012). These reports rate the five constituents of water quality on a scale of poor, fair, and good.

Sediment quality is the ability of sediment to support a healthy benthic population, and 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. Sediment quality is a combination of two factors: known sediment contaminants and sediment toxicity. Typical sediment contaminants include heavy metals and persistent organic pollutants (POPs). POPs include dioxin, Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs), and pesticides. Most major harbors in the United States have moderate to severe sediment contamination. As not all chemicals have known risk-based thresholds like known contaminants, sediment toxicity is measured by conducting static toxicity tests with amphipods, specifically *Leptocheirus plumulosus* and *Eohaustorius estuaries* for estuarine or marine sediments. Data on sediment quality are also

[28] https://www.epa.gov/national-aquatic-resource-surveys/national-coastal-condition-assessment-2010-results

compiled by the NCCA, and the data below are mainly taken from the NCCA 2010 report (EPA 2015). Similar to water quality, these reports rate sediment quality on a scale of poor, fair, and good.

3.3.2 Affected Environment

NMFS Greater Atlantic Region. The Northeast coast encompasses the coastal waters of Maine through Virginia, and is the most densely populated coastal region in the United States, with millions of people living on or near several large estuaries, such as the Hudson River Estuary and the Chesapeake Bay. Forty-four percent of estuaries along the Northeast coast are in good condition, 49 percent are rated fair, and 6 percent are rated poor; fair ratings for phosphorus and chlorophyll *a* contributed most to the fair water quality index scores for this region (EPA 2015). The DIN in most estuaries is good, with only 3 percent having a poor rating. Conversely, 55 percent of waters in this region have concentrations of DIP rated as fair, with only 35 percent of waters rated as good. Most waters have water clarity rated as good (73 percent), with only 10 percent in poor condition. DO concentrations were similar, with 73 percent rated as good and only 11 percent rated as poor. Overall, two of the five components of water quality (DO and water clarity) have improved over time, with the other three metrics (DIN, DIP, and chlorophyll *a*) showing mixed results (EPA 2015). The overall sediment quality in the Northeast is good, with 60 percent of the coastal area scoring a good rating on the sediment quality index, and only 9 percent considered to be in poor condition. Toxicity was rated poor in only 9 percent of sediments sampled, while only 1 percent contained contaminants. However, when compared to previous reports, sediment quality significantly decreased in the Northeast coast between 2006 and 2010.

NMFS Southeast Region. The Southeast Atlantic coast includes coastal waters from North Carolina through Biscayne Bay, Florida. Estuarine areas on the Southeast coast are in mostly fair condition (69 percent) (EPA 2015). The DIN rating is good, with 96 percent of estuaries scoring as good. DIP is considered fair, with 41 percent having good concentrations and 48 percent having fair concentrations. The overall rating of water clarity is good, with 63 percent of the estuarine area in good condition. Dissolved oxygen concentrations are also good, with only 1 percent of the area exhibiting hypoxia. A significant improvement in DO and water clarity contributed to the increase in overall water quality in this region since 2006 (EPA 2015). Sediment quality in the Southeast coast estuaries is mostly good, with 65 percent of estuaries containing good sediment quality and only 4 percent having poor sediment quality. Sediment toxicity and contamination are both generally considered good across the region, despite a significant decrease in sediment quality since 2006 (EPA 2015).

In Puerto Rico, the overall water quality in estuaries is considered good to fair (EPA 2012). DIN is considered good, with no estuaries exceeding concentrations greater than 0.1 mg/L. The DIP rating is fair, with only 12 percent exceeding concentrations greater than 0.01 mg/L. Water clarity is fair and DO concentrations are good with 92 percent of sites sampled rated as such. Sediment quality is poor in Puerto Rico. Sediment contamination criteria were exceeded in 20 percent of sediments, mostly for heavy metals, pesticides, and PCBs. However, sediment toxicity is considered good, as no areas were rated poor (EPA 2012).

The U.S. Virgin Islands surface water quality is generally good, but quality is declining due to an increase in point and nonpoint source discharges into the marine environment. Vessel wastes and uncontrolled runoff are major direct discharges into surface waters (VI DPNR 2001). There are no true estuaries in the U.S. Virgin Islands for assessment. Ninety-seven percent of the shoreline has been assessed. Four percent of shoreline waters are poor, 10 percent fair, and 86 percent are good (EPA 2005). Sediment quality information for the Virgin Islands is not available.

Estuaries along the Gulf of Mexico coast have mostly fair (58 percent) and poor (24 percent) water quality. DIN is considered good, with only 10 percent of areas having poor quality (EPA 2015). The DIP rating is mostly poor, with 44 percent having high concentrations. The overall rating of water clarity is good, with 61 percent in good condition. DO concentrations are good, with only 7 percent of the area exhibiting hypoxia. Coastal and deeper waters of the Gulf are degraded from spills and dumping from vessels. Hypoxia in Gulf coast waters generally results from stratification, eutrophication, or a combination of these two conditions. Mobile Bay, Alabama and waters around the mouth of the Mississippi River experience regular hypoxic events during the summer months. Since the late 1990s, water quality has continued to significantly decline along this coast, mostly driven by worsening DIP, DO, and chlorophyll *a* conditions.

Sediment quality in the Gulf of Mexico is mostly good, with only 25 percent of areas containing poor sediment quality (EPA 2015). Sediment contaminants are very low, with 93 percent of areas sampled containing low (good) amounts of known contaminants. Sediment toxicity was good, with 44 percent of sediments rated as good, while 24 percent of sediments samples were rated poor. There was a significant increase in sediment toxicity, mostly attributed to the Deepwater Horizon Oil Spill (EPA 2015). This increase in toxicity resulted in a significantly lower overall sediment quality score for the Gulf coast compared to the previous assessment in 2005 (EPA 2015).

NMFS West Coast Region. The water quality index for estuaries along the Pacific coast is good. Chlorophyll *a* and phosphorus contribute most to the poor water quality in this region (EPA 2015). The

DIN rating is good, with less than 1 percent of waters sampled having poor quality. Water clarity is considered good, with 79 percent of waters having good clarity. DO concentrations are also good, with no areas exhibiting hypoxia. The lowest measured values of DO was in Dabob Bay and the southern arm of Hood Canal, both in Washington (EPA 2012). Sediment quality in Pacific coast estuaries has significantly decreased since 2006, with 80 percent rated as good in 2006 compared to 31 percent rated as good in 2010. Sediment contaminants were low, but toxicity has significantly worsened, with 19 percent in fair condition and 27 percent in poor condition (EPA 2015).

NMFS Alaska Region. The water quality of most of Alaska's vast coastline has not been regularly monitored. A survey in 2004 of Southeast Alaska estuaries indicated that the overall water quality was good (EPA 2012). DIN and DIP levels were good, with only 3 percent rated as fair and none of the waters tested rated as poor. Chlorophyll *a* conditions were also good, with 100 percent of sites tested in Southeast Alaska rated as good, and 92 percent of waters rated as having good water clarity. DO was also good with 95 percent of waters receiving a good rating. Sediment quality was also good, with 92 percent of sediments rated as good (EPA 2012). More recently, water quality was assessed in coastal waters and estuaries along the Beaufort and Chukchi seas (Hartwell 2018). The results of this effort suggest that these waters are in pristine condition, with limited sediment contaminants that can be tied to human activities; elevated levels of some contaminants such as nickel and PAHs were determined to be derived from soil or coal and peat deposits (Hartwell *et al.* 2018).

NMFS Pacific Islands Region. Similar to Alaska, the coastline of Hawaii and Pacific island territories do not have comprehensive coastal monitoring programs. Water quality in Hawaii was most recently assessed in 2006, and the overall water quality in the state was good (EPA 2012). At the majority of sites sampled, all water quality metrics were determined to be good. Only Pearl Harbor was determined to have poor water quality, based on low scores for water clarity, DO, and chlorophyll *a*. Sediment quality was not as pristine, with 17 percent of sediments rated as fair or poor for contaminant concentrations (EPA 2012). The highest contaminant concentrations were found in Pearl Harbor and adjacent bays.

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). The most recent comprehensive water quality survey occurred in 2006 (EPA 2012). Of the bays assessed for water quality, 56 percent were rated good, and 41 percent were rated fair. The remaining sites were rated poor, and were located in Tumon Bay and near the mouth of the commercial port area within Apra Harbor, or were near extensive aquaculture sites in Talofofo Bay (EPA 2012). Sediment quality was rated good in 97 percent of the sites sampled. Sediment toxicity and contaminants were both rated as good in 71 percent of sites sampled. Two of the three sites that received a fair sediment quality index rating were located within Apra Harbor (EPA 2012). These sites are known to have high levels of metals, specifically copper, zinc, lead, and tin (GEPA 2000; EPA 2012).

Water quality in American Samoa is generally in good condition, with 96 percent of the sites sampled scoring good on the water quality index (EPA 2012). The remaining sites were rated as fair, primarily due to concerns with water clarity and chlorophyll *a.* Comprehensive sediment quality information for American Samoa is not available. Few areas in American Samoa have been assessed for sediment contaminants, however a recent study of sediment contaminants in Faga'alu Bay, Tutuila found that while contaminant loads are generally low, some parts of the bay have higher levels of contaminants that could cause concern (Whitall and Holst 2015). The contaminant loads in these areas were attributed to a local rock quarry and legacy landfill that was not properly contained (Whitall and Holst 2015).

In the southern islands of the Commonwealth of the Marianas Islands (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 2017 around Saipan, Tinian, Rota, and Managaha. Overall, 58 percent of waters were rated as good, as they were found to be to be fully supporting all fishing and swimming uses, as set forth in the Clean Water Act (Yuknavage *et al.* 2018). Sediment quality information for CNMI is not available.

3.4 Cultural Resources

3.4.1 Definition of the Resource

NOAA considers impacts to both cultural and historic resources under NEPA. Cultural resources include historic properties, as defined in the National Historic Preservation Act (NHPA), sacred sites, and archaeological sites. The scope of cultural resources considered under NEPA is broader than that considered under the NHPA (CEQ 2013). A complete inventory of potentially impacted cultural and historic resources is not possible, given the national scope of this analysis. However, NOAA expects that archeological sites and the use of marine mammals by indigenous peoples may be the only cultural resources that could be impacted by the MMHSRP's activities. "Indigenous peoples" are defined in this document as those peoples with pre-existing sovereignty who were living together as a community prior to contact with settler populations and would include, but is not limited to: Native Americans, Alaska Natives, Native Hawaiians and other indigenous Pacific Islanders, and other aboriginal peoples.[29]

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 (Ferguson and Kuwanwisiwma 2017). Examples of TCPs include, but are not limited to: indigenous peoples' ceremonial locations, urban neighborhoods that are the traditional home of a particular cultural group, and locations associated with the traditional beliefs of indigenous peoples. Other types of cultural resources include prehistoric or historic remains, artifacts, or indicators of past human activities and accomplishments. Many of these sites and resources may still be used today. This is not intended to serve as a detailed or exhaustive description; it is provided as a summary sufficient to assess the potential effects of the actions proposed in this PEIS and to inform measures that NMFS could implement to mitigate the potential effects.

Historic resources are defined as defined as prehistoric or historic sites, buildings, structures, or objects listed or eligible for listing on the National Register of Historic Places (NRHP)[30]. Artifacts, records, and physical remains associated with historic properties may be considered cultural resources (NRCS 2006). 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 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

3.4.2.1 Archeological Resources and TCPs

[29] The definition of "indigenous peoples" is for the purposes of this Marine Mammal Health and Stranding Response Program's Programmatic Environmental Impact Statement only; programs and offices within the National Marine Fisheries Service, National Oceanographic and Atmospheric Administration, and the Department of Commerce may use a different definition.

[30] https://www.nps.gov/subjects/nationalregister/index.htm

Archeological resources may be submerged or occur on land. Several historic resources in the action area are listed on, or are eligible to be listed on, the NRHP. These include lighthouses, ports, docks, coastal forts, and shipwrecks. Submerged cultural resources include inundated archaeological sites, indigenous peoples' artifacts, shipwrecks, and aircrafts. Indigenous peoples' artifacts include, but are not limited to, 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. In Hawaii, more recent archaeological historic sites and TCPs are also found below the high-water mark (typically fishponds, but anchor holes and petroglyphs have also been documented). Most archaeological sites and TCPs in Hawaii have not been surveyed, and it is likely that most coastline areas contain historic sites and resources (USCG 1999).

There are also submerged archeological resources from World War II, particularly in the Pacific Islands, such as the American tanks that did not make landfall in CNMI and sit in reef waters next to beaches (Cabrera 2005). Additionally, many shipwrecks from World War II are grounded on beaches throughout CNMI (CNMI 2001). There is also 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.

Archeological resources may occur on beaches or on land adjacent to the water. Prehistoric archeological resources on land include shell middens, lithic scatters, habitation sites, burials, and ceremonial and sacred sites of early indigenous populations. Other indigenous peoples' cultural remains include domestic artifacts, stone tools, ivory objects, woven fishing nets, fiber-tempered pottery, masks, pictographs, and petroglyphs. Petroglyphs may also be found on prominent boulders along the shoreline, such as in Washington State (Stilson *et al.* 2003). Another example is in American Samoa where 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 2019). In Guam, Latte stones and ancient Chamorro artifacts occur in coastal areas. Latte stones were pillars on which ancient Chamorro houses were built. 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. Remains of Latte villages can also be found on CNMI coastal stretches and may include petroglyphs and latte stones. Underground remains of prehistoric sites are also present in CNMI.

More recent archaeological sites that occur on land can be found in Hawaii, and 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 (Cleghorn 2001). In the Northwestern Hawaiian Islands, Nihoa and Mokumanamana (Necker) Islands are both listed on the NRHP for their ceremonial and religious usage by Native Hawaiians.

There are also many historic sites in the West coast, Alaska, and the Pacific Islands 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).

3.4.2.2 Marine Mammals as Cultural Resources

In some coastal areas of the United States, indigenous peoples maintain strong cultural and subsistence ties to the environment and living natural resources, including marine mammals. This rich heritage may be traced to prehistory through art, language, tradition, or social customs. Many indigenous villages located on the coast depended on fish, shellfish, and marine mammals for subsistence and cultural purposes. Whaling and sealing played a large role in the culture of many coastal indigenous groups. Native Americans hunted whales and used stranded whales for subsistence uses, including food, tools, and trade. Native American lands, trust resources, and tribal rights have been secured through treaties, statutes, judicial decisions, and EOs. NMFS works through government-to-government relationships with tribes. Coastal tribes 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).

For some indigenous peoples, marine mammals are considered family or personal gods and revered as deified ancestors. For example, some Native Hawaiian practitioners consider whales to be *kinolau* of Kanaloa (embodiments of the Hawaiian god Kanaloa), that the whales are deities themselves, and that whales are the mediums or the messengers between *pō* (the realm of the gods and spirits) and *ao* (the realm of mortals and consciousness). Another belief held by some Native Hawaiian cultural practitioners is that when whales die a natural death, their spirit transitions into *pō* via a process known as *lele i ka pō* (literally to jump into *pō*) (Akutagawa *et al.* 2019).

Under the MMPA (Section 101 and Section 109), Alaska Natives may use marine mammal parts for cultural handicrafts and harvest marine mammals for subsistence. Alaska Natives currently hunt ribbon seals (*Phoca fasciata*), ringed seals, bearded seals (*Erignathus barbatus*), spotted seals (*Phoca largha*), bowhead whales, walrus, beluga whales, harbor seals, northern fur seals, Steller sea lions, sea otters, and polar bears. 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, Steller sea lions, 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 conduct marine mammal research, stranding response, and monitoring efforts.

As Section 119 of the MMPA only applies to the Alaska natives, other NMFS regions work with Native American tribes, Native Hawaiians and other indigenous Pacific islanders, and other indigenous peoples in different ways. In the Pacific Northwest, western Washington tribes that exercise their treaty right to fish, may also use practices that deter pinnipeds from interfering with treaty fishing, gear, and catch. In 2013, the Northwest Indian Fisheries Commission (Commission) and several of its member tribes completed development of a model regulation addressing the interaction of treaty fishing operations with marine mammals in the Salish Sea and along the Washington coast. Individual tribes have developed their own regulations, based on the model regulation, which allow non-lethal deterrence and, in some instances, lethal take of California sea lions, Steller sea lions, and harbor seals. The Commission and several tribes communicated with NMFS during development of the model regulation, and included provisions for government-to-government information sharing and coordination between tribal and NMFS officials and NOAA's Office of Law Enforcement.

In the Pacific Islands Region, traditional Hawaiian culture holds that the bones or *iwi* of humans and many animals, including whales, are considered to hold the *mana* (spiritual essence or divine power) of the being from which they came. It is believed that the *'uhane* (spirit) of a person hovers near iwi, and that mishandling or desecration of *iwi* results in an insult to the *'uhane* and trauma and harm to living descendants. In many cases, proper respectful handling of *iwi* is considered an important cultural practice, which may entail burial in the earth, but some Hawaiian cultural practitioners have indicated that the ocean is the most appropriate final resting place for the *iwi* of deceased cetaceans. Practitioners have indicated that cremation is not considered an appropriate manner of handling *iwi*, and may even be considered disrespectful to the *'uhane* of the animal. In addition to traditional Hawaiian beliefs and practices surrounding the bodies of cetaceans and their body parts, there are also significant cultural practices that are associated with living cetaceans, including cetaceans that are dead or dying or in a compromised state (*e.g.*, cetaceans that are considered to be stranded from a western perspective). *Pule* (prayer) and *kilo* (mindful observation seeking meanings or messages) are among these practices. Hawaiians engage in these practices to show respect for, and to interact spiritually with, cetaceans, deities and other spiritual elements. Engaging in these practices and ensuring their cultural beliefs are respected and fulfilled is considered essential for some Hawaiian practitioners' spiritual obligations in order to achieve spiritual fulfillment (Ayau 2000).

Marine mammals have always been and continue to be significant beings for a number of tribes on the east coast of the United States. The Greater Atlantic Region and its stranding partners continue to build relationships with their tribal partners. Collaboratively, a timely process for notification of stranding events was developed and piloted with a tribal government. This protocol facilitates the tribes' ability to be present at stranding events to perform culturally-significant ceremonies. The Greater Atlantic Region is now working on protocols with additional tribal partners. In addition, the Greater Atlantic Region has provided marine mammal parts to tribes for use with a parts authorization letter.

Therefore, due to the cultural and spiritual belief systems surrounding marine mammals in the West Coast Region, the Greater Atlantic Region, and Pacific Islands Region, the associated regional offices and Regional Stranding Coordinators have worked with indigenous people to ensure cultural and spiritual beliefs are included during stranding responses. Tailored to a specific indigenous people as appropriate, this work may encompass, but is not limited to:

- Including practitioners in stranding response for the purposes of providing spiritual practices (chants and prayers) over live and dead marine mammal strandings;
- Including tribal or cultural representatives in marine mammal response;
- Providing cremated remains of necropsied marine mammals to community leaders and practitioners for ceremonial interment;
- Providing parts for interment with a parts authorization letter;
- Providing marine mammal parts for educational use with a parts authorization letter;
- Performing necropsies on stranded marine mammals on reservations or in sacred areas at the request of tribes or communities and shared cause of death information; and
- Providing notification of entangled large whales within tribal usual and accustomed fishing areas.

3.5 Human Health and Safety

3.5.1 Definition of the Resource

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

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

3.5.2 Affected Environment

3.5.2.1 Marine Mammal Responder and Researcher Safety

Stranding Response: For authorized persons responding to strandings, hazards include physical injury, zoonotic diseases, contaminant and toxin exposure, and exposure to the elements. Stranded marine mammals may cause physical injuries to responders, including cuts, scrapes, rashes, bites, bruises, broken bones, or other injuries from blunt-force trauma. Stranded cetaceans may thrash their flukes or roll over onto a person. Pinnipeds may inflict serious bites that can also become infected. Chemical exposure may occur if personnel are in contact with euthanasia solutions, other drugs or cleaning solutions. Other physical injuries include cuts from bone fragments, knives, scalpels, hooks, and other instruments. Lifting and rolling large animals can cause strains and bruises. Improper use of heavy machinery used to conduct field necropsies of large marine mammals, such as whales, may also cause physical injuries. 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. Lines under tension (such as when towing or dragging a carcass) can be dangerous if they break or part unexpectedly. The beach composition (fine sand, mud, cobble, boulder, etc.) can complicate response activities, increasing the risk of physical injury.

Marine debris also poses a hazard during stranding responses. Responders may be injured by stepping on broken glass, metal, needles, or other litter. Responders could become entangled in derelict fishing gear during water responses. Responders may also come into contact with contaminated debris, including medical waste and sewage. Additionally, stranding responses can coincide with hazardous waste spills, such as oil. Responding to marine mammals contaminated with oil or other hazardous materials may cause lightheadedness; nausea; and eye, skin, and respiratory irritation (Geraci and Lounsbury 2005). Exposure to oil spills can lead to long-lasting adverse health effects, even for people working to mitigate the effects of the spill (D'Andrea and Reddy 2018).

Reports of human illnesses from contact with marine mammals are rare, but have occurred. Marine mammals may carry infectious zoonotic diseases that can be transmitted to humans. Pathogens may be transmitted through direct contact with tissues and body fluids usually through a break in the skin or through mucous membrane contact (splashes in mouth, eyes, or nose) or aerosols of pathogens from the infected animals or their tissues especially through activities at necropsy such as use of saw blades or high-pressure-hoses. Zoonotic pathogens may include, but are not limited to, *Mycoplasma spp.* (seal finger), *Mycobacterium spp.*, *Erysipelothrix spp.*, *Leptospira spp.*, *Brucella spp.*, *Parapoxvirus 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, Hunt *et al.* 2008). In a survey of marine mammal researchers, stranding responders, and managed care personnel, a few respondents reported dangerous infections, including tuberculosis, leptospirosis, and brucellosis (Hunt *et al.* 2008). However, studies suggest that the few cases of tuberculosis documented in marine mammal handlers may be more likely caused by less virulent marine tuberculosis pathogens (*i.e.*, *Mycobacterium marinum* or *M. pinnipedii*) than the more common *M. bovis* (Roe *et al.* 2019).

Stranding responders may also be exposed to biotoxins from harmful algal blooms (HABs). Most biotoxins only pose 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.

Other marine organisms are also a safety concern for marine mammal stranding responders. Handling or stepping on coral or oysters can lead to cuts which may become infected. Jellyfish stings, depending upon the species, may cause a range of reactions, from minimal damage to 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 responders are entering the water. Shark attacks do occur in U.S. coastal waters, with over 449 attacks between 2007 and 2016. Of this number, 244 attacks have occurred in Florida; 65 in Hawaii; 39 in South Carolina; and 33 in California (FLMNH 2019). Terrestrial scavengers, such as bears, and semi-aquatic animals, such as alligators and crocodiles, may also pose a danger to stranding responders.

Stranding responders are also 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 the water for extended periods of time. Symptoms of hypothermia include weakness, drowsiness, confusion, uncontrollable shivering, and cold, pale skin.

Entanglement Response: Safety issues that may arise during entanglement response activities are related to aircraft operations, boating operations, physical and chemical restraint of the animal, weather conditions, the entangling gear or debris, and the reactions of the animal(s) to response activities. 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 or pilot error.

During entanglement response operations, boating accidents may include collisions with another vessel or a fixed object. Capsizing by operator error, sea conditions or an animal response, a person falling overboard, or drowning can also occur. 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 and potentially drowning.

Physical injuries from entanglement response activities, both in water and on land, include bites or tail slaps from entangled animals, bruises, dislocations, broken bones, or other injuries from blunt-force trauma. 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. In 2017, an experienced Canadian large whale entanglement responder was struck and killed by a North Atlantic right whale's fluke just after successfully removing an entanglement from the whale.

Rehabilitation: Safety risks relative to rehabilitation include physical injury, exposure to 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, rashes, other physical injuries from contact with the animal, and drowning. Exposure to zoonotic diseases, contaminants, and toxins are potential risks to all personnel handling animals. Animal handlers in pools are exposed to water contaminated with urine, feces, and other bodily fluids. Chemical exposure is possible during the administration of drugs, including euthanasia solutions, or while using cleaning solutions. Sunburn, heat exhaustion, heat stroke, and hypothermia are possible, if rehabilitation activities require people to be outside for extended periods of time.

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 extended periods of time. Physical injuries may occur from contact with marine debris.

Research: Research activities conducted under the MMHSRP may occur in a laboratory, in the field, 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 ultraviolet radiation. Physical injuries such as cuts, punctures, bruises, and burns may occur while using laboratory equipment and materials.

Research activities conducted in the field or 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 or hot branding. Captured cetaceans may thrash their flukes or ram (head-butt) personnel, while captured pinnipeds may inflict serious bites that can also become infected. 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 or if researchers are in the water for extended periods of time. Symptoms of hypothermia include weakness, drowsiness, confusion, uncontrollable shivering, and cold, pale skin. Jellyfish, stingrays, other venomous fish, and sharks all pose threats to researchers in the 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`

Human interactions with stranded and/or entangled marine mammals can be public health risks. As mentioned above, stranded or entangled animals can thrash around, roll onto, and bite or otherwise attack humans. Consumption of marine mammals, which occurs in Alaska, may also be hazardous if animals have environmental contaminants including biotoxins or zoonotic diseases. Some zoonotic diseases can be passed to humans if a person comes into contact with the animal, its tissues, or body fluids.

MMHSRP activities may include operating vessels around members of the public. Boating operations may include, but are not limited to, motorboats, sailboats, personal watercraft (jet skis), and kayaks. In 2017, the U.S. Coast Guard counted 4,291 accidents as a result of recreational boating accidents. The top five types of recreational boating accidents were: collision with a vessel; collision with a fixed object; flooding/swamping; grounding; and falls overboard. 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.

Shark attacks are relatively low in the United States, with fewer than two attacks per 10,000,000 million people (Midway *et al.* 2019). However, the rate has slowly increased since 1960 (Midway *et al.* 2019). Although more research is needed (Tucker *et al*. 2018), there are no studies that have demonstrated that sharks are attracted to decaying marine mammal carcasses on land, likely because the leachate plume from carcasses is small and rarely reaches groundwater (Tucker *et al.* 2019). The MMHSRP may authorize other researchers to use stranded marine mammal parts during the course of shark studies in order to attract the target animal(s). However, those projects would be conducted offshore without members of the public present.

3.6 Socioeconomic Considerations

3.6.1 Definition of the Resource

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

EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, requires federal agencies to identify and address any disproportionately high and adverse human health or environmental effects their actions may have on minority and low-income populations. The alternatives are largely based upon marine mammal strandings and entanglements. Strandings and entanglements cannot be predicted and may occur anywhere on the coasts or in waters of the United States. 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, and carcass disposal would not be targeted at minority and low-income populations. 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 analyzed in 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 VII.

Existing and potential members of the Stranding Network (and those who provide services to the Network) are likely to fall into either two categories in the U.S. Economic Census: 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 VII. The information for these industry categories includes 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 VII contains combined summary information for lodging and restaurant industries located in coastal counties. Lodging includes hotels, motels, bed and breakfasts, recreational vehicle parks, campgrounds, recreational camps and vacation camps. The restaurant category includes full-service restaurants, limited-service restaurants, cafeterias, snack bars, and bars.

Stranding responses are usually short-term events. Most stranding responses last for less than a day. Responses to complicated cases such as large whale strandings or mass strandings of animals may take several days. In tourist-based coastal economies, the economic input of stranding responses will be minimal and undetectable in regional economic statistics. However, marine mammal rehabilitation centers may have a positive impact on these communities, as they may attract tourists.

Chapter 4 Stranding Response

The overarching goals of the National Marine Mammal Stranding Response Network (Stranding Network) are to provide for the welfare of live marine mammals, minimize risks to public health and safety, collect data from stranded[31] marine mammals as a resource for scientific information, advance public education and engagement, and enhance the conservation and management of wild marine mammal populations.

Each marine mammal stranding event is unique, and several factors are considered when determining the most appropriate course of action (*e.g.*, aspects of the stranding location, the species, the number and size of animal(s), animal condition, access to equipment as well as sufficient funds and staff, etc.) in response. Lessons learned from relatively abundant species (*e.g.*, bottlenose dolphins (*Tursiops truncatus*), harbor porpoises (*Phocoena phocoena*), California sea lions (*Zalophus californianus*), harbor seals (*Phoca vitulina*)) can help identify threats, inform management actions, and refine techniques to enhance success during emergencies involving threatened or endangered species (*e.g.*, for North Atlantic right whales (*Eubalaena glacialis*), Hawaiian monk seals (*Neomonachus schauinslandi*), Cook Inlet beluga whales (*Delphinapterus leucas*), Southern Resident killer whales (*Orcinus orca*), and Guadalupe fur seals (*Arctocephalus townsendi*)).

Under Section 109(h) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1379 109(h)), government employees acting in their official capacity may conduct stranding responses to marine mammals not listed under the Endangered Species Act of 1973 (ESA). Additionally, Section 112(c) of the MMPA allows the federal government to enter into agreements with non-governmental parties to carry out the purposes of Title IV, including responding to stranded marine mammals. These agreements, known as Stranding Agreements (SAs), are formally established between the National Marine Fisheries Service (NMFS) Office of Protected Resources (OPR) Marine Mammal and Sea Turtle Conservation Division and Regional Offices and Stranding Network participant organizations, to allow for stranding response to marine mammal species under the jurisdiction of NMFS (*i.e.*, all cetacean and pinniped species, with the exception of walrus (*Odobenus rosmarus*)). By issuing SAs under the authority of Section 112(c), NMFS allows Stranding Network response organizations, acting as agents of the government, an exemption to the prohibition on takes of non ESA-listed marine mammals established under the MMPA. The SA does not authorize the

[31] Under the MMPA, a stranding is 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).

taking of any marine mammal listed as endangered or threatened under the ESA. However, authorization to take ESA-listed species by the Stranding Network is provided under the Marine Mammal Health and Stranding Response Program's (MMHSRP) current MMPA/ESA permit to authorized Co-Investigators (CIs) issued pursuant to MMPA Section 104 and ESA Section 10(a)(1)(A). In the event of a stranding, response to threatened or endangered marine mammal species requires authorization and direction from these CIs. For a complete list of Stranding Network members, see Appendix I.

4.1 Stranding Agreement Template and Criteria

The National Template for Marine Mammal SAs (Appendix VIII) was developed to standardize SAs nationwide, while maintaining flexibility in certain areas to address differences between NMFS regions. In the template, all sections in black font are proposed to be implemented nationwide; shaded sections are flexible and may be implemented on a region-by-region basis; sections marked as [Reserved] may be issued, or not, on a case-by-case basis. Flexible areas include reporting timelines for Level A data and additional reporting requirements (Level B and C data). For more information on data collected from stranded animals, refer to Chapter 1. The current SA template codifies the rights and responsibilities of both NMFS and the Stranding Network participant/applicant. Different sections apply to the different roles of stranding responders, and may be used independently or in conjunction with each other.

The issuance of SAs is delegated to the NMFS Regional Offices as each Stranding Network organization needs to coordinate closely with their Regional Office in real-time on emergency events. To obtain or renew a SA, the organizations must submit an application package to the NMFS Regional Office. This SA application package is evaluated against nationally standardized criteria (Appendix IX). As part of the SA application, organizations submit detailed information including: past experience, available resources (including personnel and equipment), and protocols for rapid response and investigation. An organization is not issued a SA until their application is complete and the Regional Office can determine that they meet all applicable criteria. The qualifications were designed to standardize SAs across the United States, while still allowing regional flexibility when necessary. For example, in areas that are geographically remote or have low stranding coverage, some evaluation criteria may be waived at the discretion of the NMFS Regional Administrator. Distinct criteria are listed to allow qualifications to be evaluated separately for different types of response: 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.

Stranding Network participants must comply with the terms and responsibilities of their SAs through (1) timely reporting of strandings to NMFS; (2) timely submission to NMFS of complete reports on basic Level A data (generally accomplished through entry into the National Stranding Database); (3) collection and timely reporting of additional information when feasible and requested by NMFS; and (4) cooperation with other Stranding Network members as well as local, state, tribal, and federal officials. All policies and guidelines issued by NMFS applicable to the activities of the Stranding Network can be considered binding for the members of the Stranding Network under their respective SA. Each SA contains a section outlining the ability for NMFS to place a SA holder on probation or suspension, or to terminate the SA if the SA holder has violated the terms and conditions of the SA or any other policy or guideline issued by NMFS.

4.2 Response Activities

Within the United States, from 2009-2018, the Stranding Network responded to an average of 6,684 confirmed marine mammal strandings per year. Stranding Network members conduct emergency responses to stranded marine mammals within their authorized geographic response area, when possible. Response activities vary depending on the context of the stranding event. For the purposes of this chapter, response activities are divided into three main categories: response to live-stranded marine mammals, response to dead-stranded marine mammals, and training. Free-swimming entangled marine mammals do not meet the statutory definition of stranded (as long as the animal remains in its natural habitat), and are therefore discussed in detail in Chapter 8.

4.2.1 Response to Live-stranded Marine Mammals

Live-stranded marine mammals reported to the Stranding Network include animals that are alive on a beach (in surf or high and dry), land, or ice, but are unable to return to the water; alive on a beach, land, or ice and in apparent need of medical attention; and alive in the water and unable to return to their natural habitat without assistance, or otherwise imperiled. Response to a live-stranded marine mammal may include but is not limited to beach assessment, at-sea observation, hazing, animal capture with or without administration of drugs, relocation, temporary holding at-site, transport to a holding or rehabilitation facility, euthanasia, and/or immediate release back to the wild.

4.2.1.1 Visual Assessment and Monitoring

When live-stranded animals are reported to the Stranding Network, local responders travel to the stranding location (or general area in the case of free-swimming animals) to locate, observe, and document the animal, where appropriate. Documentation can include assessing the extent of injuries, diagnosing signs of stress, and/or evaluating the general behavior of the animal. Documentation can also include an assessment of the stranding habitat (*e.g.*, recording environmental and local hazards, and noting any sensitive/protected habitats). This information would inform subsequent response decisions on potential impacts, and would direct communications with local authorities, where appropriate. Documentation generally includes photos and videos that can be used for additional communication or requests for assistance with other stranding personnel or regional coordinators. Visual assessment and monitoring of live animals in water, or haul-outs in the case of some pinnipeds, are conducted via ground, vessel, and aerial surveys (including photo identification and unmanned aerial systems).

Not all animals reported to the Stranding Network are in need of assistance. For example, pinnipeds come ashore (on land or ice) to rest, breed, nurse and rear pups, molt, or avoid predators. Therefore, pinnipeds on beaches without obvious debilitations or risk concerns may be monitored for 24-48 hours before any further response is taken to ensure that the animal is truly stranded or imperiled, and in need of assistance. In contrast, it is rarely normal for cetaceans to be alive on land and out of water, although some species (small cetaceans) do temporarily beach themselves to pursue prey. Large whales stranded in the surf or on beaches may be monitored for one to two tidal cycles to see if they refloat, depending on the circumstances of the stranding (*e.g.*, age of the whale, topography of the beach). If the whales cannot refloat themselves, then human intervention, either euthanasia or assistance with refloating, may be considered, depending upon the circumstances of the stranding.

4.2.1.2 First Aid/Supportive Care

In most cetacean strandings, visual assessment and monitoring quickly gives way to first aid, as these species cannot survive outside of the water for long. Responders generally provide first aid/supportive care to keep the animal as comfortable as possible while stranded, which may include the righting of small cetaceans found on their side (depending on their size, large whales deemed releasable can sometimes be assisted with floats, inflated mats/bags/pontoons to provide clearance from the substrate), offering protection from surf, keeping the animal cool with water or water soaked sheets in warm temperatures or warm with dry blankets in cold temperatures, and using shade where possible. Constant monitoring of physiological parameters such as respirations and heart rate as well as behavior can reveal changes in health, and enable responders to reassess the situation and make better decisions that will inform the direction of the response. Given that pinnipeds are able to tolerate long periods out of water if kept cool and/or moist (Gulland *et al.* 2018), they generally do not require the same type or extent of first aid as cetaceans. Most first aid delivered to pinnipeds requires that stranded animals be caught and restrained (see section 4.2.1.3 below), and would mostly involve keeping them cool or warm depending on the conditions; reducing further stress by limiting noise and protecting them from domestic animals, humans, and other potential threats; and monitoring animals before and during transport.

4.2.1.3 Capture and Restraint

For land captures of pinnipeds, nets may be used; types of nets include, but are not limited to, circle, hoop, dip, stretcher, and throw nets. Net guns and pole nooses may also be employed. Typically seals resting onshore are stalked and placed in individual nets. An injectable immobilizing agent or sedative, administered remotely or by hand, may be used to subdue larger animals (*e.g.*, adult sea lions). Young pups may be caught and picked up by responders. Herding boards may be used to maneuver animals into cages or pens. For in-water capture of pinnipeds, nets and traps may be used; types of nets and traps include, but are not limited to, dip nets, large (*e.g.*, seine or purse) nets, stretcher nets, modified gill nets, floating or water nets (nets with a floating frame that can be brought adjacent to a haul-out and which the animals jump into), and platform traps. Purse seine or tangle nets may be used offshore of haul-out sites to capture animals when they return to the water. Animals become entangled by the net as it is pulled ashore (seine) or in the water (tangle). Once removed from the net, animals are placed head first into individual hoop nets. Once in-hand, pinniped restraint can be accomplished using a variety of methods (see Chapter 6 for details).

Depending on the size of the animal, small cetaceans that are stranded in the surf or high and dry can be maneuvered into a stretcher or sling. Responders can slip a stretcher under the stranded animal by removing the poles from the stretcher (if present) and rolling or lifting sections of the animal onto the material. It is extremely important to make sure that the animal is centered in the stretcher (Appendix X).

Methods used to capture and restrain cetaceans in-water vary depending on the species, location, and depth of water (Barratclough *et al*. 2019). For most small cetaceans (in shallow water), target animals are encircled with a seine net usually deployed at high speed. Small vessels are used to help contain the animals until the net circle is complete. Once the net is completely encircling the cetacean, handlers are deployed around the outside of the corral to aid animals that become entangled. The target animal(s) eventually strikes the net and becomes entangled, which allows animal handlers to more easily control the small cetacean(s). In some circumstances, handlers may be able to hand catch and restrain an animal as it swims around the restricted space.

Another method of capturing small cetaceans in shallow water environments involves using hand set nets positioned vertically in the water to block off areas (*e.g.*, canals), thereby restricting swimming space, and encouraging animals to move towards the capture team. Gradually moving the hand set nets can further restrict the available space.

In some cases, small cetaceans have to be captured in deep (>2m depth) water. A break-away hoop-net can be used to capture individuals as they surface to breathe or while bow riding. Using the animals' forward momentum, in combination with the net handlers' skill, the animal is captured in the net. The additional drag of the net slows the animal, but the design allows the animal to swim, surface, and breathe during this process. The net is attached to a tether tied off to a large float or vessel, and the animal is retrieved, maneuvered into a sling and brought onboard the capture boat. For animals not inclined to bow ride, or those in turbid, low visibility environments, the seine net method (as described above) could be pursued, with some modifications (*e.g.*, handlers would not get into the water until the animal is adequately restrained alongside a vessel). In very deep water, the seine net method is not generally preferred as it is considered high risk to both animals and responders, and is less effective as the nets take time to sink, which can allow target animals to escape by going under the sinking net panels. Capturing small cetaceans in very deep water using the seine net method does not occur often, and would require additional discussion, planning, and coordination with NMFS to determine the method(s) to attempt before approval is provided.

For larger small cetaceans (*e.g.*, killer whales) a soft tail line can sometimes be used to guide an animal into a sling, however, this method is reserved for slow moving individuals (*e.g.*, logging at the surface) that allow close approaches by vessels. The aforementioned methods of capture and restraint for both cetaceans and pinnipeds are similar to those used for entanglement response (Chapter 8) and biomonitoring and research (Chapter 9).

For large whales (baleen whales and sperm whales), capture and restraint of animals stranded, imperiled, or otherwise in distress are typically impracticable if not impossible given the animals' massive size. On extremely rare occasions, there may be a need to assist a live stranded calf or juvenile that strands on shore (Sumich *et al*. 2001), and if deemed prudent and logistically feasible, a large whale calf may be transported from the stranding location to a rehabilitation facility.

4.2.1.4 Administration of Drugs

Drugs are sometimes used to sedate or restrain a live-stranded marine mammal or, in the course of triage and rehabilitation, used for stabilization and medical treatment. Antibiotics, anesthetics, antifungals, and other medicines may be administered during stranding response activities. The type of drug administered to live-stranded marine mammals is context specific, and is left to the discretion of the attending veterinarian. Drugs may be administered orally, rectally, topically, through injection, intubation, or inhalation. For further description of the potential drugs and doses used during marine mammal stranding response activities, refer to the CRC Handbook of Marine Mammal Medicine (Gulland *et al.* 2018).

4.2.1.5 Sample Collection

A variety of samples may be collected from live-stranded marine mammals during stranding response activities, and will be dependent on the species, the animal's stress level, physical condition of the animal, and likely outcome of the event (*e.g.*, immediate release, transfer to rehabilitation, etc.). Samples encompass both physical samples (*i.e.*, specimens) and non-physical samples. Physical samples include, but are not limited to, blood, saliva, urine, feces, milk, sperm, stomach contents, swabs of bodily orifices, breath, biopsies, skin, hair, nails, teeth, any tissue or lesion accessible, and whiskers. Additionally, non-physical samples such as diagnostic imaging (*e.g.*, ultrasound), acoustic sampling (*e.g.*, Auditory Evoked Potential (AEP)), body measurements (morphometrics), etc. may be collected from marine mammals during stranding response activities. Although the collection of biological samples is a component of emergency response, the methods of sampling are the same as those used during biomonitoring and research. Therefore, the impacts of sample collection are discussed in detail in Chapter 9, and specific methods can be found in Appendix XI.

4.2.1.6 Immediate Release

Immediate release is when an animal is responded to, assessed, and is approved to be released back into the wild during the same event. Candidates for immediate release may include healthy pinnipeds that have strayed too far inland or have come ashore entangled in debris, but are minimally injured and can be completely disentangled (Geraci *et al.* 2005), or, stranded cetaceans that are deemed healthy. Before an animal is released, a hands-on physical assessment is performed by the response team, the stranding is documented, and the animal is often marked or tagged for post-release monitoring (to help determine if the same animal strands again later). For more information on marking and tagging methods, refer to section 4.2.1.9 below, Release of Rehabilitated Animals (Chapter 7), and Biomonitoring and Research (Chapter 9). For cetaceans, most animals that strand as part of a mass stranding event are healthy (Bogomolni *et al*. 2010, Jefferson *et al.* 2011, Sampson *et al*. 2012), and can be released together as a group, depending on the context of the stranding. Because much of cetacean behavior is learned, mass stranded juveniles are generally released with adults or in the presence of conspecifics, and mothers released with their dependent young, when feasible. Single stranded social cetaceans more frequently strand due to illness or injury (Bogomolni *et al*. 2010), and thorough health assessments are especially important when considering the best course of action for these animals. In many cases, solitary social cetaceans are poor candidates for immediate release. There are certain geographic areas, such as Cape Cod, Massachusetts, where solitary cetaceans are prone to stranding due to disorienting geographic features; it may be appropriate to release stranded animals after assessment and transport to the open ocean (Sharp *et al.* 2016). Animals suitable for immediate release may be refloated from the stranding site or transported to an alternative location such as a quiet beach or taken offshore via boat. Vehicles, boats, and/or aircraft may be used to transport marine mammals. For further description of marine mammal transport, see Chapter 6 and Appendix X.

4.2.1.7 Euthanasia

For some stranded marine mammals, euthanasia may be determined to be the best and most humane course of action. Euthanasia could occur at the stranding site, other location (*e.g.*, veterinary hospital), or following medical treatment at a rehabilitation facility. Euthanasia of animals would be authorized by veterinary staff and only be performed by trained personnel. Persons administering euthanasia are knowledgeable and trained to perform the procedure, and competent in the performance of the technique. There are many situations that could call for the consideration of euthanasia (*e.g.*, dependent calf without mother, serious injury or illness, etc.) and when considered, appropriate planning needs to take place. Approval for euthanasia comes from NMFS, either through pre-approval of existing protocols for commonly stranded species or on a case-by-case basis for uncommon, difficult cases, or ESA-listed species. As part of that approval process, NMFS will discuss euthanasia methods with the relevant federal, state, tribal or other local land authority if applicable. Euthanasia is only administered after considering all aspects of the case, including the welfare of the animal, human safety, eco-toxicological hazards of the euthanasia chemicals on-hand, carcass disposal options, and the availability of appropriately trained and licensed individuals (NMFS-OPR-56).

The decision to euthanize an animal is never approached lightly, and all other options are weighed prior to making this determination. Euthanasia methods used by the Stranding Network result in rapid loss of consciousness followed by cardiac or respiratory arrest and the ultimate loss of brain function (NMFS-OPR-56). In addition, the techniques employed minimize distress and anxiety experienced by the animals prior to loss of consciousness. All euthanasia procedures follow approved guidelines, such as those referenced in the American Veterinary Medical Association (AVMA) guidelines for the Euthanasia of Animals (AVMA 2020); the CRC Handbook of Marine Mammal Medicine (Gulland *et al.* 2018); and for cetaceans the Cetacean Euthanasia Technical Memorandum (Barco *et al*. 2016) and the Report of the IWC Workshop on Euthanasia Protocols to Optimize Welfare Concerns for Stranded Cetaceans (2014). Intravenous administration of an acceptable pharmaceutical agent is considered the most rapid and reliable means of obtaining euthanasia in mammals (AVMA 2020), and is the most common method used in marine mammals (Gulland *et al.* 2018). For pinnipeds and small cetaceans, commonly used chemical agents include barbiturates (Gulland *et al.* 2018), and for large whales heavy sedation followed by the administration of potassium chloride (Harms *et al.* 2014). Stranded marine mammals may also be euthanized by physical means, including exsanguination after heavy sedation or anesthesia (Geraci and Lounsbury 2005), ballistics (shooting), although ballistics are not effective in very large animals, or other specialized euthanasia equipment such as captive bolt, spinal lance, explosive penthrite grenades, etc. (IWC 2014). Lastly, depending on the stranding conditions and in the interests of human safety, sometimes the only option is to let the animal expire naturally without assistance. More details on euthanasia methods can be found in Appendix XIII.

4.2.1.8 Transport and Relocation

Vehicles, boats, or aircraft may be used to transport marine mammals, and the specifics of transport will vary on a case-by-case basis. Transport is conducted by trained and qualified individuals using equipment specific to the species being transported. Small pinnipeds are typically transported in plastic or metal carriers or cages. Carrier/cage dimensions must be large enough to allow the animal to turn around and exhibit normal posturing during transport (Gulland *et al.* 2018). Large pinnipeds are transported in appropriately-sized crates or containers, which may need to be custom-made. To reduce the stress experienced, some animals may need to be sedated during transport which could compromise their ability to thermoregulate as well as the ability of staff to assess their condition. Pinnipeds traveling by vehicle are generally protected from extreme sun, extreme heat, extreme cold, wind, noise, and exhaust fumes. Pinnipeds may overheat during transport and are monitored regularly. To prevent hyperthermia, fans, water, and ice packs are used to maintain appropriate body temperatures.

Cetaceans may be transported using dry transport methods on stretchers, foam pads, or air mattresses. For short-term transport, closed-cell foam pads are preferred because they are rigid and do not absorb water. Open cell foam pads are typically used for long-term transport because the pads can contour to the animal's form. Alternatively, cetaceans may be transported using wet transport methods in boxes or other containers specially constructed to transport the animal upright on a stretcher in water. To reduce the stress experienced, some animals may need to be sedated during transport which could compromise their ability to thermoregulate. As with pinnipeds, cetaceans are generally protected from exhaust fumes, noise, extreme sun, extreme heat, extreme cold, and wind, as transport often occurs via truck. Animals are kept moist and cool, to avoid overheating, or conversely must be kept warm during colder months (Geraci and Lounsbury 2005). Although transport is a large component of stranding response, the action is also considered a rehabilitation activity, and therefore discussed in more detail in Chapter 6. More details on transport methods can also be found in Appendix X.

Stranded marine mammals may be relocated for human safety, to avoid threats that may exist in the stranding location, or to place an animal in a habitat where they are less likely to re-strand, such as the releases of cetaceans that strand inside the very tidal area of Cape Cod Bay back into the Atlantic Ocean. This practice could be used for any marine mammal, particularly those considered "out of habitat" in their stranding location but are otherwise healthy, or those subjected to harassment (human or animal) in their stranding location, and could be accomplished using any of the methods discussed above. Relocation also requires capture and handling, as well as the release of, the stranded marine mammal. These activities are discussed in greater detail in subsequent chapters (capture and handling (Chapter 6); release (Chapter 7)).

4.2.1.9 Marking/Tagging

Marking of marine mammals for identification purposes can be achieved in several ways, and will depend on the species and the context of the response (*e.g.*, mass stranding, animal release, rehabilitation). Grease pencils/crayons, zinc oxide, and paint (including paintballs) can be used on pinnipeds and cetaceans for temporary, short-term marking. Hair dye, which is temporary and no longer visible after molt, can be used to mark pinnipeds. Longer lasting marks include freeze brandings and notching of fins (cetaceans), and freeze or hot branding (pinnipeds). Lettered and numbered plastic tags, including Rototags and Allflex tags (*i.e.*, livestock ear tags), are also commonly used marking methods for long-term monitoring of both pinnipeds and cetaceans. The attachment of scientific instruments (*e.g.*, satellite-linked tags, very high frequency (VHF) tags, passive integrated transponder (PIT) tags, etc.) may also be used to remotely monitor an animal's location and to monitor post-release survival. Tag attachment methods vary with tag type, species, and circumstances. Pinniped attachment methods include, but are not limited to: glue, bolt, harness, suction cup, or surgical implant. Attachment methods for cetaceans include, but are not limited to: bolt, punch, suction cup, or implant. The tagging or marking method with the least impact on the animal's behavior and welfare that meets the requirements of the situation is selected. In some cases, a tag may be chosen as the appropriate method when it would meet the requirements better than a mark. For more information on marking and tagging methods, refer to Release of Rehabilitated Animals (Chapter 7) and Biomonitoring and Research (Chapter 9).

4.2.1.10 Hazing (Deterrence)

In certain emergency situations, it may be necessary to attempt to prevent marine mammals from encountering or persisting in a potentially harmful situation, such as an oil spill, a group of dolphins entering shallow water that are likely to mass strand (*e.g.*, around Cape Cod), or to encourage an animal to leave freshwater (such as a large whale that has swum inland up a river). This may be accomplished by attempting to haze or deter the animal to cause it to avoid or leave the harmful area, or by attempting to lure or attract it to a better situation. For all marine mammals, including threatened and endangered species, hazing is authorized under the MMHSRP's MMPA/ESA permit and requires prior approval by the Principal Investigator (PI). Hazing methods include, but are not limited to, acoustic and visual deterrents, vessels, exclusion devices, and tactile harassment (*e.g.*, water hoses, water guns, foam projectiles, etc.). For cetaceans, active and passive acoustic deterrents may be used. Pingers, which are typically used in the commercial fishing industry, produce high-frequency pulses of sound to deter animals. Other active acoustic deterrents used for cetaceans include, but are not limited to, Oikomi pipes (*i.e.*, striking a vertical metal pipe in the water to create a loud noise), and playing underwater recordings of known predator sounds/alarm vocalizations. Passive deterrents include devices that provide a reflection of echolocation signals. The method chosen would depend on the context of the situation, including the environment, species being deterred, and potential nearby non-target animals. Pinniped-specific acoustic deterrents include impulsive explosive (*e.g.*, fireworks, cracker shells, and bird whistlers, etc.) and non-explosive (*e.g.*, passive acoustic in-air deterrents), and non-impulsive (*e.g.*, acoustic alarms, in-air noisemakers, and predator sounds, etc.). For both cetaceans and pinnipeds, sounds produced as part of acoustic deterrents would not result in a permanent threshold shift in hearing, as defined in NMFS' Revised Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS 2018).

Visual deterrents for pinnipeds include flags, air dancers, streamers, bubble curtains, and flashing lights. Vessels can be used to herd animals back out to open water or away from a hazardous situation. Physical barriers may include rigid fencing, anti-predator netting, containment booms/waterway barriers, and gates/closely spaced bars and swim step protectors for pinnipeds. Attractants may include playing sounds from conspecifics (particularly those associated with feeding) in the downstream or "open" area in an attempt to encourage the animal to move in that direction to investigate the sounds. Attractants may also include olfactory methods, such as dimethyl sulphide (DMS), which is a naturally occurring scented compound that is produced by phytoplankton in response to zooplankton grazing. DMS has been experimentally proven to change acoustic behavior in humpback whales (Bouchard *et al.* 2019), and extreme olfactory sensitivity to DMS has been shown in harbor seals (Kowalewsky *et al.* 2006).

The decision to employ hazing or attractants is a cost/benefit analysis of the potential harm to the animal from entering or remaining in the negative situation, the potential harm to the animal from the deterrence/attractant technique(s), disturbance to other wildlife in the vicinity, the potential risks to the crews conducting the deterrence as well as the public, the costs (financial and logistical) of conducting the deterrence, and the anticipated efficacy. There is no one hazing technique that will work in all situations or for all species. There are limited instances where hazing operations may be conducted under the authority of the SA. To be conducted under the SA, the hazing must be for individuals or small groups of non ESA-listed pinnipeds or small cetaceans, and must use only non-lethal techniques (Ziccardi *et al.* 2015; 85 FR 53763). Experimental and other hazing and deterrent techniques could be used under the MMPA/ESA permit, as described in Chapter 9 and Appendix XI.

4.2.1.11 Use of Unmanned Aerial Systems (UAS)

The MMHSRP uses UAS as a tool for response (*e.g.*, response to stranding, entanglement, and/or out of habitat events), as well as for biomonitoring and research. This technology facilitates visual observations in closer proximity to marine mammals, while avoiding potentially hazardous situations for responders. Additionally, UAS enable responders to maintain a greater distance from sick or injured animals (from a vessel or on shore) so as not to distress a marine mammal more than necessary and gain data on a target animal's situation remotely. Although UAS is currently used on a limited basis during emergency response, UAS is used routinely for some types of research. Therefore, methods would be similar to those used in biomonitoring and research, and UAS activities are discussed in detail in Chapter 9 and Appendix XI.

4.2.1.12 Unintentional (Incidental) Harassment

During response to a live-stranded animal, including preparatory exercises and training, unintentional (incidental) harassment of non-target animals in the immediate vicinity of the stranding response activity (*e.g.*, close approaches by aircraft or vessel, hazing, etc.) could occur. Chapter 3 includes a description of non-target species, including marine mammals under U.S. Fish and Wildlife Service (USFWS) jurisdiction, terrestrial mammals, invertebrates, reptiles, fish, and birds. Only unintentional (incidental) harassment of marine mammals under NMFS jurisdiction would be authorized under the proposed MMPA/ESA permit. In rare instances, unintentional (incidental) harassment may result in injuries (serious[32] and/or non-serious) to a non-target marine animal, including marine mammals and sea turtles.

4.2.2 Response to Dead-stranded Marine Mammals

Dead-stranded marine mammals reported to the Stranding Network include animals found floating in the water or carcasses on land or ice (including animals that stranded dead, and animals that stranded alive but subsequently died). Response to a dead-stranded marine mammal may include beach assessment, at-sea

[32] NMFS defines serious injury for marine mammals in its regulations (50 CFR 229.2) as "any injury that will likely result in mortality," and clarifies its interpretation of the regulatory definition of serious injury in NMFS Policy Directive 02-238. Further, NMFS Procedural Directive (02-238-01) outlines the process for making and documenting injury determinations, with an objective of correctly and consistently categorizing documented injuries or injury events as either a serious or non-serious injury.

observation and sampling, recovery of the carcass (*e.g.*, towing the carcass to shore), field or laboratory necropsy, sample collection, carcass disposal, and/or the retention of parts and specimens.

4.2.2.1 Carcass Recovery

Some carcasses reported to the Stranding Network are of animals floating offshore, whereas others involve animals that have washed ashore dead, or stranded alive but subsequently died. Once a dead-stranded marine mammal is reported to the Stranding Network, responders may attempt to locate the carcass in order to document the stranding. If logistically feasible (taking into account human safety and the surrounding environment), responders may also attempt to recover the carcass to conduct a necropsy (see section 4.2.2.2 below). Depending on the species and location, recovery of both floating and landed carcasses would likely involve the use of vehicles or vessels (or some combination thereof), as well as heavy equipment, and in rare cases may involve aircraft or UAS to locate the carcass.

4.2.2.2 Necropsy

Necropsies are performed to gain further insight into the cause of stranding and death, life history, and contribute to scientific research of marine mammals. When resources allow, Stranding Network members conduct thorough and complete necropsies, but in some situations (*e.g.*, remote locations, tides and weather, advanced carcass decomposition, local restrictions), necropsies may be more limited. The MMHSRP requires that all fresh dead and moderately decomposed carcasses be examined for evidence of human interaction, when feasible. Examples of human interaction include, but are not limited to, vessel interactions (*e.g.*, propeller wounds and blunt trauma), entanglements in fishing gear or marine debris, ingestion of gear or debris, impalements, and gunshots. When immediate necropsy is not possible, refrigerating or chilling the carcass is recommended (Gulland *et al.* 2018). Carcasses can also be frozen for later necropsy, although the quantity and quality of samples (see section 4.2.2.3 below) may diminish.

4.2.2.3 Sample Collection

A variety of samples may be collected from dead-stranded marine mammals during stranding response activities. Physical samples that may be collected include, but are not limited to: blood, urine, feces, milk, sperm, stomach contents, swabs of bodily orifices, skin, hair, nails, teeth, baleen, whiskers, bones, any tissue or lesion, and parasites. Non-physical samples, such as body measurements (*i.e.*, morphometrics) and diagnostic imaging may also be collected. The quantity and quality of samples (both physical and non-physical) taken may diminish as carcass decomposition progresses, while other samples may be easier to collect from a decomposed carcass (*e.g.*, bones). It is recognized that it is not possible or practical to collect maximal samples and data in all cases; the effort must be tailored to the conditions (Perrin and Geraci 2009). Samples collected from stranded marine mammals are also used in a variety of scientific research projects (see Chapter 9 for more details). The MMHSRP oversees the collection and maintenance of marine mammal tissue samples in the National Marine Mammal Tissue Bank, as discussed in Chapter 1. When strandings are associated with a potential enforcement case, samples are collected following strict "Chain of Custody" protocols to ensure they can be used as evidence for any potential litigation.

4.2.2.4 Carcass Disposal

Several factors are taken into consideration when determining the most appropriate carcass disposal option including, but not limited to, the number and size of animal(s), carcass condition, the stranding location, if chemicals were administered to the animal, and logistics. Although carcass disposal is a component of stranding response, carcass disposal methods are discussed in Chapter 5 and Appendix XIV.

4.2.3 Training

Training is an important component of stranding response as it enables responders to strengthen and diversify their response skills (including learning new tools, techniques, and protocols), and increases the likelihood that they will be equipped to handle a variety of response situations in a safe and appropriate manner. Training events can also build relationships with partners that may be involved with stranding response, which could facilitate more efficient communication and response during a stranding incident. The level and type of training for stranding response is left to the discretion of the response organization. Field or simulation training activities would likely have similar environmental impacts to those response activities described above (section 4.2.1 and section 4.2.2), depending on the location, timing and types of training activities included, and are therefore analyzed concurrently with stranding response activities in this chapter.

4.3 Environmental Consequences

4.3.1 Alternative 1: Continue Program Implementation at Current Activity Levels (No Action Alternative)

Under Alternative 1, NMFS OPR Marine Mammal and Sea Turtle Conservation Division and Regional Offices would continue to use the current SA template and criteria. Current SAs would continue to be issued regionally, with national programmatic oversight, on a case-by-case basis to those entities requesting authorization that were determined to meet the SA criteria (including renewal and new applications). The

SA template would not be modified to include any new activities. Under Alternative 1, OPR Permits and Conservation Division would not issue a new MMPA/ESA permit to the MMHSRP after the current MMPA/ESA permit expires. Therefore, after the current permit expires on December 31, 2022, the MMHSRP and SA holders would only be authorized to conduct stranding response activities on species that are not listed under the ESA. Additionally, as many Prescott Grant recipients use the MMHSRP's MMPA/ESA permit to accomplish some of their project's goals (*i.e.*, respond to ESA-listed species), Alternative 1 may curtail the number and scope of Prescott Grant proposals received from the Stranding Network if authorized response to ESA animals were to cease.

4.3.1.1 Biological Resources

Under Alternative 1, Stranding Network participants that request authorization and meet the current SA criteria would continue to be issued new or renewed SAs and would continue to respond to non ESA-listed species. Additionally, until the current MMPA/ESA permit expires on December 31, 2022, CIs could continue in their response to ESA-listed species. The impacts of stranding response activities on biological resources by permitted MMPA Section 109(h) responders would be the same as those of SA holders. The type, context, level of intensity, and duration of impacts will vary depending on the geographic location, the species involved, and the equipment used in the response.

Due to the unpredictable emergency nature of strandings, marine mammal health-related events, unusual mortality events (UMEs), oil spill responses, natural disasters, and entanglements, it is not possible to know, or reliably predict, when or where every stranding will occur. Depending on the stranding location, minor, temporary, and short-term adverse effects on protected and sensitive habitats, submerged aquatic vegetation (SAV) and macroalgae, coastal and marine birds, reptiles, invertebrates, terrestrial mammals, and other marine mammals could occur during stranding response activities. A marine mammal may strand, alive or dead, in a protected or sensitive habitat, and equipment may be needed as part of the response effort. Equipment used for animal response and transport could potentially damage sand dunes and associated vegetation, could cause compaction of the beach, and may need to traverse sensitive terrestrial habitats to access the animal. However, every effort would be taken to avoid adverse impacts on protected and sensitive habitats during stranding response activities (see Mitigation section 4.4.1), including the decision not to respond to a stranded marine mammal or not to use specific equipment such as heavy machinery (if necessary to avoid potential or likely impacts on natural resources). Equipment used during stranding response activities could also accidentally leak oil or other materials into sand and nearshore waters. Accidental contaminant 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. Historically, stranding response activities, including the use of heavy equipment (*e.g.*, excavator) to access a stranded animal, have avoided reefs and shellfish beds. In such circumstances, carcasses are left in place to decompose naturally (unless otherwise instructed by land managers). Leaving carcasses in place may actually cause damage to reefs and other invertebrate communities, but this damage is a natural process and it is not the responsibility of the Stranding Network to prevent damage to these communities that would otherwise naturally occur.

Potential minor, adverse effects on protected and sensitive habitats could also include damage from vessels or anchors used during stranding responses at sea. Coral reefs, seagrass beds, and other sensitive habitats may be damaged from contact with a vessel or an anchor. Every effort would be taken to avoid adverse impacts on protected and sensitive habitats, such as coral reefs, during stranding response activities (see Mitigation section 4.4.1). Accidental spills of hazardous materials or wastes from vessels conducting stranding response activities at sea could also impact biological resources. Some materials could be diluted quickly by currents, only causing temporary impacts. Others could linger in the water column or adhere to sediment particles, causing more extended impacts. Biological resources could be injured or killed if in the vicinity of a spill.

Minor to moderate, short-term indirect 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. These birds may return to the area once response activities ended (Weston *et al.* 2011) and impacts could be temporary, as response activities would be of limited duration, although reproductive failure could occur in nesting birds. Ground nesting birds could be adversely affected by response activities, depending on the location and time of year. Heavy equipment could accidentally crush nests and response personnel could disturb or damage nests and chicks. Disturbance of nesting birds (ground-, tree-, and shrub-nesting) could leave eggs unprotected and vulnerable to predation and ambient temperatures (too hot or too cold) during the period that the nest is unattended. Response activities conducted in shallow waters could disturb foraging birds. This impact would be minimal, as birds could forage in nearby areas and may return once response activities ended.

Minor to moderate, short-term indirect adverse effects on reptiles, such as sea turtles, could occur during response activities. Response equipment could disturb or injure sea turtles nesting or basking on beaches, depending on the location and time of year. Disturbance of sea turtles or other reptiles nesting or basking on beaches would likely result in minor to moderate, temporary and short-term adverse impacts. Apart from green turtles (*Chelonia mydas*) that occasionally come ashore to bask on Hawaiian beaches (Rice *et al.* 2000), female sea turtles typically only come ashore at night to lay their eggs once a year. Response activities would avoid basking or nesting reptiles, and avoid night operations, minimizing the potential for adverse effects to reptiles. Heavy equipment could crush nests and response personnel could accidentally disturb or damage nests. Disturbance of nests could leave unhatched eggs exposed and vulnerable to predation and exposure to the environment. Where possible, response activities would not be conducted near known sea turtle nesting sites, minimizing the potential for adverse effects.

Minor, adverse effects on other coastally-dependent terrestrial species (*e.g.*, mammals, invertebrates, etc.) may occur during, and as a result of, stranding response and training activities. The use of equipment and the presence of people could disturb animals and may cause them to temporarily leave the area. These animals may return to the area once response activities end; impacts are likely to be temporary as response activities would be of limited duration. Stranding Network responders conducting stranding response and training activities would take great care not to intentionally injure or kill terrestrial species, or damage their habitat.

Minor to major short-term and long-term indirect adverse effects on other (non-target) marine mammals could occur during, and as a result of, stranding response and training activities. Captures of suspected compromised pinnipeds may incidentally harass and disrupt other animals if the capture occurs near a haul-out site or any other area where animals are located. Indirect, short-term moderate, adverse effects may occur if startled pinnipeds disperse from rookeries and haul-outs, and pups become trampled or separated in the process. Minor to major short-term and long-term indirect adverse effects may also occur if juvenile and adult animals are trampled during stampedes or injured on underwater rocks and cliff faces. While the MMHSRP has never documented injuries (serious or non-serious) to a non-target pinniped while it was flushed from a haul-out, this has been documented with other programs (Fay and Kelly 1980; Geraci and St. Aubin 1980). Providing animals were not injured, these indirect impacts would be minor and short-term as animals would likely return once responders have left. Pinniped reactions to vessels are highly variable, depending on the species (Calkins and Pitcher 1982).

Unintentional (incidental) harassment of non-target cetaceans may also occur during stranding response and training activities, resulting in temporary, indirect adverse effects. Reactions to vessel close approaches from cetaceans may include forceful exhalations (“chuffing”), increased swim speed, breaching, diving, staying submerged longer, tail and fin slapping, or moving away from the vessel. Cetacean reactions to vessels are highly variable, depending on the individual, the species, and the level of prior exposure to close approaching vessels (Watkins 1986). Changes in cetacean behavior in response to close approaching vessels is likely to persist only for the period in which the vessel is close.

Minor to major short-term and long-term adverse effects on individual marine animals could occur as target or non-target animals may be unintentionally (incidentally) injured or captured during the rescue attempt (*e.g.*, non-target marine mammals, sea turtles, etc.). Minor to major short-term and long-term adverse impacts may result if target and non-target animals are accidentally captured or entangled during a net capture, which may result in injuries or death. For example, two sea turtles were accidentally captured during a research-focused dolphin capture effort in 2015. In this instance, both turtles were released unharmed. Target and non-target animals may be accidentally struck by a response vessel, which may result in injuries (serious and/or non-serious) or death. For example, in 2015, a manatee was accidentally struck and seriously injured by a capture vessel targeting a bottlenose dolphin. Similarly, as the success of a rescue may depend upon responders locating a stranded animal quickly, non-target animals may be unintentionally (incidentally) harassed or injured (non-serious and/or serious) while responders are transiting to the target animal. For example, in 2021 a large whale entanglement responder accidentally struck and non-seriously injured a non-target whale while transiting to the target whale. However, any impacts to non-target animals are anticipated to be rare, as the examples given above are the only documented instances of accidental capture, injury (serious and non-serious), and mortality while the MMHSRP was conducting these types of activities. Additionally, the mitigation described in section 4.3.1 would further reduce the likelihood of accidental capture, injury (serious and non-serious), and mortality.

Both target and non-target animals may also be approached by piloted aircraft and UAS during response or training activities. Pinniped and cetacean reactions to aircraft are highly variable (Calkins and Pitcher 1982; Patenaude *et al.* 2002), and depend on the aircraft's altitude, speed, time spent overhead, and species or individual behaviors. Approaches to marine mammals below certain altitudes (Würsig *et al.* 1998) could indirectly cause temporary minor adverse effects, as these approaches may harass marine mammals and cause a change in behavior, or elicit different behaviors, such as diving rapidly. Behavioral responses to close approaches, by both vessel and aircraft, would generally be short-term, with a minimal effect on the individual or the population.

The decision to employ hazing or attractants necessitates a cost/benefit analysis of the potential harm to the animal from entering or remaining in the negative situation versus the potential harm to the animal from the deterrence/attractant technique(s) to be employed. Potential adverse effects of hazing would likely be from the close approach of vessels either used to deploy hazing methods or result from the method itself. The intent of the activities is to encourage the animal(s) to change their behavior and move away from a potential threat. There are limited instances where hazing operations may be conducted under the authority of the SA. To be conducted under the SA, the hazing must be for individuals or small groups of non ESA-listed pinnipeds or small cetaceans, and must use only non-lethal techniques (Ziccardi *et al.* 2015; 85 FR

53763). Acoustic deterrent methods (*e.g.*, pingers, airguns, seal bombs, predator calls, etc.), if used correctly, may cause temporary physical discomfort, but would not likely cause long-term injuries or a permanent threshold shift in hearing (NMFS 2018). Similarly, physical barriers and tactile hazing may startle the target animals, but would not likely cause long-term injuries. Temporary, negligible impacts may also occur on non-marine mammal species (*i.e.*, birds), if DMS is used as an attractant, as DMS has been experimentally proven to be an attractant to seabirds (Nevitt *et al.* 2004).

Minor, adverse effects on live-stranded marine mammals could occur during response activities. Live-stranded marine mammals would most likely experience stress and pain due to the stranding event itself that could be decreased or increased by stranding response activities. Response activities would be conducted with the best interests and welfare of the animal in mind, including assessment and intervention, which may entail disentanglement, relocation, and/or euthanasia to alleviate pain and suffering. The effects of stranding response activities on the animal would depend on the condition, species, and medical history of the animal (if known). An alert and responsive animal may panic when responders approach. Mothers separated from their young may become aggressive, and members of social species may experience negative effects if separated from conspecifics. Debilitated animals that are not as responsive, or are unresponsive, may not display outward signs of reaction, but may still experience a stress response (*i.e.*, increased cortisol, etc.).

Stranding response activities could require physical capture of the animal, which could cause direct minor to moderate adverse effects. Capture, restraint, and lifting an animal, if not properly executed, could cause discomfort, stress, injury, and/or death. Signs of stress for both cetaceans and pinnipeds include increased or reduced respiration, and prolonged struggling while being held. Cetaceans may also arch (*i.e.*, raising the head and tail simultaneously). The frequency of capture, the method(s) of restraint, as well as the age and general condition of the animal are all factors that would affect the animal's response to capture. Animals could incur injuries in their attempts to avoid capture or escape restraint (Fowler 1978). Stress could also alter an animal's immune response, making it more susceptible to infection and disease. It may also lead to behavioral changes including aggressive and antisocial tendencies (Fowler 1986). Stress from capture and restraint could cause capture myopathy (Fowler 1978; Breed *et al.* 2019).

Using drugs to sedate or restrain animals (*e.g.*, chemical immobilization) may decrease stress and risks of injury for animals and responders. However, chemical immobilization also has risks, if not administered and monitored correctly, particularly in ill or injured animals. The stress response as well as certain injuries or illnesses could change an animal's reaction to drugs, including those commonly used for chemical restraint, which could have sub-lethal or lethal consequences. When anesthetized or sedated, an animal may go into a dive reflex, which would include breath holding, slowing of heart rate, and restricted blood flow to the extremities. Anesthetized animals could develop hypothermia or hyperthermia. The short-term minor to moderate adverse effects and risks from physical and chemical restraints would be outweighed by the potential beneficial outcome of interventions intended to treat a sick or injured animal, but this requires evaluation on a case-by-case basis by experienced personnel.

Live-stranded marine mammals may need to be transported to a rehabilitation facility for further treatment and care. Transport can induce physiological stress, especially for stranded cetaceans (Atkinson and Dierauf 2018; Yip and Dold, 2018), and can have minor to moderate temporary or short-term adverse impacts if appropriate transport guidance is not followed. Prior to transport, field stabilization techniques (*e.g.*, assessment, administering oral electrolyte solution, sedation, etc.) may be used. Depending on body condition, marine mammals may develop hyperthermia or hypothermia during transport, particularly if there is limited or no protection from ambient conditions, including direct sun. Body surfaces may be exposed to the drying effects of air. Improper or non-ideal transport of marine mammals (which may be necessary in an emergency) may cause physical trauma such as muscle damage, pressure necrosis, thermoregulatory problems, and respiratory problems. Additionally, animals may inhale exhaust fumes during improper transport. Skeletal muscular stiffness may also occur from transport, but most equipment specific to transport is designed to minimize or avoid damage to muscles. Skeletal muscle stiffness would be expected to disappear within a few hours to a few days, unless there was permanent muscle damage (Antrim and McBain 2001). Depending upon the mode of transport, animals may be exposed to high levels of noise and may suffer temporary hearing loss. These risks can be minimized by following proper transport procedures.

Biological samples may be collected from a stranded marine mammal to help determine the life history, medical and physiological condition, assess the best course of action, and for research purposes. Samples could include blood, swabs, biopsies, etc., and sample collection techniques would not differ from those described in Chapter 9. Sample collection may cause minor stress or discomfort to the animal, relative to the actual stranding event. The impacts of specific sample collection techniques are discussed in greater detail in Chapter 9.

Response activities would include euthanasia when deemed necessary and feasible as the most humane course of action. Euthanasia procedures would be overseen directly or indirectly by the attending veterinarian and would be carried out by veterinary staff or trained personnel using procedures as outlined in the American Veterinary Medical Association Guidelines for the Euthanasia of Animals (2020); the CRC Handbook of Marine Mammal Medicine (Gulland *et al.* 2018); and for cetaceans, the Cetacean Euthanasia

Technical Memorandum (Barco *et al.* 2016) and the Report of the IWC Workshop on Euthanasia Protocols to Optimize Welfare Concerns for Stranded Cetaceans (2014). Chemical euthanasia agents may cause hyperexcitability or violent reactions in some species such as *Delphinus* and *Kogia* spp. (Barco *et al.* 2016). Improper use of chemical or physical euthanasia methods, may prolong or exacerbate the pain and suffering of an animal.

Healthy animals may be released immediately from the stranding site, and marking and/or tagging may be approved to monitor the animal's movements post-release. Lettered and number tags, including Rototags and Allflex tags, are commonly used marking methods for long-term monitoring of both pinnipeds and cetaceans. Tags are typically attached to the hind flippers of phocids, the foreflippers of otariids (Patterson *et al.* 2011), and to the dorsal fin of most cetaceans. Tag attachment (including the attachment of scientific instruments, as described in Chapter 7 and Chapter 9) could cause momentary pain to the animal during application, and tag sites could become infected. For further detail on the variety of tagging options available, and the specific impacts of each tagging method, see Chapter 7 and Chapter 9. During mass strandings, cetaceans may be marked with a grease pen, paint stick, or zinc oxide to keep track of each animal. Pinnipeds may also be marked with a grease pen, paint stick, or hair dye for short-term follow-up. These materials would only have a minimal and temporary impact on marine mammals.

The short-term adverse effects from stranding response activities on stranded marine mammals would be outweighed by the potential beneficial outcomes. Major long-term beneficial effects on marine mammals would be expected under Alternative 1, as all response activities would be conducted in an attempt to enhance the health and welfare of compromised animals or to investigate animal carcasses to identify and understand threats to marine mammal populations and ocean health. Stranding response activities could have both individual and population-level beneficial impacts by identifying causes of stranding or death while allowing for management measures to reduce those threats, benefitting all individuals in a population. This would be particularly critical for depleted, threatened, or endangered populations.

Information obtained from stranded marine mammals has helped establish baseline population health data for most species, and contributed to a more comprehensive understanding of wild populations. For some species, such as those not easily observable in the wild or in managed care (*e.g.*, beaked whale species (*Ziphiidae* spp.)), the only existing information (aside from scattered sightings) comes from examining stranded animals (Dalebout *et al.* 2002; Pitman *et al.* 2006; Hooker *et al.* 2019). Geographic locality of strandings and rate of occurrence can help define the distribution and abundance of a species, although extralimital strandings do occur. Sample collection (from both live and dead animals) can assist in disease detection, the assessment of population health, increase understanding of marine mammal biology and life history, examination of human-caused injuries and mortality, and can indicate changes in environmental health. Changes in environmental conditions have been first detected in stranded marine mammals (and also beach-cast birds), including high contaminant levels, oil spills, and harmful algal blooms (Cossaboon *et al.* 2019; Van Hemert 2020). Early detection of these circumstances allows for human intervention, which could result in a reduced potential impact on biological resources. Similarly, data collected from animals and carcasses with evidence of human interaction (*e.g.*, entanglements and vessel strikes) can be used by researchers and resource managers to reduce human-marine mammal conflicts. Gear modifications, geographic changes (area closures), and temporal changes (time or season closures) may all be changed so that the probability of fishery interactions with marine mammals (particularly those that are threatened or endangered) is reduced. The Stranding Network provides critical information about emerging issues which allows for a management response before the problem becomes widespread and costly or impossible to ameliorate.

Under Alternative 1, new members could be added to the Stranding Network, or authorized as MMPA/ESA permit CIs. This will increase the number of stranded animals that receive a response. Stranding response activities may be modified, as new techniques and tools become available. These would likely have minor to major, short and long-term, beneficial impacts on marine mammals as response efforts would be conducted using the best available equipment and methods. Modifications could also be made to euthanasia techniques, if safer, more effective methods or chemical solutions are developed. The use of new technologies and tools would have impacts similar to, or less than, those currently used during stranding response activities (section 4.2.1 and section 4.2.2).

After the expiration of the MMPA/ESA permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, stranding response by SA holders would end for ESA-listed species, but response to non-listed species would continue as described above. Therefore, major short-term adverse impacts would occur for individual ESA-listed marine mammals, as sick and injured animals would not receive a response and would be more likely to die from injuries and disease. Further, threatened and endangered animals would not be hazed away from hazards which could result in otherwise preventable injury and death. At a population level, major long-term adverse impacts could occur as response to vulnerable populations (*e.g.*, threatened or endangered species) would be curtailed. Valuable information on marine mammal populations, such as biology, health, disease incidence, and human interactions, collected during the examination of stranded animals, would no longer be collected for ESA-listed species.

Without a MMPA/ESA permit, federal, state, and local agencies authorized under MMPA Section 109(h) or Section 112(c) would still be able to conduct emergency response to non ESA-listed species. Also under ESA regulations (50 CFR 17.21(c)(3) and 17.31(a)), employees of the USFWS, NMFS, any other federal land management agency, or state conservation agency, may also continue to respond to ESA-listed species.

4.3.1.2 Water and Sediment Quality

Minor, short-term adverse effects on water and sediment quality could occur under Alternative 1. Stranding response activities would not intentionally generate any pollutants or disturb sediment. However, accidental spills of hazardous materials or wastes from response and survey vessels could impact water and sediment quality. Equipment used to access or transport animals (on land) could leak oil or other materials into sand and nearshore waters. 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 longer, but still localized, impacts. Heavy equipment, in addition to human traffic, could increase erosion or compact the sediment. The level of impact would vary by site and would depend on the sediment, the type of equipment used, as well as the duration of equipment use. However, stranding response activities (and the need for heavy equipment) are typically conducted over a few hours to at most a couple of days (*e.g.*, mass stranding events). Training exercises, in preparation for emergency response situations, would likely cause impacts similar to, or less than, those previously described in this section.

After the expiration of the MMPA/ESA permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, stranding response by SA holders would end for ESA-listed species, but response to non-listed species would continue as described above. As they would receive no response, live-stranded ESA-listed marine mammals would be more likely to die from injuries and disease, increasing the number of carcasses on the beach, and dead-stranded animals would remain in the environment to decompose naturally. Carcasses left on the beach to decompose naturally would have the impacts discussed in Chapter 5.

4.3.1.3 Cultural Resources

Minor, adverse effects on cultural resources could occur under Alternative 1. The use of equipment and vehicles on the beach during release activities may damage cultural resources buried in the sand or dunes. This would negatively impact areas such as the Pacific Islands region, where many unknown artifacts and habitation sites are buried on beaches. However, the potential for impact would be minor, as release activities are scattered along the entire U.S. coastline, and consultation with local authorities (prior to release site selection and/or undertaking actions) would provide information on areas of known cultural or historical significance to be avoided. Stranding response activities conducted in the water would not likely affect submerged cultural resources.

Stranding responses on indigenous people's lands would be coordinated with the community to accommodate cultural uses of marine mammals, as appropriate. Responders would also be sensitive to the fact that traditional cultures often involve ceremonial, medicinal, or subsistence uses of plants and animals (including marine mammals), as well as specific geographic locations. Every effort would be taken to avoid adverse impacts on culturally sensitive habitats during stranding response activities (see section 4.4.3), including the decision not to respond to a stranded marine mammal if necessary to avoid potential or likely impacts on cultural resources.

As defined in section 3.4.1, "indigenous peoples" are defined in this document as those peoples with pre-existing sovereignty who were living together as a community prior to contact with settler populations, and would include, but is not limited to: Native Americans, Alaska Natives, Native Hawaiians and other indigenous Pacific Islanders, and other aboriginal peoples. As discussed in Chapter 3, marine mammals and marine mammal parts have cultural significance to many indigenous peoples. Minor to major long-term direct and minor long-term indirect beneficial effects on cultural resources (*i.e.*, marine mammals and marine mammal parts) and associated cultural practices could result from implementing the proposed action to the extent the action promotes improved marine mammal health and conservation. Direct minor to major beneficial effects would result when during stranding response individual animals are provided veterinary care or other interventions that address health issues or otherwise increase their chances of survival in the wild. Indirect minor beneficial effects would result when the proposed action generates scientific findings that help improve the effectiveness of marine mammal conservation activities.

In addition to the beneficial effects associated with the promotion of marine mammal health and conservation, the proposed action could also result in some adverse effects to cultural resources, specifically for indigenous peoples that revere marine mammals as deities. Adverse effects associated with stranding response could range from negligible adverse effects to long-term major effects to cultural resources, depending on the specific circumstances of the stranding response and the extent to which stranding responders may feasibly implement mitigation measures. For example, negligible adverse effects would result in the case of a severely decomposed carcass that comes ashore in a remote location where the carcass could be left to decompose in place and cultural access and practices could be conducted with no public health or safety concerns and no sample retention. On the other hand, major adverse effects to cultural resources could result in the case of a live, stranded marine mammal with no chance of survival being euthanized and transported to a laboratory for postmortem examination and retention of its parts for scientific purposes, therefore permanently preventing traditional cultural burial practices, or use of the bones or parts for cultural or ceremonial use.

After the expiration of the MMPA/ESA permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, stranding response by SA holders would end for ESA-listed species. Response to non-ESA species would continue, and therefore the same impacts as those described above would continue. No additional effects on cultural resources would be expected.

4.3.1.4 Human Health and Safety

Human safety is the first priority during all stranding response activities. However, minor to major, short-term and long-term adverse effects on human health and safety could occur under this Alternative. Risk to responders would include physical injuries, and potential exposure to contaminants and zoonotic pathogens.

Physical injuries such as bites, bruises, strains, slips, trips, or falls may occur while approaching, handling, lifting, and transporting a live-stranded animal or carcass. Responders may be injured by stepping on beach litter or marine debris. Responders could step on or become entangled in submerged derelict fishing gear during water responses. Responders may also come into contact with contaminated debris, including medical waste and sewage. Responses in or close to water could result in drowning if safety measures are not taken. Responders in water may come into contact with sharks, jellyfish, rays, and venomous fish. Other physical injuries (*e.g.*, blunt-force trauma or broken bones) may arise from the handling and lifting of animals (*e.g.*, via stretcher or carrier), and the improper use of equipment. Sunburn, heat exhaustion, heat stroke, and hyper- or hypothermia are possible, if responders are outside for extended periods of time. Techniques associated with biological sampling often involve needles, knives, and scalpels, which place responders at risk of punctures, cuts and scrapes. Similar tools are used when performing necropsies. Serious infection could also occur if minor injuries are not treated properly. Persons involved in necropsy and disposal risk physical injury from using heavy equipment and lines under tension. Persons could also be hit or crushed by heavy equipment (*e.g.*, excavator). Accidental injections or exposure to euthanasia solution, and other drugs used in animal treatment, could also cause adverse effects, depending on the chemical(s) used. Vessel collisions, fire, capsizing, and running aground could result in injuries, or drowning. Inclement weather, such as lightning strikes, may also pose threats to human health and safety.

Contaminants, including biotoxins and petroleum products (from oiled animals), may produce short-term effects, such as respiratory problems, lightheadedness, nausea, and eye or skin irritation. The handling and transport of oiled animals could pose additional risks to responder health and safety (Aguilera *et al.* 2010).

Response to, and rehabilitation of, marine mammals exposed to petroleum would be conducted by experienced, and appropriately trained personnel. Contact with contaminated bodily fluids or tissues could injure responders. Responders may have allergic reactions to animal blubber and oils. Serious infections may also occur from contact with carcasses. Pathogens encountered may be antibiotic resistant, making treatment more difficult, or be pathogens not typically seen in humans increasing the chance of misdiagnosis (*e.g.*, *Mycoplasma spp.,* which causes seal finger) (Baker *et al.* 1998). Some zoonotic diseases may have short-term minor adverse effects including swelling, joint pain, skin lesions, and flu-like symptoms. Long-term, major adverse effects from zoonotic diseases could also occur, especially if they are misdiagnosed or difficult to treat.

Potential adverse effects on public health and safety could occur, as individuals may take it upon themselves to respond to sick and injured animals. As these unauthorized individuals are not trained, they are at a higher risk of serious injury than authorized responders. However, the public may decide not to intervene if they know that there are qualified, experienced, and authorized individuals available to conduct stranding response activities. This may result in fewer human-animal interactions, and could reduce some of the potential health and safety impacts to the public.

After the expiration of the MMPA/ESA permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, stranding response by SA holders would end for ESA-listed species, but response to non-listed species would continue as described above. This would have a beneficial effect on human health and safety, as responders would no longer be conducting stranding response activities as frequently as they are now, thereby reducing exposure to the health and safety risks previously described. However, without stranding response activities to ESA-listed species, the public would likely approach stranded marine mammals either out of curiosity or in an attempt to help. People and/or pets may be exposed to contaminants or infectious diseases if they interact with marine mammal carcasses or live animals. Live animals may bite, roll, or otherwise thrash about, causing physical injuries to people who attempt to interact with the animals.

4.3.1.5 Socioeconomics

The socioeconomics of the surrounding community are not taken into account when conducting stranding response activities, only the logistics of the response (*e.g.*, is it safe for responders/the marine mammal(s)). Minor short-term beneficial effects could occur under this alternative. The SA Template (Article II, Part D, Number 2) requires SA holders to cooperate with other members of their regional Stranding Network and the National Marine Mammal Stranding Program as well as federal, state, tribal, and local officials and employees. Greater cooperation between Stranding Network participants, including the pooling of resources, could reduce some of the costs incurred by individual organizations conducting stranding response activities. Further, SA holders are encouraged to cooperate with local land management agencies, which can sometimes provide staff, equipment and expertise of the area to help support response activities. Stranding response activities can also generate international cooperation, provide valuable educational outreach opportunities, and promote data sharing across geographic regions.

Stranding response activities include the recovery of live animals and carcasses from a variety of locations. The removal of carcasses from high-use areas, such as public beaches, would have a minor short-term positive impact on tourism activities. However, in some situations carcasses are left in place to decompose naturally. Depending on the location this could have minor short-term adverse or positive impacts on local businesses and/or tourism. For specific detail on the potential socioeconomic impacts of carcass disposal activities, see Chapter 5.

After the expiration of the MMPA/ESA permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, stranding response by SA holders would end for ESA-listed species. Carcasses of ESA-listed animals would remain at stranding sites to naturally decompose. Minor, short-term adverse impacts may occur due to the unappealing sight and smell of carcasses, which in turn could reduce tourism activity as visitors may choose to spend their money elsewhere. However, tourists may want to see a live-stranded animal or a carcass, which could create a minor short-term beneficial impact on surrounding businesses. Response to non-ESA species would continue, and therefore the costs associated with response activities to these animals would remain relatively unchanged.

4.3.2 Alternative 2: Improved Program Implementation and Issuance of a New Scientific Research and Enhancement Permit (Preferred Alternative)

Under Alternative 2, the MMHSRP would implement some operational improvements to a subset of programs and activities. NMFS would implement updated SA criteria (corresponding to newly added articles) and issue SAs on a case-by-case basis to those entities meeting the updated criteria (including new applicants and renewals), utilizing the new SA template. The updated SA template would include several new articles that authorize additional stranding activities (*i.e.*, short-term holding facilities and temporary participation in the Stranding Network for certain emergencies (*e.g.*, oil spills)), in addition to modifying current SA articles. The new SA template could be modified and updated in the future, as needed. The MMHSRP would also issue new best practices documents (*i.e.*, euthanasia, small cetacean intervention, large whale emergency response, and cetacean mass stranding). Under Alternative 2, NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit, and therefore stranding response to ESA-listed species could continue after the current permit expires on December 31, 2022. Prescott Grant recipients often use the MMHSRP's MMPA/ESA permit to accomplish some of their project's goals. Alternative 2 would allow all authorized organizations to continue to conduct response to ESA-listed species as part of their Prescott Grants.

4.3.2.1 Biological Resources

The effects on marine mammals from stranding response activities would be the same as those described under Alternative 1, except that the addition of new SA articles to the SA template, the implementation of updated SA criteria corresponding to the new SA articles, and the issuance of new best practices documents would be expected to have an overall beneficial impact on marine mammal health, welfare, and safety.

The updated SA template criteria (Appendix IX), corresponding to the new SA articles, would have a positive impact on the welfare of stranded marine mammals as it would provide a standardized process to screen all Stranding Network participants (new and existing) interested in providing short-term (Article VI) care. Additionally, a new article would allow for providing temporary participation in the Stranding Network during certain emergencies (Article VII) which would streamline the application process and may encourage some organizations to temporarily provide rehabilitation during extraordinary circumstances or emergencies (*e.g.*, oil spills, natural disasters, etc.). The SA template criteria would ensure that SA holders in every NMFS region are held to the same standards, and are qualified and experienced to conduct all activities for which they are permitted. The new SA articles (short-term holding and emergency temporary participant facilities) would provide the Stranding Network with additional capacity to respond to, assess, and stabilize sick and injured animals.

The new short-term holding article (Article VI) would authorize some facilities to care for a stranded marine mammal up to 96 hours prior to releasing or transferring to long-term care. The impact of short-term holding facilities is discussed in greater detail in Chapter 6. The new emergency temporary participant facility article (Article VII) of the SA template would allow Stranding Network members to be authorized on an expedited basis to become a temporary member of the Stranding Network to support a large-scale disaster response for the duration of the emergency, but not as a permanent member of the Stranding Network. Emergency temporary participants would typically assist the Stranding Network in response to an anthropogenic event (*e.g.*, oil spill), a marine mammal event (*e.g.*, an UME), or to fill a temporary gap in coverage. This would have a positive impact on animal welfare by ensuring that quality care is maintained during periods when the current Stranding Network is overextended, by providing a procedural streamlining solution to expedite temporary participation by different groups during emergencies, and by providing greater flexibility to address the specific needs of each situation.

The new Marine Mammal Euthanasia Best Practices (Appendix XIII) would have an overall beneficial impact on marine mammal welfare because they would standardize protocols, while still allowing for a degree of flexibility. By adhering to the best practices, responders would be better prepared to determine the best course of action for each situation. The best practices also provide taxa-specific information as well as a decision matrix, which could lead to quicker decision making, and in turn reduce the pain and suffering experienced by the stranded marine mammal. Euthanasia procedures would continue to be conducted by experienced and qualified personnel using procedures as outlined in the AVMA Guidelines for the Euthanasia of Animals (2020); the CRC Handbook of Marine Mammal Medicine (Gulland *et al.* 2018); and for cetaceans, the Cetacean Euthanasia Technical Memorandum (Barco *et al.* 2016) and the Report of the IWC Workshop on Euthanasia Protocols to Optimize Welfare Concerns for Stranded Cetaceans (2014).

The Small Cetacean Intervention Best Practices (Appendix XII) would outline general protocols and procedures specific to small cetacean intervention for free-swimming distressed or imperiled animals (*e.g.*, out of habitat animals, entangled animals, orphaned calves, etc.). These protocols balance the need for standardized procedures while allowing flexibility to address specific requirements of different situations for diverse species and habitats, as well as unforeseen circumstances. These best practices recommend pre-intervention monitoring to help evaluate the health of the animal (including the severity of injuries), and assess the environmental surroundings. Further, the best practices provide a decision matrix, which could also assist responders in determining and preparing for the appropriate course of action (Appendix XII). This could lead to a more efficient intervention, and in turn reduce the potential stress experienced by the distressed or imperiled small cetacean. The issuance of these best practices would have an overall positive impact on the health, welfare, and safety of free-swimming small cetaceans in distress or imperiled.

The Large Whale Emergency Response Best Practices (Appendix XVI) outline recommended standardized protocols to be followed when responding to large whales that are either alive and in need of assistance (*e.g.*, out of habitat, significantly injured or moribund, entangled, and stranded alive in the surf zone or on a beach), or are dead (*e.g.*, floating carcasses or dead stranded large whales). The guidelines outline triage criteria, and provide information to assist responders in determining when and how to intervene. This could lead to efficient decision making, and in turn reduce the potential stress experienced by each animal. Further, the best practices detail the recommended training, experience, and qualifications that each large whale responder should have. This would have a positive impact on the welfare of large whales as all responders would be held to the same standards, and be qualified to conduct the activities for which they are authorized.

The Cetacean Mass Stranding Best Practices (Appendix XV) would have a beneficial impact on cetaceans that mass strand as they provide detailed information on triage, sample collection, animal deterrents, and post-release monitoring. As these situations can be relatively rare (depending on the geographic area), having protocols would help Stranding Network members deal effectively with mass stranding events that they may not have much experience in handling. Triage procedures would help create an organized effort, and ensure that animals with the best chance of survival are assisted first. Standardized sampling practices and post mortem examinations could assist in better understanding the cause of the mass stranding, and potentially enable comparisons to past events. This information could be used by researchers and resource managers to help understand future stranding trends. Detailed information on animal deterrents would be useful to attempt to guide animals away from danger and prevent immediately released animals from re-stranding, and post-release monitoring would provide a mechanism to assess how stranded animals fared once they were refloated. This information could also be used to direct future mitigation, which would have an overall positive impact on wild populations.

Effects on protected and sensitive habitats (*e.g.*, coral reefs), SAV and macroalgae, reptiles, invertebrates, mammals, fish, and birds from stranding response activities would be the same as those described under Alternative 1, except that the issuance of euthanasia (Appendix XIII) and carcass disposal (Appendix XIV) best practices would have a positive effect on reducing the risk of secondary poisoning to scavengers and other biological resources. As Alternative 2 also includes the issuance of a new MMPA/ESA permit, stranding response activities for ESA-listed species could continue under the new permit. The effects on biological resources from continuing stranding response activities to ESA-listed species would be the same as those previously described in this section and above in section 4.3.1.1.

4.3.2.2 Water and Sediment Quality

The effects on water and sediment quality under this Alternative would be the same as those described under Alternative 1, except that the Marine Mammal Euthanasia Best Practices (Appendix XIII) and the Marine Mammal Carcass Disposal Best Practices (Appendix XIV) recommend that carcasses containing high concentration of euthanasia solutions known to cause secondary poisoning to scavengers (*e.g.*, barbiturates) be removed from the environment (incineration is the recommended disposal method). If followed, these actions could have a positive impact on water and sediment quality. The impacts of euthanasia solutions are discussed in greater detail in Chapter 5.

As Alternative 2 also includes the issuance of a new MMPA/ESA permit, stranding response activities for ESA-listed species could continue under the new permit. The effects on water and sediment quality from continuing stranding response activities to ESA-listed species would be the same as those previously described in this section and above in section 4.3.1.2.

4.3.2.3 Cultural Resources

The effects on cultural resources under this Alternative would be the same as those described under Alternative 1. As Alternative 2 also includes the issuance of a new MMPA/ESA permit, stranding response activities for ESA-listed species could continue under the new permit. Continued response to ESA-listed species would have the same effects as those described above in section 4.3.1.3.

4.3.2.4 Human Health and Safety

The effects on human health and safety under Alternative 2 would be the same as those described under Alternative 1, except that the implementation of updated SA criteria for the new SA articles, and issuance of new best practices documents would standardize stranding response protocols, and ensure that Stranding Network participants are experienced and qualified to conduct permitted activities. This would reduce the likelihood of accidents, and would have a beneficial impact on human health and safety. The issuance of the new Marine Mammal Euthanasia Best Practices (Appendix XIII) would standardize euthanasia procedures, allow for flexibility, and ensure that responders are prepared to meet the needs of different and unpredictable circumstances. The Cetacean Mass Stranding Best Practices (Appendix XV) would standardize triage procedures thereby reducing the chances of human error. The Large Whale Emergency Response Best Practices (Appendix XVI), and the use of the Incident Command System (ICS), would provide a clear chain of command, and allow for improved on-scene flexibility. The guidelines also identify the recommended personal protective equipment (PPE), as determined by the specific responder role. The issuance of the new Small Cetacean Intervention Best Practices (Appendix XII) would standardize intervention procedures, allow for flexibility, and ensure that responders are prepared to meet the needs of different and unpredictable circumstances.

As Alternative 2 also includes the issuance of a new MMPA/ESA permit, stranding response activities for ESA-listed species could continue under the new permit. The effects on human health and safety from continuing stranding response activities to ESA-listed species would be the same as those previously described in this section and above in section 4.3.1.4.

4.3.2.5 Socioeconomics

The effects on socioeconomics under Alternative 2 would be the same as those described under Alternative 1, except that the new Large Whale Emergency Response Best Practices (Appendix XVI) recommend that a Stranding Network participant (on scene) be identified to liaise with the public, and handle media enquiries. This would allow other responders (in different roles) to focus on the response itself and also provide the public with an educational outreach service. Increased transparency and improved communication, especially in disadvantaged communities, could also have a temporary positive impact on the socioeconomics of an area, lasting the duration of the event.

As Alternative 2 also includes the issuance of a new MMPA/ESA permit, stranding response activities for ESA-listed species could continue under the new permit. The effects on socioeconomics from continuing stranding response activities to ESA-listed species would be the same as those previously described in this section and above in section 4.3.1.5.

4.3.3 Alternative 3: More Stringent Protocols and Best Practices and Issuance of a New Scientific Research and Enhancement Permit

Under Alternative 3, the MMHSRP would implement some operational improvements to a subset of programs and activities, including those improvements outlined under Alternative 2. NMFS would require response to all threatened and endangered animals (where feasible, permitted, and safe) as part of the terms and conditions of the SA. Response to all other animals would be highly encouraged. Stranding participants could respond to these non-listed animals when feasible, based upon the availability of resources. Under Alternative 3, NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit, and therefore stranding response to ESA-listed species could continue after the current permit expires on December 31, 2022. Prescott Grant recipients often use the MMHSRP's MMPA/ESA permit to accomplish some of their project's goals. Alternative 2 would allow all authorized organizations to continue to conduct response to ESA-listed species as part of their Prescott Grants.

4.3.3.1 Biological Resources

Minor to major short-term and long-term impacts are expected to occur under Alternative 3. The requirement to respond to all threatened and endangered species (where feasible, permitted, and safe) would have beneficial effects on ESA-listed marine mammals at both the individual and population level. Stranding response activities to live ESA-listed marine mammals would be conducted in an attempt to reduce pain and suffering, and increase the chance of survival for the individual animal. For depleted, threatened, or endangered populations, the survival of each individual (especially breeding-age females) would contribute to population growth and recovery, population resilience, and in maintaining genetic diversity. Information gained from analysis of biological samples from both live and dead-stranded animals would broaden our understanding of causes of mortality and morbidity of ESA-listed species, and provide managers with biological and ecological information to identify, evaluate, and resolve conservation problems for such species.

Minor to major short-term and long-term adverse impacts could also occur for non-listed species under this alternative. If funds are limited, and response to threatened and endangered species is a priority, then response to non-listed stranded marine mammals might not be conducted as frequently. This could have an adverse impact on animal welfare at both the individual and population level. Live-stranded non-listed animals with routine and treatable conditions, with a high likelihood of survival if rehabilitated, could be left at stranding sites where they would most likely die from their injuries or disease without intervention. This would be a detriment to the wild population, and would result in needless death and suffering of animals. The continued response to non-listed species is important as currently stable populations may become threatened in the future. Further, recovering and examining carcasses of non-listed animals would also be funding dependent and not considered a priority. This could eliminate the collection of valuable information on marine mammal health and populations gained through the examination of stranded animals. This may also indirectly affect ESA-listed species, as non-listed species often serve as models for ESA-listed species. Limiting response to non-listed species would decrease the information gained from stranded animals that could prove beneficial to the survival of threatened and endangered species. Responding to non-listed species increases detection of new diseases or hazardous conditions in the ocean, which may reduce the impacts on threatened and endangered species, or species of concern.

The requirement to respond to all ESA-listed species (where feasible, permitted, and safe) could potentially result in additional responses to stranded animals, thereby increasing the potential for adverse impacts on protected and sensitive habitats, SAV and macroalgae, other marine mammals, sea turtles, fish, shellfish, other invertebrates, terrestrial mammals, and birds, depending on the stranding location. A marine mammal may strand, alive or dead, in a protected or sensitive habitat, and equipment may be needed as part of the response effort. As previously described under Alternative 2, potential damage could occur as equipment may need to traverse sensitive terrestrial habitats to access the animal. However, traversing sensitive habitats would be avoided as much as possible. Equipment used for animal response and transport could unintentionally damage sand dunes and associated vegetation, and could also cause compaction of the beach. Ground (*i.e.*, burrow, beach) nesting birds, nesting sea turtles, and other terrestrial wildlife could also be disturbed by the use of equipment, and the presence of responders.

While responding to ESA-listed marine mammals at sea, accidental spills of hazardous materials or discharges of wastes from response vessels could impact biological resources. Some materials would likely be diluted quickly by currents, only causing temporary impacts. Others 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. Additionally, adverse effects on protected and sensitive habitats could include damage from vessels or anchors. Coral reefs and other habitats may be damaged from contact with a vessel or anchor. However, every effort would be taken to avoid protected and sensitive habitats, such as coral reefs, during stranding response activities (see Mitigation section 4.4.1).

4.3.3.2 Water and Sediment Quality

The effects on water and sediment quality from stranding response activities under this alternative would be the same as those described under Alternative 2, except that the requirement to respond to all ESA-listed species (where feasible, permitted, and safe) could potentially result in additional responses to stranded animals, thereby increasing the potential for adverse impacts on water and sediment quality, as described under Alternative 2.

4.3.3.3 Cultural Resources

Effects on cultural resources from stranding response activities under this alternative would be the same as those described under Alternative 2, except that requirement to respond to all ESA-listed species (where feasible, permitted, and safe) could potentially result in additional responses to stranded animals, thereby increasing the potential for adverse impacts on cultural resources, as described under Alternative 2.

4.3.3.4 Human Health and Safety

Effects on human health and safety under this alternative would be the same as those described under Alternative 2, except that the requirement to respond to all ESA-listed species (where feasible, permitted, and safe) could potentially result in additional responses to stranded animals, thereby increasing the potential for adverse impacts on responder health and safety, as described under Alternative 2.

Potential beneficial effects on public health and safety could occur under this alternative, as responders would be required to respond to ESA-listed species (where feasible, permitted, and safe) as part of the terms and conditions of their SA. The public may decide not to intervene if they know that there are qualified, experienced, and authorized individuals to conduct stranding response activities. This could result in fewer human-animal interactions, and reduce some of the potential health and safety impacts to the public. Conversely, if there are fewer authorized responders conducting stranding response activities on non-listed species, as a result of funding limitations and the prioritization of ESA-listed animals, the public may choose to intervene. As these unauthorized individuals are not trained, they are at a higher risk of serious injury than trained and authorized Stranding Network participants.

4.3.3.5 Socioeconomics

Costs associated with responding to all threatened and endangered species (where feasible, permitted, and safe) could put a financial strain on many Stranding Network partners. Some ESA-listed animals may strand in locations that are expensive and logistically challenging to access (*e.g.*, offshore islands, remote and uninhabited locations, etc.). In some parts of the country (*e.g.*, the Pacific Islands region, the Alaska region, far offshore), response to some ESA-listed animals could take several days, depending on the stranding location. There could also be significant costs associated with the transport of supplies, equipment, and staff.

Response to live large whales, most of which are ESA-listed, typically result in high costs. Given their size, a larger volume and higher concentration of sedatives and euthanasia solution may be needed, if euthanasia is warranted. Additionally, heavy machinery is often needed to move large whale carcasses and conduct necropsies, further increasing the cost for large whales when compared to small cetaceans and pinnipeds. Further, response to dead large whales can be logistically challenging, and may require additional responders from outside the local area. Carcass disposal methods, as discussed in Chapter 5, could also put a financial strain on Stranding Network participants.

Under this alternative, response to non-listed species would continue to be encouraged (when feasible). Responses to non-listed species are not anticipated to cause any adverse or beneficial impacts on Stranding Network participants under Alternative 3.

4.4 Mitigation

The purpose of mitigation is to avoid, minimize, or eliminate negative impacts on the affected resources from the proposed action. Under Alternatives 1, 2, and 3 specific measures will be taken to moderate any significant impacts likely to occur as a result of stranding response activities. As discussed in section 1.4.2.1, there are some standard mitigation measures already included under the MMHSRP research and enhancement permit, as set forth by the Permits and Conservation Division. There are additional standard mitigation measures for some MMHSRP activities in our Stranding Agreement Template (Appendix VIII) and Evaluation Criteria for Marine Mammal Stranding Agreements (Appendix IX). In addition, there is required mitigation for certain events including sampling of animals during research under the NMFS

IACUC policy (NMFS-PD 04-112-01), responding to animals during an oil spill through HAZWOPER training, and use of UAS following the NOAA UAS Policy 220-1-5. These standard mitigation measures are described below under each resource area (sections 4.4.1-4.4.5).

There are also other (optional) mitigation measures that the MMHSRP could implement to further reduce significant impacts on marine mammals while conducting activities. These are identified in the relevant Best Practices appendices in the PEIS and are also described below under each resource area (sections 4.4.1-4.4.5).

4.4.1 Biological Resources

For all alternatives, potential adverse impacts on biological resources from stranding response activities would continue to be minimized by conditions outlined in the SA (Appendix VIII). Stranding Network participants would be required to coordinate with federal, state, and local officials and employees in matters supporting the purposes of their SA (Article II, Part D, Number 2). Additionally, the updated SA criteria (Appendix IX) provides a national screening process and ensures that only those individuals, organizations, or institutions qualified and trained to conduct response, assessment, rehabilitation, and/or release of marine mammals are given SAs. Building a Stranding Network of experienced and trained professionals would ensure that the highest quality of care is provided to marine mammals in need of intervention.

Due to the unpredictable emergency nature of strandings, health-related events, UMEs, oil spills, natural disasters, and entanglements, it is not possible to know what species and/or the number of animals that may require response. Measures would be taken to avoid protected and sensitive habitats as much as possible (including during activities pertaining to the relocation of stranded marine mammals, carcass recovery, etc.). However, strandings are typically unpredictable and may occur in protected areas including: national parks, monuments, seashores, and forests; National Marine Sanctuaries (NMSs); National Estuarine Research Reserves (NERRs); wilderness areas; essential fish habitat (EFH) and habitats of particular concern; state and local parks; and on native lands. When stranding response activities occur in protected and sensitive areas, the Stranding Network would coordinate the response activities with the appropriate authorities, to determine the manner in which a response may occur (if it is permitted at all), and to minimize the impacts of a response on biological resources. In many cases, the Stranding Network pre-plans with the appropriate authorities to avoid emergency consultations/coordination. In situations where EFH may be impacted by response activities, the appropriate NMFS EFH coordinator would be contacted. Additionally, stranding response activities (including relocation activities and carcass recovery) would be coordinated with federal, state, and/or local agencies to avoid or minimize impacts to non-target species including SAV and corals, nesting sea turtles or birds, other marine mammals, terrestrial mammals, invertebrates, reptiles, and fish.

The Stranding Network would strive to reduce impacts to protected and sensitive habitats. In some instances, this may include not conducting stranding response activities in areas with protected and sensitive habitats (*e.g.*, in-water captures of stranded animals using nets would not be conducted on or near a coral reef). To reduce the potential for coral reef, mangrove, and seagrass bed damage, anchors may be set by hand when water visibility is acceptable. Anchors would be placed in unvegetated areas within seagrass meadows or areas having relatively sparse vegetation/coral coverage, whenever possible. Anchor removal would be conducted in a manner that avoids dragging of anchors and anchor chains.

The current SA Template (Article III and Article IV, Part B, Number 4) requires 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 and may have contributed to the soiling of the site. Beach burial on federal and state lands and disposal in federal and state waters would only occur after federal, state, and/or local authorities have given permission to conduct such activities (as described in Chapter 5). If necessary, Stranding Network members would obtain a permit to conduct these disposal activities. Issuance of the Marine Mammal Carcass Disposal Best Practices (Appendix XIV) would ensure that Stranding Network members are informed of effective and appropriate carcass disposal techniques.

The MMHSRP would follow all mitigation measures set forth by NMFS OPR Permits and Conservation Division as conditions of their MMPA/ESA permit, and all activities would be conducted in consultation with, and with consent of, the permit PI. For stranding response activities involving live-stranded marine mammals, responders would approach animals gradually, with minimal noise to reduce any reaction. Extra care would be taken around nursing mothers and calves/pups. During at sea responses (especially involving large whales), responders would approach animals at slow speeds, avoid making sudden changes in speed or pitch, and avoid using reverse gear to the extent possible. Only responders with extensive experience operating vessels in close proximity to marine mammals would be involved in vessel approaches. When using UAS for stranding response, activities by the SA holder, would generally be conducted pursuant to NOAA UAS Policy 220-1-5 including pilot and crew training and qualification under the NOAA Operations Manual, aircraft authorization through the Federal Aviation Administration (FAA), preflight and operational checklists, and appropriate agency notifications and authorization for using UAS in defined areas. UAS usage by NOAA personnel conducting stranding response would be conducted pursuant to all requirements of NOAA UAS Policy 220-1-5 including aircraft airworthiness certification from NOAA. For both vessel and aerial surveys (including UAS), the amount of time spent in close proximity to an animal(s) would be limited to the minimum necessary to obtain the needed data. During such surveys, non-target animals would be avoided to the extent possible to limit disturbance.

Capture, handling, and restraint procedures would be performed or directly supervised by experienced and qualified personnel. Additionally, marine mammal veterinary staff would provide direct or indirect supervision of all activities involving the use of anesthesia and sedatives, and the administration of other drugs. Administration of these drugs would be carried out by trained personnel. Only personnel experienced in capture and sampling techniques would respond to complete the activities as safely and efficiently as possible. For pinnipeds, responders would carry out activities efficiently, such that the total time they are occupying beach haul-out areas, and the 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, as a response would incidentally harass non-stranded animals. In this situation, a response would only be performed under the authority of the MMPA/ESA permit in coordination with the NMFS Regional Stranding Coordinator (RSC) and Permit Holder/PI. Experienced personnel would be used during capture and restraint to complete the activities as quickly as possible.

To prevent interactions with non-target ESA-listed biological resources during on-water response activities, vessel personnel would be informed that it is illegal to intentionally, or unintentionally (incidentally), harm, harass, or otherwise "take" ESA-listed species, and would be instructed to watch for endangered marine species. Capture activities that involve the use of seine nets would cease if a West Indian manatee (*Trichechus manatus*), sea turtle, or other endangered marine species is sighted in the vicinity of the vessel. If a manatee, sea turtle, or other ESA-listed marine species is accidentally captured, the vessel would immediately be stopped and either turned off or put in neutral. Tension on the net would be released to allow the animal the opportunity to free itself. Caution would be exercised when attempting to assist the animal in freeing itself. More details on capture activities can be found in Chapter 9. The appropriate USFWS Field Office and NMFS OPR Permits and Conservation Division would be contacted immediately to report any incidents.

Tagging animals for immediate release would be performed or directly supervised by qualified personnel. Tag size would be kept to a minimum in order to lessen the energetic cost of carrying the tag, and placement would be selected so that it would not interfere with an animal's ability to forage or conduct other vital functions. Pinniped flipper tags, for example, would be placed appropriately so animals would not walk on or be irritated by them. Depending on the tag, a local anesthetic or analgesic could be administered prior to tagging to minimize discomfort during application. More details on tagging activities can be found in Chapter 9.

Under Article IV, Part A, Number 1d of the updated SA template (Appendix VIII), euthanasia of animals would be authorized by the veterinary staff and only be performed by trained personnel. Persons administering the euthanasia would be knowledgeable and trained to perform the procedure, and competent in the performance of the technique and follow guidance in the new Marine Mammal Euthanasia Best Practices (Appendix XIII). Some animals may be sedated prior to administering euthanasia. Euthanasia procedures would follow approved guidelines, such as those referenced in the AVMA Guidelines for the Euthanasia of Animals (2020); the CRC Handbook of Marine Mammal Medicine (Gulland *et al.* 2018); and for cetaceans the Cetacean Euthanasia Technical Memorandum (Barco *et al.* 2016) and the Report of the IWC Workshop on Euthanasia Protocols to Optimize Welfare Concerns for Stranded Cetaceans (2014). Persons using controlled drugs would comply with all federal and state laws and regulations, including regulations enforced by the Food and Drug Administration, the Drug Enforcement Administration and any applicable state veterinary practice laws and regulations. In addition to measures listed above, Stranding Network members would require further authorization and coordination with the appropriate NMFS RSC to euthanize ESA-listed species under the MMPA/ESA permit.

Potential injuries, physiological stress, and other health implications resulting from animal transport (*e.g.*, translocating animals, transfer of animals to a rehabilitation facility, etc.) would be minimized with the issuance of Marine Mammal Transportation Best Practices (Appendix X). For more information on the mitigation measures specific to marine mammal transport, see Chapter 6.

Pinniped and Cetacean Oil Spill Response Guidelines (Ziccardi *et al.* 2015) would be followed to avoid potential impacts during oil spill response. The guidelines include information on data collection and chain-of-custody procedures. Stranding responders would work through the appropriate ICS hierarchy to conduct those response activities authorized by the Unified Command/Federal On-Scene Coordinator for oil spill response, and consult with NMFS on appropriate response measures.

Potential impacts from hazing to target and non-target animals would be minimized by visual observations during the use of all acoustic deterrents. If adverse animal behavior is observed (other than moving away from the sound), the acoustic deterrent source would be shut down temporarily. The type of deterrent devices used, and their duration, would be taxa-appropriate, and based on the findings of a Marine Mammal Non-Lethal Deterrent workshop held by NMFS in 2015 (NOAA Technical Memorandum NMFS-OPR-50) and the non-lethal deterrent rule (85 FR 53763). Sounds produced as part of acoustic deterrents would not result in a permanent threshold shift in hearing (NMFS 2018). Deterrents would only be used by individuals with specific authorization or training to use certain devices and methods, as incorrect or misuse of equipment has the potential to severely injure marine mammals. Additional mitigation for hazing threatened and endangered species may be included as conditions of the MMPA/ESA permit.

4.4.2 Water and Sediment Quality

The current SA template (Article III and Article IV, Part B, Number 4) requires SA holders 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. Disposal of marine mammal carcasses *in situ* following response to dead-stranded animals would only occur once necessary permits are obtained. For more information on mitigation measures specific to carcass disposal, see Chapter 5. If hazardous materials or wastes were accidentally released during response activities, responders would notify the appropriate federal, state, or local authorities and assist with clean-up operations as needed and authorized. These measures would help protect the surrounding environment, including water and sediment quality.

4.4.3 Cultural Resources

Potential damage to known cultural resources would be avoided during stranding response activities by communicating with local land management agencies, and contacting the appropriate State Historic Preservation Officer (SHPO) and/or a Tribal Historic Preservation Officer (THPO) or other local Native authorities to identify culturally sensitive areas prior to conducting response activities. Under the proposed alternatives, if cultural resources are discovered during response operations, all activities would cease and the SHPO, a THPO, or a representative from the local indigenous community would be contacted.

Stranding response activities on indigenous peoples' lands would be coordinated with a THPO or a representative from the local indigenous community to accommodate cultural uses of marine mammals to the extent consistent with MMPA and other applicable authorities. Responders would also be sensitive to the fact that tribal cultures often involve ceremonial, medicinal, or subsistence uses of plants, animals (including marine mammals), and specific geographic locations. Every effort would be taken to avoid adverse impacts on culturally sensitive habitats during stranding response activities, including the decision not to respond to a stranded marine mammal. These measures would be taken to minimize or eliminate any potential impacts on Alaska Natives, Native American tribes, or other indigenous people's cultural uses of coastal resources. The SA template (Article III and Article IV, Part B, Number 4) requires 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.

Responders would also be sensitive to and seek to accommodate cultural ceremonies or other practices by indigenous peoples surrounding the stranding, death, or release of the marine mammals, to the extent consistent with MMPA and other applicable authorities. The expectation that responders coordinate with local groups has been included in the SA template (Article II Part D, Number 19). Adverse effects to cultural resources and associated practices during stranding response would be mitigated via a variety of measures overseen by the NMFS Regional Stranding Coordinator. These measures would accommodate indigenous peoples to engage in cultural practices related to marine mammals and facilitate culturally appropriate handling of marine mammals as practicable and allowed by law. These mitigation measures would include, as feasible and to the extent consistent with MMPA and other applicable authorities:

- Facilitating indigenous peoples' engagement in various stages of stranding response and necropsy.
- Facilitating indigenous peoples to have access to, and time with, stranded marine mammals and their parts to conduct cultural practices and fulfill their spiritual obligations.
- Facilitating communications with indigenous peoples regarding concerns and opportunities for enhanced collaboration.

The extent to which these mitigation measures can be feasibly and legally implemented will depend on a variety of factors unique to each stranding case, including human health and safety; stranding location and access; and the size and condition of the stranded animal(s). Additionally, while these mitigation measures will be conducted nationwide, each NMFS region may also implement more specific mitigation measures to better address the cultural needs of local indigenous peoples. Some mitigation measures that some regions may implement include, but are not limited to:

- Providing NMFS staff with training on cultural awareness and maintaining standard operating procedures for culturally appropriate staff conduct during stranding response activities.
- Maintaining and publicizing criteria for euthanizing stranded marine mammals and criteria for retaining marine mammal parts and samples collected for scientific purposes.

4.4.4 Human Health and Safety

Human safety is the first priority during all animal response activities. The SA criteria (Appendix IX) ensures that SA holders have relevant experience and expertise with the marine mammal species most likely encountered in the proposed area of geographic response. Further, SA holders must demonstrate the ability to address health and safety when responding to dead or live-stranded marine mammals by providing to NMFS a description of the organization's operational safety plan or protocols.

The SA Template (Article II, Part D, Number 5) requires Stranding Network participant organizations promote human and public safety by taking safety precautions against injury or disease to any Stranding 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 immediately the NMFS RSC upon learning of any diseases of concern (*e.g.*, national and state reportable and/or zoonotic diseases: please see U.S. Department of Agriculture, Centers for Disease Control, or the applicable state public health department list) that could be a potential hazard for public health. To minimize any impacts on human health and safety, all SA holders engaged in stranding response would have a health and safety plan for personnel and volunteers that is reviewed by NMFS as part of their application. Measures that may be used by SA holders to reduce health and safety risks during response include, but are not limited to, the use of personal protective equipment including clothing, gloves, 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 cardiopulmonary resuscitation (CPR). If, despite these precautions, injuries occur that require the injured party to seek medical attention, the SA template requires the SA holder to report that injury to the RSC, who can work collaboratively with the SA holder to determine if additional measures should be implemented in the health and safety plan.

In addition, the SA template (Article III and Article IV, Part B, Number 4) requires 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. This measure would safeguard beach users from stepping on misplaced objects (*e.g.*, needles, scalpels, etc.), and would also reduce any risks of exposure to zoonotic pathogens and other possible contaminants.

NMFS expects that all Stranding Network personnel and volunteers be trained to the highest level of responsibility they are assigned. Handling and restraint procedures would be performed or directly supervised by qualified personnel and if possible, experienced marine mammal veterinary staff would provide direct or indirect supervision of all activities involving the use of anesthesia and sedatives. Several of the best practices documents emphasize the importance of planning (logistical, contingency, etc.), standardizing protocols and procedures, and establishing and following a clear chain of command. Such measures ensure consistency among responders and across regions, and highlight the need for clear and open communication during emergency response situations. These best practices would have a positive impact on human health and safety as responders would be aware of the potential safety risks and the methods to avoid or minimize these risks. Continued training of Stranding Network participants would also play an important role in familiarizing responders with the most up-to-date tools and techniques, preparing them for many situations, and keeping them safe for the duration of the activity. While these measures may reduce some risks, there would always be potential for adverse effects on human health and safety.

The Pinniped and Cetacean Oil Spill Response Guidelines (Ziccardi *et al.* 2015) would serve as mitigation during oil spill response. Personnel involved in oil spill response activities would have to comply with all applicable worker health and safety laws and regulations. The primary federal regulations are the Occupational Safety and Health Administration standards for Hazardous Waste Operations and Emergency Response (HAZWOPER) (29 CFR 1910.120). Oil spill response personnel may be required to have HAZWOPER training (*e.g.*, 24 hour level), depending on the extent of their involvement and state regulations. Recommended training for response includes first-aid, CPR, ICS, crisis management, aircraft and boating safety, and marine mammal oil spill response. Personal protective equipment must be used to protect responders from exposure to hazardous substances and dangers associated with response activities. Recommended PPE includes full eye protection, oil resistant clothing, gloves, ear protection, and respiratory protection. The Safety Data Sheet for the spilled material would be reviewed and all recommended precautions would be followed. Response personnel would be periodically monitored to determine exposure. Stranding Network members would be responsible for training and certifying their employees and volunteers.

4.4.5 Socioeconomics

If John H. Prescott Marine Mammal Rescue Assistance Grant Program funds are appropriated, competitive funding opportunities could be available to eligible Stranding Network members to help offset costs incurred by stranding response activities. Some costs associated with response during an UME may be reimbursed through the UME Fund, in accordance with Section 405 of the MMPA.

Chapter 5 Carcass Disposal

5.1 Carcass Disposal Methods

A large majority of marine mammals that strand are dead, die shortly after coming ashore, or need to be humanely euthanized to alleviate their suffering due to the severity of their injury or illness. Animals also die or are euthanized after being brought to rehabilitation facilities. From 2009-2017, the National Marine Mammal Stranding Response Network (Stranding Network) responded to and disposed of an average of 3,800 marine mammal carcasses per year within the United States.

As discussed in Chapter 4, response to and disposal of carcasses can be conducted under Section 109(h) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1379 109(h)), government employees acting in their official capacity may conduct stranding responses to marine mammals not listed under the Endangered Species Act of 1973 (ESA). Additionally, Section 112(c) of the MMPA allows the federal government to enter into agreements with non-governmental parties to carry out the purposes of Title IV, including responding to stranded marine mammals. These agreements, known as Stranding Agreements (SAs), are formally established between the National Marine Fisheries Service (NMFS) Office of Protected Resources (OPR) Marine Mammal and Sea Turtle Conservation Division and Regional Offices and Stranding Network participant organizations, to allow for stranding response to marine mammal species under the jurisdiction of NMFS (*i.e.*, all cetacean and pinniped species, with the exception of walrus *(Odobenus rosmarus)*). By issuing SAs under the authority of Section 112(c), NMFS allows Stranding Network response organizations, acting as agents of the government, an exemption to the prohibition on takes of non ESA-listed marine mammals established under the MMPA. The SA does not authorize the taking of any marine mammal listed as endangered or threatened under the ESA. However, authorization to take ESA-listed species by the Stranding Network is provided under the Marine Mammal Health and Stranding Response Program's (MMHSRP) current MMPA/ESA permit to authorized Co-Investigators (CIs). In the event of a stranding, response to threatened or endangered marine mammal species requires authorization and direction from these CIs. For a complete list of Stranding Network members, see Appendix I.

While the Stranding Network does not and cannot respond to every stranded marine mammal, when they do respond and deem disposal necessary, the carcass must be disposed of properly. No single disposal method is recommended for every stranding, and several factors are considered when determining the most appropriate option for each stranding event. These factors include the species, the number and size of animal(s), carcass condition, the stranding location, if chemicals were administered, and logistics. Location considerations include coastal geography, currents, proximity to areas used extensively by people, and federal, state, tribal, and/or local laws and regulations. The methods of carcass disposal are also based upon the chemicals, if any, used to treat the animal, including antibiotics, sedatives, and/or euthanasia solution. Logistical considerations refer to the availability of equipment, resources, and workforce.

Euthanasia methods for marine mammals have been summarized previously (AVMA 2020, Barco *et al.* 2016, Harms *et al.* 2018). When chemical euthanasia is used for wildlife, depending upon the chemicals used, precautions are taken to minimize secondary poisoning (which can occur with, *e.g.*, pentobarbital) of the environment and any known or potential risks to scavengers. Certain chemical euthanasia methods, such as saturated potassium chloride solutions in conjunction with heavy sedation, have a low risk of secondary poisoning for scavengers and may be used when certain methods of disposal (*e.g*., deep burial, rendering, incineration) are not available (AVMA 2020, Harms *et al.* 2014, Barco *et al.* 2016). Similarly, some animals may be euthanized using physical methods (*i.e.*, ballistics), and lead ammunition may be poisonous to scavengers.

Carcass disposal methods for stranded marine mammals fall into one of two main categories: **(1) *remain in the environment*** **or (2) *remove from the environment*** (Table 5-1). *Remain in the environment* methods use decomposition to break down the carcass over many months or years. These methods include remain in place, burial, return to the sea, and sinking (see descriptions below). *Remove from the environment* methods use controlled means to break down a carcass faster than would naturally occur. These methods involve removing the marine mammal carcass from the stranding location to a disposal facility, including, but not limited to, a landfill, rendering plant, incinerator, or compost facility. While the specific disposal method selected depends upon several factors, under the 2009 Programmatic Environmental Impact Statement (PEIS), the Marine Mammal Health and Stranding Response Program (MMHSRP) recommended that all chemically euthanized animals be transported off-site and disposed of with removal from the environment methods. Since that PEIS was finalized, a low-residue method for chemical euthanasia (*i.e.*, heavy sedation followed by the administration of potassium chloride) has been developed which does not have the same impacts on the human environment as other euthanasia chemicals that are known to cause secondary poisoning of scavengers (*e.g.,* pentobarbital) (Harms *et al.* 2014). Therefore, Alternative 2 (Improved Implementation (Preferred)) would only recommend that marine mammals euthanized with chemicals known to cause secondary poisoning (*e.g.*, pentobarbital) be transported off-site. Other factors such as location and logistics may preclude the removal of chemically euthanized carcasses.

Table 5-1 Carcass Disposal Methods

Remain in the Environment	Remove from the Environment
• Remain In Place • Burial • Return to the Sea • Sinking	• Landfill • Render • Incinerate • Compost

5.1.1 Remain in Place

This disposal method involves leaving the carcass where the stranding occurred (either on the beach or floating), or moving the carcass to a nearby location (*i.e.*, secondary site) and leaving the carcass above ground, in the tidal zone, or shallow water areas. Natural decomposition, scavengers, weather, and the tidal cycle will eventually remove the remains. Leaving the carcass on-site is possible in uninhabited or minimally inhabited, remote areas or certain parks (*e.g.*, national or state parks). However, it is less feasible in populated areas where the carcass may be a public health, safety, or aesthetic concern, or if chemicals known to cause secondary poisoning (*e.g.*, pentobarbital) were used to euthanize the marine mammal.

5.1.2 Burial

This disposal method involves burying the carcass in the same, or a similar, location to where the animal stranded, ideally above the high tide line. This method is useful when the size of the animal makes it difficult to safely or easily move, and the carcass is not located in an area that is recommended for remain in place (*i.e.*, is located in a highly trafficked area). Burial of large carcasses may involve the use of heavy machinery, while smaller carcasses could be buried with shovels. Additionally, larger carcasses may be cut into smaller, more manageable pieces before burial. This disposal method is not feasible on beaches with hard substrates (*i.e.*, rocky shorelines), with heavy wave action that could transport sand and expose the carcass, where the groundwater table is high, where vulnerable or protected wildlife and/or cultural resources may be disturbed by burial activities (*i.e.*, sea turtles, nesting birds, sensitive plant species etc.), or when limited by manpower.

5.1.3 Return to the Sea

In some areas, access to a carcass stranding site from the land is limited (no roads, high cliffs, etc.), or a floating carcass has been determined to be floating towards a high human use area (*i.e.*, channels, ports, public beaches, etc.). If a carcass cannot remain in place or be moved to a secondary site and left above ground or buried, it can be towed offshore and returned to the sea (if the carcass condition allows), where it may float for a while but will eventually sink. To facilitate rapid sinking, the body cavity may be opened. As the ultimate goal of the release at sea method is for the carcass to sink, the release site must be far enough from shore and onshore currents so the carcass will not wash up again or create a hazard to navigation. If a carcass returns to shore, it necessitates further response and disposal activities, frequently in a different jurisdiction than the original stranding location.

In the United States, the return to the sea method generally requires authorization under the Marine Protection, Research and Sanctuaries Act (MPRSA), sometimes referred to as the Ocean Dumping Act. The MPRSA prohibits the transport of any material, including marine mammal carcasses, for the purpose of ocean dumping, except as authorized by a permit. The EPA has issued a general permit under the MPRSA[33] to authorize the transport and disposal of marine mammal carcasses in open ocean waters under specified conditions. The general permit authorization is available for any officer, employee, agent, department, agency, or instrumentality of federal, state, tribal, or local unit of government, as well as any SA holder, and any Alaskan Native, who already may take a marine mammal under the MMPA and ESA, to transport from the United States and dispose of a marine mammal carcass in ocean waters. The general permit was published in the Federal Register on December 6, 2016 (81 FR 87928). The general permit is intended to expedite required authorizations for ocean disposal when there is a need for such disposal. For certain situations where the general permit is not applicable, EPA may issue MPRSA emergency permits for the ocean disposal of marine mammal carcasses.

5.1.4 Sinking

Intentionally sinking a carcass is similar to return to the sea, as the ultimate goal for both methods is to have a marine mammal carcass sink. One additional benefit with this method is that the location where the carcass is sunk can be chosen. Carcasses are sunk by attaching materials, such as cement barriers or chains, to weigh the carcass down. To facilitate rapid sinking, the body cavity is opened. Similar to return to the sea, all sinking activities in ocean waters must be conducted under the MPRSA general permit for the ocean disposal of marine mammal carcasses or an emergency ocean dumping permit.

5.1.5 Landfill

With this disposal method, the carcass is removed from the stranding location and brought to a licensed landfill[34] in a lined or contained transport vehicle. This method is most practical if the animal is small

[33]Additional information about the general permit as well as EPA contacts for inquiries about the ocean disposal of marine mammal carcasses are available at: https://www.epa.gov/ocean-dumping/ocean-disposal-marine-mammal-carcasses

[34] Landfills are licensed by state and local governments per the Resource Conservation and Recovery Act.

enough to be easily transported from the stranding location, but a larger carcass can be cut into smaller sections for transport, or larger vehicles can be used. However, not all licensed landfills will accept animals that have been euthanized with chemicals known to cause secondary poisoning (*e.g.*, pentobarbital). Burial on private land away from the shoreline may also be conducted in some areas with limited landfill options.

5.1.6 Render

Rendering is an industrial process in which livestock and wildlife carcasses are broken down and recycled into new products[35]. This process uses all parts of the animal and often creates a protein by-product (*e.g.*, protein meal) and a fat by-product (*e.g.*, tallow and grease). As the tissues will be repurposed, some facilities may not be able to accept certain chemically euthanized (*e.g.*, pentobarbital) carcasses or marine mammal tissues known to contain toxins. It is recommended that Stranding Network responders work with local commercial rendering facilities to ensure that the carcass disposal needs will fit within that facility's policies and guidelines. Rendering can be expensive, and rendering plants are not commonly found in all areas of the United States. However, in areas where these facilities exist, rendering can be a useful carcass disposal option.

5.1.7 Incinerate

Incinerating is similar to the rendering method, in that it is an industrial process in which livestock and wildlife carcasses are broken down by burning. Unlike rendering, the incineration method destroys the soft tissues; the remaining ashes and hard parts (*e.g*., bones, teeth, etc.) are buried in a landfill. As the carcass is broken down and the remains are buried in a landfill, this disposal option helps to prevent the spread of pathogens, toxic materials (*i.e.*, persistent organic pollutants (POPs), toxic metals, and/or biotoxins), and veterinary drug residues contained in the carcass from entering the environment. Incineration can be very expensive, these plants are not commonly found in all areas of the United States, and not all facilities can accept marine mammal carcasses. The Marine Mammal Carcass Disposal Best Practices (Appendix XIV) recommend that Stranding Network responders work with local incinerator facilities to ensure that the carcass disposal needs will fit within that facility's capabilities, policies, and guidelines. However, in areas

[35] Salvaged marine mammal parts may not be sold or traded for commercial purposes (pursuant to regulations at 50 CFR 216.22 and 50 CFR 216.37). The repurposing of marine mammal carcasses or parts thereof (i.e., composting, cremating, and rendering facilities) significantly alter the marine mammal carcass or part so that the resulting byproducts are no longer considered marine mammal parts, as these processes destroy the marine mammal DNA. Therefore, these commercial enterprises may sell the byproducts that were originally sourced from marine mammal carcasses or parts, provided that those byproducts do not contain and are not marketed as containing marine mammal parts. Additionally, cremated remains used in cultural practices are not considered marine mammal parts.

where these facilities exist, and can accept marine mammal carcasses, incinerating can be a useful carcass disposal option.

5.1.8 Compost

Composting marine mammal carcasses has become more widespread in the past decade. This method may involve bringing a carcass to a licensed commercial composting facility, to a site set aside specifically for marine mammal carcasses, or composting in a carcass digester[36]. The major shortcoming of this method is that commercial composting facilities are not common in many areas of the United States. However, in areas where these facilities exist, composting can be a useful carcass disposal option. The Marine Mammal Carcass Disposal Best Practices (Appendix XIV) recommend that Stranding Network responders work with local commercial compost facilities to ensure that the carcass disposal needs will fit within that facility's policies and guidelines. For example, some facilities may only be able to compost larger animals if they are first broken into smaller pieces.

5.2 Use of Carcasses for Non-Marine Mammal Research

Letters are issued by the National Marine Fisheries Service (NMFS) Regional Administrator (RA) to legally authorize the receipt and use of marine mammal parts from stranded, public display, or research animals (but not subsistence harvested marine mammals, which require a permit) for the purposes of scientific research, maintenance in a properly curated, professionally accredited scientific collection (*e.g.*, museum), or educational purposes. The marine mammal part transfer does not have to be for research on marine mammals as the subject of the study. Examples of past research projects requesting marine mammal parts for research not conducted on marine mammals include: shark research; condor/raptor predation studies; studies of whale falls (ecosystems that exist around whale carcasses on the seafloor); and ecosystem-level research (*e.g.*, cycling of heavy metals such as mercury). Stranded marine mammal parts and/or carcasses may be used by researchers who are studying sharks and want to attract their study organism to their research vessel to enable tagging or capture for health assessment. In December 2020, NMFS published a Procedural Directive about the "Process for Authorizing Possession of Marine Mammal Parts from

[36] Salvaged marine mammal parts may not be sold or traded for commercial purposes (pursuant to regulations at 50 CFR 216.22 and 50 CFR 216.37). However, commercial facilities that repurpose marine mammal carcasses or parts thereof (*i.e.*, composting and rendering facilities) significantly alter the marine mammal carcass or part so that the resulting byproducts are no longer considered marine mammal parts, as these processes destroy the marine mammal DNA. Therefore, these commercial enterprises may sell the byproducts that were originally sourced from marine mammal carcasses or parts, provided that those byproducts do not contain and are not marketed as containing marine mammal parts.

Stranded Animals by Researchers Conducting Research on Sharks" (NMFS Policy Directive Number 02-308-04), which is available at: https://media.fisheries.noaa.gov/2020-12/02-308-04.pdf

5.3 Environmental Consequences

5.3.1 Alternative 1: Continue Program Implementation at Current Activity Levels (No Action Alternative)

Under Alternative 1, the NMFS Office of Protected Resources (OPR) Marine Mammal and Sea Turtle Division and Regional Offices would continue the carcass disposal activities of the Stranding Network using the disposal methods outlined above, until the current MMPA/ESA Permit expires on December 31, 2022. Under Alternative 1, OPR Permits and Conservation Division would not issue a new MMPA/ESA permit to the MMHSRP, at which point members of the Stranding Network would only be authorized to conduct carcass disposal activities on non ESA-listed species. As many Prescott Grant recipients use the MMHSRP's MMPA/ESA permit to accomplish some of their project's goals (*i.e.*, carcass disposal of ESA-listed species), Alternative 1 may curtail the number and scope of Prescott Grant proposals received from the Stranding Network if authorized response to ESA animals were to cease.

5.3.1.1 Biological Resources

Under Alternative 1, the current methods of carcass disposal would continue, with the recommendation to *remove from the environment* all chemically euthanized carcasses. The effects of carcass disposal will vary by method. Minor to major, short- and long-term, beneficial effects are expected to occur when *remain in the environment* methods are used. These methods allow for the carcass to naturally break down, enabling nutrients to return to the environment. Marine mammal carcasses are an important component of the ecosystem, serving as an important food and nutrient source for terrestrial scavengers, insects, and microbes when on a beach, or entire communities of organisms on the seafloor when the carcass sinks at sea (Stockton and DeLaca 1982; Smith and Baco 2003; Fallows *et al.* 2013). A single large whale carcass contributes substantial nutrients to the environment; while individual pinniped and small cetacean carcasses contribute fewer nutrients, the volume of these species overall also provide a significant contribution.

Some temporary, negligible or minor adverse effects could also occur when using *remain in the environment* methods. Marine mammal carcasses may contain POPs, toxic metals, pathogens, and/or biotoxins. Contaminant levels may be higher in species that feed at higher trophic levels and/or are in areas where prey may be more contaminated. The potential toxicological impacts posed by an individual decomposing carcass cannot be determined by stranding responders, as the life history of stranded animals is never fully known. However, the potential exists for the decay products of carcasses to be released into the surrounding environment or recycled into the food web, with subsequent temporary negligible or minor negative impacts, scaling to the number of carcasses. However, these impacts would be no different than what would happen naturally without any Stranding Network intervention.

Animals that stranded alive and subsequently died may also contain chemical residues from substances administered by stranding response personnel during the course of treatment, including chemical euthanasia solution and sedatives. If the marine mammal is an animal that has received treatment and/or been rehabilitated, it may also contain antibiotics, antifungals, and other medicine. These chemicals may persist in the carcass at different concentrations and for different amounts of time. The Standards for Release of Marine Mammals following Rehabilitation (Appendix V) recommend cessation of medications at least 2 weeks prior to release from rehabilitation, to ensure that the drugs have cleared the animal's system. Therefore, most chemical residues in carcasses would not likely create a large-scale environmental hazard, and would have only local, short-term, minor impacts. One exception are chemicals such as pentobarbital that are known to cause secondary poisoning to scavengers, which is why it is recommended in the Marine Mammal Carcass Disposal Best Practices (Appendix XIV) that carcasses that contain those chemicals be removed from the environment.

Negligible, short-term, adverse effects on scavengers would be expected to occur from the removal of carcasses from the environment. Carcasses provide food for many animals, including ESA-listed species. California condors (*Gymnogyps californianus*), an endangered species reintroduced to the wild in 1991, have been documented feeding on marine mammal carcasses (Kurle *et al*. 2016). Effects of carcass removal are expected to be negligible in many areas because many scavengers are not solely dependent on marine mammal carcasses for their survival. In most areas, strandings are rare and not a notable component of a scavenger's diet.

Despite the negligible short-term, adverse effects on scavengers from carcass burial or removal from the beach, scavengers may suffer moderate to major short-term adverse impacts if carcasses chemically euthanized with barbiturates are left to decompose on the beach. While it is currently recommended that all chemically euthanized carcasses are removed from the environment, other considerations such as local geography and logistics may preclude their removal. Some euthanasia solutions are toxic (*e.g.*, pentobarbital) and may injure or kill animals feeding on these carcasses, by secondary poisoning (O'Rourke 2002, Bischoff *et al.* 2011). Some euthanasia methods (*e.g.*, potassium chloride) are not toxic to scavengers and do not cause secondary poisoning (Harms *et al.* 2014). However, this method is often used in combination with heavy sedation drugs that may impact scavengers, which is why it is recommended that injection sites of sedation drugs are excised and disposed of using *remove from the environment* methods (Appendix XIV). Similarly, some animals may be euthanized using physical methods such as ballistics, and lead ammunition may be poisonous to scavengers, which may subsequently suffer minor to moderate short-term adverse impacts. Therefore, non-lead ammunition is recommended in the new Marine Mammal Carcass Disposal Best Practices; if lead ammunition is used, it is recommended that it is removed from the carcass prior to using *remain in the environment* disposal methods (Appendix XIV).

In addition, if all carcasses were left in place, scavengers may consume POPs, other toxic chemicals, and biotoxins that may have accumulated in certain tissues of the marine mammal. Minor to major short-term adverse impacts could occur as this would increase toxin exposure in the scavengers that consume the carcass, with the rare potential for serious injuries or death. In cases in which the animal died of an infectious disease, the carcass may also cause minor short-term detrimental health effects if consumed by scavengers or domestic pets. However, these short-term adverse impacts to scavengers occur whenever a marine mammal dies and is not reported (*i.e.*, the animal dies at sea or strands in a remote location), or the Stranding Network is unable to respond (*i.e.*, inaccessible, remote areas, etc.). Lastly, domestic pets may become ill from eating decomposing tissues from carcasses that are left in place.

Anthropogenic contaminants from carcasses that are improperly buried or left on the surface below the high tide line could leach into groundwater and flow into nearshore water, harming sensitive areas in and around the disposal site. This impact would be minor and short-term. However, carcasses above the high tide line that are left on the surface or buried above the groundwater table would not be likely to leach toxic chemicals into nearshore waters (Tucker *et al.* 2019). If contaminants do 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 an improperly buried carcass. Over time, these concentrations would be diluted and flushed by the currents; therefore, the impact on biological resources would be short-term and minor.

Carcasses disposed of by burial requires digging that would physically alter and disrupt the site. Potential short-term minor damage could occur as equipment may need to traverse sensitive terrestrial habitats to access the carcass for removal or burial. The proper authorities and relevant land management agencies are generally contacted to minimize the impacts of on-site burial in sensitive and protected habitats. Additionally, equipment could indirectly increase erosion or compact the sediment. The level of adverse impact would be temporary and minor but vary by burial site and would depend on the sediment, the type of equipment used, as well as the duration of equipment use. On-site carcass burial could also adversely affect sea turtle or marine bird nests on the beach, depending on the location and time of year. Carcass burial sites are not purposefully located near known sea turtle or marine bird nesting sites, minimizing the potential for adverse effects. Submerged Aquatic Vegetation (SAV) and macroalgae could be indirectly adversely affected by on-site burial. Small sediment plumes created by digging activities may flow into nearshore waters and smother SAV leaves and macroalgae. These impacts would be temporary and minor, and SAV leaves and macroalgae would grow back within weeks or months, depending upon the species impacted and the level of sedimentation. Additionally, as any sediment plume would likely be highly localized, organisms that use SAV and macroalgae as habitat would be able to use surrounding areas until the impacted area recovers. Sediment plumes are unlikely to be extensive and sustained enough to impact other sensitive benthic habitats that occur further offshore, such as coral reefs.

Indirect, temporary and short-term minor adverse effects on coastal and marine birds could occur during carcass burial or removal. The use of equipment and the presence of people could temporarily disturb birds nesting or roosting in trees or small bushes, and may cause them to leave the area. In general these birds are likely return to the area once response activities ended and impacts would be temporary, as response activities would only occur for a short period (hours). Ground nesting birds could be adversely affected by transport and burial activities. Indirect, short-term minor, adverse impacts could occur if heavy equipment accidentally crushes nests and digging for burial could accidentally remove a nest. Disturbance of nesting birds could leave eggs unprotected and vulnerable to predation during the period that the nest is unattended. Personnel helping with carcass disposal could also accidentally disturb or damage a nest or chicks.

Indirect minor, short-term adverse effects on shellfish and other invertebrates could occur during carcass transport or burial 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 temporarily suffer negligible negative impacts during burial activities. Potentially, contaminants (*i.e.*, POPs, toxic metals, etc.) from carcasses that are improperly buried or left on the surface below the high tide line could leach into groundwater and nearshore waters. Potential exposure of leached contaminants to fish and shellfish communities in close proximity to the disposal site may result in minor short-term adverse impacts. However, if carcasses are buried according to recommendations in the Marine Mammal Carcass Disposal Best Practices (Appendix XIV), the impacts would be negligible, as properly buried carcasses should not leach contaminants (Tucker *et al.* 2019).

Carcass disposal at sea (either through release at sea or intentional sinking) could also cause minor, short-term, adverse effects. Equipment used for disposal at sea and the towed carcass could hit and damage submerged sensitive habitats, such as coral reefs or SAV and macroalgae. Damage to coral reefs may take longer to recover than damage to faster-growing SAV and macroalgae. However, towing operations would avoid traversing across protected and sensitive habitats as much as possible, decreasing the likelihood of these impacts on these habitats.

Accidental spills of hazardous materials or wastes from vessels during at-sea carcass disposal activities could negatively impact biological resources. Biological resources, such as fish, shellfish, or protected and sensitive habitats could be injured or killed if they are in the vicinity of a spill. Equipment used during carcass disposal activities could accidentally leak oil or other materials into sand and nearshore waters. Accidental leaks from equipment could negatively 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.

Indirect adverse impacts may occur to biological resources subject to predation from scavengers attracted to the carcass. For example, lines left on carcasses that are towed and released at sea or sunk may inadvertently entangle scavengers. This would be mitigated by removing lines or cutting them very short before releasing a carcass at sea or sinking a carcass. Conversely, disposal of marine mammal carcasses at sea would have major long-term benefits locally, as the carcass would create habitat or food for organisms that depend on whale carcasses (Stockton and DeLaca 1982; Smith and Baco 2003; Fallows *et al.* 2013).

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by the OPR Permits and Conservation Division under the No Action Alternative, carcass disposal for ESA-listed species would not occur and carcasses would remain on the beach to naturally decompose. Carcass disposal for non-listed species would occur as described above. This would disproportionately have an impact on large whale carcasses, as most large whales are ESA-listed species. This would have negligible to minor long-term impacts nationally, but as most of the carcasses that would be left in place would be large whales, there could be moderate to major long-term impacts on a local scale. The carcasses of ESA-listed species (typically large whales) would have beneficial impacts on scavenger food availability. However, some of the carcasses could have tissues contaminated with contaminants (*i.e.*, POPs, toxic metals, etc.) or pathogens which could have more adverse impacts on scavengers. Anthropogenic contaminants from carcasses on beaches could leach into groundwater and flow into nearshore water, and floating carcasses may leach contaminants into the surrounding water, but these concentrations would be diluted and flushed by the currents.

5.3.1.2 Water and Sediment Quality

Under Alternative 1, current methods of carcass disposal would continue, with the recommendation to use a *remove from the environment* method for all chemically euthanized animals. Potential effects depend on the method of carcass disposal and if the animal was administered medications or drugs before it died, including euthanasia drugs. Carcasses left on the beach to naturally decompose would not cause an impact to water and sediment quality, unless the animal had been chemically euthanized with barbiturates (*i.e.*, pentobarbital) or contains anthropogenic contaminants or biotoxins. However, 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. The potential does exist for decay products of carcasses to be released into the surrounding environment or recycled into the food web, with subsequent minor short-term negative impacts. Chemical residues from barbiturate euthanasia solution and other administered drugs persist in the carcass at different concentrations and for different amounts of time. Most drugs are not likely to create an environmental hazard, as they would break down within months and would not persist in the surrounding environment. Therefore, the negative impacts would likely be minor and temporary or short-term. However, some barbiturate chemicals used for euthanasia (*i.e.*, pentobarbital) are known to persist in aquatic environments for a long time (Peschka *et al.* 2006), which is why it is recommended that carcasses euthanized with these chemicals are removed from the environment, to prevent longer-term adverse impacts.

Short-term minor adverse impacts may result from body fluids containing POPs, toxic metals, pathogens, chemicals, and/or biotoxins seeping into the sand or soil immediately beneath the animal. However, if the animal is properly buried or left above the high tide line, the adverse impacts would be negligible, as these substances are not likely to enter groundwater or nearshore waters, as the leachate plume from carcasses is small (Tucker *et al.* 2019). If contaminants do 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 downstream 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. Negligible, short-term negative impacts to sediment quality within only a few meters of the carcass may occur, but these impacts would resolve within a few months (Tucker *et al.* 2019).

Burial of carcasses could increase erosion, but this would be a negligible or minor impact. The burial site would only be disturbed for a short-period of time and would be refilled with the appropriate fill to match the surrounding sediment quality and ground level. The use of heavy equipment, to bury larger carcasses could also temporarily increase erosion or compact the sediment. This would be a negligible impact as equipment would only be used for a short time period (hours), but may cause minor, temporary increases in turbidity. Spills of hazardous materials or wastes from heavy equipment could impact water and sediment quality. Impacts would be considered minor to major, depending on the material, size of spill, location, and/or vicinity of these resources. Burial does not inactivate all pathogens in the carcass. Some carcasses may contain POPs, toxic metals, pathogens, and/or biotoxins all of which have different decay rates in a carcass; however the specific types and concentrations of anthropogenic contaminants, pathogens, and biotoxins are typically not known at the time of burial. As these carcasses decay, body fluids may leach into sediment in the immediate area. If carcasses are buried too close to the groundwater table, contaminants may also leach into 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. Most euthanasia solutions or other drugs in carcasses would not likely persist in the environment over long time periods, with the exception of pentobarbital (Peschka *et al.* 2006), which is why it is recommended that animals euthanized with these drugs are removed from 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 animals could release POPs, toxic metals, pathogens, pharmaceuticals, 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 or break down over time in the tissues. Additionally, the impacts would be no different than what would happen naturally if the carcass sank offshore and received no intervention from the Stranding Network. The material used to sink the carcass may have an adverse effect, if it could be considered a contaminant. Some materials, (*e.g.*, concrete, sandbags, jute rope) could be used to sink a carcass and these would have no impact on water or sediment quality. However, all materials used to weigh down a carcass that remains after the carcass has broken down would be considered marine debris until those materials had also broken down. Transport of the carcass offshore 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 could impact water and sediment quality. Impacts would be considered minor to major, depending on the material, 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 to a secondary site or off-site for disposal using *remove from the environment* methods. 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 definition of hazardous waste *(e.g.*, ≥50 ppm PCBs[37]), these carcasses may be taken to a licensed rendering, incineration, or composting facility. Because the landfill, rendering, composting, or incineration facilities have been previously licensed, any impacts from these activities would be covered by the individual rendering, composting, or incinerating facility and their permits, not the MMHSRP or Stranding Network members.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, carcass disposal for ESA-listed species would not occur and carcasses would remain where they naturally stranded. Carcass disposal for non-listed species would occur as described above. This would have moderate short-term impacts, as marine mammal carcasses of ESA-listed species would be left below the high tide line. Anthropogenic contaminants from these carcasses could leach into the sediment and groundwater and ultimately flow into nearshore water, degrading the sediment and water quality in close proximity to the carcass.

5.3.1.3 Cultural Resources

Under Alternative 1, current methods of carcass disposal would continue, with the recommendation to use a *remove from the environment* method for all chemically euthanized animals. Negligible to major, short-term or long-term adverse effects on cultural resources could be expected to occur under this alternative. The use of equipment and vehicles, as well as carcass burial may damage cultural resources buried in the sand or dunes. Before carcass removal or burial, efforts would be made to contact the appropriate State Historic Preservation Office (SHPO) or other local authorities to determine if cultural resources have been identified in the area. Similarly, carcass disposal on indigenous peoples' lands would be coordinated with Tribal Historic Preservation Offices (THPO) and the appropriate communities. Digging may unearth artifacts, and equipment used for digging could physically impact buried resources. This would negatively

[37] Per 40 CFR § 761.61, concentrations of 50 ppm or less of Polychlorinated Biphenyl compounds (PCBs) are not considered hazardous waste under the Resource Conservation and Recovery Act.

impact areas such as the Pacific Islands area, where many known artifacts and habitation sites are buried on beaches. Transporting the carcass off-site also has the potential to damage resources, as the equipment used could crush buried resources. In other regions (*i.e.*, Alaska), the MPRSA general permit authorizes any Alaskan Native, who already may take a marine mammal under the MMPA/ESA, to transport and dispose of marine mammal carcasses in ocean waters. However, the potential for impact to these resources 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.

As defined in section 3.4.1, "indigenous peoples" are defined in this document as those peoples with pre-existing sovereignty who were living together as a community prior to contact with settler populations, and would include, but is not limited to: Native Americans, Alaska Natives, Native Hawaiians and other indigenous Pacific Islanders, and other aboriginal peoples. As discussed in Chapter 3, marine mammals and their parts have cultural significance to many indigenous peoples. While responders would be sensitive to the fact that traditional uses often involve ceremonial, medicinal, or subsistence uses of plants, animals (including marine mammals), and specific geographic locations, the proposed action could result in some adverse effects to cultural resources. Adverse effects associated with stranding response could range from negligible adverse effects to long-term major effects, depending on the specific circumstances of the carcass disposal activities and the extent to which stranding responders may feasibly implement mitigation measures. An example of negligible adverse effects would be in the case of a severely decomposed carcass that comes ashore in a remote location where the carcass could be left to decompose in place and cultural access and practices could be conducted with no public health or safety concerns and no sample retention. For example, some Native Hawaiian practitioners consider whales to be embodiments of the Hawaiian god Kanaloa; and, therefore, a carcass left in place would allow for associated ceremonial practices to take place. Further, some Native Hawaiian beliefs place importance on the bones of whales being buried, or returned to sea, and a deceased whale left in place would more closely align with this belief as compared to removal of the carcass. On the other hand, major adverse effects to cultural resources would result in the case of a marine mammal carcass being disposed of using a *remove from the environment* method (*i.e.*, landfill, incinerate, compost, and render disposal methods), which would permanently prevent traditional cultural burial practices, or use of the bones or parts for cultural or ceremonial use. In cases where a community has a specific cultural or spiritual beliefs and wants to inter the animal in a ceremonial way, transferring remains to these groups may be appropriate, to the extent consistent with MMPA and other applicable authorities. After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division, no carcass disposal for ESA-listed species would occur. Carcass disposal for non-listed species would occur as described above. ESA-listed carcasses would remain on the beach to naturally decompose. This would reduce the already minor, adverse effects on cultural resources expected to occur under Alternative 1, as there would be fewer carcass disposals.

5.3.1.4 Human Health and Safety

Minor, short-term, adverse effects on human health and safety would be expected to occur under this alternative. Carcasses of stranded animals may be left to naturally decompose, buried, towed to sea, or transported off-site to an incinerator, rendering facility, landfill, or compost facility. Animal carcasses may contain euthanasia solutions, contaminants, or infectious diseases that people may come in contact with through tissues or fluids, if the carcasses are left to naturally decompose. Contaminants, including petroleum products and other hazardous materials, may produce short-term effects, such as respiratory problems, lightheadedness, nausea, eye irritation, or skin irritation. If disposal activities occur during certain harmful algal blooms, aerosolized toxins may be inhaled by humans and could cause respiratory problems, nausea, vomiting, and neurological symptoms. 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. Some infectious diseases may have short-term effects including swelling, joint pain, skin lesions, and flu-like symptoms. Long-term effects from infectious diseases could occur, especially if they are not diagnosed or treated properly. Most chemically euthanized carcasses left on the beach or buried would not likely affect human health, with the exception of animals that are euthanized with pentobarbital, which is why it is recommended that these carcasses are removed from the environment. Risks to human health could occur if toxic, diseased, or chemically euthanized carcasses were consumed.

Persons involved with the disposal risk physical injuries from using heavy 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. Responders may be exposed to hot or cold stress during carcass disposal activities. Carcasses that are disposed of in close proximity to shipping lanes, or any that resurface, could cause vessel accidents.

Fluids from carcasses that are improperly buried or left on the surface below the high tide line could leach into groundwater and nearshore waters. Impacts would be minor and temporary, as the leachate plume in groundwater would likely be flushed out quickly by tidewater and/or precipitation. The leachate could flow into nearshore waters, but would rapidly be diluted and flushed out by currents. There has been increasing public concern since the publication of the MMHSRP's prior PEIS in 2009 that decaying marine mammal carcasses on beaches may attract sharks to the area, increasing the likelihood of shark-human interactions. Although more research is needed (Tucker *et al*. 2018), there are no studies that have demonstrated that sharks are attracted to decaying marine mammal carcasses on land, likely because the leachate plume from carcasses is small and rarely reaches groundwater (Tucker *et al.* 2019).

Conversely, the MMHSRP may authorize other researchers to use stranded marine mammal parts during the course of non-marine mammal related studies (*i.e.*, shark studies, condor/raptor studies, etc.). These studies would use marine mammal carcasses to attract the target animal(s). No impacts to human health and safety are anticipated from authorizing these studies, as the researchers generally conduct their studies in secluded areas, and would not conduct their studies in areas where members of the public are near the study site (for boat-based shark studies) or expected to be in the study site (for studies where carcasses are left at sites such as condor/raptor studies).

Under Alternative 1, the MMHSRP would not conduct carcass disposal of ESA-listed species after the current MMPA/ESA permit expired on December 31, 2022. This would have a beneficial effect, as personnel involved in carcass disposal would no longer be conducting these activities as frequently as they are now, thereby reducing the frequency to which they are exposed to the health and safety risks mentioned above. Specifically, most large whale species are ESA-listed, and their disposal frequently necessitates the use of heavy equipment. Therefore, Stranding Network responders would have less occasion to use heavy machinery, thereby decreasing the likelihood of an accident involving this type of equipment. Conversely, there would be an increase in the number of carcasses in areas frequented by the public (particularly large whales) that are not disposed of properly, or create other complex management issues. This would increase the likelihood of the negative effects previously described in this section, and may have major long-term adverse impacts if a large whale carcass stranded in a heavily populated area.

5.3.1.5 Socioeconomics

Negligible adverse effects on tourism activities could occur under Alternative 1. The most basic disposal method, remain in place, results in some carcasses left on beaches. Carcasses, including those of ESA-listed species, may be left in areas of recreational and tourism activities, such as beachfront hotels or natural areas. While the socioeconomic status of the surrounding community is not considered when determining carcass disposal options, carcasses would not be left aboveground on actively used beaches, unless logistically impossible to remove. Carcasses could be left on remote beaches that may be part of a national park, seashore, or National Estuarine Research Reserve (NERR).

Alternative 1 also includes the denial of a new MMPA/ESA permit, which would prevent carcass disposal of ESA-listed species after December 31, 2022. Carcasses from ESA-listed species would be left wherever they naturally occurred. Minor to moderate long-term beneficial effects are likely to occur for existing Stranding Network members, as the elimination of carcass disposal activities for ESA-listed species would lower operating costs. Specifically, Stranding Network members would not be able to respond to many large whale species; large whale carcass disposal is often more expensive than small cetacean and pinniped carcass disposal.

Carcasses left on-site to decompose would remain odorous and in an unsightly state for a longer period of time without assistance in their removal. The duration would be longer for larger sized animals. Some stranding 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, short-term 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. However, negligible, short-term beneficial effects on surrounding businesses may occur if people visit the area to view the carcass.

5.3.2 Alternative 2: Improved Program Implementation and Issuance of a New Scientific Research and Enhancement Permit (Preferred Alternative)

Under Alternative 2, the MMHSRP would implement some operational improvements to a subset of programs and activities. NMFS would issue the Marine Mammal Carcass Disposal Best Practices (Appendix XIV) and recommend that the best practices for carcass disposal are followed. Additionally, NMFS would only recommend that animals euthanized with chemicals known to cause secondary poisoning (*e.g.,* pentobarbital) be removed from the environment. Under Alternative 2 NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit, and therefore carcass disposal of ESA-listed species could continue after the current permit expires on December 31, 2022. Prescott Grant recipients often use the MMHSRP's MMPA/ESA permit to accomplish some of their project's goals. Alternative 2 would allow all organizations to continue to conduct carcass disposal of ESA-listed species as part of their Prescott Grants.

5.3.2.1 Biological Resources

Under Alternative 2, current methods of carcass disposal would continue, and NMFS would issue best practices for carcass disposal, with a recommendation to use *remove from the environment* methods, if feasible, for carcasses of animals euthanized with chemicals known to cause secondary poisoning (*e.g.*, pentobarbital). The removal of carcasses euthanized with these types of chemicals would occur almost exclusively on beaches, as marine mammals are not typically chemically euthanized while swimming, floating, or at sea. The effects under Alternative 2 would be similar to the effects described under Alternative 1, with a few exceptions.

The Marine Mammal Carcass Disposal Best Practices (Appendix XIV) recommend that animals euthanized with barbiturates or other chemicals with demonstrated risks of secondary poisoning be incinerated or rendered, if possible. It is recommended that as incinerators are not commonly found in all areas of the country, these carcasses may also be disposed of in a licensed landfill, composting facility, or rendering plant, if the local facility can effectively mitigate the impacts of these euthanasia chemicals. As the landfill, rendering, or composting facilities have been previously licensed, all environmental impacts from these facilities have already been considered. Any impacts from disposing of chemically euthanized carcasses in this manner would be covered by the individual rendering, composting, or incinerating facility and their permits, not the MMHSRP or Stranding Network members.

Some chemical euthanasia methods, such as administration of potassium chloride subsequent to heavy sedation, break down quickly and have a low risk of secondary poisoning. Therefore, only short-term, minor impacts from these chemicals will occur if these carcasses are no longer removed from the stranding location or buried. The Marine Mammal Carcass Disposal Best Practices (Appendix XIV) also recommends that responders move carcasses above the high tide line for the remain in place or burial carcass disposal methods, as long as this will not negatively impact other biological resources (*i.e.*, birds, sea turtles, etc.). Additionally, the best practices recommend that carcasses should be buried as deeply as possible, but also at least 3 meters above the ground water table, to ensure that the leachate plume, including both contaminants and euthanasia solutions not known to cause secondary poisoning (*i.e.*, potassium chloride), is more contained. Properly burying or moving carcasses above the high tide line would have a positive effect on protected and sensitive habitats, SAV and macroalgae, fish, shellfish, other invertebrates, and scavengers. As discussed in section 5.2.1.1, burying may also have a negative impact on protected and sensitive habitats, as it may lead to compaction or erosion of sediments. If a carcass is too large to move, and the animal was euthanized using the potassium chloride method, the sedative injection sites may be excised promptly following euthanasia, once the animal is confirmed dead, and the excised tissue disposed of using a *remove from the environment* method (incineration, landfill, etc.).

As Alternative 2 also includes the issuance of a new MMPA/ESA permit, carcass disposal of ESA-listed species could continue under the new permit. The effects from continuing carcass disposal of ESA-listed species would be the same as those previously described in this section and above in section 5.3.1.1.

5.3.2.2 Water and Sediment Quality

Under Alternative 2, current methods of carcass disposal would continue, and NMFS would issue the Marine Mammal Carcass Disposal Best Practices (Appendix XIV), with a recommendation to use *remove from the environment* methods for carcasses of animals euthanized with chemicals known to cause secondary poisoning (*e.g.*, pentobarbital). The effects under Alternative 2 would be similar to the effects described under Alternative 1, with a few exceptions. If carcasses are buried or moved according to the best practices, any contaminants, medicines, or euthanasia solutions not known to cause secondary poisoning contained in the carcass would only have short-term, minor impacts to sediment quality. If the best practices recommendations are followed, there are expected to be no impacts to nearshore waters from land-based disposal methods.

As Alternative 2 also includes the issuance of a new MMPA/ESA permit, carcass disposal of ESA-listed species could continue under the new permit. The effects from continuing carcass disposal of ESA-listed species would be the same as those previously described in this section and above in section 5.3.1.2.

5.3.2.3 Cultural Resources

The effects on cultural resources under Alternative 2 would be the same as those described under Alternative 1. As Alternative 2 also includes the issuance of a new MMPA/ESA permit, carcass disposal of ESA-listed species could continue under the new permit. The effects from continuing carcass disposal of ESA-listed species would be the same as discussed under Alternative 1 (section 5.3.1.3).

5.3.2.4 Human Health and Safety

The effects on human health and safety under Alternative 2 would mostly be the same as those described under Alternative 1. However, one difference is that NMFS would issue the Marine Mammal Carcass Disposal Best Practices (Appendix XIV). Carcasses buried or moved according to these best practices would only contaminate the sediment within a few meters of the carcass, and no impacts to human health and safety would be expected.

As Alternative 2 also includes the issuance of a new MMPA/ESA permit, carcass disposal of ESA-listed species could continue under the new permit. The effects from continuing carcass disposal of ESA-listed species would be the same as those previously described in this section and above in section 5.3.1.4.

5.3.2.5 Socioeconomics

The effects on socioeconomic resources under Alternative 2 would be similar to those described under Alternative 1. One difference is that NMFS would only recommend that marine mammals euthanized with drugs known to cause secondary poisoning (*e.g.*, pentobarbital) be disposed of with *remove from the environment* methods. Minor to moderate beneficial effects are likely to occur for existing Stranding Network members that participate in other activities besides response and carcass disposal. Stranding Network members use euthanasia solutions in some situations that are not known to cause secondary poisoning (heavy sedation followed by the administration of potassium chloride). Additionally, *remove from the environment* methods are more costly than *remain in the environment* methods. Therefore, the lower volume of cases in which the more expensive *remove from the environment* methods are recommended would reduce operating costs for these members.

As Alternative 2 also includes the issuance of a new MMPA/ESA permit, carcass disposal of ESA-listed species could continue under the new permit. The effects from continuing carcass disposal of ESA-listed species would be the same as those previously described in this section and above in section 5.3.1.5.

5.3.3 Alternative 3: More Stringent Protocols and Best Practices and Issuance of a New Scientific Research and Enhancement Permit

Under Alternative 3, the MMHSRP would implement some operational improvements to a subset of programs and activities. NMFS would issue the Marine Mammal Carcass Disposal Best Practices (Appendix XIV), and require that the best practices are followed. Additionally, NMFS would require that all chemically euthanized marine mammals, regardless of drugs used or size of carcass, be removed from the environment and animals euthanized with chemicals that have demonstrated secondary poisoning (*e.g.*, barbiturates) must be incinerated. Under Alternative 3 NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit, and therefore carcass disposal of ESA-listed species could continue after the current permit expires on December 31, 2022. Prescott Grant recipients often use the MMHSRP's MMPA/ESA permit to accomplish some of their project's goals. Alternative 3 would allow all organizations to continue to conduct carcass disposal of ESA-listed species as part of their Prescott Grants.

5.3.3.1 Biological Resources

Effects from Alternative 3 would be the same as those described under Alternative 2, except for the effects from chemically euthanized animal carcasses. Under Alternative 3, these carcasses would be required to be transported off-site to a licensed landfill, rendering plant, incinerator, or composting facility, which would result in minor short-term and long-term positive impacts. Removing chemically euthanized carcasses from the environment eliminates the risk of contamination from both the euthanasia chemicals and any contaminants in the carcass (although the risk would be reduced by following the Marine Mammals Carcass Disposal Best Practices (Appendix XIV)). This would be a positive effect on protected and sensitive habitats, SAV and macroalgae, fish, shellfish, other invertebrates, and scavengers. Conversely, there would also be a negative impact on scavengers, as more carcasses may ultimately be removed from the environment, decreasing an important food source for some organisms.

Conversely, minor short-term negative effects would also occur. More carcasses would need to be removed from beaches, the frequency of heavy equipment use would increase, and the impacts from heavy equipment use on biological resources, as discussed under Alternative 1, could increase. Additionally, if a live-stranded animal was in a remote location and/or if the Stranding Network could not afford to remove the carcass from that location (as discussed below in section 5.2.3.5), they may not chemically euthanize a marine mammal when it would otherwise be the appropriate course of action. This may needlessly increase the suffering of stranded marine mammals.

5.3.3.2 Water and Sediment Quality

Minor short-term and long-term positive impacts are expected to occur under Alternative 3. Effects from Alternative 3 would be the same as those described under Alternative 2, except for the effects from chemically euthanized animal carcasses. Under Alternative 3, these carcasses would be required to be transported off-site to a licensed landfill, rendering plant, incinerator, or composting facility, removing the risk of contamination from both the euthanasia chemicals and any contaminants in the carcass. This would have a positive effect on sediment and water quality.

5.3.3.3 Cultural Resources

The effects on cultural resources under Alternative 3 would be the same as those described under Alternative 2.

5.3.3.4 Human Health and Safety

Minor short-term positive and negative impacts are expected to occur under Alternative 3. Effects from Alternative 3 would be the same as those described under Alternative 2, except for the effects from chemically euthanized animal carcasses. Under Alternative 3, these carcasses would be required to be transported off-site to a licensed landfill, rendering plant, incinerator, or composting facility, removing the risk of contamination from both the euthanasia chemicals and any contaminants in the carcass. This would have a positive effect on human health and safety, as there would be less chance for human contact between contaminants and euthanasia chemicals.

Conversely, negative impacts to Stranding Network responders are expected to occur under Alternative 3. Requiring that all chemically euthanized marine mammal carcasses be transported off-site would potentially increase the number of physical injuries from using heavy equipment, as removing carcasses from the beach would become more frequent.

5.3.3.5 Socioeconomics

The effects on socioeconomic resources would be the same as described under Alternative 2. However, minor to major negative effects are likely to occur for existing Stranding Network members that participate in other activities besides response and carcass disposal because *remove from the environment* methods are more costly. Additionally, incinerators, composting facilities, and rendering plants are not common in all areas of the country, and some licensed landfills may not accept chemically euthanized (*e.g.*, pentobarbital) marine mammal carcasses if they are considered hazardous waste in that locality. Therefore, Stranding Network members may have to transport marine mammal carcasses a greater distance before they could be disposed of in a manner consistent with this requirement. Additionally, these facilities may not be able to accept large carcasses, which would further increase costs by requiring that these carcasses are cut into smaller pieces or transported even greater distances to a facility that can handle larger carcasses. Therefore, requiring Stranding Network members to remove all chemically euthanized carcasses, and not just those euthanized with barbiturates (*i.e.*, pentobarbital), could pose an extreme financial burden on these organizations. This may ultimately disincentivize Stranding Network responders from administering humane care in some cases (*i.e.*, euthanasia), as discussed in section 5.2.3.1.

5.4 Mitigation

The purpose of mitigation is to avoid, minimize, or eliminate negative impacts on the affected resources from the proposed action. Under Alternatives 1, 2, and 3 specific measures will be taken to moderate any significant impacts likely to occur as a result of carcass disposal activities.

As discussed in section 1.4.2.1, there are some standard mitigation measures already included under the MMHSRP research and enhancement permit, as set forth by the Permits and Conservation Division. There are additional standard mitigation measures for some MMHSRP activities in our Stranding Agreement Template (Appendix VIII) and Evaluation Criteria for Marine Mammal Stranding Agreements (Appendix IX). In addition, there is required mitigation for certain events including, responding to carcasses during an oil spill through HAZWOPER training and use of UAS following the NOAA UAS Policy 220-1-5. These standard mitigation measures are described below under each resource area (sections 5.4.1-5.4.5).

There are also other (optional) mitigation measures that the MMHSRP could implement to further reduce significant impacts on marine mammals while conducting activities. These are identified in the relevant Best Practices appendices in the PEIS and are also described below under each resource area (sections 5.4.1-5.4.5).

5.4.1 Biological Resources

Under all three alternatives, Stranding Network members would contact and coordinate with federal, state, and/or local agencies prior to carcass disposal. Article II, Part B, Number 7 of the SA template requires Stranding Network participants to coordinate with federal, state, tribal, and local officials and employees in matters supporting the purposes of their SA (see Appendix VIII). Beach burial on federal and state lands and disposal in federal or state waters would only occur after federal, 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 or sea turtles, vegetation, or dunes. The Marine Mammal Carcass Disposal Best Practices (Appendix XIV) would ensure that Stranding Network members are informed of effective and appropriate carcass disposal practices. For example, the best practices recommend that carcasses 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. As another example, lines left on carcasses that are towed and released at sea or sunk may inadvertently entangle scavengers. However, as discussed in the Marine Mammal Carcass Disposal Best Practices (Appendix XIV), this would be mitigated by removing lines or cutting them very short before releasing a carcass at sea or sinking a carcass.

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.

The MPRSA general permit for ocean disposal of marine mammal carcasses[38] authorizes the transport and disposal of marine mammal carcasses in ocean waters under specified conditions. The general permit authorization is available for any officer, employee, agent, department, agency, or instrumentality of federal, state, tribal, or local unit of government, as well as any SA holder, and any Alaskan Native, who already may take a marine mammal under the MMPA and ESA, to transport from the United States and dispose of a marine mammal carcass in ocean waters. Section A of the permit (General Requirements for Governmental Entities and Stranding Agreement Holders) requires that permittees must, among other requirements, consult with the MMHSRP prior to initiating any disposal activities, consult with and obtain concurrence from the appropriate EPA Regional Office regarding the selection of the ocean disposal site, which must be seaward of the 3 mile territorial sea demarcated on nautical charts, and provide disposal reports to EPA. If ocean disposal is being considered for a marine mammal carcass and it cannot be towed to a location seaward of the 3 nautical mile territorial sea as required by Section A of the MPRSA general permit, then the MMHSRP would apply for an emergency ocean dumping (MPRSA) permit from the EPA.

During carcass disposal and removal activities, measures would be taken to avoid protected and sensitive habitats. These measures include driving equipment/vessels/vehicles around protected and sensitive habitats, rather than driving through or over them. Additionally, in situations where the carcass is located in a protected/sensitive habitat, leave in place disposal, if possible, would be encouraged. When these areas cannot be avoided, the proper authorities would be contacted prior to the initiation of carcass disposal activities, to coordinate the disposal activities and minimize impacts. Pre-planning with essential fish habitat (EFH) regional coordinators is encouraged, to identify EFH and specific mitigation measures, before there is a need for carcass disposal. In situations where EFH may have been accidentally impacted by response activities, the appropriate NMFS EFH Coordinator would be contacted. Carcass disposal activities would also be coordinated with federal, state, and/or local agencies to avoid or minimize impacts to nesting sea turtles and birds and other sensitive species.

5.4.2 Water and Sediment Quality

Beach burial on federal and state lands and disposal in federal and state waters would only occur after federal, 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 federal, state, and/or local authorities would ensure that impacts to water and sediment quality would be minimal. The SA template (Article III and

[38] Additional information about the general permit as well as EPA contacts for inquiries about the ocean disposal of marine mammal carcasses are available at: https://www.epa.gov/ocean-dumping/ocean-disposal-marine-mammal-carcasses

Article IV, Part B, Number 4) requires 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. Additionally, the Marine Mammal Carcass Disposal Best Practices (Appendix XIV) outlines specific measures for each disposal method that 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.

At-sea disposal of carcasses will be conducted under the MPRSA general permit issued by the EPA that authorizes, under Section A of the permit, government entities and SA holders to transport and dispose of marine mammal carcasses in ocean waters under specified conditions. These carcasses would, after consulting with and obtaining written concurrence from EPA (or if a time-sensitive safety issue obtaining EPA concurrence by telephone) on the ocean disposal site selection, be disposed of in the selected disposal site located seaward of the 3 mile territorial sea, as required by the permit. All EPA dumping sites are selected to avoid or minimize impacts to the marine environment, including water and sediment quality. If a determination is made that the carcass must be sunk, rather than released at the disposal site, the transportation and disposal of materials necessary to ensure the sinking of the carcass are also authorized for ocean dumping under the MPRSA general permit. When materials are to be used to sink the carcass, the permittee must first consult with and obtain written concurrence (or if a time-critical safety situation by telephone) from the applicable EPA Regional Office on the selection of materials. Any materials described in 40 CFR 227.5 (prohibited materials) or 40 CFR 227.6 (constituents prohibited as other than trace amounts) shall not be used. The transportation and dumping of any materials other than the materials necessary to ensure the sinking of the carcass are not authorized under the MPRSA general permit and constitute a violation of the MPRSA. Materials used to sink carcasses would be chosen to avoid or minimize any impacts to the marine environment following guidance from the EPA. There may be circumstances where the disposal of a marine mammal carcass at sea is not permitted, for example, if marine mammal carcasses are heavily oiled, or covered with some other chemical contaminant. Coordination with EPA and NMFS, as required under the general permit, will include assessing whether there are any potential contamination concerns that might preclude a marine mammal carcass from being disposed of at sea. If ocean disposal of a carcass is being considered but the carcass cannot be towed to a site seaward of the 3 mile territorial sea as required by Section A of the MPRSA general permit, then the MMHSRP would apply for an emergency ocean dumping permit from the EPA.

5.4.3 Cultural Resources

Under all alternatives, potential damage to cultural resources would be avoided by contacting the appropriate 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 SHPO would be contacted.

Responders would be sensitive to and seek to accommodate cultural ceremonies or other practices by indigenous peoples surrounding the disposition of the marine mammal carcasses and parts, to the extent consistent with MMPA and other applicable authorities. The expectation that responders coordinate with local groups has been included in the SA template (Article II Part D, Number 19). Adverse effects to cultural resources and associated practices during carcass disposal would be mitigated via a variety of measures overseen by the NMFS Regional Stranding Coordinator. These mitigation measures would include, as feasible and to the extent consistent with MMPA and other applicable authorities:

- Facilitating indigenous peoples' engagement in various stages of carcass disposal, including postmortem exams and sample collection and final carcass disposition.
- Facilitating indigenous peoples to have access to, and time with, stranded marine mammal carcasses and their parts to conduct cultural practices and fulfill their spiritual obligations.
- Seeking Tribal Historic Preservation Office and indigenous peoples' input on culturally appropriate sites for carcass disposition, especially if carcass disposal will occur on their lands. Responders would also be sensitive to the fact that some cultures often include ceremonial, medicinal, or subsistence uses of plants, animals (including marine mammals), and specific geographic locations.
- Providing indigenous peoples with marine mammal carcasses and parts for culturally appropriate burial on land or interment at sea.
- Facilitating communications with indigenous peoples regarding concerns and opportunities for enhanced collaboration.

The extent to which these mitigation measures can be feasibly and legally implemented will depend on a variety of factors unique to each stranding case, including human health and safety; stranding location and access; and the size and carcass condition of the stranded animal(s). Additionally, while these mitigation measures will be conducted nationwide, each NMFS region may also implement more specific mitigation measures to better address the cultural needs of local indigenous peoples. Mitigation measures that some regions may also implement could include, but is not limited to:

- Providing NMFS staff with training on cultural awareness and maintaining standard operating procedures for culturally appropriate staff conduct during carcass disposal activities.
- Maintaining and publicizing criteria for retaining marine mammal parts and samples collected for scientific purposes.

5.4.4 Human Health and Safety

The SA Template (Article II, Part D, Number 5) recommends Stranding Network participant organizations 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 RSC within 24 hours of detecting and/or confirming any diseases of concern in an animal which could affect human health (*e.g.*, national and state reportable and/or zoonotic diseases: please see U.S. Department of Agriculture[39], Centers for Disease Control[40], or the applicable state public health department list). The Marine Mammal Carcass Disposal Best Practices (Appendix XIV) that would be issued under Alternative 2 and 3, discuss that response workers would be required to have sufficient protection against infection with infectious pathogens, contaminants, and other risks associated with handling decomposing carcasses. The best practices outline that workers should 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 infectious pathogens or other possible contaminants. The Pinniped and Cetacean Oil Spill Response Guidelines (Ziccardi *et al.* 2015) would serve as mitigation for impacts under all alternatives. These mitigation measures would be the same as those discussed above for oil spill response to stranded animals (section 4.4.4).

Transportation of any material, including dead animals, for the purpose of disposal in ocean waters requires a permit under the MPRSA. The burial or disposal at sea (in state ocean waters) of a carcass under the MPRSA general permit would only occur after state and/or local authorities have agreed to such activities. Stranding Network members would obtain any permits necessary to conduct carcass burial on beaches or other suitable locations and disposal in state non-ocean waters. This would include any permits or coordination with the state's health department, to ensure that public health and safety would be protected.

5.4.5 Socioeconomics

[39] See the following website for current U.S. Department of Agriculture list: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/nvap/NVAP-Reference-Guide/Animal-Health-Emergency-Management/Notifiable-Diseases-and-Conditions
[40] See the following website for current Centers for Disease Control list: https://wwwn.cdc.gov/nndss/conditions/notifiable/2020/

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

Chapter 6 Rehabilitation Activities

The goal of rehabilitation is to provide humane care for live-stranded marine mammals and to release individuals back to the wild, while simultaneously gaining valuable information that will deepen our understanding of the biology, physiology, and disease risk of marine species. Rehabilitation, however, can be challenging and does not guarantee the short- or long-term survival of the individual or species. The decision to rehabilitate a live-stranded marine mammal can be complex and depends on a suite of factors (*e.g.*, species, likelihood of release, likelihood of placement in permanent care if deemed non-releasable, geographical region, conservation value, available space at an authorized facility, access to sufficient funds and staff, organizational interest, etc.). Furthermore, rehabilitation is not always in the best interest of the animal (*i.e.*, suffering may be better alleviated through euthanasia). In the United States, most National Marine Fisheries Service (NMFS) approved rehabilitation facilities are equipped to handle pinnipeds since the animals are relatively small and live partially on land. Since cetaceans live entirely in the water and are typically larger in size than pinnipeds, fewer facilities nationwide can accommodate them, and none are specifically designed to provide care for adult large whales (baleen and sperm whales). A full list of NMFS approved rehabilitation facilities is in Appendix I.

Rehabilitation of wild marine mammals is conducted by authorized organizations under listed conditions by the Marine Mammal Protection Act (MMPA). For NMFS species, the MMPA Section 112(c) Stranding Agreements (SAs) are formally established between the NMFS Regional Offices and Marine Mammal Stranding Network (Stranding Network) participants. Article V of the SA is specific to marine mammal rehabilitation, and requires Stranding Network participants to obey all local, state, and federal laws, regulations, policies, and/or guidelines governing marine mammal stranding response and rehabilitation activities in the United States. This includes federal requirements for timely communications with NMFS, humane care, husbandry, and veterinary care of rehabilitated marine mammals, and documentation of each rehabilitation activity. The Marine Mammal Rehabilitation Disposition form (NOAA 89-878, OMB #0648-0178) is required to be completed for every animal transferred to a rehabilitation center, and provides NMFS with information on the outcome of animals admitted to rehabilitation (death of an animal, release of an animal, transfer of an animal to permanent managed care), the success of medical treatment, and the number of animals released back into the wild following veterinary care. This information also assists NMFS to keep an account of marine mammals transferred to permanent managed care. Additionally, Section 109(h) of the MMPA allows federal, state, local, or tribal government officials or employees in the normal course of their duties to perform rehabilitation activities under regulation 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 government official is required to report to the Secretary of Commerce, every 6 months, details on the marine mammal take, including "a description of the place and means of confinement and the measures taken for its maintenance and care" (50 CFR 216.22(b)(5)). Neither the SA nor 109(h) authorize the rehabilitation of any marine mammal species listed as threatened or endangered under the Endangered Species Act (ESA). Authorization to rehabilitate ESA-listed species by the Stranding Network is currently provided under the MMPA/ESA permit, and requires authorization and direction from the permit Principal Investigator (PI) or NMFS Regional Stranding Coordinator (RSC).

Regulations stipulate that a marine mammal held for rehabilitation must be evaluated, by the attending veterinarian of the rehabilitation facility, for releasability within 6 months of collection, unless an attending veterinarian determines that the release of the animal might adversely affect marine mammals in the wild; release is unlikely to be successful due to the physical condition or behavior of the marine mammal; or more time is needed to determine whether the release of the marine mammal to the wild will likely be successful (50 CFR 216.27). In such cases the animal may be considered non-releasable. A decision regarding whether or not a marine mammal has the potential to be released is generally made as early as possible during the rehabilitation period. More information about whether and when an animal is able to be released to the wild can be found in Chapter 7. The Marine Mammal Health and Stranding Response Program (MMHSRP), and Office of Protected Resources (OPR) Permits and Conservation Division, work with marine mammal facilities to place marine mammals deemed non-releasable into permanent managed care[41]. Facilities where non-releasable animals would be transferred to are licensed or registered by the U.S. Department of Agriculture (USDA) under the Animal Welfare Act (AWA), or have authorization under the Department of Defense to maintain marine mammals. Animals placed into permanent managed care are expected to have no greater impact on the environment than other rehabilitation activities addressed in this Programmatic Environmental Impact Statement (PEIS). Therefore, permanent managed care is not discussed further in this document.

NMFS has published three Procedural Directives regarding the rehabilitation, release, or retention of marine mammals:

[41] Under MMPA Section 104(c)(10), NMFS is required to maintain an inventory of live marine mammals held in permanent managed care. The data provided in the Marine Mammal Rehabilitation Disposition form are used to track when animals are deemed non-releasable and transferred from rehabilitation facilities to public display or research facilities that hold an Animal and Plant Health Inspection Service exhibitor's license or research registration under 7 U.S.C. 2131 or has authorization under the Department of Defense to maintain marine mammals.

- 2012 "NMFS Facility Standards for Rehabilitating ESA-listed Species" (02-308-01), which is available at: https://media.fisheries.noaa.gov/dam-migration/02-308-01.pdf
- 2012 Procedural Directive on the "Placement Process for Non-releasable Marine Mammals (02-308-02), which is available at: https://media.fisheries.noaa.gov/dam-migration/02-308-02.pdf.
- 2018 Procedural Directive on the "Process for Permit Applications to Retain Releasable Rehabilitated Marine Mammals for Public Display" (02-308-03), which is available at: https://media.fisheries.noaa.gov/dam-migration/02-308-03.pdf.

6.1 Rehabilitation Facilities

There are 32 NMFS approved rehabilitation facilities nationwide (West Coast Region=14; Greater Atlantic Region=7; Southeast Region=8; Alaska Region=1; Pacific Islands Region=2) currently authorized under SAs, MMPA Section 109(h), or as NMFS designees[42] to conduct marine mammal rehabilitation on species under NMFS jurisdiction (see Appendix I). Rehabilitation facilities must have all applicable federal, state, and local permits, and must comply with all federal, state, and municipal laws related to operations of the facility. Marine mammal rehabilitation facilities are highly variable in terms of their location, design, amenities (*e.g.*, onsite hospital, research laboratory, etc.), and their capacity to treat the number, size, and species of marine mammals. While some rehabilitation facilities are extensive and have permanent pools, others use temporary pools on an as needed basis. The length of time that a facility can rehabilitate an animal may depend on the species, available space, funding, medical needs of the stranded animal, and the resources available. Some facilities are designed for short-term holding (less than 96 hours) and primarily focus on the stabilization and assessment of sick and injured animals. Other organizations provide longer term care (greater than 96 hours), and these facilities usually incur considerable costs (in money, resources, and effort). Additionally, during large-scale disasters such as mass strandings and Unusual Mortality Events (UMEs), some facilities might increase their capacity by adding temporary pools, holding pens, etc. These emergency temporary holding facilities would be used to stabilize sick or injured marine mammals and could also provide longer term care, on an as needed basis.

In some cases, such as during mass strandings or UMEs, rehabilitation of cetaceans has been conducted *in situ* with nets being used to isolate a bay or lagoon, or by using floating platforms with nets attached. These emergency net pens would be temporary and would likely hold animals for days to weeks. The decision to rehabilitate animals in temporary emergency net pens would be made at the regional level, and would

[42] The Stranding Network participant may designate an organization, or institution, to act on its behalf as a designee in accordance with the SA. Any designation requires prior written approval from the NMFS Regional Administrator, and is subject to all applicable provisions of the SA as well as applicable laws, regulations, and guidelines.

ideally occur at pre-identified locations that were deemed the most environmentally and logistically suitable. Temporary emergency net pens would not be permanently fixed to the substrate, and could include weighted lines or concrete blocks to hold the nets in place. Historically, some facilities (*e.g.*, in the Florida Keys) used nets across the mouth of canals or inlets. Net pens and floating platforms have also been used on a more case-by-case basis (*e.g.*, the rehabilitation of of Northern Resident killer whale A73 "Springer"), although these have been less commonly used in the United States in recent years.

The MMHSRP is aware of efforts underway by various groups to establish potential "sanctuary" facilities for small cetaceans using net pens in the natural environment. The primary stated goal of these potential sanctuary facilities would be to provide permanent homes for small cetaceans already in managed care at public display or research facilities, but the groups advocating for these facilities state there may also be the opportunity to conduct rehabilitation of animals from the wild. As these sanctuaries have not yet been established, are not part of this (or any) federal action, and only the rehabilitation aspects would pertain to the MMHSRP, a separate consultation would be needed to discuss any potential environmental impacts of a marine mammal sanctuary prior to the permitting or other commencement of any potential sanctuary project. Rehabilitation activities at such sites could only be authorized after construction, and after an inspection was conducted to verify that the rehabilitation guidelines for net pens were met.

6.1.1 Standards for Rehabilitation Facilities

In 2009, NMFS published policies and best practices that outlined minimum standards for rehabilitation facilities including husbandry and veterinary standards designed to improve animal welfare and address health and safety issues and contingency planning. The Standards for Rehabilitation Facilities were modified from the USDA, Animal and Plant Health Inspection Service (APHIS) AWA regulations, which define minimum standards for marine mammals in permanent managed care. As part of Alternative 2 (section 6.2.2) those standards have been revisited and updated, Standards for Rehabilitation Facilities (Appendix XVII). The updated standards put forth in this final PEIS cover animals in both short term holding and temporary facilities, updates for endangered species rehabilitation, and include minimum standards for pinnipeds and small cetaceans.

Prior to becoming authorized to conduct marine mammal rehabilitation under a SA, a new applicant rehabilitation facility must be inspected by NMFS and demonstrate compliance with the regulations and minimum standards. Recommended standards (above the minimum) are included for facility design and operation and are suggestions for optimizing animal care. Meeting or exceeding the recommended standards may be considered a goal to strive towards when upgrading existing or designing new facilities or protocols. Established facilities are periodically evaluated by NMFS to ascertain compliance with the regulations and minimum standards. The MMHSRP evaluates facilities on each applicable minimum standard and determines whether any are not being met, which are then identified as Non-Compliance Issues (NCIs). Facilities may be put on notice, probation, suspended, or have their SA terminated for serious violations or NCIs that impact animal welfare. Facilities that have NCIs are required to submit a plan to the RSC outlining a proposed path forward to meet the minimum standards.

While some aspects of rehabilitating cetaceans and pinnipeds are similar, there are also considerable differences. For example, water quality, pool space and design, equipment, and the handling of debilitated animals are some of the bigger differences between the rehabilitation of these taxa. While some facilities have adequate equipment and personnel to rehabilitate pinnipeds, they may not meet the minimum standards required for the rehabilitation of cetaceans. In general, rehabilitation of cetaceans may require more expensive facilities such as larger and deeper pools, salt water systems, and more elaborate filtration in some closed system situations. Pinnipeds do well with less elaborate accommodations. Therefore, having two sets of guidelines (one for cetaceans and one for pinnipeds) allows NMFS the flexibility of issuing agreements specific to the types of animals that may be rehabilitated at each rehabilitation facility.

6.2 Rehabilitation Activities

Rehabilitation activities vary depending on the context of the stranding event and the needs of the stranded animal. Some patients in critical condition may require around-the-clock care whereas others, such as those close to being released, may only need minimal intervention. The type of rehabilitation activities conducted at each rehabilitation facility also depends on the staffing needs, expertise, funding, and available equipment and resources. The most common rehabilitation activities are described below.

Assessment and Monitoring

Once a marine mammal is admitted to rehabilitation, its physical appearance and health are monitored daily as a way of tracking its progress towards recovery. Visual assessments are often conducted to look for any change in an animal's behavior, temperament, body condition, and responsiveness. Weight is often recorded when an animal is first admitted and then periodically thereafter (depending on the rehabilitation duration). Pinnipeds are usually guided onto weighing scales using equipment such as herding/crowding boards or placement in an appropriately sized container. Pinnipeds are sometimes weighed by suspending the animal in a hoop or stretcher net from a hanging scale. Small cetaceans are commonly weighed by suspending the animal in a stretcher from a hanging scale. The weight of an animal is tracked over time, and is compared to the average weight described for that age class and species (if known, or with a similar species).

Measurement of dorsal straight length is used to infer the age of an animal, and measurement of axillary girth can be used as an indicator for body condition. Body condition can also be determined by comparing axillary girth to dorsal straight length to look at changes with age. Both measurements are typically made with a flexible tape measure. Length measurements are typically made when an animal is first admitted, and then again prior to release. For a more thorough assessment, physical examinations are performed and may include other specific evaluations such as measuring vital signs (*i.e.*, respiration and heart rate). During physical examinations, animals are handled and restrained by trained personnel, who constantly monitor the well-being (including thermoregulatory status) of the animal. Physical examinations provide veterinary and husbandry staff an opportunity to take a closer look at the whole animal, its body condition, any injuries, and enable the collection of blood and other samples for diagnostics including disease surveillance. By monitoring an individual in rehabilitation, staff can evaluate the progress of the animal, and determine whether modifications to any medical treatment or care need to be made. These examinations are almost always conducted alongside other activities that involve handling and restraint. For example, medications may be administered at the same time as taking girth and length measurements. By combining such activities, animals are handled less.

Capture, Restraint, and Handling

Although rehabilitation personnel avoid unnecessary contact with admitted animals as much as possible, marine mammals are periodically caught, restrained, and handled to allow for veterinary assessment, medical treatment, husbandry practices (including tube feeding and assist feeding), blood and other sample collection, telemetry instrument attachment, and transport. The degree and duration of restraint required to safely and successfully conduct an activity varies.

To assess appropriate capture and handling methods and safety, pinnipeds are evaluated by size, species, body condition, reproductive and molt status, type and severity of injuries, previous response to handlings, and behavior. Herding/crowding boards may be used as barriers to maneuver pinnipeds into more workable locations, separate enclosures, squeeze cages, or kennels. Nets can also be used to capture animals or to divide enclosures. The type of nets used depends on the rehabilitation facility but typically include circle, hoop (or dip), stretcher, throw, and capture nets. In some situations, capture poles may be used. Pinniped handling may include restraint by hand, a restraining device, chemical immobilization, or a combination of these. Restraining animals by hand involves people straddling the pinniped, immobilizing the animal's fore flippers and shoulders with the restrainers' knees and both gloved hands placed firmly behind or on the head with additional restrainers to control hind flippers and back end, if needed (Geraci and Lounsbury 2005). Pups may be restrained by hand, in a net or cage, through sedation (either oral, intramuscular (IM), intravenous (IV), or using gas anesthesia (administered through a mask or endotracheal tube)), or a combination of these (for a full list of drugs that may be used, see: Gulland *et al*. 2018). Older animals may be restrained by hand, a fabric restraining wrap, a restraining net or cage, a restraint board, through sedation (either oral, intramuscular (IM), intravenous (IV), or using gas anesthesia (administered through a mask or endotracheal tube)), or a combination of these, as determined by an attending veterinarian, veterinary technician, or experienced biologist. An injectable immobilizing agent administered remotely by a dart, or locally by a pole syringe or by hand, may be used if needed (*e.g.*, older or larger animals).

To assess appropriate capture and handling methods and safety, small cetaceans are evaluated on size and strength of the animal, body condition, reproductive status, type and severity of injuries, previous response to handlings, behavior, and pool type. Depending on the depth of the water, there are different methods to catch cetaceans. In shallow water (including deeper pools with lowered water level) several people enter the water forming a line across the pool (potentially including physical barriers), cutting off access to at least half of the pool. The handlers crowd the cetacean and direct the animal into a smaller area. When the opportunity presents itself, one person places their arms around the cetacean in front of the pectoral fins, while at least two others grab around the body and tail stock. Once contact has been made, other handlers help restrain and maneuver the animal into a workable position. Cetaceans can be treated in or out of the water, depending on the treatment. Stretchers are used to safely remove cetaceans from the water, if required. The stretcher is lifted from the pool either manually or by crane, depending on the species and resources available. Pools equipped with false bottoms that can be raised are ideal because the animal can be caught quickly without dropping the level of pool water. Once removed from the water, small cetaceans are typically placed on a foam bed or air mattress for examination and treatment. Depending on the size and strength of the animal, several people will be positioned from head to flukes to provide restraint by hand. Whenever a marine mammal is handled their vital signs are regularly monitored.

Transport

Vehicles, boats, or aircraft may be used to transport marine mammals. Transport times may vary depending upon stranding and rehabilitation facility locations (*e.g.*, crossing county or state borders, or in rare situations crossing country boundaries when live stranded animals need to be imported from a nearby foreign country for rehabilitation purposes). Small pinnipeds are typically transported in plastic or metal carriers/cages. Carriers/cages are large enough for animals to turn around, stretch out, and raise their heads, and allow proper air circulation. Generally, fur seals are transported in a carrier/cage with a double base to allow separation between the animal and fluids and excrement that may soil the fur. Large pinnipeds are transported in appropriately-sized crates or containers, which may need to be custom made. If animals cannot be appropriately contained, or to reduce the stress experienced, some animals may need to be sedated during transport. Pinnipeds traveling by vehicle are generally protected from extremes of sun, heat, cold, wind, and exhaust fumes. Pinnipeds may overheat during transit. To prevent hyperthermia, fans, water, and ice packs are often used to maintain appropriate body temperatures.

Cetaceans may be transported using dry transport methods on stretchers, foam pads, or air mattresses. For short-term transport, closed-cell foam pads are preferred because they are rigid and do not absorb water. Open cell foam pads are typically used for long-term transport of cetaceans because they can contour to the animal's form. Cetaceans may be transported using wet transport methods in boxes or other containers specially constructed to transport the animal upright on a stretcher in water. As with pinnipeds, cetaceans are generally protected from exhaust fumes, and from extremes of sun, heat, cold, and wind, as transport often occurs on the flatbed of or inside the rear compartment of a truck. Animals are kept moist and cool, to avoid overheating and skin damage (Geraci and Lounsbury 2005).

Specifics on transport vary on a case-by-case basis. Transport is conducted by trained and qualified individuals using equipment appropriate to the species being transferred. The decision-making process regarding animal transport (method of transport, equipment to use, destination, etc.) is done in consultation with experts on the species and taking into account the available options. This process weighs the costs of any harm that may come from the available transportation options to what the potential harm could be to the animal remaining in its present situation. Where possible, decisions are made, including contingency plans, prior to any animals being moved. More details on transport methods can be found in the Cetacean and Pinniped Transport Best Practices (Appendix X) and in Yip and Dold (2018).

Husbandry

During the rehabilitation of any marine mammal, rehabilitation personnel provide daily care, known as husbandry. Feeding protocols, standardized according to weight and diagnoses, are followed. Animals may receive food supplements (vitamins and minerals) and medication in their food, as needed. Stranded animals are often dehydrated and underweight, often to the point of emaciation when they are first admitted. For these animals, rehydration is always part of the immediate care regime. Once rehydrated, an animal may be offered small amounts of food until reaching full diet, which will result in subsequent weight gain. An animal's condition and age class usually dictates what feeding method is conducted. Often upon arrival animals may only tolerate fluids. Steps are taken to advance the animal through hands-on intensive (such as tube-feedings) to independent feeding methods.

Most marine mammals brought to a rehabilitation facility don't have a known medical history (except for "re-stranders") and may carry diseases communicable to other marine mammals, other animals, or humans. Likewise, these animals are often debilitated and may suffer from a variety of illnesses, which along with age, may compromise their immune systems, making them susceptible to diseases from other animals and/or the rehabilitation environment. Quarantine areas are recommended and proper biosecurity protocols are generally in place for all incoming animals at rehabilitation facilities. Hygiene and sanitation procedures are considered essential husbandry practices. Careful disinfection of enclosures and equipment is necessary to minimize the risk of disease transmission. Animal enclosures are disinfected between animals. Depending on the disinfectants and cleaning methods used, animals may be handled or moved (or not) from enclosures while personnel clean. Water quality is also a key component in maintaining a healthy, clean living environment for stranded marine mammals. It is important to test the water in which the animals live on a regular basis. Water may require heating or chilling to help debilitated animals maintain an optimal body temperature. For pinnipeds, time in water may be limited if water temperature cannot be controlled.

Medical Treatment

The course of medical and/or surgical procedures at a rehabilitation facility is left to the discretion of the attending veterinarian (including euthanasia, if necessary). For further description of treatment methods refer to the CRC Handbook of Marine Mammal Medicine (Gulland *et al.* 2018).

6.3 Environmental Consequences

6.3.1 Alternative 1: Continue Program Implementation at Current Activity Levels (No Action Alternative)

Under Alternative 1, NMFS OPR Marine Mammal and Sea Turtle Conservation Division and Regional Offices would continue the current rehabilitation activities of the Stranding Network (including adding new facilities, making minor adaptive changes to rehabilitation activities, etc.). Under Alternative 1, OPR Permits and Conservation Division would not issue a new MMPA/ESA permit to the MMHSRP after the current MMPA/ESA permit expires. Therefore, after the current permit expires on December 31, 2022, the Stranding Network operating under the authority of the MMHSRP would only be authorized to conduct rehabilitation activities on non-listed species. As some Prescott Grant recipients use the MMHSRP's MMPA/ESA permit to accomplish some of their project's goals (*i.e.*, rehabilitate ESA-listed species), Alternative 1 may curtail the number and scope of Prescott Grant proposals received from the Stranding Network if authorization for the rehabilitation of ESA animals were to cease.

6.3.1.1 Biological Resources

Minor to major, long-term beneficial effects on marine mammals are expected to occur under Alternative 1. Live-stranded animals would be taken into rehabilitation with the intent to release them back to the wild once they are healthy. The current Standards for Rehabilitation Facilities would continue to be implemented, requiring current and future facilities to adhere to the minimum standards as part of their SA. The standards ensure a healthy environment for rehabilitating animals, maximize the success of rehabilitation, and increase the potential for release to the wild. The current standards cover facilities, housing, space, water quality, quarantine, sanitation practices, food handling and preparation, and veterinary medical care. Rehabilitation facilities calculate the maximum holding capacity for their facility based upon the minimum space requirements, outlined in the current standards, in order to avoid overcrowding.

Minor to major long-term beneficial impacts to the marine mammals, and also terrestrial mammals in the vicinity of the rehabilitation facilities, would be expected as these standards would ensure safe, healthy, and humane conditions are in place at all facilities nationwide. Adherence to standards would decrease the risk of disease transmission between animals within the same facility, between facilities, between rehabilitating animals and terrestrial mammals (both domestic pets and wild animals), and between rehabilitating animals and care personnel. Adherence to the standards would also reduce the potential for introduction and spread of pathogens through contaminated supplies and equipment. However, some pathogens within a rehabilitation setting can mutate or evolve into a novel organism (such as bacteria with drug resistant properties), creating a novel (or drug-resistant) pathogen which could then be introduced into the environment upon the release of an infected animal following rehabilitation.

Some temporary minor adverse effects could also occur under this alternative. Live stranded marine mammals would need to be transported to the receiving rehabilitation facility, and on occasions between facilities. Transport can induce physiological stress, especially for stranded cetaceans (Atkinson and Dierauf 2018; Yip and Dold, 2018), and can have adverse impacts if appropriate transport guidance is not followed. Prior to transport, field stabilization techniques (*e.g.*, assessment, administering oral electrolyte solution, etc.) may be used. Depending on body condition, marine mammals may develop hyperthermia or hypothermia during transport, particularly if there is limited or no protection from ambient conditions including direct sun. Body surfaces may be exposed to the drying effects of air. Additionally, animals may inhale exhaust fumes. Improper transport of marine mammals may cause physical trauma such as muscle damage, pressure necrosis, thermoregulatory problems, and respiratory problems. Muscular stiffness may also occur from transport, but most equipment specific to transport is designed to minimize or avoid stiffness entirely. Muscle stiffness would be expected to disappear within a few hours to a few days, unless there was permanent muscle damage (Antrim and McBain 2001). Depending upon the mode of transport, animals may be exposed to high levels of noise and may suffer temporary hearing damage. However, most animals remain safe during transports as long as proper procedures are followed. Depending on the situation, live animals could also be imported into the United States from a foreign country for rehabilitation purposes under the current MMPA/ESA permit, but the impacts of international transport would be no greater than the effects discussed for domestic transfer.

Some temporary minor adverse effects could also occur from using disinfectants and chemicals to maintain healthy, clean living environments for stranded marine mammals. To maintain appropriate water quality, chemicals may be added to pools or used during cleaning of enclosures. Chemicals used inappropriately may damage an animal's eyes and skin, therefore it is important to test the water in which the animals live on a regular basis. Pool salinity and temperature may also have an adverse impact on health of the skin and eyes, as well as the comfort level of the animal, and are generally monitored regularly (NMFS 2009).

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 methods; one source of detailed guidance is the CRC Handbook of Marine Mammal Medicine (Gulland *et al.* 2018). If proper procedures are not followed then some adverse impacts could occur. These rehabilitation activities could include the collection of biological samples 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 could include blood, swabs, biopsies, etc. Sample collection could likely cause minor stress or discomfort to the animal, relative to the actual stranding event. Handling, lifting, and restraining an animal could cause discomfort, stress, and minor injury. When anesthetized or sedated, an animal may go into a dive reflex, which would include breath holding, slowing of heart rate, and restricted blood flow to the extremities. Anesthetized animals could develop hypothermia or hyperthermia. Administration of drugs and surgical procedures could cause injuries or in extreme cases death, if improperly used. 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.

Current rehabilitation facilities may not have enough space or resources to accommodate a stranded marine mammal or may only rehabilitate certain animals. If no rehabilitation facility can take an animal, the animal may be euthanized when deemed necessary by the attending veterinarian and/or in consultation with NMFS. Euthanasia procedures would be carried out by, or under the direction of, the attending veterinarian using proper procedures as outlined in AVMA 2020, the CRC Handbook of Marine Mammal Medicine (Gulland *et al.* 2018), and for cetaceans, the Cetacean Euthanasia Technical Memorandum (Barco *et al.* 2016) and the Report of the IWC Workshop on Euthanasia Protocols to Optimize Welfare Concerns for Stranded Cetaceans (2014). Chemical euthanasia agents may cause hyperexcitability or violent reactions in some species such as *Delphinus* and *Kogia* spp. (Barco *et al.* 2016). Injection of a euthanasia solution into the body cavity may cause short-term moderate adverse impacts, as it may lead to the prolonged onset of action due to differential or slow absorption rates. It may also cause temporary negligible adverse impacts as it may irritate in the surrounding tissues (Greer *et al.* 2001). Improper chemical euthanasia agents or methods of delivery may prolong the pain and suffering of an animal.

The use of net pens for rehabilitation could have long-term minor to moderate adverse impacts on biological resources because the pens are open to ocean and bay waters. Animals housed in net pens are exposed to conditions beyond the control of the rehabilitator (*i.e.*, water temperature, harmful algal blooms, weather). Local fish, shellfish, marine invertebrates, and other marine mammals could be exposed to novel pathogens and feces, as well as medicines, foods, and materials used to treat animals undergoing rehabilitation. Additionally, the use of net pens to isolate a bay or lagoon could exclude fish and wild marine mammals from certain habitats and interfere with essential behaviors (*e.g.*, foraging, resting, etc.).

Under this alternative, minor adaptive changes to rehabilitation activities (*i.e.*, adaptive changes to rehabilitation best practices) could be made, as needed. Rehabilitation activities may change with improvements in technologies, techniques, and other aspects of marine mammal medicine. These new activities would have impacts similar to, or less than, those currently conducted. The closure of rehabilitation facilities is also included under adaptive changes. Animals being held at a facility due to close would be transferred to the nearest available rehabilitation facility in the region. Impacts from the transfer of animals would include handling, lifting, restraint, and transport, as described above.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, stranding response and rehabilitation activities by SA holders would end for ESA-listed species. Rehabilitation for non-listed species would occur as described above. Sick and injured ESA-listed species would not be taken into rehabilitation and would most likely die from injuries or disease. This would be a major, long-term adverse impact to vulnerable populations that have been identified as threatened or endangered, and for species that have previously benefited from rehabilitation activities by SA holders (*e.g.*, Hawaiian monk seal). Further, this outcome would eliminate the collection of valuable information on marine mammal health and populations gained through the examination of rehabilitated animals.

Even without a MMPA/ESA permit, federal, state, and local agencies authorized under MMPA Section 109(h) would still be able to conduct emergency response to non ESA-listed species. Under ESA regulations at 50 CFR 17.21(c)(3) and 17.31(a), employees of the USFWS, NMFS, any other federal land management agency, or a state conservation agency, may also continue to respond to ESA-listed species (endangered and threatened). However, there are currently only a few MMPA Section 109(h) participants that routinely conduct marine mammal rehabilitation, so these activities would be extremely limited and localized. The impact of rehabilitation activities on biological resources by permitted MMPA Section 109(h) responders would be the same as those previously described in this section.

No effects on protected and sensitive habitats, submerged aquatic vegetation (SAV) and macroalgae, reptiles, or birds would be expected to occur from rehabilitation activities under this alternative.

6.3.1.2 Water and Sediment Quality

Minor long-term adverse effects could occur under Alternative 1. 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 (CWA). 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 minor long-term adverse impacts to local water and sediment 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 to waters and sediments within and just outside the net pen.

Temporary pools could also pose minor short-term adverse impacts to water and sediment quality. Temporary pools might not have any means to treat effluent and 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.

Under this alternative, minor adaptive changes to rehabilitation activities could be made, as needed. The closure of rehabilitation facilities is included under adaptive changes. The closure of a rehabilitation facility would eliminate any potential adverse impacts on water and sediment quality.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, stranding response and rehabilitation activities by SA holders would end for ESA-listed species. Rehabilitation for non-listed species would occur as described above. Sick and injured ESA-listed species would not be taken into rehabilitation and would most likely die from injuries or disease. Carcasses left on the beach to naturally decompose would have the impacts discussed in Chapter 5.

6.3.1.3 Cultural Resources

Potential minor, short-term adverse effects on cultural resources could occur under Alternative 1. The use of temporary pools could damage cultural resources, depending on where they are sited. The use of net pens cause minor, long-term adverse effects, as they may disturb or damage submerged cultural resources.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, stranding response and rehabilitation activities by SA holders would end for ESA-listed species. Rehabilitation of non-ESA species would continue, and therefore the same impacts as those described above would apply. No additional effects on cultural resources would be expected.

6.3.1.4 Human Health and Safety

Human safety is the first priority during all animal rehabilitation activities. However, minor, short-term, adverse effects on human health and safety could occur under Alternative 1. Animal induced injuries could include bites or physical injuries from being hit by a fin, flipper, tail, or other body part (Hunt *et al.* 2008). Working on wet surfaces may cause bruises, slips, trips, or falls. Drowning is also a possibility as work would occur around or in pools and pens. Physical injuries may also arise from the handling and lifting of animals (*e.g.*, stretcher or carrier), the cleaning or repairing of enclosures, and the improper use of equipment. Sunburn, heat exhaustion, heat stroke, and hypothermia are possible, if rehabilitation activities require people to be outside or in buildings without climate control for extended periods of time. Techniques associated with biological sampling often involve needles, knives, and scalpels, which place personnel at risk of cuts and scrapes. Infection, with potentially serious consequences, could also occur if minor injuries are not treated properly. Pathogens encountered may be antibiotic resistant, making treatment more difficult, or be marine mammal specific pathogens that are not typically seen in human cases. Accidental injections or exposure to euthanasia solution, and other drugs used in animal treatment, could also cause adverse effects, depending on the chemical(s) used.

Short-term minor adverse impacts could occur if personnel come in contact with marine mammal tissue or blood samples and bodily fluids, such as excretions and vomitus. Similar impacts could occur if in the course of their duties, rehabilitation staff are exposed to contaminants, potential zoonotic pathogens, euthanasia solution, medication, and chemicals used for cleaning or maintaining pool water quality. Zoonotic diseases may have short-term minor adverse effects including swelling, joint pain, skin lesions, prolonged malaise, and flu-like symptoms. Long-term adverse effects from zoonotic diseases could also occur, especially if they are not diagnosed or treated properly. 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). Contaminants, including petroleum products (from oiled animals), caustic and harsh cleaning solutions, and other hazardous materials may produce short-term adverse effects, such as respiratory problems, lightheadedness, nausea, eye irritation, or skin irritation. The handling and transport of oiled animals could pose additional risks to responder health and safety (Aguilera *et al.* 2010). Response to, and rehabilitation of, petroleum exposed marine mammals would be conducted by experienced personnel with the appropriate training.

Current Standards for Rehabilitation Facilities would be followed under this alternative, which would have a minor long-term beneficial effect on health and safety. The standards 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 (and vice versa). Staff would also be trained to properly handle contaminated equipment and adhere to proper sanitation techniques. Safety equipment for staff such as eye protection, protective clothing, and eye flushing stations would be provided by the rehabilitation facility. Rehabilitation facilities are also required to comply with Occupational Safety and Health Administration (OSHA) regulations.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by the OPR Permits and Conservation Division under the No Action Alternative, stranding response and rehabilitation activities by SA holders would end for ESA-listed species. Rehabilitation for non-listed species would occur as described above. Sick and injured ESA-listed species would not be taken into rehabilitation and would most likely die from injuries or disease. Without response activities, the public would likely approach the animal or carcass either out of curiosity or in an attempt to help, which may result in minor to moderate short-term adverse impacts. 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.

6.3.1.5 Socioeconomics

Minor to major, short- and long-term beneficial effects could occur under this alternative. Marine mammal rehabilitation centers fulfill important roles in some communities and could, along with other businesses, draw tourists to an area. Increased visitation could positively impact local businesses in the community such as restaurants and hotels. In addition, rehabilitation facilities can provide additional employment opportunities to local residents. Some rehabilitation facilities also offer internship and volunteer opportunities. Many rehabilitation facilities host school groups and provide other educational outreach services.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, stranding response and rehabilitation activities by SA holders would end for ESA-listed species. Rehabilitation for non-listed species would occur as described above. Sick and injured ESA-listed species would not be taken into rehabilitation. Rehabilitation facilities that exclusively care for ESA-listed species (*e.g.*, Ke Kai Ola) would be heavily impacted. These facilities may cease altogether unless their activities could be shifted (*e.g.*, they are able to redirect rehabilitation efforts to non ESA-listed animals), or they independently obtain an ESA Permit for ESA species rehabilitation. Further, SA holders who rely on the rehabilitation of ESA-listed animals to attract external funding could be negatively impacted.

After the current permit expires, carcasses of sick and injured ESA-listed animals would remain at stranding sites to naturally decompose. The unappealing sight and smell could reduce tourism activity at that particular location, as visitors may choose to spend their money elsewhere. However, tourists may want to see a live stranded animal or a carcass, which could create a beneficial impact on surrounding businesses.

6.3.2 Alternative 2: Improved Program Implementation and Issuance of a New Scientific Research and Enhancement Permit (Preferred Alternative)

Under Alternative 2, the MMHSRP would implement some operational improvements to a subset of programs and activities. Updated Standards for Rehabilitation Facilities (Appendix XVII) would be implemented and would include new sections on ESA-listed species, short-term holding, and emergency temporary holding facilities. New best practices documents that apply to rehabilitation activities such as marine mammal transport (Appendix X), euthanasia (Appendix XIII) and rehabilitation of dwarf and pygmy sperm whales (Appendix XVIII) would also be issued. Under Alternative 2 NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit. Prescott Grant recipients often use the MMHSRP's MMPA/ESA permit to accomplish some of their project's goals. Alternative 2 would allow all organizations to continue to conduct rehabilitation of ESA-listed species as part of their Prescott Grants.

6.3.2.1 Biological Resources

The effects on marine mammals from rehabilitation activities under this alternative would be the same as those described under Alternative 1, except that the implementation of updated Standards for Rehabilitation Facilities (Appendix XVII) and issuance of new best practices documents would improve animal health, welfare, and safety. These documents will also balance the need for standardized procedures while allowing flexibility to address the specific needs of different situations.

The updated Standards for Rehabilitation Facilities (Appendix XVII) will outline short-term holding minimum requirements for facilities to hold (for less than 96 hours) marine mammals for assessment and triage before they are released, prior to sending to other rehabilitation facilities for more long-term or advanced care, or are euthanized. Short-term holding facilities closer to the stranding location could be used for stabilization and assessment of sick or injured animals, and transit times to and between facilities could be reduced. Shorter transportation times would be expected to decrease stress for sick or injured animals. Transportation protocols would be standardized and ensure the safe, effective, and expeditious transfer of live stranded animals following recommendations in the Cetacean and Pinniped Transport Best Practices (Appendix X) and Yip and Dold (2018). Frequent checks on transported animals could lead to the early recognition of health issues. Issues that are identified at an earlier stage tend to be more manageable and pose less danger to animal health and safety. This would have a minor long-term positive impact on animal welfare. Standardized equipment, personnel, and transport planning would increase animal welfare and safety. Transport planning would include sourcing appropriate support equipment, ensuring personnel are well-trained and briefed, and outlining possible emergencies or unusual situations that may occur and possible contingency plans for dealing with situations. These documents will ensure that any issues in health are assessed promptly, and will improve the Stranding Network's rehabilitation procedures as well as animal welfare by enabling facilities to join the Stranding Network as short-term stabilization facilities (less than 96 hours) to triage animals and assess them for release, long-term care, or euthanasia prior to transfer to a long-term rehabilitation center. Additionally, a new article (Article VI) of the revised SA template and criteria (Appendices VIII, IX) will authorize some Stranding Network members to conduct only short-term holding.

The updated Standards for Rehabilitation Facilities (Appendix XVII) will outline minimum standards for emergency temporary holding facilities to support rehabilitation efforts during large-scale disasters such as mass strandings and UMEs, as well as anthropogenic disasters such as oil spills. Sick or injured marine mammals will be stabilized (including administering emergency care) at emergency temporary holding facilities, and could also benefit from longer term care at the facility on an as needed basis. Additionally, a new article (Article VII) of the revised SA template and criteria (Appendices VIII, IX) will authorize Stranding Network members to be authorized on an expedited basis to be a temporary member of the Stranding Network to support a large-scale disaster. These facilities would have a positive impact on animal welfare as the Stranding Network would be given greater flexibility to address specific needs of each situation.

The updated Standards for Rehabilitation Facilities (Appendix XVII) will also reinforce standards for rehabilitation facilities dealing with ESA-listed species, including: veterinary requirements; record keeping, permit authorization, and reporting; euthanasia authorization; and restrictions on public viewing. Collectively, these measures would have a beneficial impact on ESA-listed species, and help facilitate an animal's recovery.

Rehabilitation of dwarf (*Kogia sima)* and pygmy sperm whales (*Kogia breviceps*), which has largely been unsuccessful, would not be recommended (for details, see Dwarf and Pygmy Sperm Whale Best Practices in Appendix XVIII). Based upon findings from a workshop held by NMFS in 2008, there are common disease syndromes (*e.g.*, cardiomyopathy, gastrointestinal issues) in dwarf and pygmy sperm whales that make rehabilitation of certain age classes (*e.g.*, adults and calves) extremely difficult. Therefore, most live-stranded dwarf and pygmy sperm whales would be euthanized and rehabilitation not attempted, which would be in the animals' best interest to end their suffering. However, rehabilitation efforts may be attempted on a case-by-case basis for sub-adult dwarf and pygmy sperm whales, in consultation and with prior approval from NMFS using the research plan outlined in the Dwarf and Pygmy Sperm Whale Best Practices (Appendix XVIII). Euthanasia procedures for all species would be conducted by experienced and qualified personnel in consultation with NMFS, and follow guidance in the new Marine Mammal Euthanasia Best Practices (Appendix XIII). Improperly administered chemical euthanasia agents or methods of delivery may prolong the pain and suffering of an animal.

No effects on protected and sensitive habitats, SAV and macroalgae, reptiles, or birds would be expected to occur from rehabilitation activities under this alternative.

6.3.2.2 Water and Sediment Quality

The effects on water and sediment quality under this alternative would be the same as those described under Alternative 1, except adding new articles to the SA template might result in additional short-term rehabilitation facilities and emergency temporary rehabilitation facilities. The impacts of these types of facilities are not expected to be different than the effects of current rehabilitation facilities, which were discussed under Alternative 1.

6.3.2.3 Cultural Resources

The effects on cultural resources under this Alternative would be the same as those described under Alternative 1.

6.3.2.4 Human Health and Safety

The effects on human health and safety from rehabilitation activities under this alternative would be the same as those described under Alternative 1, except that the implementation of updated Standards for Rehabilitation Facilities (Appendix XVII) and issuance of new best practices documents would provide guidance on additional measures to safeguard marine mammal personnel. This would have a minor, long-term beneficial effect on human health and safety. While some of these measures may currently occur at some rehabilitation facilities, the updated standards would ensure that all facilities would be implementing the most effective safety measures. The issuance of the new Marine Mammal Euthanasia Best Practices (Appendix XIII) would have an overall beneficial impact on the health and safety because they recommend standardize euthanasia procedures, allow for flexibility, and ensure that rehabilitation personnel are prepared to meet the needs of different and unforeseen circumstances. Cetacean and Pinniped Transportation Best Practices (Appendix X) would also have a positive effect on human health and safety. Transport personnel would have more defined roles, which will help to streamline and facilitate the transfer of animals, resulting in a safer environment for crew and escorts. Contingency planning would aid in navigating potentially dangerous situations, and have an overall positive impact on the health and safety of rehabilitation personnel.

6.3.2.5 Socioeconomics

The effects on socioeconomics under this alternative would be the same as those described under Alternative 1. While this alternative includes the implementation of updated Standards for Rehabilitation Facilities (Appendix XVII), the additions to the standards will not require upgrades to facilities, and therefore will not have a financial impact on currently authorized rehabilitation centers. The standardization of marine mammal transport protocols could increase regional efficiencies and reduce costs. However, there could be some additional costs associated with upgrading equipment and procedures but some reduced costs through greater efficiencies.

The rehabilitation of dwarf and pygmy sperm whales is expensive and has been largely unsuccessful in the past. Therefore, rehabilitation facilities could save money by following the new Dwarf and Pygmy Sperm Whale Best Practices (Appendix XVIII) which recommend that most stranded dwarf and pygmy sperm whales are not admitted to rehabilitation and are instead euthanized.

6.3.3 Alternative 3: More Stringent Protocols and Best Practices and Issuance of a New Scientific Research and Enhancement Permit

Under Alternative 3, rehabilitation activities would not differ from those previously described in Alternative 2. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, therefore rehabilitation activities could continue at current or increased levels under the new permit. Prescott Grant recipients often use the MMHSRP's MMPA/ESA permit to accomplish some of their project's goals. Alternative 3 would allow all organizations to continue to conduct rehabilitation of ESA-listed species as part of their Prescott Grants.

6.3.3.1 Biological Resources

The effects on biological resources under this Alternative would be the same as those described under Alternative 2. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, rehabilitation activities could continue at current or increased levels under the new permit.

6.3.3.2 Water and Sediment Quality

The effects on water and sediment quality under this Alternative would be the same as those described under Alternative 2. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, rehabilitation activities could continue at current or increased levels under the new permit.

6.3.3.3 Cultural Resources

The effects on cultural resources under this Alternative would be the same as those described under Alternative 2. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, rehabilitation activities could continue at current or increased levels under the new permit.

6.3.3.4 Human Health and Safety

The effects on human health and safety under this Alternative would be the same as those described under Alternative 2. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, rehabilitation activities could continue at current or increased levels under the new permit.

6.3.3.5 Socioeconomics

The effects on socioeconomics under this Alternative would be the same as those described under Alternative 2. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, rehabilitation activities could continue at current or increased levels under the new permit.

6.4 Mitigation

The purpose of mitigation is to avoid, minimize, or eliminate negative impacts on the affected resources from the proposed action. Under Alternatives 1, 2, and 3 specific measures will be taken to moderate any significant impacts likely to occur as a result of rehabilitation activities.

As discussed in section 1.4.2.1, there are some standard mitigation measures already included under the MMHSRP research and enhancement permit, as set forth by the Permits and Conservation Division. There are additional standard mitigation measures for some MMHSRP activities in our Stranding Agreement Template (Appendix VIII) and Evaluation Criteria for Marine Mammal Stranding Agreements (Appendix IX), and Standards for Rehabilitation Facilities (Appendix XVII). In addition, there is required mitigation for certain events including sampling of animals during research under the NMFS IACUC policy (NMFS-PD 04-112-01) and rehabilitating animals during an oil spill through HAZWOPER training. These standard mitigation measures are described below under each resource area (sections 6.4.1-6.4.5).

There are also other (optional) mitigation measures that the MMHSRP could implement to further reduce significant impacts on marine mammals while conducting activities. These are briefly described below under each resource area (sections 6.4.1-6.4.5) and explained in detail in the relevant Best Practices appendices.

6.4.1 Biological Resources

NMFS would implement the updated Standards for Rehabilitation Facilities (Appendix XVII) and updated SA template and criteria (Appendices VIII, IX), and issue several new rehabilitation Best Practices documents (Appendices X, XII, XVIII) as mitigation for Alternatives 2 and 3.

Organizations requesting authorization (via a renewal or new issuance of a SA) to conduct rehabilitation of marine mammals provide information that shows the participant's plan for implementing Article V (Rehabilitation of Stranded Marine Mammals) of the SA, and present evidence that the participant has the skills, resources, and organizational capabilities to be successful. To meet the rehabilitation article criteria (Appendix IX), the rehabilitation facility must have sufficient physical and financial resources to maintain appropriate animal care for the duration of rehabilitation, including costs associated with release (*e.g.*, long-term rehabilitation, transport to release site, post-release monitoring) or transport to another facility. Further, the Stranding Network participant would submit a facility operation manual to NMFS for review prior to the issuance of a SA. All operations conducted by rehabilitation facilities would be consistent with NMFS and other applicable federal, state and local policies, guidelines, directives, regulations, and laws. All NMFS approved facilities are periodically inspected by NMFS to ascertain compliance with the minimum standards and all new facilities must be inspected prior to receiving a SA for rehabilitation.

Per the SA criteria (Appendix IX), the rehabilitation facility would have key personnel (*e.g.*, animal handlers, husbandry staff, veterinarian, etc.) with experience or comparable training in all aspects of marine mammal rehabilitation. The rehabilitation facility would have and maintain an attending veterinarian experienced in marine mammal care, or that can consult with experienced marine mammal veterinarians, and that would assume responsibility for diagnosis, treatment, and medical clearance for release or transport of marine mammals in rehabilitation. Also, the attending veterinarian would 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 inspection of the facilities, protocols, standard operating procedures, and case records. All documentation of the attending veterinarian's experience would also be submitted to NMFS for review prior to issuance of a SA.

Veterinary medical care standards (sections 3 (for cetaceans) and 4 (for pinnipeds) in the updated Standards for Rehabilitation Facilities, Appendix XVIII) 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, 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. Many veterinarians have additional training or qualifications including: 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 from disease transmission would be minimized by measures outlined in the updated Standards for Rehabilitation Facilities (Appendix XVII). Under section 2 of the updated standards, quarantine facilities and protocols would be recommended for all incoming animals. Recommended quarantine and biosecurity standards include, but are not limited to: isolating incoming animals in dedicated quarantine areas; providing sufficient space or solid barriers between animal enclosures to prevent direct contact; and thoroughly cleaning and disinfecting equipment to prevent transmission of pathogens. Prior to moving an animal out of a dedicated quarantine area, an evaluation is generally conducted and a completed blood count and blood chemistry obtained, unless waived in writing (*e.g.*, through a notation in the animal's file), by veterinary personnel. Further, the updated Standards include measures to reduce the spread of disease from net pens. Standards also include measures to prevent disease transmission from domestic and wild terrestrial animals to marine mammals and vice versa. More information on quarantine standards can be found in the updated Standards for Rehabilitation Facilities (see Appendix XVII).

Handling and restraint procedures would be performed or directly supervised by qualified personnel. An experienced marine mammal veterinarian or veterinary technician would be present to carry out or provide direct on-site supervision of all activities involving the use of anesthesia and sedatives whenever possible, or remotely supervise if not present on site. Only personnel experienced in handling and sampling techniques would be used in order to complete the activities as efficiently as possible.

Similar to the mitigation measures discussed in Chapter 4, potential adverse impacts from euthanasia would be minimized in several ways. Under Article V, Part A, Number 5 of the updated SA template (Appendix VIII) and section 2.7 of the updated Standards for Rehabilitation Facilities (Appendix XVII), euthanasia of animals would only be performed by the attending veterinarian or by a person acting under the direction of the attending veterinarian. Persons administering euthanasia would be knowledgeable and trained to perform the procedure, competent in the performance of the technique, and follow guidance in the new Marine Mammal Euthanasia Best Practices (Appendix XIII). Some animals may be sedated prior to the administering of euthanasia, and this would be on a case-by-case basis. Each facility would have a written euthanasia protocol signed and periodically reviewed by the attending veterinarian. Euthanasia procedures would also follow approved guidelines, such as those referenced in the AVMA Guidelines for the Euthanasia of Animals (2020 edition); the CRC Handbook of Marine Mammal Medicine (Gulland *et al.* 2018); and for cetaceans the Cetacean Euthanasia Technical Memorandum (Barco *et al.* 2016) and the Report of the IWC Workshop on Euthanasia Protocols to Optimize Welfare Concerns for Stranded Cetaceans (2014). Persons using controlled drugs would comply with all applicable federal and state laws and regulations. This would include Drug Enforcement Administration regulations and any applicable state veterinary practice laws and regulations. In addition to the measures listed above, rehabilitation personnel would require further authorization and coordination with the appropriate NMFS RSC to euthanize ESA-listed species under the MMPA/ESA permit.

Potential injuries, physiological stress, and other health complications resulting from animal transport procedures would be minimized with the issuance of the Cetacean and Pinniped Transportation Best Practices (Appendix X). Transportation protocols would be standardized, ensuring the safe, effective, and expeditious transport and transfer of live stranded animals. Greater efficiency and transport planning would likely reduce the stress on the individual marine mammal and have an overall positive impact on animal welfare and safety. Transportation crews/escorts would include experienced qualified personnel, animal handlers, support staff, and where necessary an attending veterinarian. Frequent checks on transported animals could lead to the early recognition of health issues and result in earlier treatment. As necessary and practical for the taxa, transportation crews would monitor the animal's respiratory rate, record body temperature, and observe the animal for any signs of discomfort. Selecting equipment specific to the taxa being transported (*e.g.*, stretchers, kennels, foam pads, etc.) would also promote animal safety and minimize the potential for physical injury.

Pinniped and Cetacean Oil Spill Response Guidelines (Ziccardi *et al.* 2015) 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 wastewater. The guidelines include information on data collection and chain-of-custody procedures. Rehabilitation facilities would work with the federal On-Scene Coordinators for oil spill response and consult with NMFS on appropriate rehabilitation measures.

6.4.2 Water and Sediment Quality

Rehabilitation centers, including new and existing facilities that discharge directly to surface waters would have the required NPDES, state, and local permits for facility discharges directly to surface waters. 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 CWA. Documents of authorization or necessary permits must be kept on site as part of the administrative record and may be requested by NMFS as part of the SA. Impacts from permitted discharges would already be accounted for under the respective federal, state, and/or local regulations. Water used in temporary pools would be discharged into a sewer drain, where available. Facilities discharging to POTWs would have a pretreatment plan in place if necessary, as POTWs do not remove toxic organics or metals. Standards for net pens, such as placement of pens in areas with ample tides and currents, would ensure that good water quality is maintained. Once NMFS has specific details about where and how a net pen facility would be created, it could further evaluate potential the impacts and identify site-specific mitigation measures.

Potential adverse impacts on water quality from the treatment and rehabilitation of oiled animals would be minimized by containing oil contaminated water in separate holding tanks (fractionation tanks). The oil contaminated water would not be released into the normal sewer system, and would instead be disposed of in accordance with appropriate federal, state, and municipal regulations.

6.4.3 Cultural Resources

Known cultural resources would be avoided during rehabilitation activities. If cultural resources are discovered during rehabilitation activities under the proposed alternatives, all activities would cease and the State Historic Preservation Office (SHPO) and/or a Tribal Historic Preservation Officer (THPO) would be contacted.

6.4.4 Human Health and Safety

Human safety is the first priority during all animal response and rehabilitation activities. To ensure public safety some rehabilitation activities, such as the transfer of an animal to a rehabilitation facility, would be coordinated with appropriate personnel prior to any response occurring. The SA template (Article II, Part D, Number 5) recommends that Stranding Network participants promote human and public safety by taking proper safety precautions against injury or disease to any Stranding 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 their NMFS RSC within 24 hours of detecting and/or confirming any diseases of concern in an animal which could affect human health (*e.g.*, national and state reportable and/or zoonotic diseases: please see U.S. Department of Agriculture, Centers for Disease Control, or the applicable state public health department list). To minimize any impacts on human health and safety, each rehabilitation facility is required to have a health and safety plan on site that identifies all health and safety issues pertinent to working with wild marine mammals. The safety plan would identify all potential zoonotic diseases and outline standards for the safe and appropriate handling of all species seen at that facility. NMFS expects that all Stranding Network personnel and volunteers be trained to the highest level of responsibility they are assigned. Handling and restraint procedures would be performed or directly supervised by qualified personnel and if possible, an experienced marine mammal veterinarian or veterinary technician would be present to carry out or provide direct on-site supervision of all activities involving the use of anesthesia and sedatives. Personnel would be trained to identify potential zoonotic diseases and prevent their transmission from animal to human (and vice versa). Guidance in the new Cetacean and

Pinniped Transport Best Practices (Appendix X), outlines that personnel involved in marine mammal transportation will include experienced qualified personnel, animal handlers, support staff, and where necessary an attending veterinarian. Contingency and logistical planning, prior to any marine mammal transport, would ensure that rehabilitation personnel are prepared for most situations, and remain safe for the duration of the activity.

Rehabilitation facilities would comply with OSHA regulations regarding personal protective equipment (PPE) (29 CFR 1910, subpart I). Safety equipment would be provided to staff including gloves and protective clothing. 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 Safety Data Sheets (SDS). Hazardous materials and toxic substances would be handled and stored according to OSHA regulations (29 CFR 1910, subpart H and subpart Z). Staff would be trained to properly handle contaminated equipment. A first-aid kit would be available.

Personnel involved in the rehabilitation of oiled marine mammals generally obtain Hazardous Waste Operations and Emergency Response (HAZWOPER) certification (*e.g.*, 24-hour level). Training on the Incident Command System, first-aid, cardiopulmonary resuscitation, crisis management, marine mammal oil spill response, and hazard communication are also recommended. PPE must be used to protect personnel from exposure to hazardous substances and dangers associated with animal care activities. Recommended PPE includes full eye protection, oil resistant clothing, gloves, ear protection, non-skid shoes, and respiratory protection. The SDS 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 effects of volatile agents. Stranding Network members would be responsible for training and certifying their employees and volunteers. A portion of the rehabilitation facility would be designated for the storage of contaminated clothing, equipment, and medical waste until the items can be decontaminated or disposed of properly in accordance with the site safety plan and all local, state, and federal regulations.

6.4.5 Socioeconomics

To minimize the impacts of implementing the updated Standards for Rehabilitation Facilities (Appendix XVII) and modifying rehabilitation activities, NMFS would provide a reasonable process for facilities to upgrade in order to meet the revised minimum standards. If John H. Prescott Marine Mammal Rescue Assistance Grant Program funds are appropriated, competitive funding opportunities could be available to eligible applicants to update facilities that do not meet the updated minimum standards. John H. Prescott

Marine Mammal Rescue Assistance Grant Program funds could also be used to improve facilities that already meet the minimum standards, with the goal to achieve or exceed the recommended standards. Some costs associated with response and rehabilitation during an UME may be reimbursed through the UME Fund, in accordance with Section 405 of the MMPA.

Chapter 7 Release of Rehabilitated Animals

The goal of rehabilitation is to provide humane care for live stranded (ill or injured) marine mammals and to release individuals back to the wild. Release of a rehabilitated marine mammal from a National Marine Fisheries Service (NMFS) approved facility (Appendix I) only occurs after an attending veterinarian, in consultation with NMFS, determines the animal is releasable in accordance with the release criteria as described in section 7.1. For marine mammals under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS), including walruses (*Odobenus rosmarus)*, facilities instead contact the appropriate office as indicated in section 9.5 of the Standards for Release of Marine Mammals Following Rehabilitation (Appendix V).

Rehabilitation of wild marine mammals is conducted by organizations authorized under the Marine Mammal Protection Act (MMPA). For NMFS species, Stranding Agreements (SAs) are formally established between the NMFS Regional Offices and Marine Mammal Stranding Network (Stranding Network) participants under MMPA Section 112(c). The SA does not authorize the rehabilitation of any marine mammal species listed as threatened or endangered under the Endangered Species Act (ESA). Authorization to rehabilitate ESA-listed species by the Stranding Network is currently provided under the MMPA/ESA permit issued to the Marine Mammal Health and Stranding Response Program (MMHSRP), and requires authorization and direction from the permit Principal Investigator (PI) or NMFS Regional Stranding Coordinator (RSC). Additionally, Section 109(h) of the MMPA allows federal, state, local, or tribal government officials or employees in the normal course of their duties to perform rehabilitation activities under regulation 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 government official is required to report to the Secretary of Commerce, every 6 months, details on the marine mammal take, including “a description of the place and means of confinement and the measures taken for its maintenance and care” (50 CFR 216.22(b)(5)).

The minimum protocols for the release of a rehabilitated marine mammal are described under existing regulations (50 CFR 216.27). In accordance with 50 CFR 216.27 (a)(1), any marine mammal held for rehabilitation must be evaluated, by the attending veterinarian of the rehabilitation facility, for releasability within 6 months of collection unless the “attending veterinarian determines that the marine mammal might adversely affect other marine mammals in the wild, release of the marine mammal to the wild will not likely be successful given the physical condition and behavior of the marine mammal, or more time is needed to determine whether the release of the marine mammal will likely be successful.” A decision regarding whether or not a marine mammal has the potential to be released is generally made as early as possible during the rehabilitation period. A release determination recommendation is made by the attending veterinarian, in consultation with the facility's assessment team (*i.e.*, veterinarians, lead animal care supervisor, and/or consulting biologist with knowledge of species behavior, ecology, and life history). If the animal is deemed to be appropriate for release, a release plan is developed by the facility team. The release plan, per 50 CFR 216.27 (a)(2)(ii), must include at minimum: 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. The MMHSRP has developed updated release criteria and a release plan template (Appendix V) that meets the minimum requirements (per 50 CFR 216.27 (a)(2)(ii)), and includes other important release considerations (sections 7.1 and 7.4.1).

To safeguard wild populations of marine mammals, no rehabilitated animals will be released that do not meet the guidelines for release of rehabilitated animals under Section 402(b) of the MMPA. Priority will be given to protecting the health of wild populations over the disposition of an individual animal. For cases involving declared Unusual Mortality Events (UMEs), the Working Group on Marine Mammal Unusual Mortality Events (WGMMUME) will be consulted to determine if event specific release standards should be implemented (Wilkinson 1996). Provisions may require monitoring a representative subset of released animals to determine survivability of released individuals as well as the impact of released individuals on the wild population.

In response to concerns raised by a co-management partner, which included potential risk to wild marine mammal populations and subsistence use of marine mammals, NMFS currently does not authorize the release of rehabilitated ringed (*Pusa hispida*, previously *Phoca hispida*), bearded (*Erignathus barbatus*), ribbon (*Histriophoca fasciata*), and spotted (*Phoca largha*) seals (collectively, ice seals) that were rehabilitated beyond the geographical areas where they were stranded in the Arctic. Certain situations, however, would be considered on a case-by-case basis (*i.e.*, an ice seal out of its range; ice seals that are part of an UME; spotted seals in Bristol Bay), and NMFS may reevaluate this decision at any time.

7.1 Release Criteria

In 2009, NMFS published policies and best practices that provided guidance for determining whether a stranded wild marine mammal, following a course of treatment and rehabilitation, is suitable for release to the wild (NMFS 2009). As part of Alternative 2 (section 7.3.2) those release criteria have been revisited and updated, see Standards for Release of Marine Mammals following Rehabilitation (Appendix V). Although some release criteria are pertinent to both pinnipeds and cetaceans, taxa-specific checklists account for different taxonomic requirements. Prior to the release of any marine mammal under NMFS jurisdiction, a thorough evaluation of the individual's case history and developmental, behavioral, ecological, and medical status must first be completed by an assessment team. It is therefore critical that detailed case history, medical, and husbandry records are maintained and reviewed by rehabilitation facilities. Following this evaluation, release candidates are assigned to one of the following Release Categories: Releasable, Conditionally Releasable, and Non-releasable. More information on Release Categories can be found in Appendix V. Based on the findings from the assessment team, if the animal is determined to be Releasable or Conditionally Releasable, a release plan is devised covering release site selection, animal identification, and post-release monitoring (section 7.2.). Following this, the attending veterinarian and their assessment team provide a written recommendation on releasability and a draft release plan (if warranted) to NMFS. The release determination recommendation and release plan are reviewed and approved or changed, if necessary, by NMFS.

In most cases, NMFS requires the release of marine mammals within 6 months of admission to rehabilitation (50 CFR 216.27(a)). This release assessment can be conducted earlier in the process of rehabilitation, such as for obvious non-release cases (*e.g.*, neonatal cetaceans, blind or deaf animals, etc.). Rather than staying in a rehabilitation situation for up to 6 months, it may be in the best interest of a suspect non-releasable animal to immediately assess, determine releasability, and (if deemed non-releasable), expedite the transfer of the animal from the rehabilitation facility to a more suitable permanent care facility. Alternatively, if an animal makes good progress through rehabilitation, or was admitted for an acute issue that is quickly resolved, the assessment and release may be well in advance of 6 months. If more time is needed beyond 6 months for successful rehabilitation, then NMFS will require periodic reporting in writing (including via e-mail) from the attending veterinarian, including a description of the condition(s) of the animal that warrants further holding, or precludes release at that time.

NMFS may also require that the marine mammal remain at the original rehabilitation facility or be transferred to another rehabilitation facility for an additional period of time, be placed in permanent managed care, or be euthanized. Per implementing regulations (50 CFR 216.27(a)(iii)), if the duration of rehabilitation exceeds 24 months, there will be a rebuttable presumption that release into the wild is not feasible. The MMHSRP, and the Office of Protected Resources' (OPR) Permits and Conservation Division, work with marine mammal facilities to place marine mammals deemed non-releasable into managed care.

NMFS has published three Procedural Directives regarding the rehabilitation, release, or retention of marine mammals:

- 2012 "NMFS Facility Standards for Rehabilitating ESA-listed Species" (02-308-01), which is available at: https://media.fisheries.noaa.gov/dam-migration/02-308-01.pdf
- 2012 Procedural Directive on the "Placement Process for Non-releasable Marine Mammals (02-308-02), which is available at: https://media.fisheries.noaa.gov/dam-migration/02-308-02.pdf.
- 2018 Procedural Directive on the "Process for Permit Applications to Retain Releasable Rehabilitated Marine Mammals for Public Display" (02-308-03), which is available at: https://media.fisheries.noaa.gov/dam-migration/02-308-03.pdf.

In general, the release recommendation and release plan are provided to NMFS at least 15 days in advance of a proposed release date, unless a regional waiver exists[43]. A waiver allows for the release of animals meeting certain pre-established criteria without the required 15-day advanced notice or detailed release plan. Historically, these waivers have applied to harbor seal (*Phoca vitulina*), northern elephant seal (*Mirounga angustirostris*), northern fur seal (*Callorhinus ursinus*), and California sea lion (*Zalophus californianus*) cases on the west coast of the United States involving large cohorts of animals with routine diagnoses (*i.e.*, annual cluster of cases where the etiology is known), treatment, and rehabilitation.

7.2 Release Activities

7.2.1 Preparation for Release

In order to be deemed "releasable," all rehabilitated marine mammals are assessed to ensure that they are nutritionally independent and in good body condition. Release candidates are expected to meet basic behavioral criteria such as demonstration of acceptable breathing, swimming, and diving. Additionally, release candidates cannot display aberrant behavior (including human-dependent behavior), have significant auditory and/or visual dysfunction that may compromise survival in the wild, and/or show symptoms that are consistent with diseases of concern (*e.g.*, national and state reportable and/or zoonotic diseases: please see U.S. Department of Agriculture[44], Centers for Disease Control[45], or the applicable state public health department for lists of reportable diseases).

In addition to the assessments described above, an attending veterinarian generally performs a hands-on physical examination prior to an animal being released, using the full spectrum of diagnostic modalities

[43] The NMFS Regional Administrator may allow for pre-approved waivers as stated in 50 CFR 216.27(a)(2)(i)(A).
[44] See the following website for current U.S. Department of Agriculture list: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/nvap/NVAP-Reference-Guide/Animal-Health-Emergency-Management/Notifiable-Diseases-and-Conditions
[45] See the following website for current Centers for Disease Control list: https://wwwn.cdc.gov/nndss/conditions/notifiable/2020/

appropriate for that case. Complete health screens are conducted and may include complete blood count, serum chemistry profile (including blood urea nitrogen, creatinine, enzymes, electrolytes, and other values), serology, microbial and fungal culture (*i.e.*, blow hole/nasal, rectal, ocular, and lesions), cytology, urinalysis, and a fecal exam. Diagnostics for pathogen detection such as polymerase chain reaction and toxicology analyses may also be performed. Prior to release, NMFS may also require additional testing for diseases of concern, such as during disease outbreaks or ongoing UME investigations. Physical examinations often require an animal to be handled and restrained for the duration of the assessment. For further description of restraint, handling, and assessment methods refer to Chapter 6.

The Standards for Release of Marine Mammals following Rehabilitation (Appendix V) states that cessation of antibiotics should occur 2 weeks prior to release to assure the attending veterinarian that the animal is no longer dependent on the medication and that drugs have cleared the animal's system based on the pharmacokinetics and requirements made by the veterinary community. In situations in which this recommendation cannot be met, and following consultation with NMFS, the animal may be deemed conditionally releasable earlier than 2 weeks following the administration of antibiotics.

Based on the release determination, and as part of the release plan devised by the assessment team, an appropriate release site is identified. Key factors in determining a release site include specific habitat, geographic and environmental factors such as weather and oceanographic states, past successful releases, site permissions, public use, potential for predators, and availability of prey as well as transport time. Ideally, the rehabilitated animal is released within its home range, genetic stock, social unit, or close to its stranding site. For species such as coastal resident bottlenose dolphins, returning the animal to its exact home range may be important. For widely ranging species such as the short-finned pilot whale (*Globicephala macrorhynchus*), specificity of the release site may be less critical as the genetics of these cetaceans may be more panmictic (characterized by random mating within a breeding population), and tags placed on rehabilitated animals have shown wide-ranging behavior. Returning an animal to its home range or genetic stock range may increase the likelihood that the animal will have a knowledge of available resources, potential predators, environmental features, and social relationships that would support its successful return to the wild. Considerations would also be given to the time of year, since the range of the animal may change based on season.

7.2.2 Marking

Prior to release, marine mammals must be marked for individual identification in the wild (50 CFR 216.27(a)(5)), and the description of the marking reported to NMFS. Several factors are considered when selecting the most appropriate marking/tagging method:

- Species
- Intent for the marking (*e.g.*, identification for subsistence hunters, Natural Resource Damage Assessment purposes, mark/recapture population assessment, etc.)
- Duration required (*e.g.*, field season, multi-year, etc.)
- Distance from which the mark on the animal must be distinguishable
- Potential user group(s) reading the mark (*e.g.*, biologists, subsistence hunters, general public, etc.)
- Number of animals to be marked
- Available resources (*e.g.*, tags, marking equipment, etc.)

The least invasive marking method that meets the requirements of the situation will be chosen; a tag may be chosen as the appropriate method when it would meet the requirements better than a mark. Based upon the size, age class, and species being marked, as well as the other procedures being conducted while the animal is in hand, individuals may be sedated or anesthetized for marking.

Marking of marine mammals for identification purposes can be achieved in several ways. Grease pencils/crayons, zinc oxide, and paint can be used on pinnipeds and cetaceans for temporary, short-term marking. Hair dye can be used to mark pinnipeds; the mark will last for weeks to months depending on the time of year, but will not last through molt. Longer term marking of cetaceans can be achieved through freeze branding (branded areas may eventually re-pigment, but may remain readable for more than 10 years (Wells 2009)). Each brand (typically letters and/or numbers approximately 2 inches high) is supercooled in liquid nitrogen and applied to the skin for 15-20 seconds. After the brand is removed, the area is warmed with seawater to return the skin temperature to normal. Cetaceans are usually branded on both sides of the dorsal fin and/or the animal's side just below the dorsal fin, except for species that lack a dorsal fin. Long-term marking of pinnipeds can be achieved by hot branding. Pinnipeds are usually branded on the side of the body or on the rump. Hot branding of pinnipeds may be conducted in rehabilitation facilities, but is more commonly performed during research and is generally conducted under anesthesia (see Chapter 9 for more details). Prior to release, each animal is photographed to record the letters/numbers and location(s) of brand marks. Notching can also be used to permanently mark marine mammals. Notching in pinnipeds involves removing a piece of skin from the hind flipper of phocids and the fore flipper of otariids. In cetaceans, a piece of skin is cut away from the trailing edge of the dorsal fin.

Lettered and numbered plastic tags, including Rototags and Allflex tags (*i.e.*, livestock ear tags), are also commonly used marking methods for long-term monitoring of both pinnipeds and cetaceans. If tags are used to mark an animal, the tag number must be reported to NMFS. All pinnipeds released from rehabilitation in the United States are released with flipper tags. Tag and placement instructions are obtained from NMFS as appropriate for the pinniped species. Flipper tags are generally attached to the hind flippers of phocids and the foreflippers of otariids (Paterson *et al.* 2011). A rehabilitation facility may re-apply a tag to an individual pinniped if the tag is broken or excessively worn upon admit or during the course of rehabilitation, in order to maintain the individual identities of these animals. Other identification methods, such as branding or glue tags, may be used in addition to flipper tags. For cetaceans, plastic livestock ear tags (*e.g.*, Rototags, Allflex tags, etc.) may be attached with a plastic pin to the trailing edge of the dorsal fin (Balmer *et al.* 2011).

The attachment of scientific instruments to released candidates may be used to remotely monitor the animal's location and assess an animal's movement post-release, and could be an additional requirement for some conditionally releasable animals. Some types of tags used on marine mammals for these purposes include:

- Digital archival (D-tags)
- Passive integrated transponder (PIT) tags
- Radio frequency identification (RFID) tags
- Satellite-linked tags
- Time-depth recorders (TDRs)
- Very high frequency (VHF) radio tags
- Acoustic tags

Other types of scientific instruments are used more for research purposes, and those tags are specifically discussed in Chapter 9. Instruments would be selected based upon the details of the situation including, but not limited to, the species, the data needs, the required monitoring duration, the number of animals to be monitored, and the supplies on hand (including available funding). Tag attachment methods vary with tag type, species, and circumstances. Pinniped attachment methods include, but are not limited to: glue, bolt, harness, suction cup, or surgical implant. Attachment methods for cetaceans include, but are not limited to: bolt, punch, suction cup, belt/harness, dart/barb, or deep implant. The least invasive tagging method possible that meets the requirements of the situation would be chosen. Based upon the size, age class, and species being tagged, as well as the other procedures being conducted while the animal is in hand, individuals may be sedated or anesthetized.

7.2.3 Transport

Once deemed releasable or conditionally releasable by NMFS, animals are transferred from their rehabilitation pool or pen, loaded into an appropriate container based on species and size, and transported to a release site. Transport may occur by truck, boat, plane, or any combination of the three. Animals may be released from the beach or may be transported some distance offshore for an at-sea release. Animals are expected to remain safe during transports as long as proper procedures are followed, such as those outlined in the Cetacean and Pinniped Transport Best Practices (Appendix X). Although transport is a large component of releasing rehabilitated animals, the action is also considered a rehabilitation activity, and therefore discussed in detail in Chapter 6.

7.2.4 Post-release Monitoring

Post-release monitoring is encouraged for released animals, and may be required for conditionally releasable animals. Data from post-release monitoring provides essential feedback for the development and refinement of marine mammal rehabilitation and release practices. The specific post-release monitoring plan is coordinated through NMFS. Post-release monitoring of pinnipeds may include opportunistic visual observations of tagged or marked pinnipeds from land, sea, or air, as well as radio or satellite-linked monitoring. Radio and satellite-linked monitoring are highly desirable as they provide a wealth of information regarding the activities and fate of the released animal. Following the release of pinnipeds, personnel avoid remaining on the beach or lingering in the area to allow the seal or sea lion to haul-out. Post-release monitoring of cetaceans is typically coordinated through NMFS and could include visual observations from land, sea, air, and/or radio or satellite-linked monitoring. Released animals (both pinnipeds and cetaceans) are generally not fed immediately prior to transport for release or during the release. For both pinnipeds and cetaceans, the first month after release is a particularly critical period that will indicate whether the animal is thriving (*e.g.*, avoiding predators, capturing sufficient prey, and being accepted by conspecifics; Wells *et al*. 2013). It is recommended that monitoring programs, if used, continue on a regular basis via field observations, radio, or satellite-linked monitoring for the minimum of the battery duration of any tags used, and ideally for a full year. Further, release plans for ESA species or conditionally releasable animals (which cover post-release monitoring) include contingency plans for recovering the released animal, if feasible.

7.3 Environmental Consequences

7.3.1 Alternative 1 – Continue Program Implementation at Current Activity Levels (No Action Alternative)

Under Alternative 1, the NMFS OPR Marine Mammal and Sea Turtle Conservation Division and Regional Offices would continue the release activities of marine mammals by members of the Stranding Network, using the release methods outlined above, until the current MMPA/ESA Permit expires on December 31, 2022. Under Alternative 1, OPR Permits and Conservation Division would not issue a new MMPA/ESA permit to the MMHSRP, at which point members of the Stranding Network authorized under 112(c) of the MMPA would only be authorized to conduct rehabilitation and release activities on non-listed species. As some Prescott Grant recipients use the MMHSRP's MMPA/ESA permit to accomplish some of their project's goals (*i.e.*, release rehabilitated ESA-listed species), Alternative 1 may curtail the number and scope of Prescott Grant proposals received from the Stranding Network if authorization for the release of rehabilitated ESA animals were to cease.

7.3.1.1 Biological Resources

Under Alternative 1, the current release activities of the Stranding Network would continue until the current MMPA/ESA Permit expires, at which point release of ESA-listed species by SA holders would cease. The type, context, level of intensity, and duration of impacts will vary depending on the geographic location, the species involved, and the equipment used in the release.

Temporary and minor, short and long-term adverse effects on protected and sensitive habitats, coastal and marine birds, reptiles, invertebrates, mammals, and other marine mammals could occur during beach releases of rehabilitated pinnipeds, depending on the degree of disturbance. Consultation with local authorities (*e.g.*, tribal; park authority whether city, county, state, or local; land management agencies, state, county, or local government; military; etc.) is needed, prior to any release, to minimize the impacts of activities on sensitive and protected habitats (including SAV and coral reefs). 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 activities ended and impacts would be temporary, as release activities would be of limited duration (minutes, generally less than one hour). Ground nesting birds, nesting sea turtles, and other terrestrial wildlife present at the release site area could be adversely affected by transport and release activities, depending on the location and time of year. Personnel helping with beach releases could also accidentally disturb or damage nests. Release activities are not performed near known sea turtle or bird (including snowy plover) nesting sites, minimizing the potential for adverse effects. The release of pinnipeds on rookeries or haul-out sites is avoided as this could disrupt other marine mammals. 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. Further, some marine mammal species have complex and fragile social orders (*e.g.*, territoriality and male competition) that could be adversely impacted by the sudden reintroduction of released animals.

Minor, short-term adverse effects on protected and sensitive habitats, SAV and macroalgae, fish, reptiles, invertebrates, and other marine mammals could occur during at-sea release activities. However, most at-sea releases are conducted in deep water, and therefore adverse impacts to benthic habitats from release activities would be minimal. Accidental spills of hazardous materials or discharges of wastes from release vessels could impact these biological resources. Some materials would likely be diluted quickly by currents, only causing temporary impacts. Others 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. Any damage to SAV leaves and macroalgae would be negligible and short-term, as only a minimal amount would be disturbed and would grow back within a few weeks to months, depending upon the exact species of seagrass.

Transporting animals to release sites could also have temporary negligible to minor adverse effects on the individual being released. Transport can induce physiological stress, especially for cetaceans (Atkinson and Dierauf 2018; Yip and Dold, 2018). Depending on body condition, marine mammals may develop hyperthermia or hypothermia during transport, particularly if there is limited or no protection from ambient conditions, including direct sun. Body surfaces may be exposed to the drying effects of air. Additionally, animals may inhale exhaust fumes. Improper transport of marine mammals may cause physical trauma such as muscle damage, anemia as a result of abrasions, pressure necrosis, thermoregulatory problems, and respiratory problems. Muscular stiffness may also occur from transport, but most equipment specific to transport is designed to minimize or avoid stiffness entirely. Muscle stiffness would be expected to disappear within a few hours to a few days, unless there was permanent muscle damage (Antrim and McBain 2001). Depending upon the mode of transport, animals may be exposed to high levels of noise and may suffer temporary hearing damage. However, animals should remain safe during transports as long as proper procedures are followed, such as those outlined in the Cetacean and Pinniped Transport Best Practices (Appendix X) and in Yip and Dold (2018).

NMFS currently does not authorize responders to transport stranded ice seals (bearded, ringed, ribbon, and spotted) beyond the geographic area where they strand for the purposes of rehabilitation and release back to the wild. NMFS does review the following situations on a case-by-case basis: an ice seal that is out of habitat, ice seals that are part of an UME, and stranded spotted seals in Bristol Bay. This decision could have potential adverse and beneficial impacts on marine mammals. At the individual level, moderate long-term adverse impacts could occur, as the position not to release rehabilitated ice seals could discourage responders from rehabilitating sick or injured animals that would otherwise benefit from medical treatment. Under these circumstances, animals would either be left at the stranding site (where they would likely die from injury or disease), be euthanized, or be taken into permanent managed care. This would eliminate the potentially beneficial effects of returning animals to the wild, and could be a detriment to vulnerable populations that have been identified as threatened or endangered. However, by not releasing ice seals that strand in the Arctic the potential for disease transmission from rehabilitated ice seals to conspecifics, other wild ice seal populations, and other marine resources is reduced, which is a minor long-term beneficial impact to the population.

As required under regulations at 50 CFR 216.27, all animals would be marked or tagged prior to release. Pinnipeds would be given flipper tags, and the tag site would depend on the species being tagged. Tags are typically attached to the hind flippers of phocids and the foreflippers of otariids (Paterson *et al.* 2011). Temporary negligible adverse impacts may occur with the application of tags, as tag attachment (including the attachment of scientific instruments, as described in section 7.2.2) could cause little or momentary pain to the animal during application. Minor short-term adverse impacts may occur if tag sites become infected. Further minor, short-term adverse impacts may result from injury and discomfort that could stem through tag migration, and constriction and swelling at the attachment site (Walker *et al.* 2012). When tags are shed (due to water drag, tissue rejection, and attempts by animals to shed tags, etc.), short-term minor adverse impacts may occur in the form of tissue damage that allows the site to become infected. Animal movement may prolong or prevent healing by producing repetitive stress on the wound. In some species that rely on fur for warmth, tag loss could result in alterations to the pelage and could possibly lead to compromised thermoregulatory capabilities (Rosen *et al.* 2018). Other pinniped marking methods such as branding, glue tags, etc. may be used in addition to flipper tags (Geraci and Lounsbury 2005), and the impacts of these are discussed in Chapter 9.

Commonly used methods of marking small cetaceans include freeze branding on or below the dorsal fin (both sides of the body) and/or the attachment of a plastic livestock ear tag (*e.g.*, Rototag, Allflex tag, etc.) to the dorsal fin. Freeze branding may cause little or momentary pain to cetaceans during application, which would require approximately 15-20 seconds per brand. Discomfort may persist for some time after the procedure, but is expected to be minor and short-term. However, liquid nitrogen could spill onto an animal during the process, causing more than momentary pain and more moderate, short-term adverse impacts. Tag attachment (including tagging instruments other than plastic livestock ear tags, as described in section 7.2.2) could also cause temporary negligible pain to the animal during application. Minor, short-term adverse impacts may occur if tag sites become infected. Depending on the tag selected, sedatives or local anesthetic would be used to manage pain. There could also be longer-term energetic and behavioral costs associated with tagging and marking individuals.

Minor, short- and long-term beneficial impacts could also be expected under this alternative. Animals released back to the wild, following a course of treatment and rehabilitation, could contribute to population growth, genetic diversity, and have a positive impact on ecosystem health.

The current release guidelines recommend the development of a post-release monitoring plan as part of the assessment process for a release determination. Post-release monitoring provides a means to evaluate an individual's reintroduction to the wild. Such monitoring may also provide opportunity to recover newly conditionally released animals that appear to be compromised and are unable to adjust (*e.g.*, not feeding, appear ill, approaching people, will likely re-strand, etc.). This would be beneficial to the individual animal, and could also protect the receiving population by preventing disease transmission or the transfer of negative behaviors. Tagging and post-release monitoring is also beneficial in the evaluation and refinement of rehabilitation and release efforts. If the post-release monitoring data suggests that a released animal is exhibiting behavior typical for that species in the wild (*e.g.*, diving to depths indicative of feeding, in geographic association with other animals of the same species, avoiding people, etc.) then this would indicate that rehabilitation and release practices are working. A description of the tagging methods proposed for each cetacean release candidate would be part of the post-release monitoring plan along with a justification for choosing a particular tagging or marking method. NMFS may approve or modify the choice of tags, depending upon the research question(s) being asked and tag availability.

Under this alternative, release activities could change as new information and data are obtained from released animals, and in line with emerging technologies. New tags and telemetry packages would likely be smaller in size and weight and be less invasive than those currently used. The release criteria may change as new information and data are obtained from released animals and as improvements are made in marine mammal medicine. New procedures and technologies may also enhance the post-release survival of an animal.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, rehabilitation and release activities by SA holders would end for ESA-listed species. Sick and injured ESA-listed species would not be taken into rehabilitation and would most likely die from injuries or disease. This alternative would have short- and long-term negative impacts on vulnerable populations that have been identified as threatened or endangered, and for species that have previously benefited from rehabilitation and release activities (*e.g.*, Hawaiian monk seal). Further, this outcome would eliminate the collection of post-release monitoring data for ESA species, which could be used to assess and better inform current rehabilitation and release practices. Release of non-ESA species would continue using the release methods described above, and therefore the same impacts as those previously described in this section would be expected.

7.3.1.2 Water and Sediment Quality

Minor, temporary, and short-term adverse effects on water and sediment quality could occur under Alternative 1. Release of rehabilitated animals would not intentionally generate any pollutant or disturb sediment. However, accidental spills of hazardous materials or wastes from vessels used to release animals at sea 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. During beach releases of pinnipeds equipment used to transport animals, in addition to human traffic, could increase erosion or compact the sediment. The level of impact would vary by release site and would depend on the sediment, the type of equipment used, as well as the duration of equipment use. Vehicles and transport equipment could also leak oil or other materials into sand and nearshore waters. 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 longer but still localized impacts.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, rehabilitation and release activities by SA holders would end for ESA-listed species. Release of non-ESA listed species would continue, and therefore the same impacts as those previously described in this section would apply. No additional effects on water and sediment quality would be expected.

7.3.1.3 Cultural Resources

Minor to moderate, adverse effects on cultural resources could occur under this alternative. The use of equipment and vehicles on the beach during release activities may damage cultural resources buried in the sand or dunes. This would negatively impact areas such as the Pacific Islands region, where many unknown artifacts and habitation sites are buried on beaches. However, the potential for impact would be minor, as release activities are scattered along the entire U.S. coastline, and consultation with local authorities (prior to release site selection and/or undertaking actions) would provide information on areas of known cultural or historical significance to be avoided. The probability that release activities may occur on a beach containing cultural resources is small. Archaeological studies have not been conducted in most coastal areas, but if cultural resources were identified the site could be avoided for release activities. The State Historic Preservation Office (SHPO) and/or Tribal Historic Preservation Office (THPO) would be notified of regularly used release sites. Release activities conducted at sea should not affect submerged cultural resources.

In response to concerns raised relating to the effects on cultural resources for subsistence harvest of ice seals, NMFS currently does not authorize responders to transport stranded ice seals (bearded, ringed, ribbon, and spotted) beyond the geographic area where they strand for the purposes of rehabilitation and release back to the wild. NMFS does review the following situations on a case-by-case basis: an ice seal that is out of habitat, ice seals that are part of an UME, and stranded spotted seals in Bristol Bay. This decision reduces the potential for introducing novel and undetected pathogens into the environment, and could limit the contamination of marine resources used by coastal Alaska Natives for cultural and ceremonial purposes.

As defined in section 3.4.1, "indigenous peoples" are defined in this document as those peoples with pre-existing sovereignty who were living together as a community prior to contact with settler populations, and would include, but is not limited to: Native Americans, Alaska Natives, Native Hawaiians and other indigenous Pacific Islanders, and other aboriginal peoples. Release activities would be coordinated with indigenous peoples to accommodate cultural uses of marine mammals, as appropriate. Responders would also be sensitive to the fact that traditional uses often involve ceremonial, medicinal, or subsistence uses of plants, animals (including marine mammals), and specific geographic locations. In cases where a community has a specific cultural or spiritual belief, inclusion of community members in a marine mammal release may be appropriate to preserve cultural heritage. There would be no effects on indigenous people's cultural uses of coastal resources from release activities.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, rehabilitation and release activities by SA holders would end for ESA-listed species. Release of non-ESA species would continue, and therefore the same impacts as those described above would apply. No additional effects on cultural resources would be expected.

7.3.1.4 Human Health and Safety

Minor, short-term, adverse effects could occur under this alternative. Physical injuries, such as strains, cuts, and bruises may occur while handling, lifting, and moving an animal. Animal induced injuries could include bites or other physical injuries from being hit by a fin, flipper, tail, or other body part (Hunt *et al.* 2008).

Sunburn, heat exhaustion, heat stroke, and hypothermia are possible, if release activities require people to be outside for extended periods of time. Vessel collisions, fire, capsizing, running aground, and inclement weather during release activities can result in injuries, including bruises, cuts, drowning, and lightning strikes.

Currently, NMFS does not authorize responders to transport stranded ice seals (bearded, ringed, ribbon, and spotted) beyond the geographic area where they strand for the purposes of rehabilitation and release back to the wild. NMFS does review the following situations on a case-by-case basis: an ice seal that is out of habitat, ice seals that are part of an UME, and stranded spotted seals in Bristol Bay. This decision was made many years ago to support and safeguard the human health and safety of Alaska Natives who depend on marine mammals for food, as it limits the potential introduction of novel and undetected pathogens, acquired in rehabilitation, into the marine environment. Further, this decision prevents animals, potentially with drug remnants (*e.g.*, antibiotics) in their system from medical treatment, from being released and consumed. However, it also eliminates the potential contribution of those rehabilitated animals into the population for contributing to population growth and genetic diversity of the species used for subsistence.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, rehabilitation and release activities by SA holders would end for ESA-listed species. Release of non-ESA species would continue, and therefore the same impacts as those described above would apply. No additional effects on human health and safety would be expected.

7.3.1.5 Socioeconomics

Minor, short-term beneficial and adverse impacts could occur under this alternative. Some rehabilitation facilities advertise upcoming release events on social media or through regional communications. Release events can provide an enriching educational service to the community, and some facilities provide internship and volunteer opportunities based around rehabilitation and release. Beach releases of rehabilitated pinnipeds could attract visitors (including current and potential donors) to a release site, especially if there was community interest when the animal initially stranded. Increased visitation to an area could positively impact local businesses in the community such as restaurants and hotels. However, unexpected increased visitation to an area such as a park or refuge could adversely impact staffing, and could require additional resources (*e.g.*, bathrooms, trash service, parking, interpretation, and crowd control, etc.) if the increased visitation lasted for multiple days. Most releases are conducted in a short time (typically an hour or less).

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, rehabilitation and release activities by SA holders would end for ESA-listed species. Release of non-ESA species would continue, and therefore the costs associated with release activities would remain relatively unchanged. However, SA holders who rely on the rehabilitation and release of ESA-listed animals to attract external funding (*e.g.*, Hawaiian monk seals) could be negatively impacted if the release of ESA-listed animals were to stop altogether. Additionally, as ESA-listed species would no longer be rehabilitated and released, there would be fewer opportunities for outreach and education about the plight of threatened and endangered marine mammal populations.

7.3.2 Alternative 2 – Improved Program Implementation and Issuance of a New Scientific Research and Enhancement Permit (Preferred Alternative)

Under Alternative 2, the MMHSRP would implement some operational improvements to a subset of programs and activities. Updated Standards for Release of Marine Mammals following Rehabilitation (Appendix V) (including updated release criteria, an updated release checklist, and issuance of a national release plan template) would be implemented. NMFS would also introduce a national release waiver template which would enable regions to waive aspects of the release approval process, for specific species and under certain conditions. Under Alternative 2, NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit, and therefore release activities for ESA-listed species could continue under the new permit. Prescott Grant recipients often use the MMHSRP's MMPA/ESA permit to accomplish some of their project's goals. Alternative 2 would allow all organizations to continue to release rehabilitated ESA-listed species as part of their Prescott Grants.

7.3.2.1 Biological Resources

The effects on marine mammals from release activities under this alternative would be the same as those described under Alternative 1, except that the implementation of updated Standards for Release of Marine Mammals following Rehabilitation (Appendix V) would improve animal health, welfare, and safety.

The issuance of a national release plan template would standardize the information needed to request approval for release, and could also reduce time spent in rehabilitation for some species. The template outlines the standard information each rehabilitation facility would provide to NMFS, including site selection, release logistics, and a plan for post-release monitoring (including recovery and contingency planning). This level of detail would promote the safe, expedient, and effective release of animals, and reduce the likelihood of an animal re-stranding in the future. It would also streamline efforts for the facilities by clearly indicating what information was required for efficient evaluation of the request by NMFS.

NMFS has the ability to waive the 15 day advance notice for marine mammals that meet pre-release conditions. NMFS has worked with regions to streamline the process (including the development of a release waiver template), which when implemented would have short- and long-term beneficial impacts on some rehabilitated animals (routine cases) awaiting release. Improving regional efficiencies could enable facilities to meet the goals of rehabilitation faster. As a result, some animals would spend less time in rehabilitation. Less time spent in a rehabilitation setting would decrease an animal's dependence on care, reduce the potential to acquire negative behaviors while in care, and facilitate an individual's integration back into the wild. Further, release of rehabilitated animals meeting pre-release conditions would not only positively impact the individual, but the population as a whole, especially for species that are threatened or endangered. The release of some animals would free up space in rehabilitation facilities, allowing for more incoming animals in need of care to be treated. Release waivers would only be used for species that are pre-approved by NMFS, and the rehabilitation facility would still follow the release criteria for determining when a marine mammal was suitable for release. Further, NMFS OPR Marine Mammal and Sea Turtle Conservation Division would maintain the right to review individual cases at any time.

Effects on protected and sensitive habitats, submerged aquatic vegetation (SAV) and macroalgae, reptiles, invertebrates, mammals, fish, shellfish, and birds from release activities would be the same as those described under Alternative 1, except that the updated Standards for Release of Marine Mammals following Rehabilitation (Appendix V) would promote consultation with local authorities, and facilitate better planning prior to selecting a release site and/or undertaking any activities. This could reduce the potential adverse impacts of release activities on biological resources. As Alternative 2 also includes the issuance of a new MMPA/ESA permit, release of ESA-listed species could continue under the new permit. The release of ESA-listed species would have the same effects as those described under Alternative 1.

7.3.2.2 Water and Sediment Quality

The effects on water and sediment quality under this alternative would be the same as those described for Alternative 1. As Alternative 2 also includes the issuance of a new MMPA/ESA permit, release of ESA-listed species could continue under the new permit. The release of ESA-listed species would have the same effects as those described under Alternative 1.

7.3.2.3 Cultural Resources

The effects on cultural resources under this alternative would be the same as those described for Alternative 1, except that the implementation of updated Standards for Release of Marine Mammals following Rehabilitation (Appendix V) would improve communication and consultation with local authorities with respect to identifying sites with cultural resources to be avoided during release activities. As Alternative 2 also includes the issuance of a new MMPA/ESA permit, release of ESA-listed species could continue under the new permit. The release of ESA-listed species would have the same effects as those described under Alternative 1.

7.3.2.4 Human Health and Safety

The effects on human health and safety from release activities under this alternative would be the same as those described under Alternative 1, except that the issuance of a release plan template (Appendix V) would provide guidance for planning animal releases, and would ensure that personnel are better prepared to meet the needs of varied and changing circumstances. This would have an overall positive impact on human health and safety. As Alternative 2 also includes the issuance of a new MMPA/ESA permit, release of ESA-listed species could continue under the new permit. The release of ESA-listed species would have the same effects as those described under Alternative 1.

7.3.2.5 Socioeconomics

The effects on socioeconomics from release activities under this alternative would be the same as those described under Alternative 1, except that the new Standards for Release of Marine Mammals following Rehabilitation (Appendix V) include updated release criteria and the national release plan template that would streamline the release determination process. Given that the rehabilitation of marine mammals can be expensive (Moore *et al.* 2007), streamlining the release of animals that meet pre-release conditions would reduce time under care and be more cost effective for rehabilitation facilities. The implementation of a release plan template could also improve coordination with potential release sites, as these plans could be shared with the release site management as well as NMFS, and therefore reduce negative impacts from additional crowds or beach use.

7.3.3 Alternative 3 – More Stringent Protocols and Best Practices and Issuance of a New Scientific Research and Enhancement Permit

Under Alternative 3, NMFS OPR Marine Mammal and Sea Turtle Conservation Division and Regional Offices would continue to implement the MMHSRP as described in Alternative 2, with the addition of more thorough protocols and best practices. NMFS would require all species listed as threatened or endangered under the ESA be released, regardless of whether the animal would normally be deemed releasable. All ESA-listed animals would be required to be released with VHF or satellite-linked tags, and all other animals released would need to be PIT tagged. Under Alternative 3 NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit, and therefore release activities for ESA-listed species could continue under the new permit. Prescott Grant recipients often use the MMHSRP's MMPA/ESA permit to accomplish some of their project's goals. Alternative 3 would allow all organizations to continue to release rehabilitated ESA-listed species as part of their Prescott Grants.

7.3.3.1 Biological Resources

Minor to major short-term and long-term impacts are expected to occur under Alternative 3. Impacts to sensitive and protected habitats, submerged aquatic vegetation (SAV) and macroalgae, reptiles, invertebrates, mammals, fish, shellfish, and birds would be the same as those described for Alternative 2, but may be slightly increased due to more release events.

The requirement to release all ESA-listed animals would have animal welfare implications at both the individual and population level. Animals that would normally be deemed non-releasable, such as those with unfavorable behavioral and developmental conditions (as per the release criteria and release checklist described above; Appendix V), may not be equipped to face the challenges of returning to the wild. For example, if a calf is nutritionally and socially dependent then its chances of surviving (and thriving) on its own are diminished and it would likely suffer from starvation leading to death if released. This is also true for animals that are ill and require frequent medications and human intervention. Conversely, some of the animals that are assessed as being non-releasable may, against expectations, actually survive in the wild, successfully reproduce, and thus contribute to the growth and genetic diversity of a population. This would be a benefit, but these cases are believed to be relatively unlikely (as the release criteria have been carefully developed), so the potential benefit of releasing a small number of rehabilitated marine mammals that would otherwise be deemed non-releasable does not outweigh the risk to wild marine mammal populations and individual animal welfare concerns.

The bearded seal and ringed seal, two Arctic ice seal species, are both currently listed as threatened under the ESA and would be released under this alternative. This could have an indirect minor short-term adverse impact on wild populations of ice seals or other species in the Arctic as ice seals rehabilitated outside of their home ranges could be carriers of pathogens not normally encountered by wild populations.

Under Alternative 3 all ESA-listed animals would be released with VHF or satellite-linked tags, and all other animals would be PIT tagged (a description of the application of PIT tags can be found in Appendix

XI). For cetaceans, some VHF and satellite-linked tags are attached via suction cups, and cause minimal discomfort to the animal but no associated injuries. Tag placement ensures that the tag will not cover or obstruct the blowhole, even if the cup migrates after placement (as any movement would be toward the tail). Other cetacean VHF and satellite-linked tags are attached via a single pin along the trailing edge of the dorsal fin, or a LIMPET or other tag implanted on the dorsal surface of the animal behind the blowhole, closer to the dorsal fin. Attachment of VHF or satellite-linked tags to pinnipeds include using glue (for head and back applications), and a single pin tag (for front or hind flippers). As described under Alternative 1, tags that penetrate the skin could cause temporary pain to animals during application, and tag sites could become infected. Further, injury and discomfort could stem through tag migration, and constriction and swelling at the attachment site (Walker *et al.* 2012). When tags are shed (due to water drag, tissue rejection, and attempts by animals to shed tags, etc.), tissue damage could occur and the site could become infected. Animal movement may prolong or prevent healing by producing repetitive stress on the wound. All non ESA-listed animals, however, would be released with PIT tags. PIT tags are primarily injected below the blubber, are considered biologically inert, and have been used without any known complications. Tagging all animals with either PIT tags, or VHF or satellite-linked tags would lead to greater surveillance of animals released from rehabilitation, and would contribute to scientific knowledge.

7.3.3.2 Water and Sediment Quality

The effects on water and sediment quality under this alternative would be the same as those described for Alternative 2, and may be slightly increased due to more release events. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, release of ESA-listed species could continue under the new permit. The release of ESA-listed species would have the same effects as those described under Alternative 2.

7.3.3.3 Cultural Resources

The effects on cultural resources under this alternative would be the same as those described for Alternative 2, except that the requirement to release all ESA-listed species could pose additional adverse impacts on cultural resources. The bearded seal and ringed seal, two Arctic ice seal species, are both currently listed under the ESA and would be released under this alternative. This could have an adverse impact on cultural resources of coastal Alaska Natives if taken for subsistence purposes, as ice seals rehabilitated outside of their home ranges could be carriers of pathogens not normally encountered by wild populations.

7.3.3.4 Human Health and Safety

The effects on human health and safety under this alternative would be the same as those described for Alternative 2, except that the requirement to release all ESA-listed species could pose additional adverse impacts on human health and safety. The release of animals that would normally be categorized as non-releasable, such as those with behavioral problems, could put humans at greater risk of injury. Inappropriate release candidates that were solely released on the basis of being an ESA-listed species could become nuisance animals and approach humans in search of food or become habituated to human activity. This could lead to more frequent animal-human interactions. Further, the release of inappropriate candidates could lead to these animals stranding again in the future. Response to released animals that subsequently re-strand could further risk human health and safety as animals could require additional handling and treatment.

The bearded seal and ringed seal, two Arctic seal species, are both currently listed as threatened under the ESA and would be released under this alternative. The release of Arctic ice seals rehabilitated outside of their home range has the potential to transmit pathogens, acquired in rehabilitation, to wild populations. This could have an adverse impact on human health and safety for food security reasons, as marine mammals are harvested year round in coastal Alaska communities.

7.3.3.5 Socioeconomics

The effects on socioeconomics from release activities under this alternative would be the same as those described under Alternative 2, except that the requirement to release all ESA-listed animals with a VHF or satellite-linked tag (and all other animals with a PIT tag) would put a financial strain on many Stranding Network partners. Satellite-linked tags are estimated to cost between $1,500 and $4,000 per tag (as of 2022) and could be more, depending on tag capabilities and supply chain considerations. There would also be an additional cost for the increased usage of satellite data. Therefore, rehabilitation facilities that rehabilitate and release a higher proportion of ESA-listed species would incur a greater share of expenses. Further, the release of inappropriate candidates (*i.e.*, ESA animals that would normally be classified as non-releasable) could lead to these animals stranding again in the future. Response to animals that re-strand would put an additional strain on the Stranding Network in both time and resources. The requirement to tag all other animals with PIT tags would also negatively impact rehabilitation facilities. PIT tags cost between $7-8 per tag (www.biomark.com), and tag readers (costing roughly $800) would also be required. This would come as a significant cost to facilities in regions with high release rates of non-listed species (*i.e.*, the West Coast Region).

7.4 Mitigation

The purpose of mitigation is to avoid, minimize, or eliminate negative impacts on the affected resources from the proposed action. Under Alternatives 1, 2, and 3, specific measures will be taken to moderate any significant impacts likely to occur as a result of releasing rehabilitation animals.

As discussed in section 1.4.2.1, there are some standard mitigation measures already included under the MMHSRP research and enhancement permit, as set forth by the Permits and Conservation Division. There are additional standard mitigation measures for some MMHSRP activities in our Stranding Agreement Template (Appendix VIII), Evaluation Criteria for Marine Mammal Stranding Agreements (Appendix IX), and Standards for Release of Marine Mammals following Rehabilitation (Appendix V). In addition, there is required mitigation for certain events including sampling of animals during research under the NMFS IACUC policy (NMFS-PD 04-112-01) and use of UAS following the NOAA UAS Policy 220-1-5. These standard mitigation measures are described below under each resource area (sections 7.4.1-7.4.5).

There are also other (optional) mitigation measures that the MMHSRP could implement to further reduce significant impacts on marine mammals while conducting activities. These are identified in the relevant Best Practices appendices in the PEIS and are also described below under each resource area (sections 7.4.1-7.4.5).

7.4.1 Biological Resources

For all release activities, the appropriate authorities would be consulted during the site selection and planning process to help coordinate activities, and ensure that release activities avoid protected and sensitive habitats (including SAV and coral reefs), or that impacts are minimized. Some areas, such as wilderness areas, may have more limitations (*i.e.*, no motorized vehicles). In situations where Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC) may be impacted by release activities, the appropriate NMFS EFH Coordinator would be contacted to determine the best release location, and any mitigation that may need to occur. Release activities would also be coordinated with federal, state, and/or local agencies to avoid or minimize impacts to nesting sea turtles or birds and other terrestrial wildlife present in the release site area. For all beach releases, experienced personnel would carry out release activities efficiently to minimize the total time spent on the beach or at the release location. Care would be taken to avoid disturbing other marine mammals in the vicinity of the release site.

NMFS would also implement the updated release Standards for Release of Marine Mammals Following Rehabilitation (Appendix V) (including release criteria, a release checklist, and release plan template) under Alternatives 2 and 3.

Potential adverse impacts from disease transmission from a released animal to the wild population would be minimized by measures outlined in the updated Standards for Release of Marine Mammals Following Rehabilitation (Appendix V). Animals would be medically cleared by the attending veterinarian and their assessment team as part of the release determination process. 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 could require some diagnostic testing to determine the risk to the health of wild marine mammal populations. Additional testing could be required if the animal was part of a UME.

Additional measures to minimize the potential for disease transmission from rehabilitated ice seals from the Arctic would continue to be implemented in the NMFS Alaska Region. NMFS would not authorize responders to transport stranded ice seals beyond the geographic areas in the Arctic where they strand for the purposes of rehabilitation and release back to the wild. NMFS would review the following situations on a case-by-case basis: 1) an ice seal out-of-range; 2) ice seals as part of an official UME; and 3) stranded spotted seals in Bristol Bay, AK. NMFS would work with Alaska Native organizations (co-managers of these species) to determine the best possible solution for those ice seals. After consultation with these organizations, NMFS may re-evaluate this policy at any time, particularly with regard to changes in the status of ice seal populations and their habitat.

Potential adverse impacts to the animals being released would also be mitigated by the updated release criteria in the Standards for Release of Marine Mammals Following Rehabilitation (Appendix V). In addition to the medical assessment (as described above), behavioral and developmental assessments would be conducted before a release determination is made. Developmental clearance would reasonably ensure that the animal has attained a sufficient age to be nutritionally independent. Behavioral clearance would include an assessment of an animal's breathing, swimming, diving, locomotion on land (pinnipeds), foraging, and hunting abilities. Also, an evaluation of an animal's visual and auditory functions is generally conducted, if possible. These assessments would have an overall positive impact on an animal's welfare, as they will help to ensure that a released animal will thrive in the wild.

The updated release plan template (Appendix V), which emphasizes in-depth planning and consideration of release site and schedule, would ensure that appropriate measures are in place, on a national level, to facilitate the release of rehabilitated animals. This would have a positive impact on biological resources as some marine mammals have complex and sometimes fragile social orders that would suffer from arbitrary reintroductions. Similarly, selecting quiet release sites away from populated areas, where possible, would protect release candidates from unnecessary encounters with humans. This would protect both the public, and have a positive impact on animal welfare.

Handling and restraint procedures for release examinations would be performed or directly supervised by qualified personnel and if possible, an experienced marine mammal veterinarian or veterinary technician would be present to carry out or provide direct on-site supervision of all activities involving the use of anesthesia and sedatives. The veterinarian would also provide emergency procedures if necessary. When tagging release candidates, the tag size would be kept to a minimum in order to lessen the energetic cost of carrying the tag, and tag placement would be selected so that it would not interfere with an animal's ability to forage or conduct other vital functions. Pinniped flipper tags, for example, would be placed appropriately so animals would not walk on or be irritated by them. A local anesthetic or analgesic could be administered prior to tagging of cetaceans to minimize discomfort during application if necessary. Other marking methods, such as branding, would be conducted by experienced personnel.

Potential injuries, physiological stress, and other health complications resulting from animal transport from rehabilitation facilities to release sites would be minimized with the issuance of the Cetacean and Pinniped Transport Best Practices (Appendix X), as described in Chapter 6.

7.4.2 Water and Sediment Quality

Consultation with local authorities prior to conducting release activities could minimize potential impacts to water and sediment quality through advanced planning and proper selection of a release site (including timing of release). If hazardous materials or wastes were discharged during release activities, Stranding Network members would notify the appropriate federal, state, tribal, or local authorities. Further, the Stranding Agreement (SA) template (Appendix VIII; Article III and Article IV, Part B, Number 4) requires SA holders to make every reasonable effort to assist in the cleanup of beach areas where their activities contributed to the soiling of the site.

7.4.3 Cultural Resources

Potential damage to known cultural resources would be avoided during release activities by contacting the appropriate SHPO and/or a THPO or other local authorities before selecting a release site and/or undertaking actions. Under the proposed alternatives, if cultural resources are discovered during release activities, all activities would cease and the SHPO and/or a THPO would be contacted.

To limit the potential contamination of marine resources used by coastal Alaska Natives, NMFS will not authorize responders to transport stranded ice seals from the Arctic beyond the geographic areas where they are stranded for the purposes of rehabilitation and release back to the wild. NMFS would review the following situations on a case-by-case basis: 1) an ice seal out-of-range; 2) ice seals as part of an official UME; and 3) stranded spotted seals in Bristol Bay, AK. NMFS would work with Alaska Native organizations (co-managers of these species) to determine the best possible solution for those ice seals. After consultation with these organizations, NMFS may re-evaluate this policy at any time, particularly with regard to changes in status of ice seal populations and their habitat.

Release activities would be coordinated with indigenous people to accommodate cultural uses of marine mammals, as appropriate. Responders would also be sensitive to the fact that traditional uses often involve ceremonial, medicinal, or subsistence uses of plants, animals (including marine mammals), and specific geographic locations. In cases where a community has a specific cultural or spiritual belief, inclusion of community members in marine mammal releases may be appropriate to preserve cultural heritage. Release of rehabilitated animals on tribal lands would be coordinated with the THPO and the appropriate community to accommodate cultural uses of marine mammals.

7.4.4 Human Health and Safety

Human health and safety is the first priority during all animal response, rehabilitation, and release activities. The SA template (Appendix VIII; Article II, Part D, Number 5) recommends that Stranding Network participants promote human and public safety by taking proper safety precautions against injury or disease to any Stranding 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 their NMFS RSC within 24-hours of detecting and/or confirming any diseases of concern in an animal which could affect human health (*e.g.*, national and state reportable and/or zoonotic diseases: please see U.S. Department of Agriculture, Centers for Disease Control, or the applicable state public health department list). All rehabilitation facilities would comply with Occupational Safety and Health Administration (OSHA) regulations regarding personal protective equipment (29 CFR 1910, subpart I). NMFS expects that all Standing Network personnel and volunteers be trained to the highest level of responsibility they are assigned. Handling and restraint procedures for release examinations would be performed or directly supervised by qualified personnel and if possible, an experienced marine mammal veterinarian or veterinary technician would be present to carry out or provide direct on-site supervision of all activities involving the use of anesthesia and sedatives.

The updated Standards for Release of Marine Mammals Following Rehabilitation (Appendix V), which recommend a release plan be prepared prior to any release, outline measures to ensure that personnel and the public remain safe. Additionally, the release plan template will ensure that human health and safety is considered during release planning. Selecting a suitable release site away from crowded beaches (where possible), and/or planning for the release to occur during quieter periods (*e.g.*, early morning, late evening, avoiding holiday weekends, etc.) would minimize contact between released animals and the public. Similarly, coordination and advanced notification with local authorities to ensure proper staffing, and crowd control in high population areas, would ensure that an appropriate distance is maintained between any public onlookers and the animal being released.

Behavioral, developmental, and medical assessments, part of the updated release determination process, would ensure that only appropriate candidates are being released (Appendix V). Further, immediate post-release and short-term monitoring could track newly released animals and ensure that they are adapting well to life back in the wild. This, in concert with contingency planning, would ensure that human health and safety is safeguarded. Newly conditionally released animals showing signs of abnormal behavior (*i.e.*, approaching people or vessels and damaging private property), could be recovered (if appropriate) at the earliest opportunity. The monitoring, deterrence using non-lethal means, and recovery of "nuisance animals" would have a positive impact on human health and safety as it would minimize contact between wild animals and the public, limiting the potential for injury and the transference of disease. For a more detailed explanation of deterrence methods see Chapter 4.

To limit the potential contamination of marine resources consumed by coastal Alaska Natives, NMFS will not authorize responders to release back to the wild any stranded ice seals that were transported beyond the geographic areas where they strand in the Arctic for rehabilitation. NMFS would review the following situations on a case-by-case basis: 1) an ice seal out-of-range; 2) ice seals as part of an official UME; and 3) stranded spotted seals in Bristol Bay, AK. NMFS would work with Alaska Native organizations (co-managers of these species) to determine the best possible solution for those ice seals. After consultation with these organizations, NMFS may re-evaluate this policy at any time, particularly with regard to changes in status of ice seal populations and their habitat.

7.4.5 Socioeconomics

The implementation of the updated Standards for Release of Marine Mammals Following Rehabilitation (Appendix V) would reduce the socioeconomic impact of release activities on the Stranding Network by increasing regional efficiencies and streamlining the decision making process. Further, if John H. Prescott Marine Mammal Rescue Assistance Grant Program funds are appropriated, competitive funding opportunities could be available for eligible Stranding Network members. If awarded, such funds may be used to help offset some costs incurred by release activities.

Chapter 8 Entanglement Response

8.1 Entanglement Response Activities

Entanglements occur when foreign material (fishing gear, line, debris, etc.) becomes wrapped around, hooked into, or otherwise associated with the outside of the body of the animal. Entanglements can also include cases when an animal has ingested gear including hooks, line, or other marine debris. The National Marine Fisheries Service (NMFS) conducts or authorizes and oversees numerous external partners to conduct entanglement response activities on marine mammals under NMFS jurisdiction. These live animal entanglement response activities are initiated to assess the type of entangling gear, the severity of the entanglement (including presence and severity of injuries), the configuration of the entanglement, and to identify the most appropriate and safe course of human intervention to remove the gear/debris to increase the likelihood of survival for the individual animal. Even partial removal of entangling gear may reduce an animal's pain and suffering, and increase its chances of survival, so every case is evaluated to determine what type of assistance is possible, practical, and safe (for the animals and responders alike). In cases where the gear or marine debris is ingested, or severely embedded into the skin and underlying tissue, the response may include capture and surgical or non-surgical removal of the gear or debris (specifically for pinnipeds and small cetaceans), and/or rehabilitation. Responding to entangled marine mammals also provides an opportunity to collect, identify, document entanglement configurations/modifications, and locate the source of gear. Data from collected gear can form a better understanding of the entanglement, be used to assess current management strategies, inform management decisions to prevent or mitigate future marine mammal entanglements, and become evidence for enforcement or litigation actions.

Response to wild marine mammals is conducted by authorized organizations under listed conditions by the Marine Mammal Protection Act (MMPA). For NMFS species, the MMPA Section 112(c) Stranding Agreements (SAs) are formally established between the NMFS Regional Offices and Marine Mammal Stranding Network (Stranding Network) participants. The SA does not authorize the response to any marine mammal species listed as threatened or endangered under the Endangered Species Act (ESA). Authorization to respond to ESA-listed species by the Stranding Network is currently provided under the MMPA/ESA permit, and requires authorization and direction from the permit Principal Investigator (PI) or NMFS Regional Stranding Coordinator (RSC). Additionally, Section 109(h) of the MMPA allows federal, state, local, or tribal government officials or employees in the normal course of their duties to perform response activities under regulation 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." Additionally, response to ESA-listed species may be conducted by employees of the U.S. Fish and Wildlife Service (USFWS), NMFS, any other federal land management agency, or state conservation agency under ESA regulations 50 CFR 17.21(c)(3) and 17.31(a).

Free-swimming entangled marine mammals generally do not meet the MMPA's statutory definition of "stranded"[46], provided the animal remains in its natural habitat. Under the SA, Stranding Network members are authorized to only conduct routine entanglement response activities on pinnipeds and cetaceans that also meet the statutory definition of "stranded" (*e.g.*, a debilitated, entangled pinniped or cetacean on the beach). Therefore, certain entanglement responses for live free-swimming cetaceans and non-stranded entangled pinnipeds are authorized through Co-Investigators (CIs) under the MMPA/ESA permit, under Section 109(h) of the MMPA, or under ESA regulations 50 CFR 17.21(c)(3) and 17.31(a). Regardless of the authorizations, these entanglement response activities are conducted on both ESA-listed and non-listed marine mammal species, and are generally differentiated by taxa groups; large whales, small cetaceans, and pinnipeds.

Although the majority of entanglement responses involve species and populations that are not considered threatened or endangered (*e.g.,* certain stocks of humpback (*Megaptera novaeangliae),* or gray whales (*Eschrichtius robustus),* bottlenose dolphins (*Tursiops truncatus)*, or California sea lions (*Zalophus californianus*)), each rescue attempt provides an important opportunity for responders to hone their skills and apply lessons learned from those cases to provide increased humane care when responding to threatened and endangered species (*e.g.*, North Atlantic right whales (*Eubalaena glacialis)*, blue whales (*Balaenoptera musculus),* or Hawaiian monk seals, (*Neomonachus schauinslandi*)).

8.1.1 Large Whale Entanglement Response Network

The Large Whale Entanglement Response Network is comprised of trained individuals who have been evaluated based on their qualifications and past experience, and then issued a Co-Investigator (CI) letter under the Marine Mammal Health and Stranding Response Program (MMHSRP)'s MMPA/ESA permit for large whale entanglement response. In order to become a CI, applicants must provide NMFS with a detailed resume summarizing any previous experience with entanglement response, including their roles in each event, their vessel experience around large whales, entanglement response training history, and any other pertinent information. This resume is reviewed by the regional NMFS Entanglement Response

[46] Under the MMPA, a stranding is 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).

Coordinators, MMHSRP staff, and relevant subject matter experts authorized within the Large Whale Entanglement Response Network. The review panel provides comments and a confidential recommendation about whether or not the individual should be authorized as an entanglement responder (and therefore a MMPA/ESA permit CI), and at which level of responsibility. In 2009, NMFS published Marine Mammal Disentanglement Guidelines that outlined definitions and roles for the Large Whale Entanglement Response Network (Appendix XIX; NMFS 2009). The five levels of responders are described, including the roles and responsibilities of each responder level and the criteria necessary to be certified for each level.

- **Level 1 and Level 2 responders** are generally members of the public, trained to observe and assess entangled large whales, but are not CIs under the MPA/ESA permit and cannot work directly with the animal.
- **Level 3 responders** are added as CIs to the MMPA/ESA permit, and can attach buoys and/or telemetry devices to the material entangling the whale and assist higher level responders in disentangling the animal.
- **Level 4 responders** are added as CIs to the MMPA/ESA permit and lead entanglement response efforts for large whales, <u>except</u> responses to North Atlantic right whales (*Eubalaena glacialis*).
- **Level 5 responders** are added as CIs to the MMPA/ESA permit and lead entanglement response efforts for all large whales, <u>including</u> North Atlantic right whales.

At present, a CI remains authorized to respond to entangled large whales as long as their CI status remains intact (typically the life of the MMPA/ESA permit, currently five years). These CIs are expected to coordinate to the extent possible during responses with the NMFS Entanglement Response Coordinators and the MMHSRP. However, given that communication can be uncertain while at sea, along with the need for quick decision-making, CIs are empowered to use their best judgment and act independently if the situation requires it. All large whale entanglement response intervention actions are reviewed after the event with participating responders, local NMFS Entanglement Response Coordinators, and MMHSRP staff. At any time, members of the Large Whale Entanglement Response Network may be called upon to respond to ESA-listed or non-listed entangled large whales. Large whale entanglement response efforts may include physical or chemical restraint, attachment of scientific instruments (*i.e.*, satellite tags), biological sampling for health studies, and disentanglement (as discussed below). For more details on response methods please see the Large Whale Entanglement Response Best Practices (Appendix XX).

8.1.1.1 Physical Restraint or Sedation

Depending on the situation, an entangled large whale may be physically restrained or chemically sedated to assist the entanglement response activities. Physical restraint may be used to slow an animal, provide responders with greater control, and help maintain large whales at the surface. Physical restraint is accomplished by attaching control lines, or by determining if any part of the entanglement can be used as a control line; attaching floats, buoys, and/or sea anchors to the entangling gear with a grappling hook or other means (*e.g.*, skiff hook deployed from pole); or by attaching new gear (*e.g.*, tail harnesses) to the animal. The drag and buoyancy from small boats may also be used to slow an animal and maintain it at the surface. Remote sedation may also be used to slow the animal and/or make the animal's behavior more routine and predictable, which may allow for closer approaches especially for entanglements around the mouth and head. Sedatives may be delivered remotely through a crossbow or dart gun syringe, for more details on remote delivery methods see the MMHSRP Research Methodologies (Appendix XI) and the Large Whale Entanglement Response Best Practices (Appendix XIX).

8.1.1.2 Tagging and Attachment of Scientific Instruments

Animals may be tagged with buoys, telemetry devices, or other scientific instruments to monitor their location and enhance the probability of relocating the individual (see Chapters 7, 9, and Appendix XI). Similar to physical restraint, tethered buoys are typically attached to the entangling gear, and may use Very High Frequency (VHF) radio waves, Global Positioning System (GPS), and/or satellite-linked tags to track the animal. Whales may also be tagged with suction cup, dart, or other tags as mentioned in Chapter 7, 9, and Appendix XI. As responses may occur over several days, the attachment of scientific instruments allows responders to quickly locate the entangled whale on subsequent days to have longer for entanglement response.

8.1.1.3 Sampling for Health Studies during Entanglement Response

Responders may collect biological samples such as biopsy and/or skin samples in the course of responding to an entangled animal. These samples can help assess the overall health and current condition of the animal. Skin can be collected through the use of a remotely deployed dart, the collection of tissues from the removed gear or line, or the collection of sloughed skin from the water. Biopsy sampling typically involves shooting a projectile dart with a hollow cylindrical tip that collects a small plug of skin and blubber (see MMHSRP Research Methodologies (Appendix XI) for a detailed description of this method). Higher-powered delivery devices, such as compound crossbows or Larsen guns, are more likely to be used while targeting large baleen whales at a distance of more than 20 meters. Lower-powered delivery devices such as recurve crossbows or adjustable-power guns are used at shorter ranges (<20 m) from small vessels. Responders typically sample the area from the dorsal flank (well behind the blowhole). After the biopsy dart hits the animal, it bounces off, as penetration is limited by a stopper, and floats at the surface of the water where the biopsy sample/dart can be retrieved.

Responders may also use a handheld pole with a dart tip on the end to collect a biopsy sample if the disposition and behavior of the entangled animal is conducive to a closer vessel approach (*i.e.*, the whale is anchored in place). In this instance, the responder slowly and cautiously approaches the animal to within one body length to quickly jab the pole into the dorsal surface or flank of the animal, while avoiding more sensitive areas such as the head, eyes, and the area around the blowhole.

8.1.1.4 Disentanglement

During disentanglement activities, responders attempt to cut the entangling gear or marine debris off of the animal. After assessing the animal's condition, behavior, and its entanglement configuration, the responders use this information to determine the best course of action and the minimum cuts needed to free the whale. Responders may attach control lines to the entangling gear or debris and use them to work in a relatively safe zone directly behind the whale. Cutting tools on the end of telescoping or long poles are most often used to cut the entanglement, however, specialized crossbow tips fitted with cutting blades can be used to cut ropes remotely. These are used less regularly, but can be deployed by skilled sharpshooters when there is judged to be no alternative available to access the entanglement, either due to the location of the entanglement (*i.e.*, a tight wrap of line around the whale), or due to the evasive behavior of a whale when attempting to approach closely by vessel. Cutting of lines and possibly flesh (when the line is embedded and not accessible) may occur during disentanglement through the typical use of pole-mounted and remotely-delivered cutting tools. Remote administration of medications (*e.g.*, antibiotics) may be used to improve the animal's prognosis (for a full list of medications that may be used see Gulland *et al*. 2018).

8.1.2 Small Cetacean Entanglement Response

In contrast with the Large Whale Entanglement Network, small live cetacean entanglement response is not as formalized. Currently, there are no defined responder levels or specific training requirements for small cetacean entanglement responders. Entanglement response activities for ESA-listed species are authorized under the MMHSRP MMPA/ESA permit or under 50 CFR 17.21(c)(3) and 17.31(a); entanglement response for non-listed species may be conducted under the authority of a SA, 109(h) responder, or the MMPA/ESA permit. Small cetacean entanglement response is primarily conducted in the Southeast Region on bottlenose dolphins, as that is where most cases are reported, given the coastal and resident nature of many stocks of bottlenose dolphins. The number of responders in this network is smaller than the Large Whale Entanglement Response Network, and has more overlap with members of the Stranding Network.

The initial response to free-swimming or anchored entangled live small cetaceans is the documentation and detailed description of the type, configuration, and severity of the entanglement and any injuries (*e.g.*, whether the gear is cutting into the animal, type/condition of injuries). If anchored, immediate intervention to conduct an emergency response may be requested and authorized by the MMHSRP. If the small cetacean is free-swimming and not in imminent danger of death, it is generally monitored and more information is collected, including sighting locations and water conditions (*e.g.*, depth), photographic identification of the individual, determining presence of a dependent calf, photos of the entanglement/injuries, and evaluation of the animal's behavior and body condition (*e.g.*, thin or emaciated). These photographs, videos, and field notes are shared with subject matter experts and veterinarians for assessment to determine whether the entanglement is likely to be life-threatening. If the entanglement is determined to be life-threatening, the RSC and MMHSRP headquarters staff consult with local responders, biologists, and/or veterinarians to evaluate site/case specific intervention logistics to determine if an intervention can be conducted safely. After consultation, MMHSRP headquarters staff and/or the RSC, acting in their capacity as a CI on the MMHSRP's MMPA/ESA permit, will decide if an intervention is authorized and an intervention plan will be developed in consultation with local responders. All response efforts involve personnel experienced in small cetacean capture and/or remote disentanglement as well as veterinary treatment, as entanglement response efforts may include physical capture and restraint of the small cetacean, surgery, sample collection (at veterinary discretion), rehabilitation, administration of chemical agents (sedatives and/or antibiotics), tagging and/or marking, release, and/or euthanasia. Recently, remote disentanglement techniques have become more commonly used with small cetaceans, utilizing modified large whale training and disentanglement techniques (described in section 8.1.1.4). Biopsy sampling may occur, either through the use of a remote dart, during satellite tag application, or the collection of tissues from the removed fishing gear. For more details on response methods please see the Small Cetacean Entanglement Response Best Practices (Appendix XXI).

8.1.2.1 Capture and Restraint Entanglement Response

Capture and restraint of small cetaceans (ESA-listed and non ESA-listed species) may occur during entanglement response activities, as well as during investigations such as health assessment studies (discussed in Chapter 9) and other emergency responses, such as out-of-habitat animals, orphaned calves, etc. (discussed in Chapter 4). Ideal circumstances for capture include shallow water (less than 1.5 m), where personnel can stand on hard bottom to support the animal(s) as necessary, minimal current, favorable weather, and no observable or subsurface obstructions that may snag the net or injure responders. Net-based capture techniques that are utilized include the use of modified hoop and large seine-type nets (Barratclough *et al*. 2019). For seine-type net captures, the animal(s) are encircled with the net. Nets used by responders are approximately 350-600 meters long by 4-8 meters deep, and are usually deployed at high speed from a specialized small vessel, typically eight meters long. Other small vessels may be used to help contain the animals until the net corral is complete. These boats make small, high-speed circles, creating acoustic barriers. Once the net corral is completed, handlers are deployed around the outside of the corral to correct net overlays and aid any animal(s) that may become entangled in the net. The remaining team members prepare for sampling and data collection. The animal may strike the net, become entangled, and need to be quickly disentangled. If the target animal does not immediately strike the net and become entangled, the handlers may pinch the net corral into a smaller corral. Handlers are sometimes able to hand catch the entangled animal as it swims slowly around the restricted enclosure. In certain circumstances, due to the animal's size, location, degree of debilitation, and behavior, a vessel based hoop net capture may be preferred. Hoop nets utilized for these capture events have been modified to have an extra-large diameter opening with an attached extra length seine-type net for the bag. During both net based capture techniques, the animal is restrained by handlers and an initial evaluation is performed by a veterinarian. If the animal is deemed stable by the veterinarian, the entangling gear and configuration is documented, removed and collected, during which the animal is continually monitored. If the animal's condition remains stable, additional samples such as biopsies and blood may be collected, to better assess overall health. The entangled animal may also be given a long-lasting antibiotic (see Chapter 4 for administration of mediations). Animals may then be marked with brands (see Chapter 7 for more details on brands), individually numbered plastic livestock ear tags (*e.g.*, Rototags, Allflex tags, etc.), or satellite or VHF radio tags, for post-capture identification and monitoring, and released. Additionally, depending upon the severity of the wounds and the overall condition of the animal, it may also be taken to a rehabilitation facility for additional treatment and to be reassessed for release at a later date, or euthanized.

8.1.2.2 Remote Entanglement Response

Response to entangled small cetaceans can occasionally be accomplished without the need to capture the animal, using long-handled cutting tools and small boats. This option generally has the benefit of less risk to the animal and to response personnel. Remote interventions may also be requested and authorized for emergency response if the entanglement is deemed immediately life-threatening (*i.e.*, the animal is anchored in place). The procedures for remote disentanglement are similar to how large whale disentanglement is conducted (described in section 8.1.1.4) but with modifications specific to small cetaceans and conducted by personnel experienced with small cetacean entanglement response. In some cases, remote response will be attempted prior to authorizing or attempting an in-water capture effort.

8.1.3 Pinniped Entanglement Response

Similar to small cetacean entanglement response, pinniped entanglement response is not as formalized as the Large Whale Entanglement Response Network, as there are no defined responder levels or specific formal training requirements for pinniped entanglement responders. Some non ESA-listed pinnipeds may be disentangled by SA holders, under certain conditions. For example, if an entangled non ESA-listed pinniped is stranded on the beach, it is typically responded to and disentangled by the Stranding Network. If the entangled pinniped is ESA-listed, the SA holder may still respond if they are listed as a CI under the MMPA/ESA permit, or after verbal authorization from the RSC acting as a CI under the MMPA/ESA permit.

Increasingly, however, there are entangled pinnipeds that are only seen in large groups of animals or in less accessible areas (*e.g.*, floating docks, jetties). Certain teams of highly trained personnel within the Stranding Network have been developing specialized techniques for responding to these entanglements, such as remote darting with a sedative, in-water captures, or a combination of both techniques. Currently, these specialized techniques are not covered under the SA, and approval for these emergency efforts under the MMPA/ESA permit is given by MMHSRP headquarters staff and/or the RSC (acting in their capacity as a CI on the MMHSRP's permit) on a case-by-case basis. Alternatively, some pinniped entanglement responders may be CI letter holders under the MMPA/ESA permit (*e.g.*, for Steller sea lion (*Eumetopias jubatus*) disentanglement) which allows them to conduct targeted pinniped entanglement response activities on a regular basis following pre-approval protocols that require notification of MMHSRP headquarters staff and the appropriate RSC when disentanglement activities are planned.

For pinnipeds, entanglement response efforts may include physical capture on land or in water with a capture pole or net. Chemical sedation (*i.e.*, a sedative delivered via remote dart or pole syringe) may also be used to sedate large (*e.g.*, Steller sea lion) entangled pinnipeds to more easily ensnare them with a capture pole or net or avoid the use of a capture pole or net altogether. Entangled pinnipeds are typically, but not always, captured on land when they are hauled out. They may also be captured using a net with a floating frame as they jump off of a haul-out into the water or by using in-water purse-seine or tangle net techniques. In some situations, remote sedation may be used to improve the ability of responders to capture and restrain the animal. For more details on response methods please see the Pinniped Entanglement Response Best Practices (Appendix XXI).

8.1.3.1 Net Captures

For net captures of pinnipeds (including both ESA-listed and non-listed species) on land, net types may include, but are not limited to: seine, hoop, dip, stretcher, and tangle nets. Net guns and pole nooses may also be used to capture pinnipeds. Alternatively, herding boards may be used to maneuver animals into cages. Nets may also be used to capture pinnipeds in water. These nets include dip nets, large nets, modified gill nets, floating or water nets (nets with a floating frame that may be brought adjacent to a haul-out which the animals jump into), and platform traps. Purse seine or tangle nets may be used offshore of haul-out sites to capture animals when they stampede into the water. Animals become entangled by the net as it is pulled ashore (seine) or in the water (tangle). Once removed from the net, animals are placed head first into individual hoop nets. Once in-hand, pinniped restraint can be accomplished using a variety of methods (see Chapter 6 for details). Once the animal is captured and restrained, the entanglement is removed, and samples such as biopsies and blood may be collected, to better assess the animal's overall health (see Chapter 9 and Appendix XI for more details on sample collection methods). After the animal(s) are freed of all gear/debris, or as much gear/debris as possible, they may be marked (with temporary hair dye, paint stick, and/or individually numbered plastic head or flipper tags for post-capture identification) and/or affixed with scientific instruments such as VHF tags or satellite-linked tags. The animal may then be released at the site or, depending upon the severity of the wounds and the overall condition of the animal, it may also be taken to a rehabilitation facility for additional treatment and released at a later date, or euthanized.

8.1.3.2 Remote Sedation

Chemical sedation using sedative drugs (see Chapters 4 and 9 for more information on the administration of drugs) may be used to capture pinnipeds by hand, or in conjunction with the net capture techniques described above (section 8.1.3.2). An injectable immobilizing agent (*i.e.*, sedative) may be administered to a pinniped hauled out on land. The sedative may be administered either remotely (by a dart or pole syringe) or by hand. Remote sedation using a dart may only be conducted by CIs on the MMPA/ESA permit. These CIs are only added to the permit after review of their qualifications by MMHSRP headquarters staff and the RSC. Prospective remote sedation MMPA/ESA permit CIs typically train and apprentice with currently authorized personnel.

After the animal is successfully sedated, it is physically restrained using nets, cages, or by hand. Once the animal is captured and restrained, the entanglement is removed, and samples such as biopsies and blood may be collected, to better assess the animal's overall health. After the animal(s) are freed of all gear/debris, or as much gear/debris as possible, they may be marked (with temporary hair dye, paint stick, and/or individually numbered plastic head or flipper tags for post-capture identification) and/or affixed with scientific instruments such as VHF tags or satellite-linked tags. The animal may then be released at the site or, depending upon the severity of the wounds and the overall condition of the animal, it may also be taken to a rehabilitation facility for additional treatment and released at a later date, or euthanized. If the animal is immediately released, the animal is often given a reversal drug to reduce and/or counteract the effects of the sedative, enabling the animal to quickly regain consciousness and return to the water.

8.1.4 Unintentional (Incidental) Harassment

During entanglement response to large whales, small cetaceans, or pinnipeds, unintentional (incidental) harassment of non-target animals in the immediate vicinity of the stranding response activity (*e.g.*, close approaches by aircraft or vessel, hazing, etc.) could occur. Chapter 3 includes a description of non-target species, including marine mammals under USFWS jurisdiction, terrestrial mammals, invertebrates, reptiles, fish, and birds. Under the proposed MMPA/ESA permit unintentional (incidental) harassment would only be authorized for marine mammals under NMFS jurisdiction.

8.2 Environmental Consequences

8.2.1 Alternative 1: Continue Program Implementation at Current Activity Levels (No Action Alternative)

Under Alternative 1, NMFS Office of Protected Resources (OPR) Marine Mammal and Sea Turtle Division and Regional Offices would continue entanglement response activities, until the current MMPA/ESA Permit expires on December 31, 2022. Under Alternative 1, the OPR Permits and Conservation Division would not issue a new MMPA/ESA permit to the MMHSRP. Therefore, after the expiration of the MMPA/ESA permit, the Stranding and Entanglement Networks could not conduct entanglement responses for ESA species of all taxa. ESA species entanglement responses could only be conducted by employees of the U.S. Fish and Wildlife Service (USFWS), NMFS, any other federal land management agency, or state conservation agency under ESA regulations 50 CFR 17.21(c)(3) and 17.31(a). For non ESA-listed pinnipeds and cetaceans, entanglement responses could be conducted on “stranded” animals (*e.g.*, a debilitated, entangled pinniped or cetacean on the beach) under the SA, however entanglement responses to non ESA-listed free-swimming cetaceans and non-stranded pinnipeds could only be conducted by 109(h) responders. As many members of the Entanglement Networks that receive Prescott Grants are authorized under the MMHSRP’s MMPA/ESA permit, Alternative 1 would significantly curtail or possibly eliminate all Prescott Grant proposals focused on entanglement response if authorization for most entanglement response were to cease.

8.2.1.1 Biological Resources

Major, long-term beneficial effects on marine mammals would be expected under Alternative 1 before the expiration of the MMPA/ESA permit on December 31, 2022. The Large Whale Entanglement Response Network would continue to disentangle or attempt to disentangle whales, and small cetacean and pinniped entanglement responses would continue on an ad-hoc basis. Removal of life-threatening gear would not only increase the chance of survival for the individual animal, but would have a positive impact on wild populations, particularly for species that are ESA-listed. New members could be added to the Large Whale Entanglement Response Network, or authorized as MMPA/ESA permit CIs to conduct small cetacean or pinniped entanglement responses, until the MMPA/ESA permit expires. This would increase the number of animals that receive a response. Under the current MMPA/ESA permit, entanglement response activities may be modified under this alternative, as new techniques, training and tools are developed. New tools may include safer, more effective cutting instruments, and new telemetry buoys with more advanced positioning systems. Chemical and physical restraint techniques may also improve, including the administration of sedatives and the attachment of buoys, floats, and control lines. These new activities would have impacts similar to, or less than, those currently used during entanglement response activities.

Adverse effects on entangled marine mammals could also occur during entanglement response activities. Minor adverse effects would include negative animal reactions to close approaches, which may include: swimming faster, breaching, diving, tail and fin slapping, or moving away from the vessel. Behavioral responses of entangled large whales to entanglement response attempts vary by species. Responders have reported that some whales encountered for assessment and documentation have not exhibited evasive behavior. However, many whales when closely approached (within 30 meters) for the purpose of tagging and entanglement response efforts exhibit evasive behavior in response to vessel approaches. For example, humpback whales are relatively predictable, especially if they have been entangled for a prolonged period of time. Experience has shown that humpbacks are less likely than other large whale species to be evasive or aggressive during entanglement response efforts; however, there are always exceptions. Conversely, North Atlantic right whales tend to be temperamental, and respond with aggressive behavior and uncooperative movements towards responders. These behaviors would generally be short-term, with a minimal effect on the animal.

Pinnipeds and small cetaceans are typically captured during entanglement response, which may result in minor to major short-term and long-term adverse impacts. Minor, temporary and short-term adverse impacts may occur if captured target animals become stressed during handling and restraint. Signs of stress include increased or decreased respiration, prolonged struggling while being held, and arching in cetaceans. The method(s) of restraint and the age and general condition of the animal are factors that may affect an animal's response to capture. Animals could incur contusions, concussions, lacerations, 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 sedation, which could have lethal consequences. Stress from capture and restraint could cause capture myopathy (Fowler 1978; Breed et al. 2019). Capture myopathy is characterized by degeneration and necrosis of striated and cardiac muscles and may develop within hours to days after significant trauma, stranding, transport, or capture (Atkinson and Dierauf 2018). Chemical sedation 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, minor to moderate adverse effects and risks from physical and chemical sedation would be outweighed by the potential beneficial outcome of successfully removing an entanglement. The benefits would extend to dependent young that could potentially die if their mothers die as a result of an entanglement.

Large whales are not captured during entanglement response, but may be restrained in other ways. During attempts to physically restrain whales, floats, buoys, and control lines would be attached, which may result in temporary and short-term minor adverse impacts. North Atlantic right whales have been known to tow numerous floats and drag moderate-sized vessels. Physical restraint (including adding additional drag) of any animal may increase stress or pain. Chemical sedation may lower a free-swimming whale's respiratory rate and decrease their swimming strength, which may result in accidental death. Sedatives may be delivered through a crossbow or dart gun syringe, which may startle the animal and cause it to react erratically.

Indirect, short-term minor, adverse impacts may occur if an animal moves during gear/debris cutting activities or if control of the equipment is lost and the animal is accidentally injured. Direct, short-term minor, adverse impacts may also occur as responders may intentionally injure an animal (*e.g.,* by cutting into the skin) to remove a life-threatening entanglement when no other options to safely remove gear exist, and only after consideration of the possible damage. Nonetheless, the potential for a long-term major, positive outcome outweighs the short-term minor adverse effects of these injuries. Potential injuries could also occur if there are accidental hazardous material spills from vessels, including stand-by vessels, during entanglement response activities. These accidental spill occurrences could result in short-term minor adverse impacts, as they may cause injury to other marine mammals in the vicinity.

Minor to major short-term and long-term adverse effects on individual marine animals could occur as target (entangled) or non-target animals may be unintentionally (incidentally) injured, captured, or harassed during the rescue attempt (*e.g.,* non-target marine mammals, sea turtles, etc.). Minor to major short-term and long-term adverse impacts may result if target and non-target animals are accidentally captured or entangled in the net, which may result in injuries or death. For example, two sea turtles were accidentally captured during a research-focused dolphin capture effort in 2015. In this instance, both turtles were released unharmed. Temporary and minor short-term adverse impacts may also result during pinniped capture and entanglement response activities if non-entangled animals are disturbed enough to leave a haul-out site. Captures of suspected compromised pinnipeds may incidentally harass and disrupt other animals if the capture occurs near a haul-out site or any other area where animals are located. Indirect, short-term moderate, adverse effects may occur if startled pinnipeds disperse from rookeries and haul-outs, and pups become trampled or separated in the process. Minor to major short-term and long-term indirect adverse effects may also occur if juvenile and adult animals are trampled during stampedes or injured on underwater rocks and cliff faces. While the MMHSRP has never documented injuries (serious or non-serious) to a non-target pinniped while it was flushed from a haul-out, this has been documented with other programs (Fay and Kelly 1980; Geraci and St. Aubin 1980).

Minor to major short-term and long-term adverse effects on individual marine animals could occur as target (entangled) or non-target animals may be accidentally struck by a response vessel, which may result in injuries (serious and/or non-serious) or death. For example, in 2015, a manatee was accidentally struck by a capture vessel targeting a bottlenose dolphin and seriously injured. Similarly, as the success of a rescue may depend upon responders locating an entangled animal quickly, non-target animals may be unintentionally (incidentally) harassed or injured (non-serious and/or serious) while responders are transiting to the target animal. For example, in 2021, a large whale entanglement responder accidentally struck and non-seriously injured a non-target whale while transiting to the entangled, target whale. However, any impacts to non-target animals are anticipated to be rare, as the examples given above are the only documented instances of accidental capture, injury (serious and non-serious), and mortality while the MMHSRP was conducting these types of activities. Additionally, the mitigation described in section 8.3.1 would further reduce the likelihood of accidental capture, injury (serious and non-serious), and mortality.

The adverse effects from entanglement response activities would be outweighed by the potential short-term and long-term beneficial outcomes. Lines and gear may cause lethal and sublethal injuries to animals and restrict their ability to move, dive, and feed. If an animal cannot free itself from the entangling material, and in the absence of entanglement response, it will likely suffer a slow, painful death (Moore and van der Hoop 2012). ESA-listed species, such as North Atlantic right whales, would be greatly negatively affected at the population level if entanglement response efforts ceased, as entanglements are known to be a significant source of mortality for this species (Sharp *et al.* 2019). The loss of one individual, especially a sexually mature female, is a major impact on the species.

During large whale entanglement response, biopsy samples may be collected via remote dart. 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. A NMFS OPR Permits and Conservation Division biological assessment (NMFS 2019b) 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. Other samples such as surgical biopsies, swabs, or blood may be taken for health studies from small cetaceans and pinnipeds while the animal is in hand. The effects of these sampling activities are discussed in Chapter 9. A small (approximately 2-5 mm) skin sample may be removed while flipper tagging pinnipeds or tagging small cetacean dorsal fins. There is no response while the animal is sedated but there may be a minor reaction if the animal is alert. Samples of skin or other tissue may be recovered from removed fishing gear/marine debris and would have no impacts on animals.

Marine mammals may be tagged and/or marked during entanglement response. For entangled large whales, buoys are typically attached to the entangling gear, but may be directly attached to the whale, if they cannot be attached to the entanglement. Buoys attached to the entanglement may have short-term, adverse impacts on the whale, as they may increase drag and therefore increase energetic costs on debilitated animals. While buoys designed for physical restraint would have a major short-term impact on drag and the whale's ability to move, smaller telemetry buoys (used to track the whales movements) may also have a minor impact on drag and possibly restrict the whale's movements. Conversely, in some cases, the attachment of buoys to the entangling gear/debris may have long-term beneficial impacts, if it pulls the entanglement off of the animal. In some cases, scientific instruments may be attached directly to the whale. These instruments may be used to track the whale or conduct follow-up studies on the outcome of the entanglement response (*i.e.*, emergency response-related research). The impacts of emergency response related-research, including the attachments of scientific instruments directly to whales, are discussed in Chapter 9. Small cetaceans and pinnipeds may also be marked and/or fitted with scientific instruments during entanglement response. These marks and scientific instruments would not differ from the types of tags, marks, brands, etc. outlined in Chapter 7, and their impacts to these species would likewise be the same (section 7.3.1.1).

Minor, short-term adverse effects on protected and sensitive habitats, submerged aquatic vegetation (SAV) and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds could occur from this alternative. Vessels used during small cetacean capture activities conducted in shallow waters may damage SAV and macroalgae with their propellers or anchors. Small cetacean entanglement responders conducting net captures may inadvertently step on SAV and macroalgae while catching and handling the entangled animal. Any damage to SAV leaves and macroalgae would be negligible and short-term, as only a minimal amount would be disturbed and would grow back within a few weeks to months, depending upon the exact species. Damage to SAV rhizomes is not likely to occur, as boat drivers would practice safe boating practices. Small cetacean entanglement responses involving capture activities would not occur on coral reefs. Entanglement response activities would not intentionally generate pollutants, however, accidental spills of hazardous materials or wastes from response vessels could cause indirect temporary or short-term minor adverse impacts on 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-lasting, but still localized, adverse impacts. Negligible, temporary adverse impacts would be expected to occur to terrestrial mammals, reptiles, and insects during pinniped entanglement responses on land, as they may be startled by entanglement response activities.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, the Large Whale Entanglement Response Network would cease to exist, and entanglement responses would be severely curtailed except in limited circumstances. Additionally, no entanglement response activities that currently are authorized under the permit could be directed at ESA-listed species of any taxa (*e.g.,* Hawaiian monk seals, North Atlantic right whales), whose populations would benefit the most from entanglement response activities. Therefore, major long-term, adverse impacts would occur for individual marine mammals, as most of these individuals would die. Major, long-term adverse impacts could occur for populations facing significant threats from entanglements, such as North Atlantic right whales (Sharp *et al.* 2019). As entanglement response activities would be severely curtailed, the likelihood of short-term adverse impacts on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, other invertebrates, and birds would be reduced.

8.2.1.2 Water and Sediment Quality

Minor, temporary or short-term, adverse effects on water or sediment quality could occur under Alternative 1. Entanglement response activities would not intentionally generate pollutants or disturb sediment, however, accidental spills of hazardous materials or wastes from response vessels 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 short-term, but still localized, impacts. Additionally, minor, short-term adverse effects to water and sediment quality could occur during remote delivery of sedatives or antibiotics during entanglement response activities; the dart may miss the target animal and be lost. The chemical agent in the lost dart may leak, causing similar impacts to water and sediment quality as discussed in Chapter 5. Due to the small quantity of drugs contained in each dart, the impacts would be minor, short-term, and highly localized.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, the Large Whale Entanglement Response Network would cease to exist, and entanglement responses would be severely curtailed except in limited circumstances. As entanglement response activities would be severely curtailed, the likelihood of impacts to sediment and water quality from vessels, as described above, would significantly decrease. There would be no impact to water and sediment quality from lost sedation darts, as all remote delivery of sedatives and antibiotics is conducted under the MMPA/ESA permit, and would therefore no longer occur.

8.2.1.3 Cultural Resources

Negligible effects on cultural resources would be expected to occur from Alternative 1. No impacts to cultural resources would occur during entanglement response activities for large whales, as these activities would generally occur in open ocean areas and would not be near or in contact with any submerged cultural resources. Similarly, small cetacean entanglement response using remote disentanglement techniques generally occurs in coastal areas, but in deeper water where responders would not be near submerged cultural resources. However, short-term minor adverse impacts may occur during small cetacean entanglement response that includes a net capture and physical restraint, as these activities could damage submerged cultural resources. Similarly, capture using a large seine net may involve anchoring boats or nets to the bottom and positioning responders in the water, which may also incidentally cause short-term minor adverse impacts, as they could potentially disturb or come in contact with artifacts and other resources.

Pinniped entanglement responses may occur on beaches, rocky coastlines, or on the water, but impacts to structures or other physical cultural resources would not be expected. Short-term, minor, adverse impacts to cultural resources may occur if remote sedation is used for pinniped entanglement response, as native communities may be unable or hesitant to harvest and consume pinnipeds that have recently had sedatives or antibiotic drugs administered. By marking pinnipeds with flipper tags, identifying the date of drug administration, and alerting native communities near the areas of entanglement response, these concerns can be minimized.

After the expiration of the MMPA/ESA Permit on December 31, 2022, and without issuance of a new permit by OPR Permits and Conservation Division under the No Action Alternative, the Large Whale

Entanglement Response Network would cease to exist, and entanglement responses would be severely curtailed except in limited circumstances. As entanglement response activities would be severely curtailed, the likelihood of impacts to submerged cultural resources (*i.e.*, physical structure or important spiritual/ceremonial/cultural locations) would significantly decrease. Additionally, there would be less impacts to native communities' cultural resources from pinniped entanglement response, as most remote delivery of chemical restraint and antibiotics is conducted under the MMPA/ESA permit, and would therefore no longer occur.

8.2.1.4 Human Health and Safety

Human safety is the top priority during all entanglement response activities. Responders put themselves at risk during all entanglement responses. For large whale entanglement response, the vessel could become entangled in the lines connected to the whale. Animal movements may knock a person overboard, capsize the vessel, or cause serious physical injuries or death. In 2017, a Canadian large whale entanglement responder was killed while disentangling a North Atlantic right whale. Drowning is also a very real threat to responders. Responders could become entangled in restraint lines onboard the boat or while attempting to cut lines from the whale. Responders could also come into contact with drugs used for the chemical sedation of whales.

While large whale entanglement responders generally would not enter the water to cut lines, small cetacean entanglement responders do so frequently; pinniped entanglement responders very rarely enter the water (most pinniped entanglement response is conducted on land or from a structure such as a dock or vessel). For responders that do enter the water, hazards include, but are not limited to, exposure to dangerous marine organisms (*e.g.*, stingrays, sharks, oysters), cuts and scrapes on submerged objects (*e.g.*, rocks, shells, broken bottles, snags), becoming entangled in the capture net, and physical injury while attempting to capture or control the entangled animal. Responders may also accidentally injure themselves with entanglement response tools (*e.g.*, knives, remote dart tips, etc.).

As the current MMPA/ESA permit allows for modifications, including new techniques and tools, no modifications to entanglement tools and techniques would occur under this alternative after the expiration of the MMPA/ESA Permit. Without modifications, hazards to responders would still occur and could not be further minimized. New techniques, and tools could decrease the time necessary for entanglement response activities, therefore reducing the time responders are on the water and in contact with animals. New tools, such as cutting instruments, may reduce the potential for injuries. Modifications of safety measures would also reduce threats to responders.

Potential minor to major short-term, indirect adverse effects on public health and safety could occur. Members of the public may attempt to disentangle an animal, putting themselves at risk of the same impacts as entanglement responders. As these unauthorized individuals are not trained, they are at a higher risk of serious injury, drowning, death, etc. than trained and authorized entanglement responders. However, the public may decide not to intervene if they know that there are qualified, experienced, and authorized individuals to conduct entanglement response activities. This may reduce some of the potential health and safety impacts to the public.

8.2.1.5 Socioeconomics

Minor to moderate, adverse effects may be borne by participants engaged in entanglement response activities. Entanglement responders may be required to upgrade and/or purchase new equipment, as new tools and techniques are developed. No socioeconomic impacts are expected to be borne by the public under this alternative.

8.2.2 Alternative 2: Improved Program Implementation and Issuance of a New Scientific Research and Enhancement Permit (Preferred Alternative)

Under Alternative 2, the MMHSRP would implement some operational improvements to a subset of programs and activities. NMFS would issue three separate guidance documents: Large Whale Entanglement Response Best Practices (Appendix XIX), Small Cetacean Entanglement Response Best Practices (Appendix XX), and Pinniped Entanglement Response Best Practices (Appendix XXI), and recommend these best practice documents are followed by the Stranding and Entanglement Networks. Under Alternative 2 NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit, and therefore entanglement response could continue at appropriate levels, based upon identification of entanglement cases, under the new permit. Additionally, the new MMPA/ESA permit would allow for the development of new techniques, training and tools. Therefore, entanglement response activities could continue to be modified after December 31, 2022, as new techniques, training and tools are developed under the new MMPA/ESA permit. New tools may include safer, more effective cutting instruments, and new telemetry buoys with more advanced positioning systems. Chemical and physical restraint techniques may also improve, including the administration of sedatives and the attachment of buoys, floats, and control lines. These new activities would have impacts similar to, or less than, those currently used during entanglement response activities. As the members of the Entanglement Networks that receive Prescott Grants are authorized under the MMHSRP's MMPA/ESA permit, Alternative 2 would allow all authorized members of the Entanglement Networks to continue to apply for Prescott Grants that are focused on entanglement response.

8.2.2.1 Biological Resources

Under Alternative 2, current entanglement response activities would continue, and NMFS would issue Large Whale Entanglement Response Best Practices (Appendix XIX), Small Cetacean Entanglement Response Best Practices (Appendix XX), and Pinniped Entanglement Response Best Practices (Appendix XXI). The effects under Alternative 2 would be similar to the effects described under Alternative 1, with a few exceptions. The best practices documents would help ensure that experienced and qualified individuals are using the most effective tools and techniques available for entanglement response. This would likely increase the success of entanglement response efforts, and have a positive impact on animal safety (for both the entangled animal as well as nearby non-target animals of all species).

As Alternative 2 also includes the issuance of a new MMPA/ESA permit, entanglement response could continue at current or increased levels under the new permit. The effects from continuing entanglement response would be the same as discussed under Alternative 1.

8.2.2.2 Water and Sediment Quality

The effects under Alternative 2 would be the same as those described under Alternative 1, except that under Alternative 2 a new MMPA/ESA permit would be issued after the current permit expires. The issuance of a new permit would authorize entanglement response activities to continue and the effects would be the same as those discussed under Alternative 1.

8.2.2.3 Cultural Resources

The effects under Alternative 2 would be the same as those described under Alternative 1, except that under Alternative 2 a new MMPA/ESA permit would be issued after the current permit expires. The issuance of a new permit would authorize entanglement response activities to continue at current or increased levels, and therefore similar effects to those previously described would be expected.

8.2.2.4 Human Health and Safety

The effects under Alternative 2 would be similar to the effects described under Alternative 1, with a few exceptions. The three best practices documents would be issued (Appendices XIX, XX and XXI), and would help ensure that experienced and qualified individuals are operating in a safe, efficient, and effective manner. While the types of risks to responders and safety measures would be the same as those described under Alternative 1, there would be less risk overall under this alternative, as responders would have more skills and knowledge to avoid or mitigate dangerous situations. These best practices may be modified as new training and safer tools and techniques are developed, further reducing threats to responders. Even with experienced responders, and safety measures in place, human health and safety could still be negatively impacted. Additionally, the public may decide not to intervene if they know that qualified, experienced, and authorized individuals are there to conduct entanglement response activities. This may reduce some of the potential health and safety impacts to the public.

As Alternative 2 also includes the issuance of a new MMPA/ESA permit, entanglement response could continue at current or increased levels under the new permit. The effects from continuing entanglement response would be the same as those discussed in section 8.2.1.4. Additionally, the new MMPA/ESA permit would allow for modifications, including new techniques and tools. Therefore, modifications to entanglement tools and techniques could occur under this alternative, under the new permit. New techniques, and tools could decrease the time necessary for entanglement response activities, therefore reducing the time responders are on the water and in contact with animals. New tools, such as cutting instruments, may reduce the potential for injuries. Modifications of safety measures would also reduce threats to responders.

8.2.2.5 Socioeconomics

The effects under Alternative 2 would be the same as the effects described under Alternative 1, except that under Alternative 2 a new MMPA/ESA permit would be issued after the current permit expires. The issuance of a new permit would authorize response activities to continue at current or increased levels, and therefore similar effects to those previously described would be expected.

8.2.3 Alternative 3: More Stringent Protocols and Best Practices and Issuance of a New Scientific Research and Enhancement Permit

Under Alternative 3, the MMHSRP would implement some operational improvements to a subset of programs and activities. NMFS would issue three separate guidance documents: Large Whale Entanglement Response Best Practices (Appendix XIX), Small Cetacean Entanglement Response Best Practices (Appendix XX), and Pinniped Entanglement Response Best Practices (Appendix XXI), and recommend these best practice documents are followed. Additionally, entanglement response activities to pinnipeds or small cetaceans could not be conducted unless responders meet formalized training prerequisites. Large whale entanglement response activities would be the same as under Alternative 2. Under Alternative 3, NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit, and therefore entanglement response could continue at current or increased levels under the new permit. As the members of the Entanglement Networks that receive Prescott Grants are authorized under the MMHSRP's MMPA/ESA permit, Alternative 3 would allow all authorized members of the Entanglement Networks to continue to apply for Prescott Grants that are focused on entanglement response.

8.2.3.1 Biological Resources

The effects under Alternative 3 would be similar to the effects described under Alternative 2, with some exceptions. Currently, there are no formal training programs for the small cetacean and pinniped entanglement networks, and no training prerequisites have been identified. Therefore, small cetacean and pinniped entanglement responses would effectively cease while training programs and requirements are developed. This would have major, long-term, adverse impacts on entangled pinnipeds and small cetaceans that will likely die without intervention. As there would be no small cetacean and pinniped entanglement responses until training programs and requirements are developed, the potential impacts on small cetaceans and pinnipeds, as described under Alternative 1, would not occur. Similarly, as entanglement response for small cetaceans and pinnipeds would cease until training and authorization prerequisites were developed, the level of the adverse impacts from small cetacean and pinniped entanglement response on other biological resources and protected and sensitive habitats described under Alternative 1 would cease, until training programs were developed and these activities would begin again.

Once training and authorization prerequisites were developed, responders would be better trained and entanglement response tools and techniques would be more standardized. This may further increase the beneficial impacts, as new members could be added to these networks, which would increase the number of entanglement responses. As training prerequisites would be implemented nationwide, this would help ensure that only experienced and qualified individuals are engaged in entanglement response activities. This would likely increase the success of disentanglement and decrease the potential risk to entangled animals and the surrounding environment during entanglement response activities.

Large whale entanglement response activities would be the same as under Alternative 2, and therefore the effects would be the same as under Alternative 2.

8.2.3.2 Water and Sediment Quality

Under Alternative 3, current entanglement response activities would continue and NMFS would issue best practices documents for entanglement response (Appendices XIX, XX and XXI), but entanglement response activities to pinnipeds or small cetaceans could not be conducted unless responders meet formalized training prerequisites. The effects under Alternative 3 would be similar to the effects described under Alternative 2, with some exceptions. Currently, there are no formal training programs, and no training prerequisites have been identified for small cetaceans and pinnipeds entanglement response. Therefore, small cetacean and pinniped entanglement responses would effectively cease while training programs and requirements are developed. As there would be no small cetacean or pinniped entanglement response until training programs and requirements are developed, the potential impacts from these activities on sediment and water quality, as described under Alternative 1, would cease, until training programs were developed and these activities would begin again. Once formal training programs and authorization prerequisites were established and small cetacean and pinniped entanglement responders were authorized, the impacts would be the same as those described under Alternative 2.

Large whale entanglement response activities would be the same as under Alternative 2, and therefore the effects would be the same as under Alternative 2.

8.2.3.3 Cultural Resources

Under Alternative 3, current entanglement response activities would continue and NMFS would issue best practices documents for entanglement response (Appendices XIX, XX, and XXI), but entanglement response activities to pinnipeds or small cetaceans could not be conducted unless responders meet formalized training prerequisites. The effects under Alternative 3 would be similar to the effects described under Alternative 2, with some exceptions. Currently, there are no formal training programs, and no authorization prerequisites have been identified for small cetacean and pinniped entanglement response. Therefore, small cetacean and pinniped entanglement response would effectively cease while training programs and requirements are developed. As there would be no small cetacean and pinniped entanglement response until training and requirements are developed, the potential impacts on cultural resources from these activities, as described under Alternative 1, would cease, until training programs were developed and these activities would begin again. Once formal training programs and authorization prerequisites were established and small cetacean and pinniped entanglement responders were authorized, the impacts would be the same as those described under Alternative 2.

Large whale entanglement response activities would be the same as under Alternative 2, and therefore the effects would be the same as under Alternative 2.

8.2.3.4 Human Health and Safety

Under Alternative 3, current entanglement response activities would continue and NMFS would issue best practices documents for entanglement response (Appendices XIX, XX, and XXI), but entanglement response activities to pinnipeds or small cetaceans could not be conducted unless responders meet formalized training prerequisites. The effects under Alternative 3 would be similar to the effects described under Alternative 2, with some exceptions. Currently, there are no formal training programs, and no training prerequisites have been identified for small cetacean and pinniped entanglement response. Therefore, small cetacean and pinniped entanglement response would effectively cease while training programs and requirements are developed. As there would be no small cetacean or pinniped entanglement response while training programs and requirements are developed, the potential impacts on human health and safety, as described under Alternative 1, would decrease. Once formal training programs and authorization prerequisites were established and small cetacean and pinniped entanglement responders were authorized, the impacts would be the same as those described under Alternative 2.

Once training and authorization prerequisites were developed, responders would be better trained and entanglement response tools and techniques would be more standardized. There would be less risk to human health and safety under this alternative, as responders would have standardized skills and knowledge to avoid or mitigate dangerous situations. Even with experienced responders, and safety measures in place, human health and safety could still be negatively impacted. Conversely, the public may decide not to intervene if they know that qualified, experienced, and authorized individuals are there to conduct small cetacean and pinniped entanglement response activities. This may reduce some of the potential health and safety impacts to the public.

Large whale entanglement response activities would be the same as under Alternative 2, and therefore the effects would be the same as under Alternative 2.

8.2.3.5 Socioeconomics

Under Alternative 3, current entanglement response activities would continue and NMFS would issue best practices documents for entanglement response (Appendices XIX, XX, and XXI), but entanglement response activities to pinnipeds or small cetaceans could not be conducted unless responders meet formalized training prerequisites. The effects under Alternative 3 would be similar to the effects described under Alternative 2, with some exceptions. Currently, there are no formal training programs for small cetacean and pinniped entanglement response. No training prerequisites have been identified, however, once training programs are developed, there may be some adverse economic impacts on responders, if they have to cover costs to receive training, including travel to a training site, lodging and meals while participating in a training, or registration fees for a course.

8.3 Mitigation

The purpose of mitigation is to avoid, minimize, or eliminate negative impacts on the affected resources from the proposed action. Under Alternatives 1, 2, and 3 specific measures will be taken to moderate any significant impacts likely to occur as a result of entanglement response activities.

As discussed in section 1.4.2.1, there are some standard mitigation measures already included under the MMHSRP research and enhancement permit, as set forth by the Permits and Conservation Division. There are additional standard mitigation measures for certain events including sampling of animals during research under the NMFS IACUC policy (NMFS-PD 04-112-01), responding to animals during an oil spill through HAZWOPER training, and use of UAS following the NOAA UAS Policy 220-1-5. These standard mitigation measures are described below under each resource area (sections 8.3.1-8.3.5).

There are also other (optional) mitigation measures that the MMHSRP could implement to further reduce significant impacts on marine mammals while conducting activities. These are identified in the relevant Best Practices appendices in the PEIS and are also described below under each resource area (sections 8.3.1-8.3.5).

8.3.1 Biological Resources

Under Alternatives 2 and 3, NMFS would also issue three new best practices documents: Large Whale Entanglement Response Best Practices (Appendix XX), Small Cetacean Entanglement Response Best Practices (Appendix XX), and Pinniped Entanglement Response Best Practices (Appendix XXI), to mitigate impacts to biological resources.

Impacts to all biological resources from a potential hazardous material spill during vessel based entanglement response activities would be mitigated by training prerequisites for the entanglement networks. The use of trained personnel and proper equipment and protocols would reduce the potential for spills.

Entanglement response to large whales would be authorized under the MMPA/ESA permit and the MMHSRP would follow all mitigation measures set forth by NMFS OPR Permits and Conservation Division as conditions of the MMPA/ESA permit, and all activities will be conducted in consultation with and with the consent of the permit PI. For large whale entanglement response, responders would approach animals gradually, with minimal noise to reduce any reaction. While transiting to the last known location of an entangled marine mammal, responders may be driving at high speeds but would have dedicated spotters that would be looking for any marine mammal in the area, which would help to prevent vessel collisions. Once the target animal has been located, responders would approach at slow speeds, avoid making sudden changes in speed or pitch, and avoid using reverse gear to the extent possible. Extra care would be taken when approaching mothers and calves. Only responders with extensive experience operating vessels near large whales would be involved in vessel approaches, which would minimize the risk of vessel-related impacts (*e.g.*, accidental collisions, hazardous waste spills, etc.). Responders would only include those individuals who have been sufficiently trained and authorized for large whale entanglement response, as outlined in the Large Whale Entanglement Response Best Practices (Appendix XIX). Issuance of the new Large Whale Entanglement Response Best Practices (Appendix XIX) would also help mitigate adverse impacts of entanglement response on biological resources, specifically on entangled large whales by ensuring that all risks to the target animal are properly mitigated.

The majority of small cetacean entanglement response activities would be authorized under the MMPA/ESA permit as well. Therefore, the MMHSRP would follow all mitigation measures set forth by NMFS OPR Permits and Conservation Division as conditions of the MMPA/ESA permit, and all permitted activities will be conducted in consultation with and with the consent of the permit PI. Only personnel experienced in small cetacean remote entanglement response techniques would perform remote disentanglements.

If the entanglement response requires net capture, these procedures would be performed or directly supervised by qualified personnel and a 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. Personnel experienced in capture and sampling techniques would lead capture efforts. Additionally, experienced vessel drivers and spotters would be used to minimize the risk of vessel-related impacts (*e.g.*, accidental collisions with target and non-target animals, hazardous waste spills, etc.). To prevent interactions with non-target ESA-listed biological resources during capture activities, vessel personnel would be informed that it is illegal to intentionally or unintentionally (incidentally) harm, harass, or otherwise "take" ESA-listed species. In areas where West Indian manatees (*Trichechus manatus*) and/or sea turtles occur, at least one manatee and/or sea turtle spotter would be assigned on each vessel. Netting activities would cease if a manatee or sea turtle is sighted in the vicinity of the vessel. If any non-target protected species (*e.g.*, manatee, sea turtle, or ESA-listed fish species) is accidentally captured inside the net compass, but is not entangled, the catch vessel would immediately stop and open up the net, to allow the animal to escape the net. If the animal becomes entangled in the net, the catch vessel would immediately be stopped and either turned off or put in neutral. Tension on the net would be released to allow the animal the opportunity to free itself. Caution would be exercised when attempting to assist the animal in freeing itself. The appropriate USFWS Field Office and NMFS OPR Permits and Conservation Division would be contacted immediately to report any incidents with manatees or sea turtles.

To avoid potential damage to protected and sensitive habitats, responders would avoid setting the net on SAV, oyster and coral reefs, and other fragile benthic habitats. If the net must be set on SAV, responders would take great care to avoid damaging seagrass species including minimizing anchor or net drag and treading or trampling during in-water captures. To reduce the potential for seagrass damage, anchors may be set by hand when water visibility is acceptable. Anchors are placed in unvegetated areas within seagrass meadows or areas having relatively sparse vegetation coverage, whenever possible. Anchor removal would be conducted in a manner that avoids the dragging of anchors and anchor chains. If the capture gear (*i.e.*, net) is lost, diligent efforts would be made to recover the lost gear to avoid further damage to benthic habitats. Issuance of the new Small Cetacean Entanglement Response Best Practices (Appendix XXI) and Small Cetacean Intervention Best Practices (Appendix XII) would also help mitigate the adverse impacts of entanglement response on marine mammals and other biological resources.

Some pinniped entanglement response activities would be authorized under the MMPA/ESA permit as well, including all remote sedation entanglement responses, responses to entangled ESA-listed pinnipeds, or responses to entangled pinnipeds that have the potential to incidentally harass ESA-listed pinnipeds. For entanglement response to pinnipeds on beach sites, responders would carry out activities efficiently, to minimize disturbance and the amount of time responders occupy the haul-out. Issuance of the new Pinniped Entanglement Response Best Practices (Appendix XXI) would also help mitigate the adverse impacts of entanglement response on marine mammals and other biological resources. For Alternative 3, NMFS would develop standard entanglement response training programs for both small cetacean and pinniped entanglement response, similar to the existing Large Whale Entanglement Response Network training program.

Biological sampling and tagging of entangled large whales, small cetaceans, and pinnipeds may occur secondarily to an entanglement response. Biological sampling and tagging activities would not differ from the impacts and mitigation described in other chapters. Therefore, the same mitigation measures for biological sampling discussed in Chapter 9 and Appendix XI would be used during entanglement response. Similarly, the mitigation measures for tagging discussed in Chapters 7, 9, and Appendix XI, would also be used during entanglement response.

8.3.2 Water and Sediment Quality

If hazardous materials or wastes were released during entanglement response activities, responders would notify the appropriate federal, state, or local authorities. If a dart containing sedatives or other drugs is lost, responders will attempt to recover the dart. Additionally, some responders are using acoustic-transmitter equipped darts that give off a signal after they have been fired, which can be tracked using a hydrophone. This aids responders in locating animals that reenter the water after being darted so that they can be captured and disentangled, and it also aids responders in retrieval of all darts, lost or otherwise (Frankfurter *et al.* 2016).

8.3.3 Cultural Resources

As discussed in the Pinniped Entanglement Response Best Practices (Appendix XXII), pinniped entanglement responders that operate in areas where native communities rely on marine mammals for subsistence (*i.e.*, Alaska) must notify nearby communities of their activities before or immediately after an entanglement response. Pinnipeds that are chemically sedated and/or administered antibiotic drugs during entanglement response are prominently marked so that hunters are aware that those animals were administered drugs.

8.3.4 Human Health and Safety

Safety measures used by large whale entanglement response responders would include immersion suits (when appropriate based on water temperature), life jackets, helmets, and a personal knife or other cutting tool available to cut lines and gear in an emergency situation. Typically, a standby/safety vessel (a U.S. Coast Guard, NMFS, other government, non-profit organization, or other experienced mariner 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, or became, too dangerous. This could be due to the behavior of the whale (increasing evasion or aggression), changes in the entanglement configuration, environmental conditions including sea state or wind, time of day, or distance from shore. Training for large whale entanglement response is required, in order to become a member of the Large Whale Entanglement Response Network. Type and extent of training depends upon level of involvement. Issuance of the new Large Whale Entanglement Response Best Practices (Appendix XIX) would also help mitigate adverse impacts of entanglement response on responder health and safety. Lastly, responders are encouraged to document all responses with wide lens action cameras (*e.g.*, GoPro or other brand), as the footage of the response is invaluable for after-action reviews.

Similarly, capture leads that conduct small cetacean and pinniped entanglement response under the MMPA/ESA permit may be preauthorized as CIs. While there are currently no formal trainings for these responders, entanglement response CIs often train/apprentice with currently authorized CIs and their experience in these activities is reviewed before they are issued a CI letter and added to the permit. Training and the issuance of the new Small Cetacean Entanglement Response Best Practices (Appendix XX), and Pinniped Entanglement Response Best Practices (Appendix XXI), ensure that responders know the potential safety risks and the methods to avoid these risks. While these safety measures may reduce some risks, there would always be potential for adverse effects on human health and safety.

8.3.5 Socioeconomics

The issuance of the Large Whale Entanglement Response Best Practices (Appendix XIX), Small Cetacean Entanglement Response Best Practices (Appendix XX), and Pinniped Entanglement Response Best Practices (Appendix XXI), would reduce the socioeconomic impact of entanglement response activities on the Stranding and Entanglement Networks by increasing regional efficiencies and streamlining the decision making process. Further, if John H. Prescott Marine Mammal Rescue Assistance Grant Program funds are appropriated, competitive funding opportunities could be available for eligible Stranding and Entanglement Network members. If awarded, such funds may be used to help offset some costs incurred by release activities.

Chapter 9 Biomonitoring and Research

9.1 Biomonitoring and Research

Response to and research on wild marine mammals is conducted under the Marine Mammal Protection Act (MMPA). Additionally, the Endangered Species Act (ESA) mandates the protection and conservation of threatened and endangered species and the ecosystems on which they depend. The National Marine Fisheries (NMFS) Office of Protected Resources (OPR) Permits and Conservation Division issues MMPA/ESA permits pursuant to MMPA Section 104 and its implementing regulations (50 CFR 216) and ESA Section 10(a)(1)(A) and its implementing regulations (50 CFR 222). The NMFS OPR Marine Mammal Health and Stranding Response Program (MMHSRP) conducts and sponsors a variety of prospective health assessments and research projects relating to marine mammal health under the auspices of the MMHSRP's MMPA/ESA permit. Biomonitoring activities (including both enhancement and research; hereafter referred to as "biomonitoring and research" or "research") may be in response to Unusual Mortality Events (UME), mortality and morbidity events, disease outbreaks, known health concerns or in areas of previous health concerns, toxin exposure, and emerging threats. Research may be conducted by the MMHSRP directly or in cooperation with other scientists including, but not limited to, members of the Marine Mammal Stranding Network (Stranding Network), Large Whale Entanglement Response Network, NMFS staff, and other individuals and organizations to conduct health-related research.

Under MMPA Section 112(c), Stranding Agreements (SAs) are formally established between the NMFS Regional Offices and Stranding Network participants. The SA does not authorize the response to any marine mammal species listed as threatened or endangered under the ESA. Authorization to respond to ESA-listed species by the Stranding Network including collection of samples is currently provided under the MMPA/ESA permit, and requires authorization and direction from the permit Principal Investigator (PI) or NMFS Regional Stranding Coordinator (RSC). As the PI, the MMHSRP Coordinator also may add Co-Investigators (CIs) to conduct specific research and enhancement activities under the MMPA/ESA permit at their discretion. Addition of CIs typically occurs following a review of the proposed activities (including protocols and statistical analyses) and a review of prospective CIs qualifications to ensure the qualifications are commensurate with their duties and responsibilities (including the curriculum vitae of the investigator). Under the current MMPA/ESA permit (Permit No. 18786-06), activities for which animals may be taken for biomonitoring and research purposes include: non-invasive research (including the use of unmanned aerial systems (UAS)), capture, restraint, attachment of scientific instruments, marking, sample collection, sample analysis, vaccinations, administration of drugs, euthanasia, and unintentional (incidental) harassment. General descriptions of these research methodologies are found in section 9.2; more detailed descriptions of specific research and sampling techniques can be found in the MMHSRP Research Methodologies (Appendix XI).

9.1.1 Types of Research Conducted by the MMHSRP

The health assessment research activities of the MMHSRP are conducted on live and dead stranded animals, as well as wild animals that may provide data at the population level on marine mammal health and stranding risks. Biomonitoring and research activities conducted by the MMHSRP fall into two main categories:

1. activities that occur either during an emergency or after the fact and directly derive from an emergency event investigation ("emergency response-related research"), and
2. baseline health research not related to emergencies.

Examples of "emergency response-related research" projects that derive from an emergency event investigation include, but are not limited to: capturing marine mammals to conduct health assessments of marine mammals during and after an UME, disease outbreak (morbidity event), extreme weather event, entanglement response, release of a rehabilitated marine mammal, or oil spill impact assessments (per the Natural Resource Damage Assessment (NRDA)). For example, the Working Group for Marine Mammal Unusual Mortality Events (WGMMUME) or scientists through the NRDA process (respectively) may recommend continued monitoring, assessment, and study of a population (or several populations) for a number of years to evaluate current and longer term impacts of these types of events on the population or stock, even after the UME has closed or after the response/cleanup phase of an oil spill. These assessments may include monitoring of animals that appear outwardly healthy or animals that are visibly unhealthy (*e.g.*, underweight) within those populations. In such cases, research would be considered a part of the emergency response because the target animals may still be affected by the incident, and the purpose of the research is to determine to what extent the animals may still be affected or whether they are recovering. As long as the research activities are part of the approved research plans of the expert body (*e.g.*, WGMMUME, NRDA, etc.), these emergency response-related research projects would be considered part of an emergency response. Emergency response-related research would be conducted by the PI or CIs listed on the MMPA/ESA permit. CI emergency response-related research would need prior approval by the PI, following a review of the research proposal.

Some examples of research projects that do not derive from an emergency event investigation include, but are not limited to: baseline monitoring of presumed wild "healthy" animals to gain reference data on the respective population; investigation of declining populations to better understand why the population is declining; research and development of tools and techniques for emergency response or health investigations (that would first be tested on animals in public display, rehabilitation, or the wild); or surveillance of presumed healthy animals for the detection of new threats such as infectious diseases, biotoxins, or freshwater exposure. Prospective baseline health research may also be conducted on animals in rehabilitation or managed care. These research projects can only be conducted by CI's listed on the permit, and must receive prior approval by the PI following a review of a detailed research proposal and qualifications of the research personnel. In addition, some researchers listed as CIs under the MMPA/ESA permit may be conducting unrelated marine mammal research under their own MMPA/ESA permit, but coordinate with the MMHSRP to collect additional marine mammal parts/samples from the animals they capture/sample (*i.e.*, piggy-backing). Whenever possible, the MMHSRP strives to use piggy-backing to coordinate baseline health research activities with other permitted researchers, to reduce the number of marine mammals that are captured and/or sampled while increasing our access to health biosurveillance information. All marine mammal health research helps the marine mammal research community better understand the health of these animals, develop tools and techniques that can be used to study or assist marine mammal populations, and conduct basic scientific research.

9.2 Biomonitoring and Research Activities

While biomonitoring and research activities may be conducted under two different categories, the protocols, tools, and techniques to conduct emergency response-related science and baseline marine mammal health biomonitoring or hypothesis driven research are the same. All biomonitoring and research activity methods are reviewed and approved by NMFS Institutional Animal Care and Use Committees (IACUCs), in accordance with the Animal Welfare Act (AWA; 7 U.S.C. 2131 – 2156).

Specific biomonitoring and research activities are described below, but no distinction is made between the two types of research. Similarly, the impacts of the two types of research are the same and analyzed concurrently in section 9.3. The mitigation measures described in section 9.4 apply to both emergency response-related research and baseline marine mammal health research unless otherwise stated.

9.2.1 Non-Invasive Research

The MMHSRP always attempts to use the least invasive methods possible to achieve research goals. Healthy and suspected compromised animals may be monitored remotely with cameras or visually by researchers and responders, using a variety of methods and platforms. For example, research aircraft (including UAS) may closely approach marine mammals to conduct assessments, monitoring, photo-identification, photogrammetry, sample collection, and behavioral observations. Animals may also be approached by ground or by vessels (including unmanned on-water and underwater vehicles) for assessment, monitoring, photo-identification, photogrammetry, sample collection, and behavioral observation. The specific parameters of these non-invasive efforts are determined by the PI and/or CI ahead of time, and more specific methods for each type of survey can be found in MMHSRP Research Methodologies (Appendix XI).

9.2.1.1 Use of Unmanned Aerial Systems

The MMHSRP uses UAS as a tool for response (*e.g.*, response to stranding, entanglement, and/or out-of-habitat events), as well as for biomonitoring and research. This technology can be used as a platform for non-invasive research and facilitates visual observation in close proximity to marine mammals, avoiding potentially hazardous situations for responders or researchers (*e.g.*, closely approaching a large whale in a vessel). As discussed in section 9.3.1.1, UAS also allow responders or researchers to remain a greater distance away from an animal (in a support vessel or on land) so as not to distress a marine mammal more than necessary and obtain data on a target animal's condition remotely. Similarly, UAS increases human health and safety by keeping responders further away from the animal. UAS are most frequently used during research activities to carry a small camera that relays images to researchers in real time or to record video and still images that may be reviewed later. UAS may also be used as a platform for photogrammetry, digital sensors (such as thermal imaging), tagging, or to collect breath or other samples such as skin. More detail on how the MMHSRP uses UAS platforms to conduct biomonitoring and research activities can be found in MMHSRP Research Methodologies (Appendix XI).

9.2.2 Capture

Some research projects require more invasive procedures that necessitate the capture and release of marine mammals. The MMHSRP does not capture some ESA-listed small cetaceans (*i.e.*, Cook Inlet beluga whales (*Delphinapterus leucas*), Hawaiian insular false killer whales (*Pseudorca crassidens*), Southern resident killer whales (*Orcinus orca*)) for baseline directed research purposes, but may capture them during emergency response associated events that allow the collection of health data and samples, such as with an UME, oil spill, etc. Additionally, research, assessment, and sample collection (including physical samples (described in 9.2.6), as well as non-physical samples such as photos, body measurements, etc.) may be conducted on these ESA-listed species when they are in-hand from other authorized activities such as stranded animals (mass or single stranded animals and animals in temporary care in rehabilitation). Research, assessment, and sample collection may also occur on animals in permanent managed care, and captured for other permitted scientific research (*e.g.*, by collecting additional samples via piggy-backing). Capture methods for biomonitoring and research activities would not be different than those described in Chapter 8, and more specific methods for capture techniques can be found in MMHSRP Research Methodologies (Appendix XI).

9.2.3 Restraint

Once a marine mammal is captured, it must be safely restrained. Physical restraint methods include, but are not limited to, the use of hands, nets, nooses, and/or crowding boards. Restraint methods for biomonitoring and research activities would not be different than those described in Chapters 6 and 8 which may be tailored to the species, and more specific methods for each restraint technique can be found in MMHSRP Research Methodologies (Appendix XI).

9.2.4 Attachment of Scientific Instruments

Scientific instruments are used to monitor an animal's location and assess an animal's behavior and environment. A variety of scientific instruments may be attached to or implanted in an animal, and the type of scientific instrument and method of attachment would depend on several factors, including the species being tagged, the type of desired monitoring, research, or question being addressed, and the health of the animal. Many of the types of scientific instruments and methods of attachment currently used by the MMHSRP for research (*i.e.*, digital archival (D-tags), passive integrated transponder (PIT) tags, radio frequency identification (RFID) tags, satellite-linked tags, time-depth recorders (TDRs), very high frequency (VHF) radio tags, acoustic tags) were previously described and analyzed in Chapter 7. However, some types of scientific instruments are used more for specific biomonitoring and research purposes that may provide life history and demographic data about species, including crittercams (video cameras), life history transmitters (LHX tags), low impact minimally percutaneous electronic transmitter (LIMPET) tags, dorsal ridge (*i.e.*, spider tags), and pill tags (*e.g.*, stomach temperature telemeters). Some tags may also carry environmental sensors (*e.g.*, salinity). Crittercams are usually attached to pinnipeds and cetaceans using glue or suction cups, respectively. Life history transmitters and LIMPET tags are implanted surgically and remotely, respectively, while pill tags are ingested. Dorsal ridge tags are exclusively used for cetaceans that do not have a dorsal fin such as beluga whales (Litzky *et al.* 2001), and up to four holes are bored into the dorsal ridge to allow the tag to be secured to the dorsal ridge with wires (Appendix XI).

All instruments and methods of attachment are evaluated by the MMHSRP in consultation with biologists, veterinarians, and other personnel with recent experience with these instruments and protocols. As new technologies are developed, and the best available science improves, current techniques will likely change.

However, if new tools, technologies, and techniques change significantly such that they are outside the bounds of what is described in this Programmatic Environmental Impact Statement (PEIS) and/or the effects are not analyzed in this PEIS, additional analysis in the form of a supplemental or tiered document would be completed. Some research activities conducted by the MMHSRP may involve testing novel scientific instruments and attachment methods not currently described. When testing novel scientific instruments and attachment methods, the preference would be to conduct the study in a controlled setting, such as a managed setting where the animals are well known and can be closely monitored, and are of the same species as the target wild population. If this is not possible, the next preference would be to use a closely-related surrogate species. If a suitable captive population cannot be found, a cohort in a rehabilitation center would be the next choice, particularly animals of the same species or a closely-related surrogate. If the initial tests in a more controlled setting are positive, the new tool/technique would be tested on wild animals, with follow-up monitoring to ensure they perform as expected. However, the types of scientific instruments and methods of attachment used routinely by the MMHSRP would not differ from those described here or in Chapter 7, and more details on all scientific instrument types can be found in MMHSRP Research Methodologies (Appendix XI).

9.2.5 Marking

Marine mammals are often marked during the course of biomonitoring and research activities. Marking methods vary by species, but most marking methods would be similar to methods used to mark animals prior to release from rehabilitation (see Chapter 7 for details). One exception would be hot branding, as it is primarily used during response in the field and research, and not in rehabilitation. Hot branding uses heat to kill both hair follicles and pigment-producing cells to leave a bald brand, similar to the longer contact freeze branding method. Hot branding is permitted only for pinnipeds, and cetaceans are never hot branded. For example, in a remote location such as Alaska, hot branding may be the preferred method for permanent marking to allow long-term monitoring of pinnipeds following an oil spill or entanglement response. For some pinniped species, hot brands may be more readable and effective compared to other permanent marks (*i.e.*, freeze branding). Hot brands have been documented to be long-lasting, with Steller sea lions (*Eumetopias jubatus*) resighted with readable marks at least 18 years after having been branded (Merrick *et al.* 1996). More specific descriptions of methods for hot branding and other marking methods can be found in MMHSRP Research Methodologies (Appendix XI).

9.2.6 Sample Collection

A variety of samples, for research or diagnostic purposes, may be collected from both live and dead marine mammals during biomonitoring and research activities. Physical samples (*i.e.*, specimens) include, but are not limited to: blood, saliva, urine, feces, milk, sperm, stomach contents, swabs of bodily orifices, breath, biopsies, skin, hair, nails, teeth, any tissue or lesion accessible, and whiskers/hair. Additionally, non-physical samples such as diagnostic imaging (*i.e*., ultrasound, X-ray, etc.), acoustic sampling (*e.g.*, Auditory Brainstem Response (ABR)/Auditory Evoked Potential (AEP), active acoustic playbacks, etc.), photogrammetry, body measurements, etc. may be collected from marine mammals during biomonitoring and research activities. During live animal response or research, specimen and data collection protocols will depend on the species, the samples being collected, the intended analyses and information needed to fulfill the biomonitoring or specific research need. During necropsy (animal autopsy), any specimen of interest may be collected and archived for future retrospective analyses or analyzed after collection. Specimens may also be acquired opportunistically in coordination with ongoing studies or prospective design plans of other permitted researchers. These types of sample collections for archival and immediate analyses allow the program to follow temporal trends in specific data or determine when a given condition began in a population allowing the MMHSRP to follow individuals and populations over time and space. Given the broad range of health investigations and biomonitoring activities of the MMHSRP, samples may be collected from marine mammals of all ages, including pups/calves, and lactating and pregnant females, as called for in the specific research protocols of each research study or response event. Specific methods for biopsies, blood, breath, and other sampling can be found in the MMHSRP Research Methodologies (Appendix XI).

9.2.7 Sample Analysis

Many different diagnostic and research lab staff, both foreign and domestic, are CIs or Authorized Recipients (ARs) on the MMHSRP's MMPA/ESA permit and/or under contract or collaboration with the MMHSRP to provide analyses and interpretation of collected samples (both physical specimens and non-physical samples). Services provided include but are not limited to: acoustic diagnostics, bacteriology, genetic/genomic analyses, histopathology, parasitology, toxicology (contaminant and biotoxin analyses), and virology. General research methodologies are described in MMHSRP Research Methodologies (Appendix XI).

For import and export of marine mammal specimens to/from foreign laboratories, the MMHSRP would be required to have import and export authorization under a MMPA/ESA permit, and if the species is listed on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix I, II, or III, a CITES permit would be required. The CITES permits for import and export are issued by the U.S. Fish and Wildlife Service (USFWS) and are required to import and export samples, parts, carcasses, or live animal species (for treatment or release) listed in CITES Appendices. Species listed on CITES Appendix I require both an import permit and an export permit be issued for international shipments. Species listed on CITES Appendix II only require an export permit, unless the importing country has stricter measures than CITES. The only marine mammal listed under CITES Appendix III is the walrus (*Odobenus rosmarus*).

9.2.8 Vaccinations

Vaccination of animals, including wildlife, has been used as a management technique for years to eradicate specific pathogens that impact public, domestic animal, and wildlife health or to mitigate infectious disease impacts on individuals or populations (Cross *et al.* 2007; Lombard *et al.* 2007; Meeusen *et al.* 2007). The MMHSRP uses vaccinations to limit the spread of infectious disease in vulnerable marine mammal populations (*e.g.*, vaccinations have been used to protect endangered Hawaiian monk seals (*Neomonachus schauinslandi*) from a *morbillivirus* outbreak through establishment of herd immunity to limit the transmission from animal to animal). NMFS is committed to being prepared to rapidly respond to, or prevent, outbreaks caused by specific pathogens through vaccination/research and enhancement activities. Vaccine research begins with a risk evaluation and feasibility study, to ensure that vaccines are the appropriate tool for a specific situation (see Robinson *et al.* 2018). If a vaccine is determined to be appropriate, the vaccine would be developed and first tested in managed care or rehabilitating marine mammals, before it is deployed in the wild. If there are no conspecifics in managed care or in rehabilitation, the MMHSRP may use a closely related surrogate species. After a vaccine has been developed and tested on marine mammals in managed care and/or rehabilitation, and if proven to be safe and effective, a vaccination program for wild populations may be developed and deployed. Specific methods for the development of vaccinations can be found in MMHSRP Research Methodologies (Appendix XI).

9.2.9 Administration of Drugs

In both cetaceans and pinnipeds, drugs may be administered commonly for sedation/chemical restraint and/or veterinary treatment during stranding response (see Chapter 4), entanglement response (see Chapter 8), rehabilitation (see Chapter 6), and release (see Chapter 7), drugs may also be administered during research activities. In general, the administration of drugs would not differ significantly from the methods described in the preceding chapters (specifically Chapter 4). Anesthetics, analgesics, and antibiotics may be used during research before or after performing biopsies, tooth extractions, and other invasive procedures. Sedatives may be administered to reduce the risk of stress related consequences of capture and handling. One difference between administration of drugs during emergency response or rehabilitation would be the use of drugs to collect data. For example, deuterium oxide can be administered to study body condition and metabolism, and Evans blue (dye) can be used to study blood volume. Chapter 27 of the CRC Handbook of Marine Mammal Medicine (Gulland *et al. 2018*) is used as a reference for potential drugs and doses for marine mammal species. All medications are administered at the discretion and oversight of the attending veterinarian or the PI.

Research activities conducted by the MMHSRP also include using marine mammals in managed care or rehabilitation for drug therapy, diagnostic test validation, or other research projects that require drug administration. The name and location of the facility and the specific animals are provided to the NMFS OPR Permits and Conservation Division prior to the start of any research activity. The research activity only proceeds after review and approval by the facility's and/or the NMFS IACUCs. When testing new techniques, medications, or vaccinations, the preference would be to conduct the study in a controlled setting, such as a managed care setting where the animals are well known and can be closely monitored, and are of the same species as the target wild population. If this is not possible, the next preference would be to use a closely-related surrogate species. If a suitable managed care population cannot be found, a cohort in a rehabilitation center would be the next choice, particularly animals of the same species or a closely-related surrogate. Specific methods for the administration of drugs, including administering drugs to collect data and trials to test the safety and efficacy of novel medicines/diagnostic tests, can be found in MMHSRP Research Methodologies (Appendix XI)

9.2.10 Euthanasia

Euthanasia is most commonly administered during emergency response and rehabilitation activities, when continued medical care is deemed not in the best interest of the animal. However, in some extreme circumstances it may be necessary to administer euthanasia to a marine mammal during the course of research activities, either because the animal was severely injured during the research or a severe injury is discovered while conducting research. Euthanasia decisions and protocols would not differ from those described in Chapter 4, and specific methods can be found in MMHSRP Research Methodologies (Appendix XI) and the Marine Mammal Euthanasia Best Practices (Appendix XIII).

9.2.11 Unintentional (Incidental) Harassment

While research activities are directed at a target individual or group, other animals are sometimes incidentally harassed when trying to identify the target (*e.g.*, aerial survey over several whales to find a target animal), or while conducting research activities (*e.g.*, a non-target animal is approached while attempting to move closer to the target animal). Chapter 3 includes a description of non-target species, including marine mammals under USFWS jurisdiction, terrestrial mammals, invertebrates, reptiles, fish, and sea birds. The MMHSRP maintains a separate permit authorization from the USFWS for incidental takes of marine mammals under USFWS jurisdiction. Only unintentional (incidental) harassment of marine mammals under NMFS jurisdiction would be authorized under the proposed MMPA/ESA permit.

9.3 Environmental Consequences

9.3.1 Alternative 1: Continue Program Implementation at Current Activity Levels (No Action Alternative)

Under Alternative 1, the MMHSRP and Regional Offices would continue biomonitoring and research activities using the methods outlined above, until the current MMPA/ESA Permit expires on December 31, 2022. Under Alternative 1, OPR Permits and Conservation Division would not issue a new MMPA/ESA permit to the MMHSRP, at which point, all MMHSRP biomonitoring and research activities would cease. Unless a researcher currently has their own MMPA/ESA research permit, many Prescott Grant recipients use the MMHSRP's MMPA/ESA permit to accomplish their project's goals. Therefore, Alternative 1 would significantly curtail or possibly eliminate all Prescott Grant proposals received from researchers.

9.3.1.1 Biological Resources

Under Alternative 1, biomonitoring and research activities would continue until the current MMPA/ESA permit expires on December 31, 2022. Similar to emergency response activities, minor, short-term, adverse effects on all biological resources could occur from vessel and vehicle uses during biomonitoring and research activities. Accidental spills of hazardous materials from vessels 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. These would likely be small amounts that would be flushed out and/or diluted rapidly, causing a minor, short-term impact.

Potential minor, adverse effects on protected and sensitive habitats could include damage from vessels, anchors, or researchers in the water or on the beach. Coral reefs and other habitats may be damaged from contact with a vessel, anchor, or a person. Every effort would be taken to avoid protected and sensitive habitats, such as coral reefs, during biomonitoring and research activities. This may include not conducting research activities in areas with protected and sensitive habitats.

Negligible, short-term adverse effects on submerged aquatic vegetation (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 or anchors. Any damage to SAV leaves and macroalgae is expected to be negligible and short-term, as only a minimal amount would be disturbed and would grow back within a few weeks to months, depending upon the exact species of seagrass. Damage to SAV rhizomes is not likely to occur, as boat drivers would practice safe boating practices.

Minor to moderate, short-term indirect adverse effects on sea turtles could occur during research activities. Activities conducted on beaches could disrupt nesting sea turtles causing them to abandon nesting or damage their nests and/or eggs. Equipment could crush nests and research personnel could accidentally disturb or damage nests. Disturbance of nests could leave unhatched eggs exposed and vulnerable to predation and exposure to the environment. Where possible, research activities would not be conducted near known sea turtle nesting sites, minimizing the potential for adverse effects. Sea turtles may also be incidentally harassed and/or taken during net capture activities, but would be released immediately.

Minor, short-term adverse effects on coastal and marine birds could occur during research activities. Close approaches by vessels or aircraft, the use of equipment, or the presence of researchers on beaches could disturb birds nesting or roosting in trees, small bushes, or on the ground, and may cause them to temporarily leave the area, and potentially abandon chicks. Ground nesting birds could be adversely affected by research activities. Equipment could crush nests, research personnel could disturb or damage a nest, or predators could take eggs, chicks, or adults after disturbance of nesting areas. Research conducted in nearshore waters could disturb foraging birds, but efforts would be made to limit or avoid disturbing 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 under Alternative 1. 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 and would benefit both individual animals and populations. Adverse effects on individual marine mammals from biomonitoring and research activities would be expected to occur under this alternative.

Non-Invasive Research: Close approaches would occur during research activities such as health assessments, remote sampling (*e.g.*, remote biopsy or breath sampling), tagging, photo identification, and collection of sloughed skin and feces. Cetaceans may suffer negligible temporary adverse impacts as a result of close approach for non-invasive research; expected cetaceans reactions from these activities would include swimming faster, breaching, diving, tail and fin slapping, or moving away from the vessel, aircraft, or research personnel. Cetacean reactions to aerial surveys depend on the aircraft's altitude, speed, time spent overhead, and species or individual behaviors. Approaches to marine mammals below certain altitudes could harass marine mammals and cause a change in behavior, or elicit behaviors, such as diving rapidly. Behavioral responses to close approaches, by both vessel and aircraft, would generally be temporary, with a negligible effect on the individual or the population.

Pinnipeds may suffer negligible temporary adverse impacts as a result of close approach for non-invasive research. In most cases, the potential reaction of the animal is limited to disturbance, with the animal becoming more alert and/or moving away from the vessel, aircraft, or research personnel, but remaining at the haul-out site. Hawaiian monk seals have been documented to very rarely react to manned aerial surveys (including large, low-flying aircraft systems), and when they do, typically only raise their heads momentarily (NMFS 2014c). However, pinniped reactions to vessels and piloted aircraft can be variable, and depends on the species (Calkins and Pitcher 1982). In Steller sea lion studies (Calkins and Pitcher 1982) and harbor seal (*Phoca vitulina*) studies (Suryan and Harvey 1999), reactions ranged from no apparent reaction to complete and immediate departure from the haul-out site. Minor to moderate, indirect short-term adverse impacts may occur when pinnipeds are startled and disperse from rookeries, as pups or young may be trampled or abandoned. Similarly, juvenile and adult animals may also be trampled during stampedes or injured on underwater rocks and cliff faces while attempting to flee from vessels, aircraft, or research personnel conducting non-invasive research. The incidence of stampedes in response to aerial surveys at specific altitudes is unknown. Level of disturbance from aerial surveys would be dependent on aircraft specifications, aircraft's altitude, speed, time spent overhead, and species or individual behaviors.

***Use of UAS*:** UAS cause minimal disturbance due to their relatively small size, minimal noise, and strategic use. UAS operations have been integrated into numerous field studies involving a variety of marine mammal species (Acevedo-Whitehouse *et al.* 2010; Koski *et al.* 2009; Martin *et al.* 2012; Schick *et al.* 2014; Selby *et al.* 2011), and cause substantially lower levels of disturbance than traditional aircraft when flown at comparable heights (Acevedo- Whitehouse *et al.* 2010; Mulaca *et al.* 2011; Sleno and Mansfield 1978).

UAS that hover close to animals to conduct non-invasive research (*e.g.*, for breath sampling of cetaceans) may cause more disturbance compared to those that do not hover close to animals, resulting in temporary, negligible adverse impacts. A recent study on bottlenose dolphins (*Tursiops truncatus*) found that animals were significantly more likely to react to UAS activities when the vehicle was closer than 25 meters

(Fettermann *et al.* 2019). Conversely, this did not appear to be the case for larger cetaceans as minimal, or no, disturbance was documented at heights above ~12 meters for blue (*Balaenoptera musculus*), gray (*Eschrichtius robustus*), humpback (*Megaptera novaeangliae*), and sperm whales (*Physeter macrocephalus*) (Acevedo-Whitehouse *et al.* 2010). Therefore, the magnitude of the temporary, negligible adverse impacts from the use of UAS for non-invasive research are variable between different species of cetaceans.

Similarly, pinnipeds may also suffer from temporary, negligible adverse impacts during the use of UAS for non-invasive research, but the impacts may vary between species. Northern fur seals (*Callorhinus ursinus*), Weddell seals (*Leptonychotes weddellii*), and leopard seals (*Hydrurga leptonyx*) did not appear disturbed by UAS flying at an altitude of approximately ~23 meters (Goebel *et al.* 2015). Similarly, work by the NMFS Marine Mammal Laboratory with surveys for Steller sea lions found no reactions to flights of a UAS at ~60 meters (NMFS 2014a). However, gray seals (*Halichoerus grypus*) showed responses (heads-up) at ~20 meters and movement towards the water when the UAS was operated at ~9 meters above the haul-out (O'Connor and Pomeroy 2013).

The use of UAS has been analyzed in environmental assessments (EAs) for permits for Steller sea lions (NMFS 2014a) and various cetacean species including low altitude operations (*e.g.*, observing lunge feeding (NMFS 2008) and breath sampling of large whales (NMFS 2014b)), and in the PEIS for Hawaiian monk seals (NMFS 2014c); and, it was concluded that the use of UAS would not result in significant impacts to the subject species or human environment.

Capture, Restraint, and Handling: Any capture and/or restraint procedure would likely have at least some temporary or short-term, negligible or minor adverse effect on the behavior or activities of marine mammals. Capture, restraint, and handling may also have major adverse impacts, if it results in the death of the target animal. The number of times an animal would be captured, the method(s) of restraint, the experience of the handlers, and the age and general condition of the animal are all factors that would affect an animal's response to capture. Capture, restraint, and handling procedures would not differ from the capture procedures outlined in Chapter 8 and the handling and restraint procedures outlined in Chapter 6, and their impacts to biological resources would be the same as discussed in those chapters.

Tagging/Attachment of Scientific Instruments to Cetaceans: During targeted research activities for baseline health research, scientific instruments will not be attached to large whale calves less than 6 months of age or females accompanying such calves. For small cetaceans, no tagging or attachment of scientific instruments will occur on calves less than one year of age and mothers accompanying these animals would not specifically be targeted for baseline health research. However, if not targeted but accidentally captured during net deployments for health assessments, the mother of a calf may be tagged. Tagging could evoke reactions to the close approach and the physical attachment of the tag. The negligible, temporary adverse impacts to close approaches are described under non-invasive research. Free-swimming cetaceans may suffer negligible, temporary adverse impacts during the application of a remote tag, as they often react to 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 are temporary and last less than a few minutes, after which behavior appears to return to normal (Watkins and Tyack 1991, Goodyear 1993, Hooker *et al.* 2001). Temporary or short-term minor adverse impacts may result for the physical presence of a tag, as this may lead to an alteration in the behavior of tagged animals, including a temporary disruption of activities. Unlike the physical restraint buoys described in Chapter 8 for large whales, the hydrodynamic drag created by tags used for research should not cause an adverse impact on the animal. 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. Two broad categories of tag design/attachment are discussed below, suction cup tags and invasive tags that break the skin tags (*i.e.*, dart/barb and deep-implant tags).

Suction cup tagging procedures have been analyzed by NMFS in several EAs with findings of no significant impact on the animals and in Section 7 consultations resulting in no jeopardy opinions (NMFS 2017 and NMFS 2019b). The remote risk of the suction cup landing in or striking a sensitive part of the animal, such as the eye, mouth, or blowhole, which may cause injury, even though the tag will not be able to attach to these areas, may result in short-term minor to moderate adverse impacts if the animal is injured. However, given the skills of the experienced researchers, this risk is expected to be minimal or non-existent. The non-invasive nature of suction cup tags eliminates the threat of infection, but not the temporary and negligible adverse impacts of inflammation and bruising. The suction cup would remain attached for a short duration (typically no longer than 48 hours), and would likely release within a few hours. The animal could easily dislodge the tag by rolling, breaching, or rubbing against other animals or on the bottom. Indirect, minor to moderate short-term adverse impacts may occur if an animal sustains 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 suggests that it is unlikely that an animal would endure long-term impacts from the attachment. Vessel strikes pose a risk when using suction cup tags, as the animal must be followed for the duration of attachment. Moderate short-term adverse impacts may occur as vessels remain close to animals and may accidentally strike both target and non-target animals. However, the MMHSRP's use of experienced vessel drivers will help to mitigate the possibility of striking an animal.

Invasive tags that break the skin tags (*i.e.*, dart/barb and deep-implant tags) used on cetaceans have a greater potential for disturbance in application and are more invasive than using suction cup tags. Minor to moderate short-term or long-term adverse impacts may result from invasive tags that typically penetrate the surface of the blubber layer (*i.e.*, dart/barb tags), but some penetrate the blubber-muscle interface (*i.e.*, deep-implant tags). Tags generally work their way out of the blubber after weeks or months, but some new satellite tags have remained implanted for over a year (Mate *et al.* 2007). Similarly, dorsal ridge tags are attached to beluga whales by boring multiple holes through the dorsal ridge, but the pins migrate out of the dorsal ridge with no adverse impacts to the animal, beyond scarring (Suydam *et al.* 2005). This is in contrast to Shelden *et al.* (2018) which reviewed beluga tagging efforts in Cook Inlet from 1999-2002, and found three of eighteen tagged beluga whales that had tag durations of less than 54 hours, one of which was a confirmed mortality. However, since this work the tagging protocol has been modified, and more recent studies (while not of Cook Inlet beluga) have not observed similar mortality rates (Citta *et al.* 2013; Citta *et al.* 2016). Therefore, the use of dorsal ridge tags is anticipated to result in minor to moderate short-term or long-term adverse impacts. Disturbance of the animal would mainly occur during the close approach and tag attachment. Observed behavioral responses during the close approach and tag attachment include head lifts, head lunges, fluke lifts, fluke slaps, exaggerated fluke beats on diving, quick dives, or increased swimming speeds. Observations after tagging have shown that most adverse behavioral responses to the attachment of the tag are negligible and temporary (Mate *et al.* 2007). These responses would not likely injure individuals.

Once attached, a properly functioning 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, such as a smaller spear tip to lessen depth of penetration into the blubber, and reducing the velocity of the package at impact. Temporary and negligible adverse impacts from inflammation would be expected to occur after tag implantation, and minor to moderate short-term adverse impacts from infection could be possible. An infection can occur if any of the implantable or dorsal ridge tags are not properly sterilized before deployment, but the chance of infection resulting from the break in the epidermis alone in a healthy individual is extremely low and insignificant (Andrews *et al.* 2019). Other moderate, short-term adverse impacts may occur, as there would also be a low potential for an abscess or septicemia to occur after implantation. Short-term or long-term negligible adverse impacts may occur as part of the foreign body response, post-tagging swelling while the tag is in place, or indentations and swelling due to tissue reaction may occur after the tags are lost, extruded, or migrate out. These swellings do not usually indicate infection of the epidermis or poor health, and typically resolve over time (Norman *et al.* 2018). Potential minor to moderate short-term adverse effects due to infection are minimized by sterilization of any portion of the tag that breaks the skin, or is implanted in the animal. There is a small possibility of indirect major, long-term adverse impacts as in some cases, poor tag design has resulted in parts of the implantable tag breaking off inside of the animal and remaining within the body after the rest of the tag has migrated out (Robbins *et al.* 2013). In these cases, the remaining pieces of the tag may take years to migrate out of the body, if at all (Robbins *et al.* 2013). Female humpback whales tagged with deep implant tags that experienced a break were less likely to calve (IWC 2020). Efforts are underway to continue improving large whale implantable tag designs to improve safety and increase retention (IWC 2020). The MMHSRP would not use tags with known issues for biomonitoring and research activities, and would use new improved tag designs once available and approved.

During health assessment or emergency response captures, small cetaceans with dorsal fins may be tagged with either a plastic livestock ear tag (*e.g.*, Rototag, Allflex tag, etc.), with or without scientific instruments (*e.g.*, acoustic tags) glued to the tag, or single pin radio or satellite tag on the trailing edge of the dorsal fin. Small cetaceans estimated to be less than one year of age will not be caught during baseline health assessments, but may be captured as part of an emergency response (*e.g.*, out of habitat animals, entanglements, etc.), but no tagging would occur on young of the year animals. Similarly, mothers accompanying animals estimated to be less than one year old would also not specifically be targeted during baseline health assessments, but may be captured during an emergency response. However, mothers may be tagged if captured during an emergency response or accidentally captured during a baseline health assessment, so that they may be monitored and/or more readily identified and avoided for future net sets. The attachment of the plastic livestock ear tag, radio, or satellite tag would not be considered significant, as the pain or discomfort would be momentary and only last during the application, and in certain cases local anesthesia may be used. Little tissue damage to the trailing edge of the dorsal fin would occur when the tag is released, but some tissue damage may occur if the tag pulls out prematurely. Therefore, mostly temporary or short-term negligible adverse impacts are anticipated from using this type of tag. Minor to moderate short-term impacts may result if the wound site becomes infected or if the tag prematurely pulls out of the dorsal fin during swimming.

Tagging/Attachment of Scientific Instruments to Pinnipeds: Tagging of pinnipeds would cause temporary negligible or minor adverse impacts (*i.e.*, stress) during capture and restraint to attach or implant the tag. Invasive tags would cause temporary negligible adverse impacts as they may cause pain during attachment or implantation and healing. Animal movement may prolong or prevent healing of tags by producing repetitive stress on the wound. Minor to moderate short-term adverse impacts may result if the wound site becomes infected or if the flipper tag (with or without scientific instruments glued to the tag) may pull out of the flipper during swimming or moving on a rookery or haul-out site. A study on gray seals found that infections from flipper tags were rare (Paterson *et al.* 2011).

Other minor to moderate short-term adverse effects associated with some implanted tags may include excessive tissue reaction, infection, and subsequent rejection of implanted materials. Northern elephant seals (*Mirounga angustirostris)* had short reactions to PIT tag implants and there were no external signs of tissue reaction (Galimberti *et al.* 2000). For LHX tags, pain would not occur during surgery, as animals would be anesthetized. Temporary minor adverse impacts may occur if animals have post-operative pain and discomfort at the incision site. If necessary, animals may be treated with appropriate antibiotics and/or analgesics if an infection or pain occurs. In sea otters, LHX tags have been used for over 20 years, and the typical reactions, both behaviorally and physically, to the tag are innocuous (Lander *et al.* 2001). Also LHX tags have been implanted into California sea lions (*Zalophus californianus*), Steller sea lions, and harbor seals with no long-term effects noted (Horning *et al.* 2017).

Attachment of scientific instruments to pinnipeds may have both short- and long-term adverse effects, in addition to the effects of capture and restraint (Horning *et al.* 2019). 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). Long-term minor adverse impacts include the hydrodynamic drag created by larger tags, which can exert an additional energetic demand on an animal (Walker and Boveng 1995, Rosen *et al.* 2018). Over time, this drag may result in reduced foraging success, increased metabolic load, and stress to the animal, but does not affect the survival rate of tagged individuals (Heylen and Natchsheim 2018). Currently, some acoustic transponders attached to a plastic livestock ear tag (*e.g.*, Rototag, Allflex tag, etc.) emit a frequency that is within the hearing range of some pinniped species (Stansbury *et al.* 2015). However, studies evaluating the acoustic Vemco tag (with a signal incorporated into a receiver unit with power levels of ~146-161 dB re 1 μPa 1 meter) deployed in both northern elephant seals (Hayes *et al.* 2013) and gray seals (Baker *et al.* 2014) demonstrate normal behavior by these animals comparable to animals carrying satellite and other telemetry tracking technologies. Additionally, some acoustic tags are currently under development that use a frequency that is not within the hearing range of the target pinniped species. Acoustic tags that emit a frequency outside the normal hearing range of the target species would be chosen, whenever possible.

The attachments of instruments to the hair of pinnipeds with epoxy should not cause pain if done following the described methods in the MMHSRP Research Methodologies (Appendix XI) and Horning *et al.* (2019). However, it may result in negligible temporary or short-term adverse impacts if the placement of the instrument causes discomfort by pulling the hair or skin during animal movement. In addition, short-term minor adverse impacts may occur if the ratio of resin and hardener is not correctly measured, and the resulting heat-producing reaction could burn the animal's skin and pelage (Lander *et al.* 2001). Both the resin and hardener could cause temporary minor adverse impacts in the form of skin irritation, resulting in itching, rashes, hives, burns, and dermatitis. Minor to moderate short-term adverse impacts may occur if the instrument is knocked or torn off, pulling out hair and possibly some of the underlying skin, which would then be vulnerable to infection.

Marking: Most marking techniques used during biomonitoring and research activities would not differ from those described in Chapter 7, and therefore the impacts would be the same. However, hot branding of pinnipeds is used more commonly in remote areas during biomonitoring and research activities. Hot branding may cause short-term minor adverse impacts in the form of pain during application of the brands for a short duration (less than 1 minute), and as the wounds heal over several weeks (Walker *et al.* 2010). Studies of captive Steller sea lions found that behavior returned to baseline after 72 hours (Walker *et al.* 2010) and there was no elevation in cortisol levels between 2 and 7 weeks post-branding (Mellish *et al.* 2007). The survival rates of hot-branded Steller sea lions (Hastings *et al.* 2009) and New Zealand sea lions (*Phocarctos hookeri*) (Wilkinson *et al.* 2011) were not significantly different from the survival rates of non-branded animals.

Potential mortality from hot branding was investigated in a 12-week study by Hastings *et al.* (2009), where weekly survival of branded Steller sea lion pups in the wild was nearly identical to estimates from a control group of undisturbed, unbranded pups, and similar to pup survival estimates from other otariid studies. Data from this study suggested branding of Steller sea lion pups can be used effectively for investigations of population declines without significantly affecting population health or study goals (Hastings *et al.* 2009).

McMahon *et al.* (2006) reported on studies at Macquarie Island, where approximately 14,000 Southern elephant seal (*Mirounga leonina*) pups were hot branded over a period of 7 years (1993-1999). Approximately 7,000 branded seals were also tagged with flipper tags, allowing comparisons of those two methods of tagging, and in 2 years a smaller group of pups (n=279) were only flipper tagged and not branded. When comparing first-year survival of the two groups of seals (those hot branded vs. those flipper tagged), the survival estimates were significantly higher for branded animals than tagged, which the authors could not directly explain, although they did attempt to compensate for tag loss in the analysis. Also, there was no difference in survival based on occurrence of brand-associated wounds.

While Merrick *et al.* (1996) reported that hot branding may lead to increased mortalities, they were not able to rule out emigration from the rookery. More recent studies on captive and wild Steller sea lions have shown no long-term adverse impacts to individuals including decreased survivorship from hot branding (Hastings *et al.* 2009). Animals are sedated with gas anesthesia for branding operations whenever possible. Sea lions have been shown to display pain-related behaviors up to 3 days after the branding (Walker *et al.* 2011). After hot branding, the skin would be returned to ambient temperature as quickly as possible using seawater. Chapter 4 of the Final PEIS for Steller Sea Lion and Northern Fur Seal Research (NMFS 2007) indicated that the primary injury and mortality risk from hot branding procedures was attributable to the capture of pups, rather than from the branding itself.

Hot branding results in short-term minor adverse impacts in the form of stress to the animal due to the restraint times and the pain involved with the techniques (mitigated when possible by the use of anesthesia). However, it is believed that the stress and pain are minor and of short duration, do not have substantial adverse impacts to long-term survivorship, and are outweighed by the benefits of being able to identify an individual remotely for several years.

Blood Sampling: Multiple attempts to obtain a blood sample could be stressful and could cause some pain. Multiple attempts to obtain a blood sample may result in damage to the vessel, clotting of the blood, and an abscess within body tissue. Removing a large volume of blood relative to the animal's mass and ability to replenish the amount taken can result in fatigue, anemia, weakened immunity, and problems with clotting. These issues are mitigated by following IACUC protocols that describe the number of blood collection attempts, the amount of blood that can be safely drawn from animals at one time, and by blood collection only being performed by trained and experienced individuals or by individuals in training overseen by experienced personnel.

Biopsy Sampling Cetaceans: Biopsy sampling in cetaceans may occur remotely or with surgical methods. The negligible, temporary adverse impacts to close approaches required to conduct remote biopsy sampling are described under non-invasive research. A careful approach generally elicits, at most, a minimal and short-lived response from cetaceans; even those that are sampled using remote biopsy procedures (NMFS 1992). A NMFS biological opinion concluded that, based on existing data and published research, biopsy sampling on cetaceans (via crossbow, compound bow, dart guns, or pole spears) would not have long-term major adverse effects on the target individual (NMFS 2019b). Published research has shown that short-term negligible adverse effects of biopsy darting on cetaceans could cause a startling reaction or be momentarily painful to the animal, and that serious trauma and/or death are unlikely (Noren and Mocklin 2012). No evidence of infection at the site of penetration or elsewhere has been observed among whales resighted in the days following biopsy sampling (NMFS 1992). However, there is a small possibility of moderate to major short-term and long-term adverse impacts to individual small cetaceans. In a recent 2020 case involving a small cetacean, a bottlenose dolphin died from an infection resulting from a biopsy dart that missed the target site and accidentally struck the dorsal fin. Mitigation measures will be added to all scientific research and enhancement permits to minimize the likelihood that biopsy darts miss the target sampling site and accidentally strike the dorsal fin, to reduce potential for infection.

Minke (*Balaenoptera acutorostrat*a), fin (*Balaenoptera physalus*), 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). Adverse behavioral responses in the remainder of the biopsies were temporary and negligible and ranged from 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 and Matilla (1993) noted that proper biopsy procedures showed little evidence of short-term or long-term adverse impacts on humpback whales.

Surgical biopsy sampling of skin and blubber also occurs during health assessment captures for small cetaceans. Small cetaceans may exhibit signs of stress due to capture and restraint, as discussed under capture, restraint, and handling. Minor temporary, negligible adverse impacts may occur as small cetaceans may experience momentary pain during the administration of local anesthesia. Short-term, minor adverse impacts may occur as animals may experience some soreness or pain with healing, but other adverse impacts would not be expected from skin/blubber biopsies (Wells *et al.* 2005). In rare occurrences, minor to moderate short-term impacts may occur if the surgically biopsied area becomes infected.

Biopsy Sampling Pinnipeds: Similar to cetaceans, pinniped biopsies may be conducted via remote methods or surgically. Remote biopsy protocols for pinnipeds using a crossbow have been previously described (Hoberecht *et al.* 2006). These methods have a high success rate for remote collection of skin and blubber from pinnipeds, with no apparent adverse effects on the target animal (Hoberecht *et al.* 2006). Additionally, this method does not require flushing an entire haul-out or rookery of all sea lions to obtain a sample (Hoberecht *et al.* 2006). Remote biopsy methods using pole spears are also being developed, and may be used once the protocols are finalized.

Effects of surgical skin and blubber biopsy samples on pinnipeds would include the effects of the capture and restraint necessary for obtaining these samples, as discussed under capture, restraint, and handling. Pinnipeds may experience no or temporary minor pain during the administration of local anesthesia, depending upon the type of anesthesia used. In rare occurrences, minor to moderate short-term impacts may occur if the biopsied area becomes infected.

Breath Sampling: Breath sampling activities on free-swimming cetaceans would include close approaches by vessels and/or UAS. Impacts from close approaches and UAS are described above under non-invasive research. The use of an extended pole to capture blow is not likely to have any impacts to cetaceans beyond physical avoidance of the vessel or potentially the pole (Acevedo-Whitehouse *et al.* 2010). In cases where the animal is captured (small cetaceans) and a vacuum cylinder is placed over the blowhole, the animal may react negatively to something being placed over its blowhole (in addition to the effects of the capture and restraint, discussed above under capture, restraint, and handling), but adverse reactions are generally mild and temporary and the animal is under constant veterinary evaluations (Zamuruyev *et al.* 2016).

Tooth Extraction: Potential adverse effects from tooth extraction relate to the risks of capture, restraint, anesthesia, and the possibility of infection following the extraction. The procedure is conducted with local anesthetics in cetaceans and gas anesthesia in pinnipeds; however, short-term minor adverse impacts may occur if the animal experiences post-procedure pain, which could interfere with foraging while the tooth socket heals. Efforts are underway to develop and validate other measures for chronological age estimates in dolphins.

Hair, Nails, and Vibrissae Sampling: Clipping hair, nails, and vibrissae (whiskers) would not likely result in pain. The effects on the animal from clipping are incidental to the effects of capture and restraint, and are discussed above under capture, restraint, and handling. In some cases, it may be necessary to pull vibrissae instead of clipping vibrissae. Pulling vibrissae are expected to have minor short-term adverse impacts as this procedure may cause momentary pain, due to the highly sensitive nature of the snout and because the hair bulb is surrounded by blood and neurons.

Other Sampling: Other sampling that could occur during research activities include the collection of feces, sloughed skin, urine and other bodily fluids. Orifices may also be swabbed to collect samples. The close approach to free-swimming cetaceans to collect feces and sloughed skin would be expected to have only temporary negligible adverse impacts on target and non-target animals. The collection of pinniped feces may disturb animals on haul-out sites or rookeries, and the effects would be the same as those described under non-invasive research above. 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.

Diagnostic Imaging: Ultrasound, x-ray, or other diagnostic imaging techniques may be used on captured animals. Cetaceans may be sampled out of the water and improper body support could result in moderate to major short-term impacts, as it may compromise cardiac and respiratory functions (Haulena and Heath 2001). Minor to moderate temporary or short-term adverse impacts may occur if animals overheat in direct sun and heat without appropriate protection, and body surfaces may be exposed to the drying effects of air. An external ultrasound or x-ray procedure would pose minimal to no risk of injury to an animal; however, an internal ultrasound (rectal, esophageal, or vaginal) procedure could pose a small risk of minor to major short-term adverse impacts in the form of infection and/or perforation. In general, internal ultrasonography is a safe, effective method that has been used in many mammals, including marine mammals (Adams *et al.* 1991; Testa *et al.* 2010; Shero *et al.* 2018). However, this procedure would only be performed by CIs and veterinarians with experience using internal ultrasonography.

Auditory Brainstem Response (ABR)/Auditory Evoked Potential (AEP): Potential adverse effects from ABR and AEP procedures would be the same as those described above under capture, restraint, and handling. The maximum sound levels presented would be lower than sound levels produced by the study animal's whistles and echolocation clicks. Sounds would likely be quieter than those animals are normally exposed to on a daily basis. Therefore, no acoustic impacts from the procedures themselves would be expected. Temporary and negligible adverse impacts, including inflammation and hyperemia, could be experienced from the suction cups used to attach electrodes to the animal. For stranded large whales, suction cup electrodes are attempted first; if unsuccessful, subcutaneous pin electrodes are placed into the blubber layer. Pin electrodes are also used on anesthetized pinnipeds. Minor short-term adverse impacts, similar to blood sampling, are anticipated from the use of subcutaneous pin electrodes.

Passive Acoustic Recording: Passive acoustic recording, which involves placing a hydrophone in the water would not be expected to have any impact on marine mammals. A recent NMFS biological opinion (NMFS 2019b) noted that entanglement in hydrophone gear is highly unlikely, and there is no known documentation to suggest that the presence of a hydrophone, or a similar recording device, results in adverse or beneficial impacts.

Active Acoustic Playbacks: Active acoustic playbacks would generally involve close approaches by one or more vessels. In certain circumstances they could be conducted from shore, in-water (on free swimming animals or after the animal is captured), or a pier. Active acoustic playbacks are expected to have negligible temporary adverse behavioral impacts on marine mammals. No physical impacts to marine mammals are anticipated. The source levels of the sounds produced would be sufficiently low and produced at a large enough distance away from the animal in order to avoid exposure levels that would cause temporary or permanent threshold shifts in hearing. Sounds produced by playback equipment would not result in a permanent threshold shift in hearing, as defined in NMFS' Revised Technical Guidance (NMFS 2018). Incidental harassment of non-target animals (including USFWS species) is not likely, as the source levels of the sounds would be sufficiently low and researchers would endeavor to conduct active acoustic playbacks when non-target animals are known to be present.

Diagnostic Testing and Analysis of Specimens: Diagnostic testing on, and the analysis of, specimens would have no impact on marine mammals. Specimens would be archived in the National Marine Mammal Tissue Bank (see section 1.2.8) or other authorized laboratory.

Import/Export of Marine Mammals or Marine Mammal Parts: The act of importing and exporting of specimens already collected would not have an impact on marine mammals. All specimens would be collected legally in the United States or other countries and would meet conditions required by the MMPA, ESA, and Fur Seal Act (FSA), and may be subject to additional requirements and evaluation under the AWA. Potential adverse effects of importing or exporting live marine mammals into or from rehabilitation facilities would be the result of restraint and transport, and these impacts are described in Chapter 6.

Administration of Drugs and Euthanasia: Delivery of anesthesia or sedation in marine mammals would follow the same methods and have the same impacts as described in Chapter 4. Similarly, delivery of euthanasia would also follow the same methods and have the same impacts as described in Chapter 4.

Incidental Harassment of Other (Non-Target) Animals: Unintentional (incidental) harassment of non-target marine mammals may also occur during biomonitoring and research activities, resulting in indirect temporary, negligible indirect adverse effects. The impacts to non-target marine mammals would typically be the same as the impacts from close approaches, described above under non-invasive research. Indirect adverse impacts to non-mammalian species (*e.g.*, sea turtle, fish, birds, etc.) are also mostly anticipated to be negligible and temporary, as these species may experience some stress and flee from the area when biomonitoring and research activities are conducted. In rare instances, minor to major short-term and long-term adverse effects on individual marine animals could occur as target or non-target animals may be unintentionally (incidentally) injured, captured, or harassed during the rescue attempt (*e.g.*, non-target marine mammals, sea turtles, etc.). Minor to major short-term and long-term adverse impacts may result if target and non-target animals are accidentally captured or entangled in the net, which may result in injuries or death. For example, two sea turtles were accidentally captured during a research-focused dolphin capture effort in 2015. In this instance, both turtles were released unharmed. Temporary and minor short-term adverse impacts may also result during pinniped research capture activities if non-entangled animals are disturbed enough to leave a haul-out site. Captures of pinnipeds may incidentally harass and disrupt other animals if the capture occurs near a haul-out site or any other area where animals are located. Indirect, short-term moderate, adverse effects may occur if startled pinnipeds disperse from rookeries and haul-outs, and pups become trampled or separated in the process. Minor to major short-term and long-term indirect adverse effects may also occur if juvenile and adult animals are trampled during stampedes or injured on underwater rocks and cliff faces. While the MMHSRP has never documented injuries (serious or non-serious) to a non-target pinniped while it was flushed from a haul-out, this has been documented with other programs (Fay and Kelly 1980; Geraci and St. Aubin 1980).

Minor to major short-term and long-term adverse effects on individual marine animals could occur as target or non-target animals may be accidentally struck by a research vessel, which may result in injuries (serious and/or non-serious) or death. For example, in 2015, a manatee was accidentally struck by the capture vessel and seriously injured. Similarly, non-target animals may be unintentionally (incidentally) harassed or injured (non-serious and/or serious) while researchers are transiting to the target animal. For example, in 2021 a large whale entanglement responder accidentally struck and non-seriously injured a non-target whale while transiting to the entangled, target whale. However, any impacts to non-target animals are anticipated to be rare, as the examples given above are the only documented instances of accidental capture, injury (serious and non-serious), and mortality while the MMHSRP was conducting activities. Additionally, the mitigation described in section 9.3.1 would further reduce the likelihood of accidental capture, injury (serious and non-serious), and mortality.

After Expiration of the Current MMPA/ESA Permit

Under Alternative 1, after the current MMPA/ESA permit expires on December 31, 2022, all biomonitoring and research activities would cease. No effects on protected and sensitive habitats, SAV and macroalgae, sea turtles, fish, shellfish, or birds would be expected to occur under Alternative 1 after the MMPA/ESA permit expires. 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 of the negative impacts associated with the aforementioned activities. However, without these research activities, important health and exposure data on marine mammal populations would no longer be collected. This would limit our knowledge and understanding of emerging and current threats to marine mammal populations. This would impede future conservation and management actions and could lead to detrimental impacts on marine mammal populations, especially those that are threatened and endangered.

9.3.1.2 Water and Sediment Quality

Minor, short-term, adverse effects on water and sediment quality could occur under Alternative 1. Biomonitoring and research activities would not intentionally generate any pollutants or disturb sediment. Accidental spills of hazardous materials or wastes from vessels or the loss of research materials overboard 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 accidentally 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.

Under Alternative 1, after the current MMPA/ESA permit expires on December 31, 2022, all biomonitoring and research activities would cease. No effects on water and sediment quality would be expected to occur after this date as biomonitoring and research activities would no longer occur and therefore any potential risks to water and sediment quality would not exist.

9.3.1.3 Cultural Resources

Long-term indirect beneficial effects on cultural resources (*i.e.*, marine mammals and their parts) and associated cultural practices could result from implementing the proposed action under Alternative 1, to the extent the action promotes improved marine mammal health and conservation. Indirect beneficial effects would result when the proposed action (e.g., biomonitoring and research) generates scientific findings that help improve the effectiveness of marine mammal conservation activities.

Minor to major, short-term and long-term, adverse effects on cultural resources may occur under Alternative 1. Minor, short-term adverse effects could occur from research activities conducted on beaches that potentially disturb buried resources if vehicles or other equipment are 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. 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. Research activities in open ocean areas would not be near or in contact with any submerged cultural resources.

As defined in section 3.4.1, “indigenous peoples” are defined in this document as those peoples with pre-existing sovereignty who were living together as a community prior to contact with settler populations and would include, but is not limited to: Native Americans, Alaska Natives, Native Hawaiians and other indigenous Pacific Islanders, and other aboriginal peoples. In some instances, cultural and spiritual belief systems surrounding marine mammals may make the study species itself a cultural resource to an indigenous community. Therefore, the proposed action could also result in some adverse effects to cultural resources. Adverse effects associated with biomonitoring and research could range from negligible adverse effects to long-term major effects, depending on the specific circumstances of the research activities and the extent to which researchers may feasibly implement mitigation measures. For example, biomonitoring and research activities that do not include collecting marine mammal parts would have only negligible adverse impacts. Conversely, for some indigenous communities, minor adverse effects may result from the collection and permanent curation of some parts for scientific purposes, which could, for example, potentially prevent the use of these parts for traditional marine mammal cultural burial practices, or use of bones or parts for cultural or ceremonial use. In these instances, the MMHSRP would plan to engage the local community, and work to include cultural representatives from indigenous communities, to ensure that these communities’ cultural needs are met, as feasible and to the extent consistent with MMPA and other applicable authorities. However, these effects may be offset by the beneficial impacts described above.

Under Alternative 1, after the current MMPA/ESA permit expires on December 31, 2022, all biomonitoring and research activities would cease. No effects on cultural resources would be expected to occur after this date as biomonitoring and research activities would no longer occur and therefore any potential risks to cultural resources would not exist.

9.3.1.4 Human Health and Safety

Minor, short-term, adverse effects on human health and safety may occur under Alternative 1. These impacts would only affect researchers and not the general public. Research 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 or frostbite in cold weather. Researchers conducting activities on pinniped rookeries and haul-out sites risk being injured by slips, trips, or falls as well as bites or other contact that may expose researchers to zoonotic diseases.

Sampling animals from vessels pose a variety of safety hazards. The use of crossbows, dart projectors, 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. Conversely, using UAS to conduct biomonitoring and research activities increases human health and safety by keeping responders further away from the animal.

Cetacean capture-release health assessments create many scenarios where human health and safety may be adversely impacted. Minor to major short-term and long-term adverse impacts could occur, including 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 traumatic injuries and/or 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. Similarly, burns could occur during hot branding of pinnipeds. 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 needlestick injuries and exposure to chemicals may occur during sampling. Activities in water may expose individuals to potentially harmful animals, such as stingrays, sharks, jellyfish, and sea lice. Shallow environments may have shells and other hard substrates that can scrape or cut skin.

Under Alternative 1, after the current MMPA/ESA permit expires on December 31, 2022, biomonitoring and research activities would not occur. A beneficial effect on human health and safety would occur after the expiration of the current MMPA/ESA permit as biomonitoring and research activities would cease and risks to researchers would end.

9.3.1.5 Socioeconomics

No impacts to socioeconomics are anticipated from biomonitoring and research activities under Alternative 1.

9.3.2 Alternative 2: Improved Implementation (Preferred Alternative)

Under Alternative 2, the NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit, and therefore the MMHSRP could continue biomonitoring and research activities after the current permit expires on December 31, 2022. The new permit would authorize biomonitoring and research activities for the length of time allowed for a permit by regulation. Future MMPA/ESA permit biomonitoring and research activities would be covered under this PEIS and no further environmental review would be necessary, unless the activities are beyond the scope of this document. Most Prescott Grant funded research projects use the MMHSRP's MMPA/ESA permit to accomplish their goals. Therefore, Alternative 2 would encourage researchers to continue to apply for Prescott Grants that are focused on marine mammal health research.

9.3.2.1 Biological Resources

The effects under Alternative 2 would be the same as the effects described under Alternative 1, with the exception that Alternative 2 also includes the issuance of a new MMPA/ESA permit. Therefore, biomonitoring and research activities could continue after December 31, 2022, and the effects from continuing these activities would be the same as those discussed under Alternative 1.

9.3.2.2 Water and Sediment Quality

The effects under Alternative 2 would be the same as the effects described under Alternative 1, with the exception that Alternative 2 also includes the issuance of a new MMPA/ESA permit. Therefore, biomonitoring and research activities could continue after December 31, 2022, and the effects from continuing these activities would be the same as those discussed under Alternative 1.

9.3.2.3 Cultural Resources

The effects under Alternative 2 would be the same as the effects described under Alternative 1, with the exception that Alternative 2 also includes the issuance of a new MMPA/ESA permit. Therefore, biomonitoring and research activities could continue after December 31, 2022, and the effects from continuing these activities would be the same as those discussed under Alternative 1.

9.3.2.4 Human Health and Safety

The effects under Alternative 2 would be the same as the effects described under Alternative 1, with the exception that Alternative 2 also includes the issuance of a new MMPA/ESA permit. Therefore, biomonitoring and research activities could continue after December 31, 2022, and the effects from continuing these activities would be the same as those discussed under Alternative 1.

9.3.2.5 Socioeconomics

The effects under Alternative 2 would be similar to the effects described under Alternative 1, with the exception that Alternative 2 also includes the issuance of a new MMPA/ESA permit. Therefore, biomonitoring and research activities could continue after December 31, 2022, and the effects from continuing these activities would be the same as those discussed under Alternative 1.

9.3.3 Alternative 3: More Stringent Protocols and Best Practices

Under Alternative 3 NMFS OPR Permits and Conservation Division would issue a new MMPA/ESA permit, and therefore the MMHSRP could continue biomonitoring and research activities after the current permit expires on December 31, 2022. However, the MMHSRP would only conduct biomonitoring and research activities on ESA-listed species. The new permit would authorize biomonitoring and research activities for the length allowed by regulation for a permit. Future MMPA/ESA permit biomonitoring and research activities would be covered under this PEIS and no further environmental review would be necessary, unless activities are beyond the scope of this document. Most Prescott Grant funded research projects use the MMHSRP's MMPA/ESA permit to accomplish their goals. Therefore, Alternative 3 would encourage researchers to continue to apply for Prescott Grants that are focused on marine mammal health research.

9.3.3.1 Biological Resources

The effects under Alternative 3 would be similar to the effects described under Alternative 2, with some exceptions. Biomonitoring and research activities would be focused exclusively on ESA-listed species. For individual animals that are ESA-listed, the impacts would be similar to those described under Alternative 2. Long-term beneficial impacts on whole populations of ESA-listed species are also expected, as more resources would be directed towards researching issues concerning the most vulnerable marine mammal populations. However, many novel tools and techniques (*e.g.*, vaccinations) are first tested on non ESA-listed species, before being applied to more vulnerable populations. Therefore, this alternative may also have indirect adverse impacts on ESA-listed species, as there would be fewer opportunities to test new tools and techniques that could ultimately help enhance ESA-listed populations through emergency response, biomonitoring, and research.

Alternative 3 will also have long-term adverse impacts on non-listed marine mammal populations, as all biomonitoring and research activities would cease for these species. This will prevent the MMHSRP from monitoring emerging health threats in these populations (which may also impact ESA-listed populations). By focusing exclusively on ESA-listed species, the MMHSRP may not be able to properly prepare for and help mitigate threats to non-listed populations.

Alternative 3 also includes the issuance of a new MMPA/ESA permit. Therefore, biomonitoring and research activities could continue after December 31, 2022, and the effects from continuing these activities would be the same as those discussed under Alternative 2, but only on ESA-listed species.

9.3.3.2 Water and Sediment Quality

The effects under Alternative 3 would be the same as the effects described under Alternative 2. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, biomonitoring and research activities could continue after December 31, 2022, and the effects from continuing these activities would be the same as those discussed under Alternative 2.

9.3.3.3 Cultural Resources

The effects under Alternative 3 would be the same as the effects described under Alternative 2. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, biomonitoring and research activities could continue after December 31, 2022, and the effects from continuing these activities would be the same as those discussed under Alternative 2.

9.3.3.4 Human Health and Safety

The effects under Alternative 3 would be the same as the effects described under Alternative 2. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, biomonitoring and research activities could continue after December 31, 2022, and the effects from continuing these activities would be the same as those discussed under Alternative 2.

9.3.3.5 Socioeconomics

The effects under Alternative 3 would be the same as the effects described under Alternative 2. As Alternative 3 also includes the issuance of a new MMPA/ESA permit, biomonitoring and research activities could continue after December 31, 2022, and the effects from continuing these activities would be the same as those discussed under Alternative 2.

9.4 Mitigation

The purpose of mitigation is to avoid, minimize, or eliminate negative impacts on the affected resources from the proposed action. Under Alternatives 1, 2, and 3, specific measures will be taken to moderate any significant impacts likely to occur as a result of biomonitoring and research activities.

As discussed in section 1.4.2.1, there are some standard mitigation measures already included under the MMHSRP research and enhancement permit, as set forth by the Permits and Conservation Division. There are additional standard mitigation measures for some MMHSRP activities in our Stranding Agreement Template (Appendix VIII), Evaluation Criteria for Marine Mammal Stranding Agreements (Appendix IX), Standards for Rehabilitation Facilities (Appendix XVII), and Standards for Release of Marine Mammals following Rehabilitation (Appendix V). In addition, there is required mitigation for certain events including sampling of animals during research under the NMFS IACUC policy (NMFS-PD 04-112-01), responding to animals during an oil spill through HAZWOPER training, and use of UAS following the NOAA UAS Policy 220-1-5. These standard mitigation measures are described below under each resource area (sections 9.4.1-9.4.5).

There are also other (optional) mitigation measures that the MMHSRP could implement to further reduce significant impacts on marine mammals while conducting activities. These are identified in the relevant Best Practices appendices in the PEIS and are also described below under each resource area (sections 9.4.1-9.4.5).

9.4.1 Biological Resources

9.4.1.1 Existing Mitigation Measures in NMFS OPR Permits and Conservation Division Permits

The MMHSRP would follow all mitigation measures set forth by NMFS OPR Permits and Conservation Division as conditions of the current and new MMPA/ESA permit, as well as the MMHSRP's own mitigation measures described in the MMHSRP Research Methodologies (Appendix XI). All NMFS OPR Permits and Conservation Division marine mammal permits contain conditions intended to minimize the potential adverse effects of the research activities on the animals. This also includes having an approved IACUC from each of the three regional NMFS IACUCs (Alaska and Northwest; California and Pacific Islands; Northeast and Southeast) to ensure that individual animal welfare is protected during research activities. 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 are requirements in the MMHSRP's current MMPA/ESA permit, and will continue to be included in the future 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.

When conducting baseline health research activities: For cetaceans, researchers may not biopsy, sample, or tag cetacean calves less than 6 months of age or females attending calves less than 6 months of age. Researchers may not capture cetaceans less than one year of age. For captures, pregnant cetaceans in the third trimester must only be sampled in-water.

- ***Photography and Filming:*** All researchers/CIs working under the permit would obtain prior approval by the Permit Holder/PI for use of photographs, video, and/or film that were taken to achieve the research objectives, and agree to the CI condition that such photographic activities would not influence the conduct of research in any way. Any photos or film approved for non-research use that are publicly published would include a credit, acknowledgement, or caption indicating that the research was conducted under a permit issued by NMFS (including the permit number) under the authority of the MMPA and/or ESA to inform the public that the activities had the appropriate authorizations.

- ***Research Personnel:*** The Permit Holder/PI would ultimately be responsible for all activities of any individual who is operating under the authority of the permit. Addition of CIs would be approved by the Permit Holder/PI after reviewing their qualifications and research plans. All authorized research personnel would be required to serve a research function and their request would be assessed to determine that they were qualified to perform that function.

- ***Reporting Conditions:*** An annual report would be submitted and reviewed by the NMFS OPR Permits and Conservation Division for each year the permit is valid. For marine mammal parts, the annual report would include data on each sample taken, imported, exported, or affected including: 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 unintentional (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 were otherwise disseminated during the year. At the expiration of the 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. Additionally, annual IACUC reports are required to be submitted (NMFS-PD 04-112-01) to the three NMFS IACUCs that list the number and species of animals that had procedures that either caused little or momentary pain or discomfort ("Category C") or caused potential discomfort or pain which is relieved by the appropriate anesthetic or analgesic ("Category D").

- ***Research Coordination:*** The Permit Holder/PI would be required to notify the appropriate NMFS Regional office at least 2 weeks in advance of research activities 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 permit would be taken in a humane manner, and in compliance with the ESA, MMPA, FSA, as applicable, and any applicable foreign law. Import and export 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, import CITES documentation from the USFWS.

- ***Biological Samples:*** All specimen materials collected or obtained by the MMHSRP would be maintained according to accepted curatorial standards as logistically possible (*e.g.*, given field conditions). 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 or destroyed.

- ***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 permit does not provide authorization for requirements under another state or federal agencies' jurisdiction. This would include obtaining necessary permits or authorizations for research conducted in a National Marine Sanctuary, national park, foreign country, etc., and following Federal Aviation Administration (FAA) requirements for UAS. Additionally IACUC approval and the approved IACUC protocols must be submitted prior to conducting research on live marine mammals.

9.4.1.2 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 permit actions. Consistent with the NMFS OPR Permits and Conservation Division 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 invasive procedures such as remote biopsy sampling, attachment of intrusive tags, biological sampling of captured animals and administration of drugs. All IACUC protocols would be followed to mitigate any animal welfare concerns. 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*, *Vessel and Aerial Surveys: 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 meters) to a large whale(s) or 50 yards (45.7 meters) 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. Researchers would leave the vicinity of an animal(s) or otherwise modify their behavior (slow down, change the angle of approach, etc.) if the animal(s) showed 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 or modified if 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.

When using UAS, activities would generally be conducted pursuant to NOAA UAS Policy 220-1-5, including pilot and crew training and qualification under the NOAA Operations Manual, aircraft authorization through the Federal Aviation Administration (FAA), preflight and operational checklists, and appropriate agency notifications and authorization for using UAS in defined areas. UAS usage by NOAA personnel conducting response or research activities would be conducted pursuant to all requirements of NOAA UAS Policy 220-1-5, including aircraft airworthiness certification from NOAA. Additionally, the UAS would hover over an individual animal only long enough to obtain the needed data.

If manatees are present in the area of vessel surveys or other vessel activities, researchers would obey all speed zones and manatee no entry zones. If manatees are observed prior to an encounter, care would be taken to slowly maneuver away from the direction of the animals. If a manatee is encountered while on the water, a minimum distance of 50 feet (15.2 meters) would be maintained at all times. If a manatee(s) approaches, vessel engines would be placed in neutral until the animal has passed. If manatees are located during manned aerial surveys, altitudes would be increased to 1,000 feet (300 meters), and surveys would cease if the manatees appear to be affected by the over flight. The appropriate USFWS Field Office and NMFS OPR Permits and Conservation Division would be contacted immediately to report any injuries that occur as a result of authorized research.

Mitigation for Capture, Restraint, and Handling: Capture, restraint, and handling procedures for pinnipeds and cetaceans would be performed or directly supervised by qualified personnel. Additionally, if possible, an experienced marine mammal veterinarian or research technician 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 in order to complete the activities as quickly as possible.

The precautionary measures for young and females with young described above would be followed during cetacean capture/release activities. During capture/release activities, female animals determined to be in late-term pregnancy (3rd trimester) may be tagged with a plastic livestock ear tag (*e.g.*, Rototag, Allflex tag, etc.) so they can be avoided in subsequent sets, and are not removed from the water for sampling.

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. During gas anesthesia, respiration would be monitored and oxygen administered. 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 animal's weight (if known) or researcher's best estimate of an animal's lean body mass and metabolic rate.

To prevent interactions with Florida manatees, sea turtles, or other ESA-listed marine species during cetacean capture activities, vessel personnel would be informed that it is illegal to intentionally or unintentionally (incidentally) harm, harass, or otherwise "take" manatees or sea turtles, and would be instructed to watch for these, and other, ESA-listed marine species. Netting activities would cease if a manatee, sea turtle, or other ESA-listed marine species is sighted in the vicinity of the vessel. If a manatee or sea turtle is accidentally captured, the vessel would immediately be stopped and either turned off or put in neutral. Tension on the net would be released to allow the animal the opportunity to free itself. Caution would be exercised when attempting to assist the animal in freeing itself. The appropriate USFWS Field Office and NMFS OPR Permits and Conservation Division would be contacted immediately to report any incidents.

Mitigation for Attachment of Scientific Instruments: Attaching scientific instruments would only be performed by CIs, trained research biologists, and veterinarians with experience applying the same, or similar, instruments to the target, or similar, species. Pinniped flipper tags would be placed appropriately, so animals would not walk on or be irritated by them. Care would be taken 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. To minimize the risk of infections from implantable tags, appropriate instrument sterilization and sterile surgery techniques would be used.

The MMHSRP would follow the best practices recommendations of a recent cetacean tagging workshop (Andrews *et al.* 2019) as well as Horning *et al*. (2017, 2019) for pinniped tagging. Additional measures to minimize the effects of attaching scientific instruments to large 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. Tags that break the skin would be sterilized according to the protocols outlined in the MMPA/ESA permit 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 down the body 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. For baseline health assessment research, no tagging attempts would be conducted on cetacean calves less than 6 months of age or females accompanying such calves, and 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 attachment methods would be minimally invasive, to minimize potential pain or infection. 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 generally receive follow-up monitoring, including visual observations where feasible, to evaluate any potential effects from tagging activities. The MMHSRP would not use tags with known issues for biomonitoring and research activities, and would use new improved tag designs once available and approved.

Mitigation for Marking: After freeze or hot branding, the skin would be returned to normal temperature as quickly as possible using water. Alternatively, branding may be conducted immediately before the animal is released and returned to the water. Pinnipeds would generally be hot branded under sedation or anesthesia, and health-compromised animals would not be hot branded.

Mitigation for All Sampling Procedures: These procedures would be performed or directly supervised by qualified personnel and if possible, an experienced marine mammal veterinarian or research technician 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, veterinary technician, 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 appear severely stressed or ill under manual restraint would not be sedated or anesthetized and would be released. 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 could lead to capture myopathy.

Mitigation for Blood Sampling: 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 would not need to exceed three attempts (needle insertions) per animal per sampling location 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. The sampling site would be disinfected prior to the procedure to minimize the risk of infection. Similarly, only sterile, disposable needles 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 would 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 Biopsy Sampling**:** Remote biopsy darts would be sterilized using an autoclave, gas sterilants, or liquid high-level disinfectants with adequate contact times (as indicated on the product label) to affect proper sterilization, per the terms and conditions of the MMPA/ESA permit. Instruments using liquid disinfectants would be rinsed with sterile water or saline before use on animals. Lastly, mitigation measures have been added to all scientific research and enhancement permits to reduce infection rates and minimize the likelihood that biopsy darts miss the target sampling site and accidentally strike the dorsal fin of certain small cetaceans. These permit mitigation measures would be followed to ensure that the likelihood of missing the target biopsy sampling area is minimized.

Sterile disposable biopsy punches or surgical instruments would be used to minimize the risk of infection and cross-contamination. Where disposable equipment is not available, an autoclave, gas sterilants, or liquid high-level disinfectants will be used with adequate contact times (as indicated on the product label) to affect proper sterilization, per the terms and conditions of the MMPA/ESA permit. Instruments using liquid disinfectants would be rinsed with sterile water or saline before use on animals. Local anesthetics will be used when collecting surgical biopsy samples, see Appendix XI for details.

Mitigation for Ultrasound Sampling: Esophageal, rectal and vaginal transducer probes will be well lubricated during sampling. Care will be taken to avoid introducing foreign matter into the esophagus, vaginal canal or rectum. Sedation may be used to minimize animal discomfort. Ultrasound and x-ray procedures on cetaceans will take place in water as often as possible.

Mitigation for Exposure to Playbacks and Other Acoustic Research: A particular playback trial would be suspended if the exposed marine mammals show strong reactions (*e.g.*, sustained breaching for cetaceans or other activities commonly associated with marine mammal stress or agitation). Playbacks may be stopped if non-target protected species approach the study area. Other mitigation for this research would be included as conditions of the MMPA/ESA permit.

Mitigation for Vaccinations: New vaccine testing would first occur on managed care, surrogate (*i.e*., non-listed species), or rehabilitating animals, before being tested in wild populations. Additionally, the MMHSRP would not use live vaccines.

Mitigation for Incidental Mortality: For a few marine mammal species, the permit authorizes a limited number of serious injuries or mortalities while conducting biomonitoring and research activities. If a serious injury or mortality occurs during biomonitoring or research activities, the specific research activity by that Co-Investigator would cease, and the Permit Holder/PI would notify NMFS OPR Permits and Conservation Division of research-related mortalities by e-mail or phone as soon as possible, and no later than 72 hours after the incident. Within 2 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 incidents. The specific biomonitoring and research activity would not resume until written permission is received from the NMFS OPR Permits and Conservation Division.

Mitigation for Incidental Mortality of USFWS Marine Mammal Species: The MMHSRP has mitigation measures to avoid interactions with these species (see: *Mitigation for Capture*, *Restraint*, *and Handling*). However, if sea otters, walrus, or manatees are injured or killed during research activities, research would be suspended. A report would be sent to the USFWS, Division of Management Authority, the appropriate USFWS Field Office, and NMFS OPR Permits and Conservation Division.

9.4.1.3 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.

Additionally, research activities would avoid essential fish habitat (EFH), including SAV and coral reefs, as much as possible. If operating in areas with SAV, coral reefs, or other EFH, vessel operators would be aware of potential impacts to these habitats, and would avoid grounding vessels or anchoring on top of fragile habitats such as SAV and coral reefs. If the MMHSRP would conduct research and biomonitoring activities in protected and sensitive habitats and damage to these resources may be unavoidable, the MMHSRP would consider moving the study site, if feasible, or developing contingency plans to mitigate damage resulting from the research and biomonitoring activities. Additionally, all mitigation outlined in the MMPA/ESA permit would be followed. This includes ensuring that research gear is never set, anchored on, or pulled across corals. Researchers would take great care to avoid damaging seagrass species including minimizing anchor or net drag and treading or trampling during in-water captures. To reduce the potential for seagrass damage, anchors may be set by hand when water visibility is acceptable. Anchors would be placed in unvegetated areas within seagrass meadows or areas having relatively sparse vegetation coverage, whenever possible. Anchor removal would be conducted in a manner that avoids the dragging of anchors and anchor chains. If research gear is lost, diligent efforts would be made to recover the lost gear to avoid further damage to benthic habitats.

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

9.4.2 Water and Sediment Quality

If hazardous materials or wastes were accidentally released during biomonitoring and research activities, personnel would notify the appropriate federal, state, or local authorities and assist with clean-up activities if possible.

9.4.3 Cultural Resources

Impacts to cultural resources during biomonitoring and research activities would be avoided by contacting the appropriate State Historic Preservation Office/Tribal Historic Preservation Office (SHPO/THPO) or other local authorities prior to any projects that may disturb or damage resources. Known, physical cultural resources would be avoided during research activities. If cultural resources are discovered during these activities, all work would cease and the SHPO/THPO would be contacted. In some instances, cultural and spiritual belief systems surrounding marine mammals may make the study species itself a cultural resource. In these instances, the MMHSRP would plan to engage the local cultural community. The MMHSRP would work to include cultural representatives from traditional communities, to ensure that these communities' cultural needs are met, to the extent practicable consistent with the MMPA and other applicable authorities. Some examples of specific mitigation that may occur could include facilitating engagement with local indigenous people in the planning stages of the planned research activity, publicizing findings of postmortem examinations and analyses, and working with local communities to develop criteria for retaining marine mammal body parts and samples. The extent to which these mitigation measures can be feasibly and legally implemented will depend on a variety of factors unique to each research study.

9.4.4 Human Health and Safety

Safety protocols have been developed for health assessment capture studies. The use of life vests would be required when working on vessels, in order to comply with National Oceanic and Atmospheric Administration's (NOAA's) Small Boat Safety Program and policies (NOAA Administrative Order (NAO)

209-125[47]). Gloves and other protective clothing would be used during most 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 capture activities conducted in water to monitor and treat any human illness or injury. If possible, U.S. Coast Guard or local law enforcement personnel would accompany the research vessel(s) 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. The NOAA's Small Boat Safety Program and policies (NAO 209-125) and policies on NOAA employees on non-NOAA vessels (NAO 209-115[48], as applicable) would be followed to reduce risks during vessel operations. NOAA's Aviation Safety Policy (NAO 209-124[49]) 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.

9.4.5 Socioeconomics

As no impacts to socioeconomics are anticipated from biomonitoring and research activities, no socioeconomic mitigation is necessary for biomonitoring and research activities.

[47] More information on this NAO can be found at: https://www.noaa.gov/organization/administration/nao-209-125-noaa-small-boat-safety-program

[48] More information on this NAO can be found at: https://www.noaa.gov/organization/administration/nao-209-115-noaa-employees-aboard-non-noaa-vessels

[49] More information on this NAO can be found at: https://www.noaa.gov/organization/administration/nao-209-124-aviation-safety-policy

Chapter 10 Cumulative Impacts

10.1 Resource Specific Cumulative Impacts

Cumulative effects are defined as those that result from incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency (federal or nonfederal) or person undertakes such 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 that take place 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 action area. Reasonably foreseeable future National Marine Fisheries Service (NMFS) Office of Protected Resources' (OPR) Marine Mammal Health and Stranding Response Program (MMHSRP) actions that are not fully analyzed in previous chapters of this final Programmatic Environmental Impact Statement (PEIS) are listed in Table 10-1. For the purposes of this final PEIS, only those resource areas identified in Chapter 3 as potentially subject to impacts from the proposed actions and alternatives are discussed in this section.

Table 10-1 Reasonably Foreseeable MMHSRP Actions

MMHSRP Action	Description	Timeline
Marine Mammal Parts Transfer Regulations	Current regulations for the transfer of marine mammal parts make it difficult for parts from live and dead stranded marine mammals to be efficiently transferred for research, education, and cultural use purposes. A proposed rule, or rules if determined more practicable, would be written to amend existing regulations. At a minimum, if any impacts associated with the proposed rule were identified that were not addressed in this final PEIS, a supplemental EA (SEA) including a Regulatory Impact Review would be prepared.	2-3 years

Public Viewing Guidelines	Public display at rehabilitation facilities is generally prohibited under Marine Mammal Protection Act (MMPA) regulations (50 CFR 216.27 (c)(5)). An exemption is provided in the case where the NMFS Regional Director or the NMFS OPR Director has specifically authorized the activities and they are conducted in a manner consistent with the requirements applicable to public display. This exemption is currently in place for all rehabilitation facilities and public viewing is not counted as a non-compliance issue during rehabilitation inspections. Public viewing guidelines would be developed by NMFS to identify and address issues associated with the viewing of marine mammals in rehabilitation and outline acceptable forms of viewing (note: not display) for facilities. These guidelines may be included in a future version of the Rehabilitation Facility Standards. An Environmental Assessment (EA) would likely be prepared to assess any environmental impacts associated with the proposed guidelines.	3-5 years
Emergency Response Hazing Guidelines	Non-lethal, minimally harmful hazing guidelines are currently in development by NMFS OPR. However, these guidelines are intended for fishers, not the stranding network. Once these guidelines are finalized, the MMHSRP may adopt these guidelines outright, or may develop separate guidelines for members of the Marine Mammal Stranding Network (Stranding Network) outlining deterrence or hazing methods that could be implemented in emergency response situations (*e.g.*, oil spills, mass strandings, etc.).	2-5 years after issuance of final NMFS guidelines
Continued Use and Adaptive Management of Best Practices Documents	The Best Practices documents included as mitigation strategies under this final PEIS will be used in the coming years. As new data and feedback on their effectiveness are gathered, the MMHSRP may make revisions to further improve the Best Practices documents.	Continuous

10.1.1 Biological Resources

Under all of the alternatives, the response, rehabilitation, and release activities of the MMHSRP would have a beneficial cumulative effect on marine mammals. Under the proposed alternatives, the MMHSRP would continue to rescue, rehabilitate, and return animals to the wild that would otherwise die (but under Alternative 1 (No Action Alternative), the MMHSRP would not receive a new MMPA/Endangered Species Act (ESA) permit and all response (including carcass disposal), rehabilitation, and release of ESA-listed species by Stranding Agreement (SA) holders would cease, all biomonitoring and research activities would cease, and most entanglement response would be severely curtailed after December 31, 2022). Under Alternatives 2 and 3 (which includes issuance of a new MMPA/ESA permit), the continued return of threatened and endangered animals back to the wild could have a beneficial impact on the survival of these species, both in terms of population growth and in contributing to genetic diversity. Similarly, continued entanglement response under Alternatives 2 and 3 would benefit individuals and populations by providing detailed information on the types and manner of entanglement which can inform management actions to prevent future entanglements, as well as freeing individuals that could contribute to the population. Therefore, the beneficial impact of entanglement response on the survival of threatened and endangered populations may be substantial. Many of the documents in this final PEIS have been recently updated, such as the standards (*e.g.*, Standards for Rehabilitation Facilities, Standards for Release), or are new best practices documents (*e.g.*, Carcass Disposal Best Practices, Small Cetacean Intervention Best Practices, Entanglement Response Best Practices). Under Alternatives 2 and 3, the MMHSRP will implement the updated standards and will recommend the use of these best practices for the foreseeable future, and may develop further guidelines and best practices documents in future years (*i.e.*, Public Viewing Guidelines, Emergency Response Hazing Guidelines). These standards and best practices documents are intended to minimize adverse impacts to biological resources (*i.e.*, marine mammals, other species, and protected and sensitive habitats) while conducting marine mammal stranding and entanglement response, carcass disposal, rehabilitation, and release. Additionally, the MMHSRP will promote training opportunities (*e.g.*, workshops, webinars, etc.) to ensure that these best practices are easily incorporated into the Stranding Network and Entanglement Response Networks. Therefore, these documents and associated trainings will have a cumulative positive impact, as they will decrease the adverse impacts on biological resources discussed in previous chapters. As new data are gathered on the effectiveness of the best practices, the documents may be revised to further decrease adverse impacts to biological resources.

Public display at rehabilitation facilities is generally prohibited under MMPA regulations (50 CFR 216.27 (c)(5)). An exemption is provided in the case where the NMFS Regional Director or the NMFS OPR Director has specifically authorized the activities and they are conducted in a manner consistent with the requirements applicable to public display. This exemption is currently in place for all rehabilitation facilities and public viewing is not counted as a non-compliance issue during rehabilitation inspections. Public viewing guidelines would be developed by NMFS for rehabilitation facilities to differentiate this activity from existing public display regulations for animals in permanent managed care. These public viewing guidelines would identify and address issues associated with the viewing of marine mammals in rehabilitation and outline acceptable forms of viewing (*i.e.*, not display). NMFS would establish guidelines that govern when and under what conditions public viewing of rehabilitating marine mammals is authorized. NMFS would develop public viewing guidelines that ensure the requirements of the MMPA are met. The guidelines would be designed to protect animal health and to ensure that the potential for a successful rehabilitation would not be compromised. A SEA would most likely be prepared to assess any impacts associated with the proposed guidelines. The guidelines would be available for review by the Marine Mammal Commission, current rehabilitation facilities, and the public. Significant cumulative effects on marine mammals would not be expected from this activity.

Cumulative impacts from non-MMHSRP activities that may have an adverse effect on marine mammals include but are not limited to: climate change, disease outbreaks, environmental pollution (marine debris and contaminants), fisheries interactions, geophysical mapping, habitat degradation, human disturbance, industrial activities, ocean noise pollution (*e.g.*, ship traffic, sonar signals, seismic air guns, underwater explosives, underwater construction), and vessel strikes. The goal of the MMHSRP is to collect information to assess how these factors influence the health and health trends of individual marine mammals and marine mammal populations, as well as to mitigate their effects. For example, the proposed actions would allow for the continued entanglement response for marine mammals affected by fisheries interactions and marine debris, thus providing mitigation to those factors that may kill or seriously injure marine mammals. The MMHSRP collects data on vessel strikes, which is used to inform management actions that could reduce vessel strikes. As well, responding to unusual mortality events (UMEs) caused by a disease outbreak could inform the potential development of a vaccination program for vulnerable populations to prevent future outbreaks mitigating cumulative impacts from disease.

There are other permits authorizing marine mammal takes in the United States, and the NMFS OPR Permits and Conservation Division has issued numerous permits for the take of marine mammals by harassment from a variety of activities, including but not limited to: aerial and vessel surveys (including manned and unmanned), photo-identification, remote biopsy sampling, attachment of scientific instruments, marking, and capture and sampling of marine mammals in the United States. The MMHSRP MMPA/ESA permit is one of the only permits authorizing the take of ESA-listed stranded, distressed, or imperiled marine mammals for stranding response (including carcass disposal), rehabilitation, and release. Additionally, the MMHSRP MMPA/ESA permit is one of the only permits that authorizes entanglement response for all ESA-listed and non-listed large whales, small cetaceans and pinnipeds. One permit, issued to the Pacific Islands Fisheries Science Center (PIFSC), authorizes vaccinations, entanglement response, and in-situ veterinary treatments of an ESA-listed species (Hawaiian monk seals (*Neomonachus schauinslandi*). Response activities for Hawaiian monk seals are closely coordinated between the MMHSRP and PIFSC. A limited number of permits authorize disentanglement of marine mammals in remote areas if entangled animals are encountered during research activities. Similarly, a limited number of permits authorize salvage of dead marine mammals in remote areas, if encountered during research activities.

The number of permits and associated takes issued by the OPR Permits and Conservation Division that allow harassment of marine mammals for research purposes indicate a high level of research effort for some marine mammal species in the proposed action area, including threatened and endangered species. This is due, in part, to interest in developing appropriate management and conservation measures to monitor and recover these species. Given the number of permits, associated takes, research vessels and personnel present in the environment, repeated disturbance of individual marine mammals may occur in some instances, particularly in areas close to shore. However, most permitted activities are conducted at different locations and at different times of the year, and therefore should not overlap. As discussed in Chapter 9, on the few occasions where overlap does occur, the MMHSRP often partners with researchers to take additional samples under existing capture permits to minimize duplication in effort (*i.e.*, piggy-backing).

All permits issued by the OPR Permits and Conservation Division for takes of protected species contain conditions requiring permit holders to coordinate their activities with the NMFS regional offices and other permit holders conducting research on the same species in the same areas, maintain close communication, and, to the extent possible, share data or samples to avoid unnecessary duplication of research and disturbance of animals. Thus, requirements are in place to limit repeated harassment of target animals.

As described in previous chapters, the proposed primary action (continuation of the MMHSRP) and the proposed secondary action (permit issuance) is likely to have both adverse and beneficial impacts on marine mammal populations in the action area, particularly where ESA-listed (endangered and threatened) and MMPA-depleted species are involved. Although the target animals are impacted by a number of human activities, it is important to note that these activities are not occurring simultaneously on the same individuals within a population/stock, or on a daily basis, and most human impacts do not cause serious injury or mortality of marine mammals. Further, the target species are not exposed to all human activities at all times, particularly given the broad action area and the migratory nature of some species.

The short-term stresses (individually and combined with other environmental stresses) resulting from the permitted activities would be expected to be minimal to targeted animals. Additionally, the MMHSRP expects any effects of harassment to dissipate before animals could be harassed by other directed research activities. The MMHSRP continues to develop tools and techniques to improve the rescue, rehabilitation, release (including post-release monitoring), entanglement response, and biomonitoring of marine mammals. Specifically, these novel tools and techniques are designed to reduce the stress experienced by both target and non-target animals during emergency response and research activities. These tools and techniques may also reduce the impacts to other biological resources (*i.e.*, protected and sensitive habitats, sea turtles, birds, etc.). Although the potential moderate adverse effects of repeated or chronic disturbance should not be dismissed, the potential long-term benefits and value of information gained on these species is significant. The proposed enhancements would include interventions that improve the welfare of sick and injured marine mammals, contribute to population recovery, and research that would provide valuable information on these species' biology and ecology that in turn would be used to improve their management and reduce the effects of human activities on these populations.

10.1.2 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, storm water 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, including carcass disposal following the best practices (Appendix XIV), would be negligible compared to these impacts.

10.1.3 Cultural Resources

For the preferred alternative, the adoption of mitigation measures would include coordinating with the appropriate federal, state, tribal, and local authorities (*e.g.*, State Historic Preservation Office or Tribal Historic Preservation Officers), and continuing to impose special release considerations on ice seals rehabilitated outside of their stranding location in the Arctic. The MMHSRP would continue to coordinate with indigenous peoples to accommodate cultural uses of marine mammals when conducting response, rehabilitation, release, carcass disposal activities, and biomonitoring and research activities, as appropriate and to the extent consistent with the MMPA and other applicable authorities. While some of the MMHSRP's activities could have negligible to major short-term and long-term adverse impacts, it is expected that the MMHSRP's activities will cumulatively have only minor impacts on cultural resources, and would not contribute to a cumulatively significant impact to these resources.

10.1.4 Human Health and Safety

Many of the best practices documents included in this final PEIS are new or have been recently updated, and the issuance of these documents is expected to have a beneficial cumulative impact on human health and safety, as they will help to mitigate risks to human health and safety, especially risks to marine mammal responders and researchers. The MMHSRP would recommend the use of these best practices for the foreseeable future, and may develop further guidelines and best practices documents (*i.e.*, Emergency Response Hazing Guidelines). Additionally, the MMHSRP may promote training opportunities to ensure that these best practices are easily incorporated into the Stranding Network and Entanglement Response

Networks. These new/recently revised best practices documents are intended to minimize adverse impacts to human health and safety while conducting marine mammal stranding and entanglement response, rehabilitation, and release. Additionally, the MMHSRP has some existing documents (*i.e.*, Pinniped and Cetacean Oil Spill Response Guidelines (Ziccardi *et al.* 2015) and Guidelines for Assessing Exposure and Impacts of Oil Spills on Marine Mammals (Sullivan *et al.* 2019)) that were not revised as part of this PEIS, but would also minimize adverse impacts to human health and safety while conducting some activities (*i.e.*, oil spill response). Overall, these documents and associated trainings will have a cumulative positive impact, as they will decrease adverse impacts on human health and safety across many of the MMHSRP's activities. As new data are gathered on the effectiveness of the best practices, and as new tools are developed, the best practices documents may be revised to further decrease adverse impacts to human health and safety. Lastly, the MMHSRP would continue outreach initiatives to reduce the number of negative animal-human interactions by untrained public. This would improve human health and safety.

10.1.5 Socioeconomics

It is possible that release of rehabilitated pinnipeds could have an adverse cumulative impact on the socioeconomics of an area where pinniped populations are recovering. Pinniped conflicts with commercial and recreational fisheries are ongoing. Pinnipeds may interact with catch and gear in several fisheries (*e.g.*, gillnet, purse seine, troll, trap and live bait fisheries). Threatened and endangered salmon fish stocks have been greatly reduced due to dams, habitat destruction, overfishing, and more. A few individual animals from recovered pinniped populations in certain localized areas along the U.S. west coast now consume some salmon as they prepare to pass through fish ladders, further impairing the recovery of some local salmon stocks (Chasco *et al.* 2017). Fishers frequently move their boats when sea lions are present, and incur additional fuel costs and loss of fishing time. However, the release of rehabilitated pinnipeds would likely not cause a large enough increase to recovering populations to contribute to additional interactions with the commercial and recreational fisheries, as successfully rehabilitated and released pinnipeds account for far less than 1 percent of the population (Table 10-2). Space conflicts between pinnipeds and humans have occurred at harbors and beaches throughout the United States. More animals hauled out on beaches may deter beach visitors, and impact revenue gained from beachgoers. However, pinnipeds can also have a positive impact on socioeconomics as well. Some areas have become well known for visitors to observe sea lions up close (*e.g.*, Pier 39 in San Francisco; Newport, Oregon Bayfront; etc.), increasing revenue for these cities. Additionally, marine mammal rehabilitation centers fulfill important roles in some communities and could, along with other businesses, draw tourists to an area. Released pinnipeds or their offspring have the potential to be involved in future conflicts, which may have an adverse or positive cumulative impact on socioeconomics.

Table 10-2 Average number of the most commonly successfully rehabilitated and released pinnipeds from 2006-2018 compared to the estimated population in 2018[50].

Species	*Average Annual Number of Pinnipeds Released (2006-2018)*	*Estimated Population in 2018*
California sea lion *Zalophus californianus*	707 $\pm$ 332	257,606
Gray seal *Halichoerus grypus*	34 $\pm$ 9	27,131
Harbor seal (California) *Phoca vitulina*	76 $\pm$ 26	30,968
Harbor seal (East Coast)	40 $\pm$ 13	75,834

10.2 Unavoidable Adverse Impacts

Unavoidable adverse impacts on marine mammals would occur during the MMHSRP's activities. During response and rehabilitation activities, animals may exhibit adverse reactions, sustain injuries or die, despite the best efforts made by trained Stranding Network participants and the implementation of the proposed mitigation measures. Some activities would require a vessel close approach, which could 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. Interventions (including stranding and entanglement response and rehabilitation) would be undertaken when prognosis for the animal was long-term suffering or death. The animal may die during the intervention, but in the judgment of the responders, it would also most likely have died without intervention. Some research activities would also impact marine mammals, even with the proposed mitigation measures in place. Animals may have adverse reactions to research activities, or may be injured or die despite the use of best available science and techniques. In some cases research may be conducted to better understand a population that is not healthy after a known event, such as an oil spill, or is unhealthy for unknown reasons. By understanding the cause(s) of the population's poor health, restoration activities or treatment/conservation activities may be developed that

[50] Population estimate data are from the 2018 Stock Assessment Reports: https://www.fisheries.noaa.gov/action/2018-marine-mammal-stock-assessment-reports-available

will benefit the population. If the mitigation measures for MMHSRP activities are followed, no unavoidable adverse impacts on other biological resources are expected.

Unavoidable impacts on human health and safety would occur from the MMHSRP's activities. Even with the implementation of the proposed mitigation measures, there would still be a risk to marine mammal personnel safety and public safety. Some risks are inherent when working with wild animals, as their behavior is unpredictable. For example, large whale entanglement response activities will always be dangerous, due to animal behavior and working on the open ocean. However the best practices aim to mitigate many of the foreseeable safety issues. During emergency response activities there would always be a potential for public safety to be impacted, as there would be a lag time between when an animal is reported and when a responder arrives on scene. During this window, members of the public could come in contact with the animal, risking physical injuries or exposure to potential infectious diseases.

Unavoidable impacts on marine mammals as cultural resources may occur from some of the MMHSRP's activities. As described in the mitigation sections of this document, NMFS will make efforts to consult with and incorporate religious and cultural practices in MMHSRP activities to the extent consistent with MMPA and other applicable authorities. However, NMFS is required to implement the provisions and objectives of the MMPA, and in some circumstances, cultural practices may not be able to be accommodated in order for NMFS to fulfill its obligations under the MMPA.

10.3 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 all proposed alternatives, no resource commitments are irreversible or irretrievable. Most potential adverse impacts are temporary and/or short-term, while the identified longer-term adverse impacts can be reduced through the proposed mitigation measures outlined in Chapters 4-9.

10.4 Relationship between Short-term Uses and Long-term Productivity

This final PEIS addresses the question of whether the proposed alternatives provide short-term benefits at the cost of future generations. Based on the analyses presented in the final PEIS, no long-term loss of productivity would be expected. The MMHSRP's stranding response, carcass disposal, rehabilitation, release, entanglement response, and biomonitoring and research activities would contribute to the long-term productivity of marine mammal populations.

Chapter 11 List of Preparers

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Chapter 13 Index

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