PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FOR THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL DATA BUOY CENTER

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ACRONYMS AND ABBREVIATIONS

AIS	Automated Identification System
BPR	bottom pressure recorders
CAA	Clean Air Act
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
C-MAN	Coastal-Marine Automated Network
CWA	Clean Water Act
CWB	Coastal Weather Buoys
CZMA	Coastal Zone Management Act
DART	Deep-ocean Assessment and Reporting of Tsunamis
EA	Environmental Assessment
EFH	essential fish habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
EPA	U.S. Environmental Protection Agency
HAPC	Habitat Area of Particular Concern
IOOS	U.S. Integrated Ocean Observing System
MBTA	Migratory Bird Treaty Act
MCC	Mission Control Center
MMPA	Marine Mammal Protection Act
MPA	marine protected area
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSR	Marine Scientific Research
NAO	NOAA Administrative Order
NASA	National Aeronautics and Space Administration
NDBC	National Data Buoy Center
NEPA	National Environmental Policy Act
NMS	National Marine Sanctuary
NMSA	National Marine Sanctuaries Act
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
NWS	National Weather Service
NWSTG	National Weather Service Telecommunications Gateway
nm	nautical miles
PEA	Programmatic Environmental Assessment
SBA	Societal Benefit Area
SHPO	State Historic Preservation Office
TAO	Tropical Atmosphere Ocean
TBTO	tributyltin oxide-based
USCG	U.S. Coast Guard

EXECUTIVE SUMMARY

INTRODUCTION

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC), a part of the National Weather Service (NWS), designs, develops, operates, and maintains a network of moored buoys and coastal stations throughout the world's oceans, seas, and lakes for the purpose of providing civil earth marine observations. NDBC has prepared a Programmatic Environmental Assessment (PEA) to analyze the continued operation of the NDBC program, including anticipated program decisions over the next five years. The PEA assesses the environmental impacts of current and future NDBC initiatives and decisions. The goal is to provide a baseline for impacts on environmental resources from the continued operation of the NDBC network of buoys and Coastal-Marine Automated Network (C-MAN) stations. The No Action Alternative is included to provide a basis of comparison to the Proposed Action, which is the administration of the current NDBC program without any changes or improvements.

NDBC has provided real-time, oceanographic, and meteorological observations since 1967 to a wide variety of stakeholders and users. NDBC provides high quality ocean and coastal observations for public safety use in direct support of short range and extended range NWS forecasts, Warnings, and Watches. This valuable data provides users with up to the minute decision-making observations needed for safe commercial and marine recreation activities.

NOAA prepared the PEA to identify potential impacts to the environment; develop alternatives and tactical plans to mitigate identified impacts; and build a strategy to address dynamic situations at a tiered level when necessary. As NDBC continues to mature, it is imperative to analyze NDBC's potential impact on the human and natural environment. The PEA also provides an efficient process for systematically analyzing NDBC's proposal to continue operations while maintaining compliance with applicable environmental laws, regulations, and NOAA guidance, such as:

- National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code [U.S.C.] Section 4321, et seq.);
- Council on Environmental Quality's (CEQ) *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 Code of Federal Regulations [CFR] Parts 1500-1508);
- NOAA Administrative Order (NAO) 216-6A, *Compliance with the National Environmental Policy Act; Executive Orders 12114, Environmental Effects Abroad of Major Federal Actions; 11988 and 13690, Floodplain Management; and 11990 Protection of Wetlands* (effective April 22, 2016); and
- Companion Manual for NOAA Administrative Order 216-6A (effective January 13, 2017).

THE IMPORTANCE OF NDBC

NDBC is responsible for the development, operations, and maintenance of the national data buoy network and serves as an international center of excellence and best practice for data buoys and associated in-situ meteorological and oceanographic environmental monitoring technology. The

NDBC network of buoys and coastal stations provides high quality meteorological and oceanographic environmental data in real time from automated observing systems in the open ocean and coastal zones surrounding the United States (NOAA NDBC 2008).

NDBC is a tenant at Stennis Space Center, which is owned and managed by NASA, in Mississippi. NDBC facility-based operations, including receiving and monitoring marine observation data; and the construction, assembly, and testing of buoys and C-MAN stations, occurs at Stennis Space Center.

The NDBC program is composed of four formal NOAA Observing Systems of Record: (1) Coastal Weather Buoys (CWB), (2) the land-based C-MAN, (3) Tropical Atmosphere Ocean Array (TAO), and the Deep-ocean Assessment and Reporting of Tsunamis (DART). Currently NDBC's network consists of 200 buoys and 46 C-MAN stations that transmit observations and data via satellite that are processed and quality-controlled, and disseminated for public release in near real-time. All NDBC CWBs measure sea surface temperature and wave height and period. Additionally, the CWBs and C-MAN stations measure wind speed and direction; barometric pressure; and air temperature. At select TAO stations, conductivity and water currents are also measured. Buoy data are an important source of observations for research studies, since they are usually the most accurate marine data available and normally one of the few long-time series data sets from fixed locations (DBCP 1996).

In-situ real-time oceanographic and meteorological observations are critical to a wide variety of users such as federal, state, academic, and private industry stakeholders. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research.

The *National Plan for Civil Earth Observations* and the *National Strategy for a Sustained Network of Coastal Moorings* identify the Societal Benefit Areas (SBAs) supported by NDBC ocean observations. The societal benefits of ocean observations are interconnected at local, regional, national, and international scales. These SBAs include scientific research, economic activities, and environmental and social domains. Many involve critical government functions, such as the protection of life and property (NSTC 2014). The nine SBAs that are applicable to NDBC are:

- **Climate:** Understanding, assessing, predicting, mitigating, and adapting to climate variability and change.
- **Coastal and Marine Hazards and Disasters:** Reducing loss of life, property, and ecosystem damage from natural and human-induced disasters.
- **Ocean and Coastal Energy and Mineral Resources:** Improving the identification and management of energy and mineral resources.
- **Human Health:** Understanding environmental factors affecting human health and well-being.
- **Ocean and Coastal Resources and Ecosystems:** Understanding and protecting ocean, coastal, and Great Lakes populations and resources, including fisheries, aquaculture, and marine ecosystems.

- **Marine Transportation:** Improving the safety and efficiency of all forms of Marine Transportation.
- **Water Resources:** Improving water-resource management through better understanding and monitoring of the water cycle.
- **Coastal and Marine Weather:** Improving weather information, forecasting, and warning.
- **Reference Measurements:** Improving reference measurements — the fundamental measurement systems and standards supporting them.

Ocean observations from diverse sources, including satellites, aircraft, and in-situ platforms, when integrated, provide powerful tools for understanding the past, present, and future conditions of Earth systems. Among the diverse sources of ocean observations, data buoys provide unique and invaluable information to support critical government functions, such as the protection of life and property. NDBC data are accessed on a daily basis, by millions of national and international stakeholders and assimilated into a myriad products and services. The categories of stakeholders, which rely on NDBC data, include:

- NWS National Centers for Environmental Prediction, and Weather Forecast Offices
- State and Federal Agencies
- Federal, State, and Local Emergency Managers
- Foreign Governments and Institutions
- Federal and State Public Health Officials
- Commercial and Recreational Mariners
- Tribal Governments
- Port and Harbor Authorities
- Commercial providers of weather and ocean conditions and forecasts

PURPOSE AND NEED

The purpose of the analysis in this PEA is to provide a baseline for impacts on environmental resources from the continued operation of the NDBC network of buoys and C-MAN stations. The operation of the NDBC network of buoys and C-MAN stations is needed to fulfill NDBC's mission to provide quality in-situ marine observations in a safe and sustainable manner to support the understanding of and predictions to changes in weather, climate, oceans, and coasts. Additionally, the action is needed to provide continued societal benefits as identified in the *National Plan for Civil Earth Observations*.

NDBC operations provide a comprehensive, reliable, and sustainable network of in-situ, real-time, meteorological, and oceanographic observations. The observations provided by NDBC are critical to a wide range of federal, state, academic, and private industry stakeholders. These observations add value to a diverse spectrum of applications, including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental and ecosystem monitoring and research.

PROPOSED ACTION

NDBC proposes to continue the operation and maintenance of the existing buoys and C-MAN stations and deploy additional buoys and C-MAN stations as operational needs arise. Technology additions to the system, such as acoustic releases, would be used during buoy deployment. Additionally, under the Proposed Action, land-based operations would continue at Stennis Space Center as currently executed.

Facility-based Operations at Stennis Space Center

Under the Proposed Action, land-based operations would continue at Stennis Space Center as currently executed. The addition of new technology equipment to the buoys would not increase or alter the operations at Stennis Space Center. Components used to construct CWBs and C-MAN stations, and sensors would be stored and tested in existing facilities. In the future, additional facilities would be constructed or renovated to support future operations as the needs arise.

Marine and Coastal Operations

Under the Proposed Action, buoy operation and maintenance would continue as currently implemented. Buoys are maintained and serviced on a regular basis to ensure that the sensors are operating properly and that batteries are still functional. The maintenance schedule is developed based on buoy location, type, and vessel availability. In the event of malfunction of a buoy sensor or battery, NDBC will deploy a team to repair or replace the sensor or battery as soon as operationally practicable.

Buoy Deployment Operations

Under the Proposed Action, buoys would continue to be deployed as the operational need arises throughout the world's oceans and the Great Lakes. Once a general area for a new buoy is identified, NDBC would locate any obstructions or hazards in the area, including telecommunication lines, pipelines, navigational waterways, geologic features (i.e., craters or trenches), biological resources (i.e., critical habitats), and cultural resources (i.e., shipwrecks). If resources are identified in the area, they would be avoided to the maximum extent practicable. Buoy deployment would be accomplished by vessels that are owned and operated by the USCG, private, or government entities under charter (e.g., commercial owner, state university).

Improvements to NDBC Moorings

Under the Proposed Action, NDBC would continue to seek improvements in mooring materials and mooring design concepts. These improvements, when implemented, have the potential to reduce the number of adrift events, which can reduce the amount of mooring material left behind and reduces the need for replacing mooring materials.

At-sea Mooring Recovery Operations

Under the Proposed Action, NDBC buoys would utilize additional mooring recovery equipment, such as acoustic releases and line cutters to maximize the recovery of the mooring (i.e., rope, chain,

or wire), excluding the anchor. An acoustic release is a device that is attached to the mooring that when activated, receives an acoustic ping and disengages the mooring line from the anchor. Since the acoustic release is located above the seafloor, the anchor and the bottom chain would not be recoverable and would remain on the seafloor. A line cutter is used when the mooring is not configured with an acoustic release or the release fails. The use of acoustic releases and line cutters would require additional funding and authorization to accommodate for the increased expense of the equipment and servicing vessels with adequate mooring recovery and handling systems.

Improved Adrift Buoy Recovery Operations

Adrift buoys represent both navigational and environmental risks. Under the Proposed Action, NDBC would continue to follow NDBC's Station Failure Response Policy (Instruction No. 1804-06.04A), adrift buoys or with no position-fixing equipment shall be recovered as soon as possible, practical, and consistent with personnel safety, subject to ship or other asset availability. In all adrift buoy events, NDBC works at local, national, and international levels to notify and inform mariners of adrift buoy locations.

Improvements to Prevent the Fouling of Buoy Hulls and the Transport of Aquatic Invasive Species

NDBC has established processes to prevent the spread of invasive and non-native species to other waters, in accordance with the National Invasive Species Act and Executive Order 13112, Invasive Species. Under the Proposed Action, NDBC would implement cleaning processes to prevent invasive species from being transported to another area. Once a buoy is recovered from the water and is aboard the ship, it is cleaned by pressure washing and scraping. The cleaning occurs in the area that the buoy was recovered from so any species that were attached to the buoy are returned to the water.

Improvements for Establishing or Relocating C-MAN Stations

Under the Proposed Action, NDBC would continue to deploy C-MAN stations and consider various factors to determine an appropriate location. Factors include, whether or not there is an existing structure that could be used to collocate the sensors, as well as natural and biologically important areas (e.g., critical habitat, U.S. Fish and Wildlife Service lands). Using this information, NDBC selects the most suitable location based on mission requirements and environmental factors.

NO ACTION ALTERNATIVE

CEQ regulations specify the inclusion of the No Action Alternative in the alternatives analysis (40 CFR 1502.14). Under the No Action Alternative, the NDBC would continue operations as currently performed. No additional buildings or facilities would be constructed at Stennis Space Center. No additional buoys or C-MAN stations would be deployed. However, the buoys that are currently deployed would continue to be operated and maintained. If a buoy were to become untethered from its mooring and go adrift in the ocean, it would be recovered when operationally practicable. Buoys and their associated moorings that become adrift could pose navigational risks and environmental risks to sensitive and protected marine areas, habitat, and marine life.

NDBC would continue to provide real-time meteorological and oceanographic data to the various groups of stakeholders. Weather forecasters and Federal, State, and Local Emergency Managers would continue to use data provided by NDBC to aid in the prediction of tsunamis, hurricanes, and other large weather events. However, without the deployment of additional buoys and C-MAN stations in the future, additional research data needed to support the SBAs would not be realized.

SUMMARY OF POTENTIAL IMPACTS

Proposed Action

The following discussion summarizes the direct and indirect impacts by resource area associated with the alternatives evaluated in Section 4 of the PEA. The impacts of the alternatives on each resource category were assessed using the evaluation criteria to distinguish type (i.e., beneficial or adverse), intensity (i.e., negligible, minor, moderate, major), and duration (i.e., short-term or long-term) of potential impacts within the context of each resource category.

Overall, the Proposed Action would be expected to result in short- and long-term, negligible to minor, adverse impacts on the physical (geological resources and water quality), biological, and cultural resources from the continued operation of the NDBC program. The continued facility-based operations at Stennis Space Center would be expected to result in short- and long-term, negligible, adverse impacts on physical (geological resources and water quality) and biological resources and no impacts on cultural resources.

Short-term, negligible to minor, adverse impacts on geological resources, marine mammals, EFH, and native aquatic species would be expected from buoy deployment operations, improving NDBC moorings, and improved adrift buoy recovery operations. Buoy deployment operations would not be expected to result in any long-term adverse impacts to marine biological resources or critical habitat.

The installation or relocation of C-MAN stations would result in short-term, negligible, adverse impacts on water quality and marine mammals from the use of vessels during installation activities. Short- and long-term, minor, adverse impacts on terrestrial geological resources from establishing a new C-MAN tower. No impacts on marine geological resources or cultural resources would be expected from the installation of C-MAN station on an existing structure.

Additionally, short- and long-term, minor to moderate beneficial impacts on water quality would be expected from the continued deployment of NDBC buoys, improving NDBC moorings, at-sea mooring recovery operations, improved adrift buoy recovery operations, and preventing the fouling of buoy hulls. Short- and long-term, moderate, beneficial impacts on marine biological species would be expected from improving buoy moorings, at-sea mooring recovery operations, improved adrift buoy recovery operations, and preventing the fouling of buoy hulls. Short- and long-term, negligible to moderate, beneficial impacts on cultural resources would also be expected from the implementation of the Proposed Action.

No Action Alternative

Under the No Action Alternative, NDBC would not deploy any new buoys. The buoys that are currently deployed would remain at sea and would continue to be operated and maintained. The No Action Alternative would eliminate any direct adverse effects of buoy deployment operations, improvements to NDBC moorings, at-sea mooring recovery operations, and improved adrift buoy recovery operations. However, short-term, negligible to minor, adverse impacts on marine geological and biological resources would be expected from the continued maintenance of the buoys in the Great Lakes Region.

Short- and long-term, minor, adverse impacts on biological resources and short-term, negligible, adverse impacts on water quality would be expected from the buoy remaining adrift for a longer period and transferring non-native species to other areas. No impacts on geological or cultural resources would be expected.

Similar to the NDBC buoy network no additional C-MAN stations would be deployed. Therefore, short- and long-term, moderate, adverse impacts on various stakeholder groups would be expected from the lack of data. No additional short- or long-term, adverse impacts would be expected from abandoning the C-MAN stations and sensors in place.

Additionally, without the deployment of new buoys and C-MAN stations, short- and long-term, moderate, adverse impacts on the various stakeholder groups would be expected from the lack of data and continued research. Additional short- and long-term, minor to moderate, adverse impacts would also be expected if an adrift buoy no longer transmits valuable data.

BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

As site-specific projects are planned, appropriate monitoring measures would be proposed as part of the design, deployment, and maintenance activities. Site-specific monitoring efforts would be more fully described in the appropriate tiered NEPA document (e.g., tiered site-specific EA, CE Memorandum, etc.). Appropriate potential monitoring and mitigation measures would be implemented at the site-specific stage through consultation with federal and state agencies, adherence to federal/state/local regulations, and development and implementation of environmental management plans and BMPs. All vessels operating in support of NDBC projects would be required to follow vessel owner/operator best management practices during deployment and maintenance activities. Prior to deployment of a buoy which would have the potential for marine geological, cultural, or biological impacts (e.g., dropping mooring anchors), NDBC personnel or vessel crew would survey the bottom to assure that the mooring and anchor are not sited in an area such that adverse impacts could occur (e.g., adverse impacts to submerged aquatic vegetation, essential fish habitat, shipwrecks). Additionally, NDBC would consult and file permits, as appropriate, with federal, state and tribal agencies prior to deploying a NDBC buoy or C-MAN station.

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1. INTRODUCTION

This Programmatic Environmental Assessment (PEA) has been prepared to analyze the continued operational activities of the National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC). NDBC is part of the National Weather Service (NWS) and designs, develops, operates, and maintains a network of moored buoys and coastal stations throughout the world's oceans, seas, and lakes for the purpose of providing civil earth marine observations. NDBC has provided real-time, oceanographic, and meteorological observations since 1967 to a wide variety of stakeholders and users. NDBC provides high quality ocean and coastal observations for public safety use in direct support of short range and extended range NWS forecasts, Warnings, and Watches. This valuable data provides users with up to the minute decision-making observations needed for safe commercial and marine recreation activities.

The Proposed Action analyzed in this PEA is the continued operation of the NDBC program, including anticipated program decisions over the next five years. This PEA assesses the environmental impacts of current and future NDBC initiatives and decisions. The goal is to provide a baseline for impacts on environmental resources from the continued operation of the NDBC network of buoys and Coastal-Marine Automated Network (C-MAN) stations. The No Action Alternative is included to provide a basis of comparison to the Proposed Action, which is the administration of the current NDBC program without any changes or improvements.

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- Companion Manual for NOAA Administrative Order 216-6A (effective January 13, 2017).

This PEA is divided into seven sections and appendices. Section 1 includes a general description of the NDBC Program, its purpose and need, and programmatic scope and Section 2 describes the Proposed Action and alternatives. Section 3 describes the affected environment and Section 4 includes the analysis of environmental consequences on the affected environment, and mitigation and monitoring measures. Section 5 is a discussion of cumulative effects. Section 6 includes a

list of references and Section 7 provides the list of agencies coordinated or consulted with during the preparation of this PEA.

1.1 NDBC PROGRAM

1.1.1 Background

In 1966, recognizing the need for a comprehensive data buoy development program, the Ocean Engineering Panel of the Interagency Committee on Oceanography recommended the creation of a national data buoy system to replace numerous individual and relatively ineffective buoy development programs that were in place. Following a 10-month feasibility study, Congress enacted legislation authorizing the initiation of a national data buoy system. The activity was assigned to the U.S. Coast Guard (USCG) and in December 1967, the National Data Buoy Development Project was created. Through an interagency agreement, the USCG and the NDBC are integral partners in the sustained operations and maintenance of coastal moored data buoys.

Upon creation of NOAA in October 1970, the National Data Buoy Development Project was transferred from the USCG to NOAA where its operations were centralized in Mississippi at the John C. Stennis Space Center, where it continues to function as the NDBC. The Stennis Space Center is a federal facility managed by the National Aeronautics and Space Administration (NASA) located in Hancock County, Mississippi, approximately 50 miles from New Orleans, Louisiana.

NDBC is responsible for the development, operations, and maintenance of the national data buoy network and serves as an international center of excellence and best practice for data buoys and associated in-situ meteorological and oceanographic environmental monitoring technology. The NDBC network of buoys and coastal stations provides high quality meteorological and oceanographic environmental data in real time from automated observing systems in the open ocean and coastal zones surrounding the United States (NOAA NDBC 2008).

The NDBC is a National Center operated by the United States Department of Commerce, NOAA NWS. It is organizationally structured as a program under the portfolio of the NWS Office of Observations. The NDBC is composed of four formal NOAA Observing Systems of Record. These four systems are the Coastal Weather Buoys (CWB), land-based C-MAN, Tropical Atmosphere Ocean Array (TAO), and the Deep-ocean Assessment and Reporting of Tsunamis (DART). Currently NDBC's network consists of 200 buoys and 46 C-MAN stations that transmit observations and data via satellite that are processed and quality-controlled, and disseminated by the NWS Telecommunications Gateway (NWSTG) for public release in near real-time. The quantities and types of NDBC observing systems of record are shown in Table 1-1. Detailed descriptions of these systems is in Section 1.1.3.2.

All NDBC CWBs measure sea surface temperature and wave height and period. Additionally, the CWBs and C-MAN stations measure wind speed and direction; barometric pressure; and air temperature. At select TAO stations, conductivity and water currents are also measured. Buoy data are an important source of observations for research studies, since they are usually the most accurate marine data available and normally one of the few long-time series data sets from fixed locations (DBCP 1996).

Table 1-1. NDBC Observing Systems of Record

Observing Systems of Record	Quantity
Coastal Weather Buoy (CWB)	106
Coastal-Marine Automated Network (C-MAN)	46
Tropical Atmosphere Ocean (TAO) Array	55
Deep-ocean Assessment and Reporting of Tsunamis (DART)	39

1.1.2 The Importance of NDBC

In-situ, real-time, oceanographic, and meteorological observations are critical to a wide variety of users such as federal, state, academic, and private industry stakeholders. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research.

The societal benefits of ocean observations are interconnected at local, regional, national, and international scales. The *National Plan for Civil Earth Observations* and the *National Strategy for a Sustained Network of Coastal Moorings* identify the Societal Benefit Areas (SBAs) supported by NDBC ocean observations (NSTC 2014). These SBAs include scientific research, economic activities, and environmental and social domains. Many involve critical government functions, such the protection of life and property (NSTC 2014). The nine SBAs that are applicable to NDBC are:

- **Climate:** Understanding, assessing, predicting, mitigating, and adapting to climate variability and change.
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- **Reference Measurements:** Improving reference measurements — the fundamental measurement systems and standards supporting them.

Ocean observations from diverse sources, including satellites, aircraft, and in-situ platforms, when integrated, provide powerful tools for understanding the past, present, and future conditions of Earth systems. These tools and the improved knowledge they provide, together with socioeconomic data describing the human dimension in the global environment, can help solve problems; address and mitigate risks; and deliver skillful predictions of the future behavior of Earth systems. Ocean observations are an indispensable component to measure and monitor our progress towards addressing societal challenges. Among the diverse sources of ocean observations, data buoys provide unique and invaluable information to large and diverse sectors of our society and global economy. Many ocean observations support critical government functions, such as the protection of life and property. NDBC data are accessed on a daily basis, by millions of national and international stakeholders and assimilated into a myriad products and services. The categories of stakeholders, which rely on NDBC data, include:

- NWS National Centers for Environmental Prediction, and Weather Forecast Offices
- State and Federal Agencies
- Federal, State, and Local Emergency Managers
- Foreign Governments and Institutions
- Federal and State Public Health Officials
- Commercial and Recreational Mariners
- Tribal Governments
- Port and Harbor Authorities
- Commercial providers of weather and ocean conditions and forecasts

NDBC data are used widely in diverse economic sectors, such as:

- Weather and Climate Forecast and Warnings
- Marine transportation
- Research and academia
- Energy resource assessment
- Spacecraft and satellite launch and recovery operations
- Fishing
- Recreation and tourism
- Aquaculture
- National defense and security
- Ecosystem monitoring

NDBC data are used in a variety of applications. Some examples include:

- **Meteorologists** use NDBC data to adjust flight level wind speeds reported by hurricane reconnaissance aircraft to surface winds.
- **Geophysicists** use NDBC data to calibrate remotely sensed measurements from spacecraft by using sea surface temperature, wind, and wave reports.
- **Engineers** use NDBC data to obtain directional wave measurements to study beach erosion and shore protection.
- **Fishermen, boaters, and surfers** use NDBC data to determine if they want to venture offshore.

- **Marine biologists** use NDBC data to help describe the processes that impact and control ocean water quality in sensitive ecosystems and marine protected areas.
- **Tsunami Warning Centers** use NDBC data to validate the occurrence of an open ocean tsunami.
- **Climate scientists** use NDBC data to study and forecast the El Niño Southern Oscillation.

1.1.3 NDBC Operations

1.1.3.1 Facility-based Operations at Stennis Space Center

NDBC is a tenant at Stennis Space Center, which is owned and managed by NASA. Stennis Space Center was created in 1961 for testing engines for the Apollo Space Program (NASA 2012). Stennis is home to many tenant organizations including the NOAA NDBC, U.S. Navy, U.S. Geological Survey, and local university programs. NDBC facility-based operations occur in 11 buildings in the southwestern corner of the Stennis Space Center (see Figure 1-1). The following section provides facility descriptions and the activities and operations that occur at each facility.

Figure 1-1. Aerial Photograph of NDBC Campus of Facilities at Stennis Space Center

NDBC Mission Control Center and Operational Highbay (Building 3203). Building 3203 is an approximately 130,000-ft^2 facility, which houses both the NDBC Mission Control Center (MCC) and the NDBC Operational Highbay, as well the NDBC IT infrastructure and as office space for employees (see Figure 1-2).

Figure 1-2. NDBC MCC and Operational Highbay (Building 3203)

The NDBC MCC is the central location for monitoring marine observation data and overall performance of NDBC buoys and C-MAN stations, as well as buoys and stations owned and maintained by federal agencies (i.e., National Ocean Service, and National Park Service), and non-federal regional ocean observing systems (i.e., the U.S. Integrated Ocean Observing System [IOOS]) (NOAA NDBC 2012). Data quality analysts in the NDBC MCC review the quality of data on a daily basis and flag questionable data to prevent questionable data from further public release (NOAA NDBC 2009). Additionally, the MCC maintains situational awareness of NDBC buoys and stations using a variety of tools including weather satellite feeds and Automated Identification System (AIS) for ship traffic.

The Operational Highbay accommodates a wide variety of buoy system refurbishment, integration, and testing activities (e.g., sensor and equipment testing); shipping and receiving; repairing and refurbishing buoys; and payload assembly. An isolated section of the highbay is dedicated to sensor testing which includes a wind tunnel and barometric pressure chamber.

Fabrication and Consumable Warehouse Facility (Building 3202). The fabrication and consumable warehouse is approximately 49,640 ft^2 that contains specialized equipment for fabrication and assembly of buoys and their necessary components. Part of Building 3202 is a standalone machine shop that contains manufacturing and material working equipment (see Figure 1-3). This facility provides NDBC with the environment needed to support the assembly and maintenance of buoys and C-MAN stations.

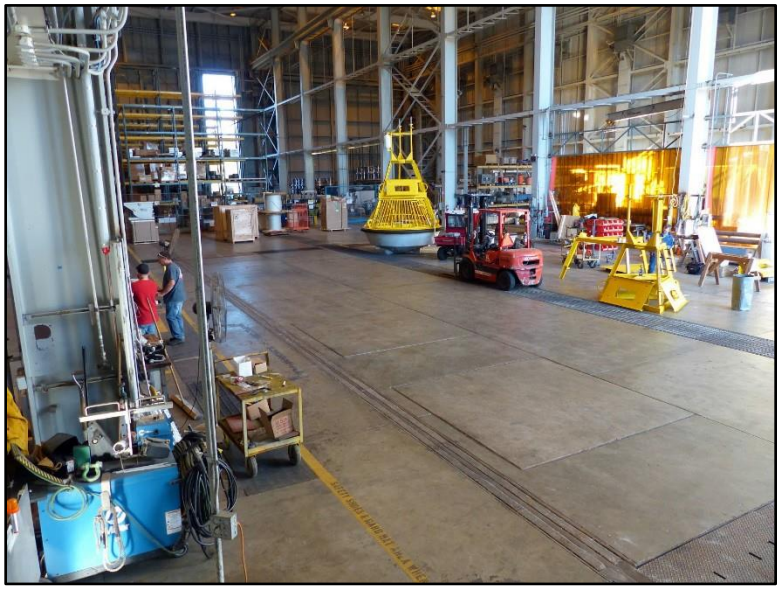


Figure 1-3. Fabrication and Consumable Warehouse (Building 3202)

Welding Facility (Building 3208). The welding building is approximately 2,900 ft^2 and is used for fabrication and repairs of steel, aluminum, and stainless steel buoy and station components (see Figure 1-4).

Figure 1-4. Welding Facility (Building 3208)

Paint and Sandblasting Facility (Building 3216). The 3,470 ft^2 paint and sandblasting facility was constructed in 2010 to refurbish buoys and their components (see Figure 1-5). The system uses a multi-stage filtering system with conditioned air during painting operations. The sandblasting facility uses a recycling system to separate contaminated media from waste streams.

Figure 1-5. Paint and Sandblasting Facility (Building 3216)

Ocean Sensor Calibration Laboratory (Building 3206). The Ocean Sensor Calibration Laboratory is approximately 1,005 ft^2 and is used for testing and calibration of ocean sensors (see Figure 1-6).

Figure 1-6. Ocean Sensor Calibration Laboratory (Building 3206)

Administrative offices, Laboratory, and Property Storage Facility (Building 3205). The offices, laboratory and storage facility is approximately 27,870 ft^2 (see Figure 1-7). The laboratory facilities are used for designing, prototyping, testing, repairing, and calibrating buoy sensors, payload assemblies, and other electronic components.

Figure 1-7. Administrative Offices and Laboratory (Building 3205)

Lead Acid and Alkaline Battery Storage Facility (Building 3215). The battery storage facility is approximately 330 ft^2 of climate controlled space used for storing new and refurbished batteries used in the buoys and C-MAN stations power systems (see Figure 1-8).

Figure 1-8. Battery Storage Facility (Building 3215)

Lithium Battery Storage Locker (Building 3209-A). The battery storage facility is a modular, climate controlled facility that is approximately 250 ft^2 and is positioned adjacent to the NDBC Mission Control Center and Operational Highbay (Building 3203) on an existing concrete pad. This facility allows NDBC to store lead acid, lithium metal, lithium ion, and alkaline batteries in separate, partitioned areas (see Figure 1-9).

Figure 1-9. Lithium Battery Storage Locker (Building 3209-A)

Mooring Storage facility (Building 3203-A). The mooring storage facility is approximately 2,890 ft^2 and provides bulk storage for buoy mooring components (see Figure 1-10).

Figure 1-10. Mooring Storage Facility (Building 3203-A)

Dock and Testing Facility (Building 3150). The dock and buoy testing facility is an approximately 360-ft^2 facility used to perform extensive field-testing of new and rebuilt sensors (NOAA NDBC 2016) (see Figure 1-11). Final calibration and testing of the completed buoy systems are accomplished in the onsite canal (NOAA NDBC 2012).

Figure 1-11. Dock and Testing Facility (Building 3150)

Sensor Test Farm and Buoy Row. The Sensor Test Farm is an outdoor area where a series of structures accommodate sensors for testing and evaluation. Buoy Row is an outdoor area where integrated systems are placed for final end-to-end testing prior to field deployment (see Figure 1-12).

Figure 1-12. Sensor Test Farm and Buoy Row

1.1.3.2 Ocean and Coastal Operations

The ocean and coastal operations of the four NOAA observing systems of record that comprise NDBC's operational network, the CWBs, C-MAN, TAO Array, and DART, are described below.

Coastal Weather Buoys

CWBs are the backbone of NDBC's national network of ocean observations. They are deployed in the coastal and offshore waters of the United States, more specifically in the Atlantic Ocean, Caribbean Sea, Gulf of Mexico, Pacific Ocean, Gulf of Alaska, Bering Sea, and the Great Lakes. CWBs measure and transmit real-time meteorological and oceanographic data such as atmospheric pressure; wind direction, speed, and gusts; air and sea temperature; salinity and directional wave energy ranges. Real-time data from CWBs are used by the NWS to forecast marine and coastal weather, as well as severe storms, such as hurricanes. Data are transmitted from CWBs, processed, and transmitted to end-users. The data from CWBs is available to the public and is accessed daily by millions of users. Currently, there are 106 CWBs operated by the NDBC (see Figure 1-13).

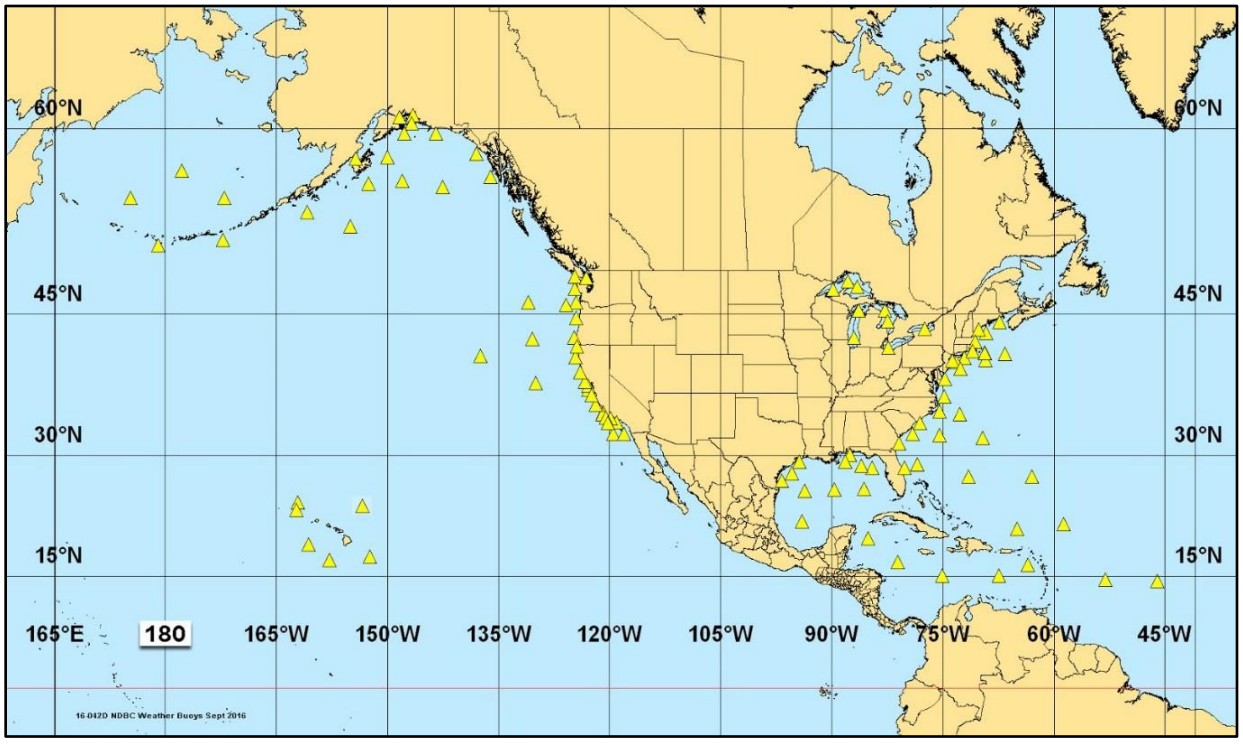


Figure 1-13. Locations of Coastal Weather Buoys Operated by NDBC

Prior to establishing a new CWB or servicing an existing CWB, NDBC considers various factors to determine the appropriate location and buoy design. Once a general location is selected based on mission requirements, NDBC will determine if existing infrastructure (e.g., pipelines, telecommunication lines), seafloor features (e.g., trenches), natural and biologically important areas (e.g., critical habitat, coral reefs, National Marine Sanctuaries), and transportation passageways are present at the location. Using this information, NDBC selects the most suitable location based on mission requirements and environmental factors.

CWBs are constructed and assembled at Stennis Space Center, then transported via flatbed truck to a seaport to be loaded aboard a ship for deployment at sea. The at sea process consists of physically placing the buoy, its associated hardware, mooring, and anchor in the ocean, at the previously determined location, using the hoisting and deck handling equipment of the ship. CWB designs vary based upon the operational needs of the station location. Surface buoy hulls are typically constructed with either aluminum or ionomer foam. The moorings are typically constructed using a combination of steel chain and hardware, synthetic rope, phenolic thimbles, syntactic foam floats, and concrete or steel anchors. The anchors have an approximate surface area of 25 ft^2 (5 feet by 5 feet), are 3.2 feet in height, and typically weigh 8,500 pounds. The anchors used in the Great Lakes are pyramid-shaped anchors that are recoverable. The Great Lakes CWBs and anchors are removed from the water each year during winterization. Detailed activities for each deployment, including the materials used, are described in a specific Field Service Plan and Cruise Plan for each mission (see Appendix A).

Coastal-Marine Automated Network

NDBC established the C-MAN in the early 1980s in order to obtain additional meteorological observations in coastal areas around the United States (NOAA NDBC 2008). C-MAN is a meteorological observation network consisting of 46 stations (see Figure 1-14) installed on lighthouses or towers; at capes and beaches; on near shore islands; and on offshore platforms (see Figure 1-15). Many of the older stations are located on or near lighthouses once maintained by the USCG. Some of the lighthouses are still in operation and are listed on the National Register of Historic Places (NRHP).

A typical C-MAN station includes sensors that measure and transmit meteorological data such as wind direction, speed, and gusts; air temperature; and relative humidity. The data are transmitted via satellites to the NDBC MCC and then processed and transmitted hourly to users in a manner almost identical to CWB data.

C-MAN stations are serviced every other year. During a service visit, the sensors are all replaced and re-calibrated. The batteries at a C-MAN station are replaced every 4 years unless the need arises for them to be replaced sooner. The maintenance to the structure in which NDBC equipment is installed, is the responsibility of the property owner. As some stations become weathered and the towers, lighthouses, or structures become unsafe for NDBC technicians, NDBC will either disestablish the station or work with the property owner to relocate the station to maintain a consistent, long-term data stream.

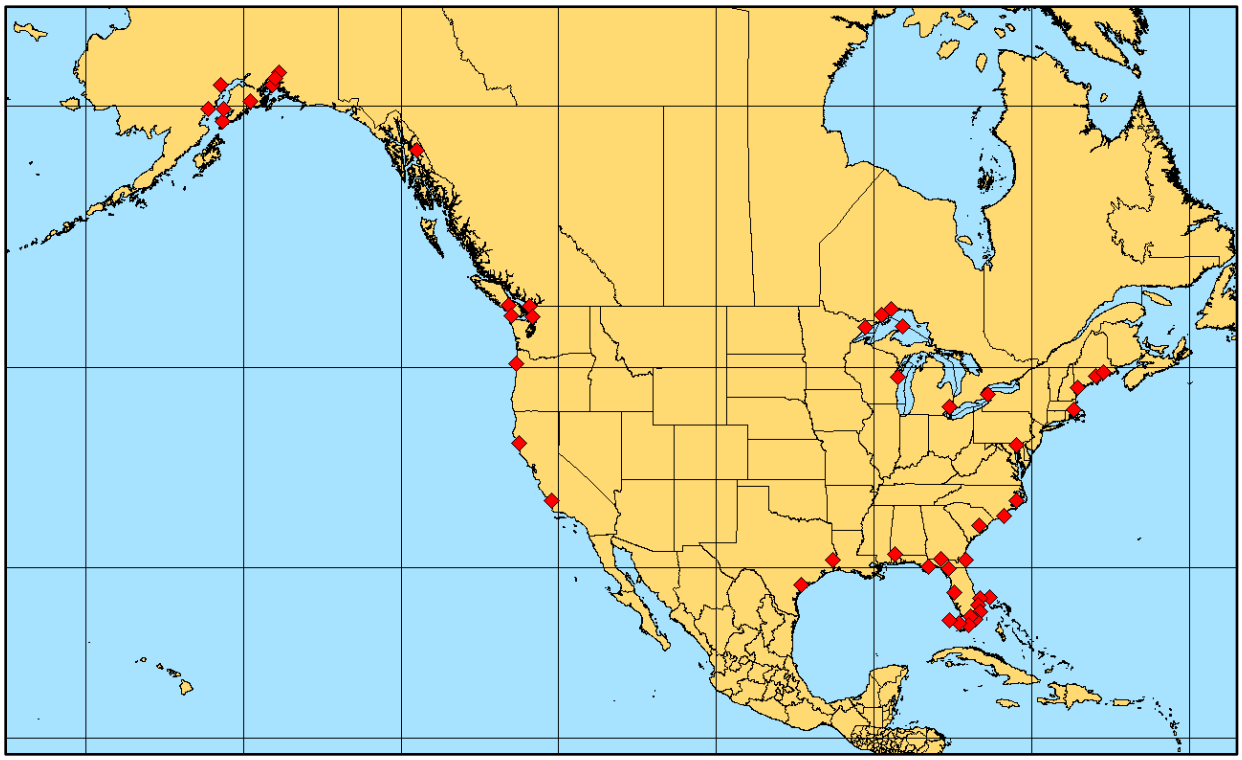


Figure 1-14. Locations of C-MAN Stations

Figure 1-15. Photographs of C-MAN Stations at Various Locations

Prior to establishing a new C-MAN station or changing the location of an existing C-MAN station, NDBC considers various factors to determine the appropriate C-MAN station design. Once a general location is selected based on mission requirements, NDBC works with the property owner to determine design constraints or site-specific requirements. As part of the permitting process, natural, biological, or historical significant areas are further investigated to determine if establishing a C-MAN station in the area is appropriate. The permitting process depends on the location and ownership of the property owner. Based on the results of this collaborative evaluation, NDBC selects the most suitable C-MAN design to meet mission requirements.

Tropical Atmosphere Ocean Buoys

Motivated by the 1982-1983 El Niño event, which highlighted the need for enhanced data from the Tropical Pacific Ocean for the monitoring, prediction, and improved understanding of El Niño, the TAO array, was developed as the U.S. component of the Global Tropical Moored Buoy Array of the International Global Ocean Observing System. Currently, the TAO array consists of 55 stations located in the Tropical Pacific Ocean (see Figure 1-16). The array was designed to measure surface meteorological and subsurface oceanic parameters, primarily wind speed and direction, sea-surface temperature and salinity, and subsurface temperature. These core observations, along with ancillary observations (barometric pressure, solar radiation, and ocean currents), are collected and transmitted to users in near real-time via satellite relay.

Prior to establishing a new TAO station or servicing an existing TAO station, NDBC considers various factors to determine the appropriate location and TAO station design. Once a general location is selected based on mission requirements, NDBC determines if existing infrastructure (e.g., pipelines, telecommunication lines), seafloor features (e.g., trenches), natural and biologically important areas (e.g., critical habitat, coral reefs, National Marine Sanctuaries), and transportation passageways are present at the location. Using this information, NDBC selects the most suitable location based on mission requirements and environmental factors. TAO stations are constructed and assembled at Stennis Space Center and then transported via flatbed truck to the port and loaded aboard a ship for deployment at sea. The at sea process consists of physically placing the buoy, its associated hardware, mooring, and anchor in the ocean, at the predetermined location, using the hoisting and deck handling equipment of the ship. TAO designs vary based upon the operational needs of the station location. Surface buoy hulls are typically constructed with either aluminum or ionomer foam. The moorings are typically constructed using a combination of steel chain and hardware, synthetic rope, jacketed wire cable, sensors, phenolic thimbles, syntactic foam floats, and steel anchors (see Figure 1-17). Detailed activities for each TAO deployment including the material used are described in a specific Field Service Plan and Cruise Plan for each mission (see Appendix A).

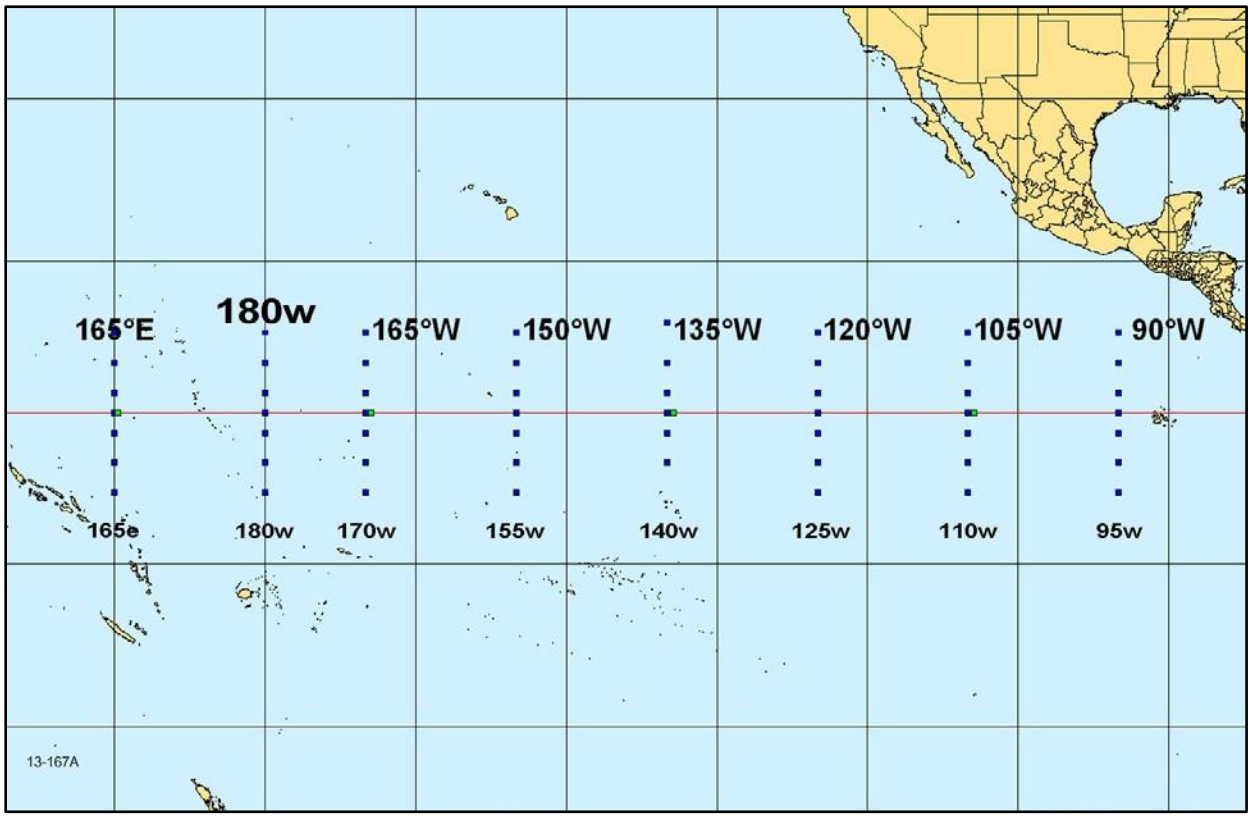


Figure 1-16. Locations of TAO Buoys

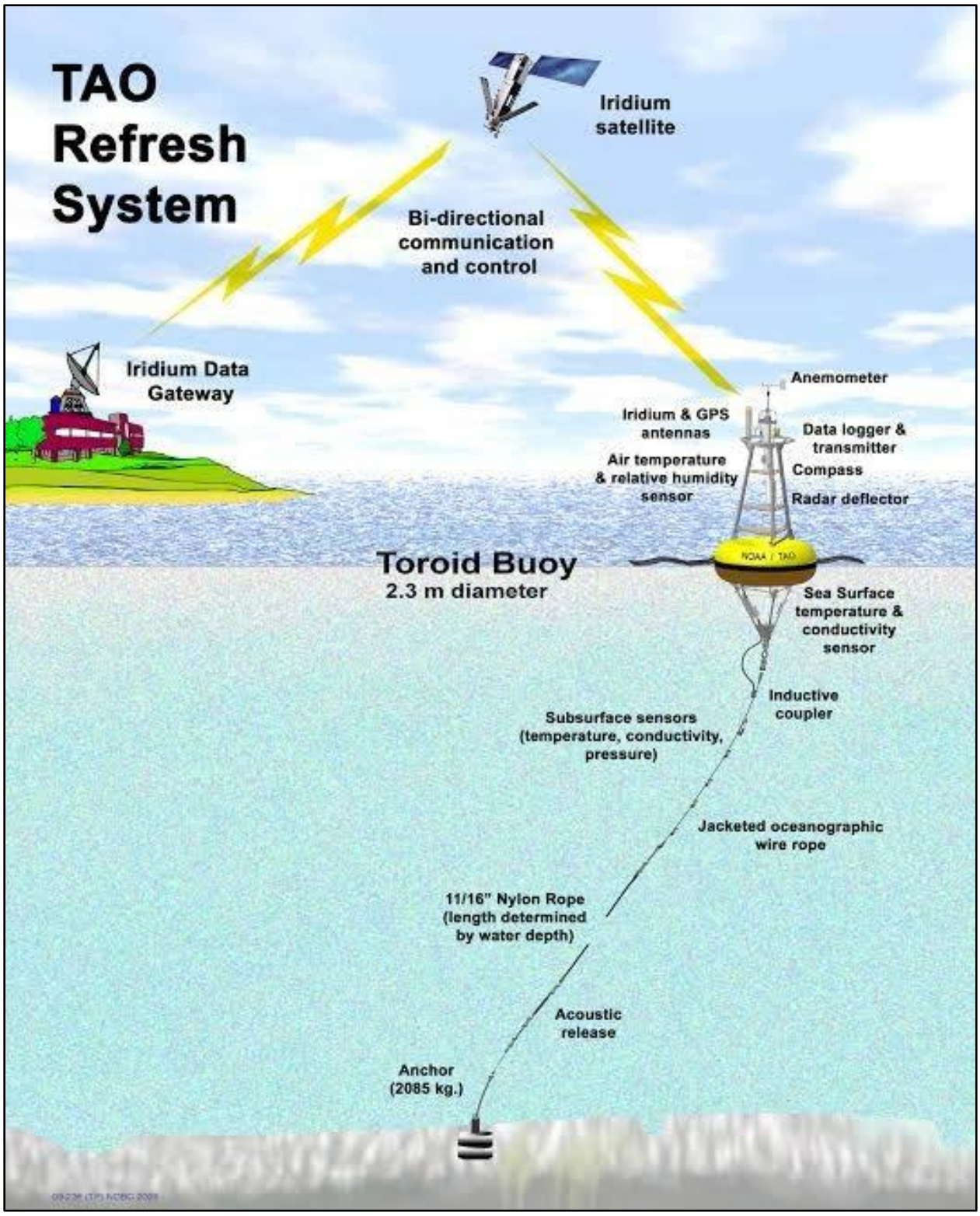


Figure 1-17. TAO Buoy and Mooring Configuration

Deep-ocean Assessment and Reporting of Tsunami Buoys

Currently, there are 39 U.S. DART surface moorings (see Figure 1-18) with accompanying subsurface bottom pressure recorders (BPR). The purpose of the DART network is to improve advanced warnings of tsunamis and reduce the risk of costly false tsunami warnings. DART buoys are a 2.6-meter discus-shaped buoy moored at a position in close proximity to the BPR and anchor (see Figure 1-19). A BPR is a platform anchored to the seafloor that measures subsurface water pressure, and is capable of detecting a tsunami energy wave as it passes through the water column. BPRs weigh approximately 1,200 pounds and are 3 feet wide, 4 feet long, and 2 feet high. Anchors are composed of steel and are approximately 6,000 pounds, 3 feet in diameter, and 2.5 feet high.

BPRs use an acoustic modem operating at 15-18 kHz to transmit data to the surface buoy, which then relays the information to shore through a satellite telecommunications link (Gonzalez et al. 1998). After receiving data from the BPR, the surface buoy relays the information to NDBC, via the Iridium satellite ground station, who in turn places the data on the NWSTG making it available in real-time to the Tsunami Warning Centers.

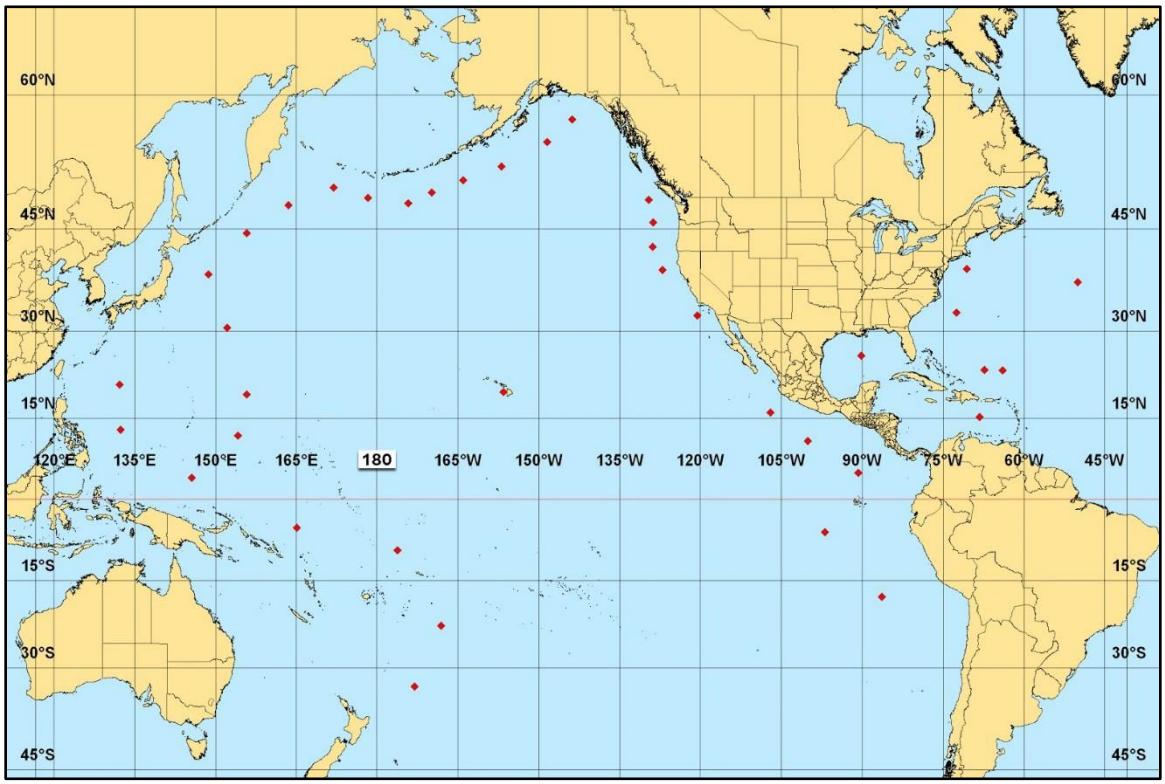


Figure 1-18. Locations of DART Buoys

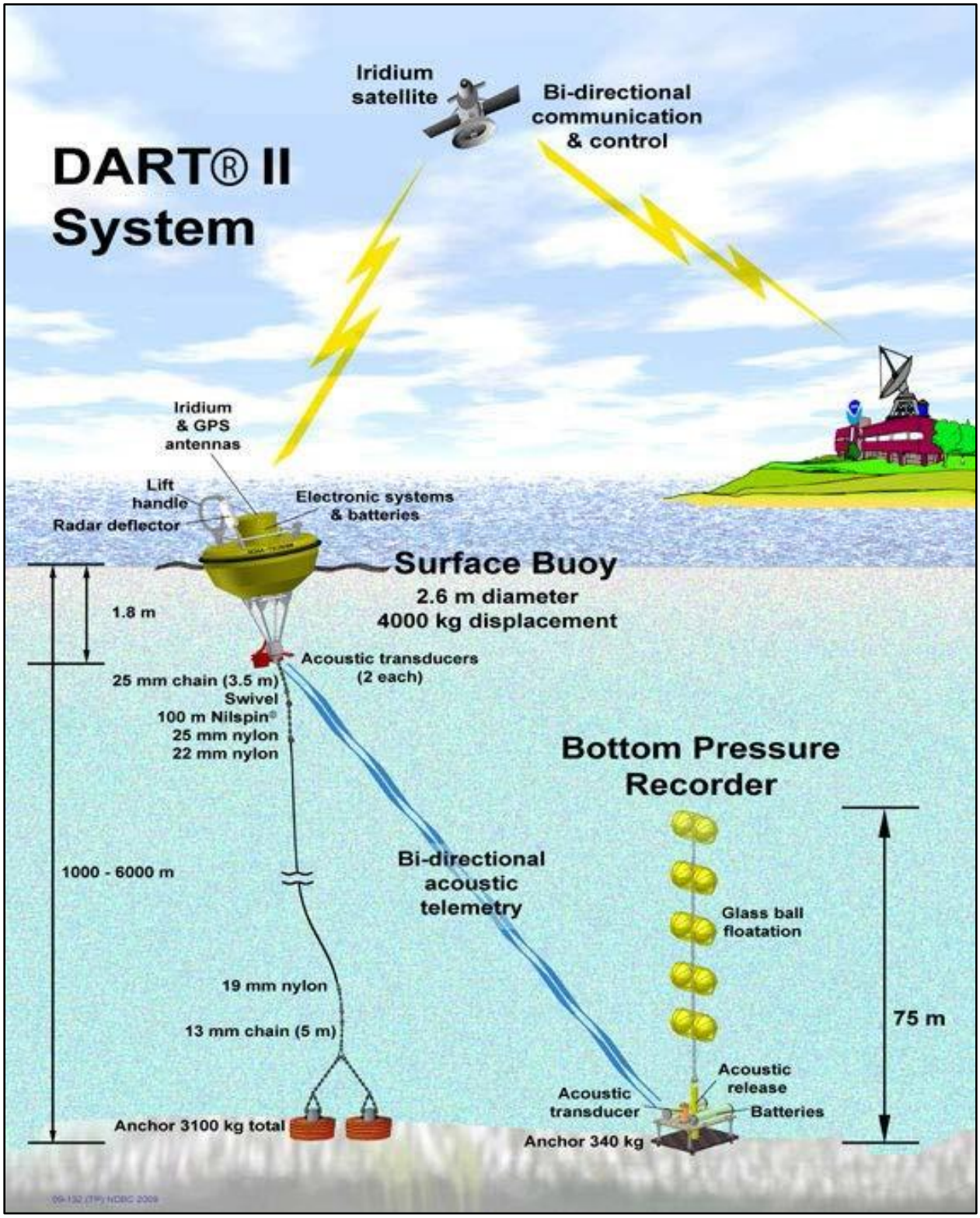


Figure 1-19. DART System Configuration

The process for determining a DART location is similar to process for CWBs. Based on mission requirements, a general location is determined and then the exact location is further defined by reviewing for existing infrastructure (e.g., pipelines, telecommunication lines), seafloor features (e.g., trenches), natural and biologically important areas (e.g., critical habitat, coral reefs, National Marine Sanctuaries), and transportation passageways. Using this information, NDBC selects the most suitable location based on mission requirements and environmental factors. Detailed activities for each DART deployment including the material used are described in a specific Field Service Plan and Cruise Plan for each mission (see Appendix A).

The DART buoys are exchanged bi-annually and the BPR and moorings are exchanged once every four years. During the exchange, a new DART buoy is located as close to the original mooring as possible. Typically the mooring and BPR are retrieved from the ocean. In rare instances when a BPR is still active and cannot be disabled or retrieved, the new mooring is moved a minimum of 10 miles from the BPR location. The new location is determined by a technician aboard the ship based on bottom surveys to locate a hard and flat area.

NDBC Moorings

As shown in Figures 1-17 and 1-19, the associated moorings are attached by a single point to the hull, near the surface of the ocean, and at the anchor on the sea floor. Generally, the moorings consist of a variety of synthetic line, chain, wire rope, steel hardware, and intermediate flotation appendages. Each mooring goes through a complete design process prior to its deployment. The design life cycle of a mooring ranges from 3–5 years, depending upon the style and duty of the mooring, and are replaced at the end of their life cycle.

Design Process

The mooring design process consists of a review of bathymetry, including depth and bottom conditions, tidal data, ocean currents, submerged hazards, and physical characteristics of the deployed system. In addition, hazards such as vessel traffic scheme and adjacent buoy deployments are considered. With this information, a Mooring Proposed Position report is created and provided to the mooring design engineer to prepare the design and input to mooring static and dynamic models.

The design process also involves defining the watch circle radius. The watch circle radius is the maximum distance, including a buffer (to prevent false notifications), from the anchor location to the extent of the stretched mooring. This radial distance is entered into a quality control database to serve as a boundary to identify when a mooring's watch circle has been breached.

During the final step of the design process, the mooring diagram is submitted to the lead mooring engineer for approval and then provided to Operations Production Engineering Department. The approved mooring diagram is used to create the Mooring Process Inspection Plan, which is a quality control document used for construction verification and ensures that the completed buoy is constructed according to design criteria. The Mooring Process Inspection Plan also catalogs the material information (e.g., lot numbers and vendor specific information) to track reliability. The completed design documentation consists of a schematic mooring diagram suitable for mooring construction and output model data file.

Composition and Size

Mooring composition and size is dictated by the buoy type and location. For example, CWBs use slack moorings (i.e., moorings whose length is greater than the height of the water column) and DART and TAO buoys use taut moorings (i.e., moorings whose length is equal to the height of the water column). Slack moorings achieve their compliance with the varying sea states by the overall length of the line versus taut moorings that rely on the stretch of the associated materials. Slack moorings are more robust, heartier, and have lower mooring loads than taut moorings and therefore have greater durability. However, taut moorings are used where subsurface sensor orientation or relative location precision is required.

The mooring composition also dictates whether it can be recovered. The recovery of TAO moorings is dependent upon the type of vessel servicing the mooring and whether or not it is equipped with an acoustic release. TAO (taut) moorings are recoverable up until the point where the anchor attaches. The top section of slack moorings are removed at an accessible length and are then cleaned and packaged for return to shore for disposal or recycling.

If a mooring is too deep to be recovered, it will typically be scuttled to the seafloor at that location. Some moorings contain sections of material that are neutrally or positively buoyant. In this scenario, a weighted material (e.g., old chains) are used to scuttle the mooring to the seafloor. By scuttling the mooring at its location, there may be a reduced risk to the local ecosystem by keeping the habitat that has formed on the mooring within the area.

1.2 PURPOSE AND NEED

The purpose of the analysis in this PEA is to provide a baseline for impacts on environmental resources from the continued operation of the NDBC network of buoys and C-MAN stations. The operation of the NDBC network of buoys and C-MAN stations is needed to fulfill NDBC's mission to provide quality in-situ marine observations in a safe and sustainable manner to support the understanding of and predictions to changes in weather, climate, oceans, and coasts. Additionally, the action is needed to provide continued societal benefits as identified in the *National Plan for Civil Earth Observations* and discussed in Section 1.1.2.

NDBC operations provide a comprehensive, reliable, and sustainable network of in-situ, real-time, meteorological, and oceanographic observations. The observations provided by NDBC are critical to a wide range of federal, state, academic, and private industry stakeholders. These observations add value to a diverse spectrum of applications, including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental and ecosystem monitoring and research.

The Proposed Action will also continue to support the mission goals of the NDBC to promote:

- an informed society that is able to anticipate and be prepared to respond to weather and climate related events and impacts;
- Coastal and Great Lakes communities that are environmentally and economically sustainable; and
- marine fisheries, habitats, and biodiversity sustained within healthy and productive ecosystems.

1.3 PROGRAMMATIC SCOPE

1.3.1 Concept of a Programmatic Environmental Assessment

In considering the Proposed Action, NDBC is responsible for complying with a number of federal statutes, regulations, and executive orders, including NEPA. This Draft PEA provides a baseline analysis of the environmental impacts for NDBC's continued operations under all such legal requirements and to encourage and facilitate public involvement in the environmental review process.

A programmatic approach may be appropriate for addressing broad agency action(s) and when the action(s) being considered falls into one of the four major categories of actions to which the NEPA applies (40 CFR §1508.18(b)). These four categories include:

(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); and

(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" NEPA analyses is also included in Council on Environmental Quality (CEQ) Regulations that address analyses of "broad actions" and the tiering process. CEQ interprets its regulations as allowing for the use of a programmatic approach in developing Environmental Assessments (EA) and Environmental Impact Statements (EIS). 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 or EIS can facilitate decisions on agency actions that precede site- or project-specific decisions and actions. They also provide information and analysis that can be incorporated by reference in future, tiered, NEPA reviews or assessments.

Continued NDBC operations can be categorized as a "broad action" as defined by CEQ (40 CFR §1508.18(b)) because the NDBC Program consists of ongoing, similar, reasonably foreseeable actions in common geographical areas. Therefore, NDBC determined that a programmatic approach for the analysis in this PEA was deemed most appropriate in order to provide information that can be incorporated by reference in subsequent tiered NEPA reviews. The analysis in this Draft PEA supports the planning-level decisions for funding future actions and establishes the framework and parameters for subsequent analyses based on this programmatic review that examines the reasonably foreseeable impacts of sustaining the NDBC Program.

1.3.2 Tiering Subsequent Analyses

"Tiering" refers to an approach whereby federal agencies prepare a site- or project-specific programmatic NEPA analysis from which future decisions and activities would also be analyzed. The tiered NEPA analysis would summarize and incorporate discussions from the broader assessment (i.e., this Draft PEA) and concentrate on the specific issues of the subsequent action. Agencies are encouraged to tier their EAs or EISs to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review (40 CFR § 1502.20).

Using this programmatic approach, the NDBC Program identified and prepared a qualitative analysis of the Program's general environmental impacts for the broad scope of actions planned for the expansion and implementation of the NDBC Program and will prepare sufficient in-depth "tiered" analyses for potential future actions, as appropriate. Subsequent analyses will likely be based on location-specific environmental factors where individual assets would be deployed or when NDBC receives a project proposal. NDBC will fulfill its responsibilities under NEPA and other applicable Federal environmental laws and regulations for all actions authorized, funded, or carried out by NDBC. As shown in Figure 1-20, a NEPA decision tree would be used to determine the appropriate level of analysis for further projects implemented by NDBC.

1.3.3 NDBC NEPA Decision Process

NEPA and CEQ regulations set forth a process for federal agency decision makers to identify and consider the effects of proposed federal actions and alternatives on the quality of the human environment. CEQ regulations (40 C.F.R. §1508.14) define the "human environment" comprehensively as "the natural and physical environment and the relationship of people with that environment." NEPA provides a mandate and a framework for federal agencies to consider all reasonably foreseeable environmental effects of their proposed actions and to involve the public and solicit information that will ensure the use of the best available science to assist the decision maker's consideration of environmental effects, alternatives, and mitigation measures that can be used to reduce adverse environmental effects.

1.3.4 Project-Specific Analysis

This PEA provides a baseline analysis for impacts on environmental resources from the continued operation of the NDBC network of buoys and C-MAN stations. Future projects proposed by NDBC may require preparation of a site-specific NEPA analysis. Once the specific details of a project has been determined, the decision tree shown in Figure 1-20 would be considered to determine the required level of NEPA analysis. The "specific environmental factors or characteristics" mentioned in Figure 1-20 could include:

- Substantial changes to the methods of buoy deployment and recovery as described in this PEA.
- Buoy locations or C-MAN stations proposed in biologically sensitive or protected areas such as National Marine Sanctuaries, marine protected area (MPAs), critical habitat, essential fish habitat (EFH), and Habitat Areas of Particular Concern (HAPCs),

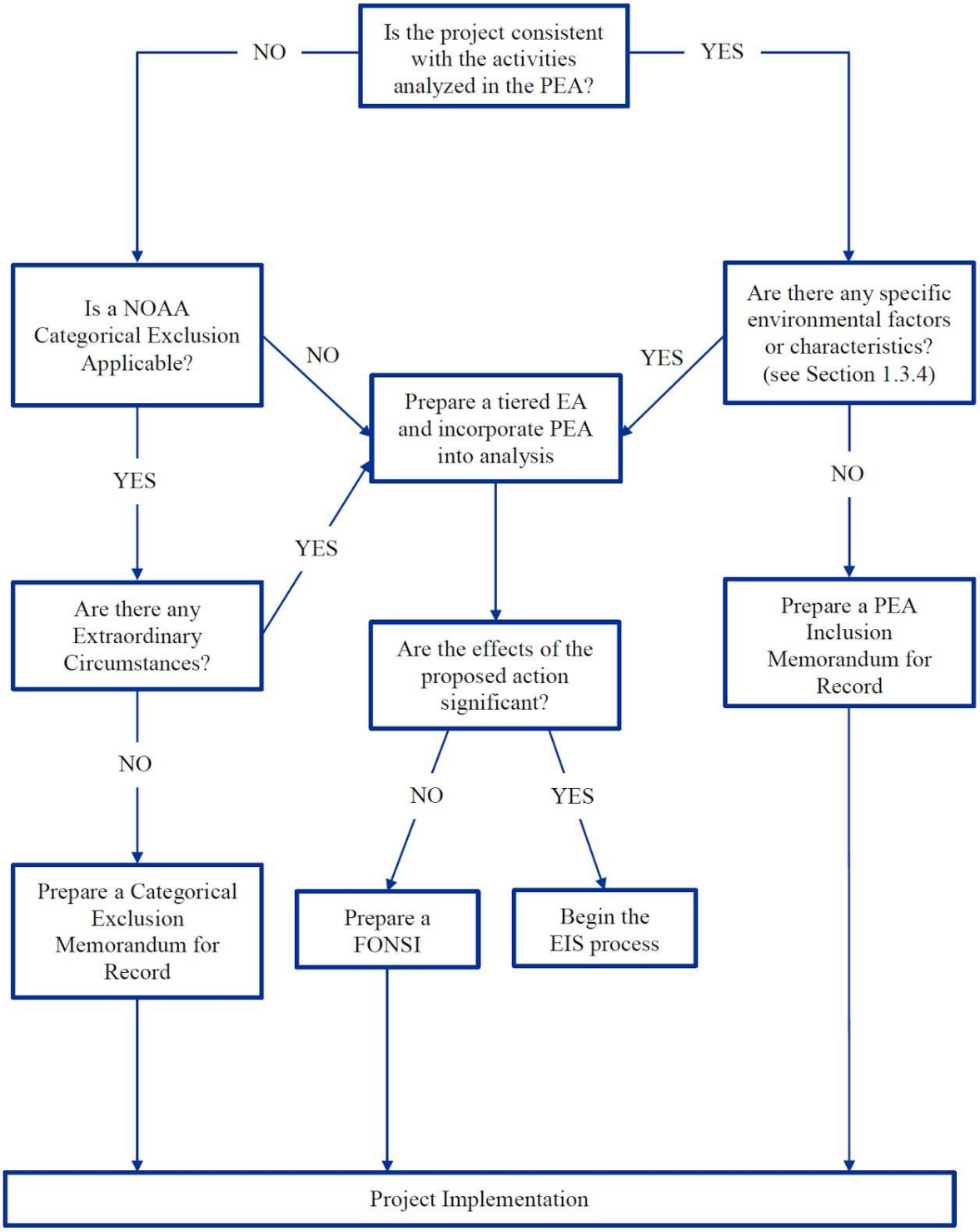


Figure 1-20. NEPA Decision Flowchart

- Buoy locations or C-MAN stations proposed in areas with traditional cultural resources or designated for usual and accustomed tribal uses.
- C-MAN stations that require access permits, such as Marine Scientific Research (MSR) permits, and tenant use or USFWS issued permits.

If one or more of these factors or characteristics is present in connection with the proposed project, then a project-specific NEPA analysis would be performed for that action, and documented in a Categorical Exclusion (CE) memorandum or EA, as appropriate. It is not anticipated at this time that any NDBC projects would require the preparation of an EIS, however Figure 1-20 includes this possibility, for completeness.

If none of the factors or characteristics listed above are found to be present for a specific project, then NDBC will prepare a PEA Inclusion Memorandum, which will complete the NEPA process for that action.

1.3.5 Scope of PEA

This PEA includes a broad-level, general description of the affected environment; including physical resources (i.e., geological resources and water quality), biological resources (i.e., marine and terrestrial), and cultural resources.

1.4 ADDITIONAL APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS

To comply with NEPA, the planning and decision making process refers to other relevant environmental laws, regulations, and Executive Orders (EOs). The NEPA process does not replace procedural or substantive requirements of other environmental laws; it addresses them collectively in an analysis, which enables decision makers to have comprehensive view of major environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated "with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively" (40 CFR 1500.2).

NDBC consulted with and will continue to consult with regulatory agencies, as appropriate, during NEPA reviews and prior to implementation of the Proposed Action to ensure that requirements are met. Section 3 (Affected Environment) of this PEA provides brief excerpts of the federal laws, regulations, or EOs associated with the Proposed Action and the evaluation of the affected environment and resources. Additional laws and regulations that will be considered during the NEPA process include: the Endangered Species Act (ESA), Coastal Zone Management Act (CZMA), Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSFCMA), Marine Mammal Protection Act (MMPA), Migratory Bird Treaty Act (MBTA), Clean Water Act (CWA), Clean Air Act (CAA), and National Marine Sanctuaries Act (NMSA). Documentation of consultation and coordination with regulatory agencies is provided in Appendix B.

1.5 PUBLIC INVOLVEMENT

Agency and public participation in the NEPA process promotes open communication between the proponent and regulatory agencies, the public, and potential stakeholders. All persons and organizations having a public interest in the proposed project are encouraged to participate in the public involvement process. The PEA will be available for review via the NDBC website (http://www.ndbc.noaa.gov/).

2. PROPOSED ACTION AND ALTERNATIVES

NEPA requires federal agencies to consider alternatives to a proposed federal action. The evaluation of alternatives under NEPA informs the decision maker of potential environmental impacts to assist in the decision making process. To warrant detailed evaluation under NEPA, an alternative must be reasonable and meet the stated purpose and need for the proposed action. For this PEA, NDBC applied the following screening criteria to the alternatives to identify which ones should be brought forward for detailed analysis.

To be considered "reasonable" for purposes of this PEA, an alternative must meet the following criteria:

- The action meets the purpose and need (see Section 1.2);
- The action is technically feasible;
- The action is consistent with the mission, requirements, and goals of NDBC;
- The action must not violate any federal statute or regulation;
- The action continues to add societal value as identified in the *National Plan for Civil Earth Observations*;
- The action must be consistent with reasonably foreseeable funding levels;
- The action must be consistent with long-term commitments and goals to maintain the integrity of regional and national information needs; and
- The action meets the guidance set forth in the *National Strategy for a Sustained Network of Coastal Moorings* (January 2017).

2.1 PROPOSED ACTION

NDBC proposes to continue the operation and maintenance of the existing buoys and C-MAN stations and deploy additional buoys and C-MAN stations as operational needs arise. Technology additions to the system, such as acoustic releases, would be used during buoy deployment. Additionally, under the Proposed Action, land-based operations would continue at Stennis Space Center as currently executed.

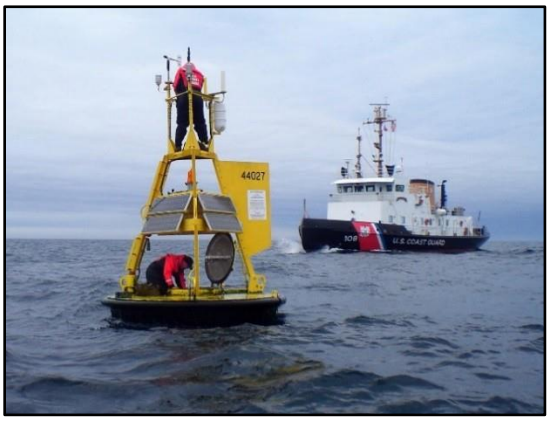
2.1.1 Facility-based Operations at Stennis Space Center

Facility-based operations would remain unchanged from current operations at Stennis Space Center, as described in Section 1.1.3.1. The addition of the new technology equipment to the buoys would not increase or alter the operations at Stennis Space Center. Components used to construct CWBs and C-MAN stations, and sensors would be stored and tested in existing facilities. In the future, additional facilities would be constructed or renovated to support future operations as the needs arise.

2.1.2 Marine and Coastal Operations

Under the Proposed Action, buoy operation and maintenance would continue as currently implemented. Buoys are maintained and serviced on a regular basis to ensure that the sensors are operating properly and that batteries are still functional. The maintenance schedule is developed based on buoy location, type, and vessel availability. In the event of malfunction of a buoy sensor or battery, NDBC will deploy a team to repair or replace the sensor or battery as soon as operationally practicable.

2.1.2.1 Buoy Deployment Operations



Under the Proposed Action, buoys would continue to be deployed as the operational need arises throughout the world's oceans and the Great Lakes. As described in Section 1.1.3.2, three types of buoys (with unique design and anchors) serve different purposes and collect various types of data. New buoys are deployed when the need for additional meteorological and oceanographic observations are identified by NWS Headquarters or Legislative Authority. Once a general area is identified, NDBC identifies any obstructions or hazards in the area, including telecommunication lines, pipelines, navigational waterways, geologic features (i.e., craters or trenches), biological resources (i.e., critical habitats), and cultural resources (i.e., shipwrecks). If resources are identified in the area, they would be avoided to the maximum extent practicable.

Additionally, buoys in the Great Lakes are deployed and recovered every year prior to the winter freeze of the lakes. All buoy components (i.e., anchor, mooring, instruments, and buoy) are removed from the water and redeployed the following spring in the same general location. Prior to redeployment, buoy and mooring components are inspected and may be replaced if there are signs of wear/damage or technology enhancements are available. Complete buoys systems in the Great Lakes Region may be retired every 3-5 years if newer technology is available or there are signs of wear or damage.

Buoy deployment is accomplished by vessels that are owned and operated by the USCG, private, or government entities under charter (e.g., commercial owner, state university). Vessel maintenance is the responsibility of the owner; however, NDBC is responsible for ensuring that vessels are operating in compliance with regulations prior to undergoing a buoy deployment operation.

2.1.2.2 Improvements to NDBC Moorings

As described in Section 1.1.3.2, different moorings are used for different buoy types. The mooring size and composition is dictated by the buoy location and buoy type. For example, CWBs use slack moorings (i.e., moorings whose length is greater than the height of the water column) and DART and TAO buoys use taut moorings (i.e., moorings whose length is equal to the height of the

water column). Slack moorings achieve their compliance with the varying sea states by the overall length of the line versus taut moorings that rely on the stretch of the associated materials. Slack moorings are more robust, heartier, and have lower mooring loads than taut moorings and therefore have greater durability. However, taut moorings are used when a precise subsurface sensor orientation or relative location is required.

Moorings for DART and TAO buoys are typically two to three percent less than the height of the water column. With the DART mooring, the limitation is governed by the frequency of the acoustic transducer, which transmits data to the surface buoy for satellite relay. This subsequently limits the movement of the buoy (and length of the mooring line) and keeps it within a restricted boundary for receiving the acoustic data stream and providing the associated power required to transmit at higher frequencies. A similar constraint exists for the TAO moorings, which is the placement of subsurface sensors at known depths throughout the water column. As new technologies become available, these constraints would not be factors and other advancements in mooring designs would occur.

Under the Proposed Action, NDBC would continue to seek improvements in mooring materials and mooring design concepts. These improvements, when implemented, have the potential to reduce the number of adrift events, which can reduce the amount of mooring material left behind and reduces the need for replacing mooring materials. Specifically, following replacement of a deep-water mooring; the upper, more buoyant section of the mooring that consists of chain and synthetic buoyant line, would be decoupled from the anchored section at a position commensurate with available slack in the line (a function of the mooring scope), and packaged for return transportation to shore and subsequent reuse or disposal. The mooring lines that are removed would be pressure washed at sea, prior to packaging for return shipment, in order to prevent the spread of invasive species. The remaining mooring line would be weighed down with a 100-pound weight and scuttled to the ocean floor.

Recently, NDBC has focused on improving the reliability of moorings to decrease potential for adrift buoys. When a mooring fails, the buoy becomes adrift and critical observations are not available. Adrift buoys require recovery and repair, incurring additional costs and leads to the potential risk of incidental contact by marine habitats and species with the free-floating, unrestrained buoy and remaining mooring. Following the recovery of a failed mooring and buoy, NDBC would inspect the equipment to determine the cause of failure and to take future corrective action, if necessary.

NDBC Engineering initiated several changes in the mooring design of the moorings used for CWBs and DART buoys. These changes included use of a sealed, lubricated, marine grade swivel (which allows the buoy to rotate on the mooring), new types of cut resistant rope, and a new type of rope with fairings to reduce drag and increase streamlining. For DART buoys, NDBC has deployed large acoustic cones (i.e., a device used to receive acoustic signals from the transducer and relay to the buoy), the latest generation of acoustic communications, allowing for the use of a slack line in lieu of a taut mooring. NDBC also proposes to evaluate the use of smaller components in the future, such as smaller anchors and buoys; thereby reducing overall weight, drag in the water, and financial costs.

2.1.2.3 At-sea Mooring Recovery Operations

Under the Proposed Action, NDBC buoys would utilize additional mooring recovery equipment, such as acoustic releases and line cutters to maximize the recovery of the mooring (i.e., rope, chain, or wire), excluding the anchor. An acoustic release is a device that is attached to the mooring that when activated, receives an acoustic ping and disengages the mooring line from the anchor. Following the release of the mooring from the anchor, the buoy and retrievable portion of the mooring would be recovered from the ocean by an adequately equipped vessel. Since the acoustic release is located above the seafloor, the anchor and the bottom chain would not be recoverable and would remain on the seafloor. A line cutter is used when the mooring is not configured with an acoustic release or the release fails. The use of acoustic releases and line cutters would require the use of servicing vessels with adequate mooring recovery and handling systems. Such vessel equipment includes high speed mooring recovery winches and other high volume mooring handling gear. In using acoustic releases and recovering the majority of the mooring line and the buoy, less marine debris would remain on the ocean floor as compared to current operational methods of abandoning or scuttling a buoy mooring. Use of acoustic releases would require additional funding and authorization to accommodate for the increased expense of the equipment.

As discussed in Section 2.1.2.1, buoys in the Great Lakes are recovered every year prior to the winter freeze of the lakes. All buoy components (i.e., anchor, mooring, instruments, and buoy) are removed from the water.

2.1.2.4 Improved Adrift Buoy Recovery Operations

Adrift buoys represent both navigational and environmental risks. The current NDBC policy on Station Failure Response Policy (Instruction No. 1804-06.04A) provides instruction that gives operational priority to addressing and recovering adrift buoys over scheduled non-adrift buoy maintenance. Per NDBC's Policy, adrift buoys or with no position-fixing equipment shall be recovered as soon as possible, practical, and consistent with personnel safety, subject to ship or other asset availability. Response times for the recovery of adrift buoys varies based upon operational conditions such as weather and sea state. Response times also vary based upon ship or other asset availability and operational resource constraints.

In all adrift buoy events, NDBC works at local, national, and international levels to notify and inform mariners of adrift buoy locations. NDBC's Standard Operating Procedures include certain action steps to confirm if a buoy has gone adrift or departed its mooring area. The first step is to verify that the buoy is adrift, by determining that it has crossed its watch circle radius and has continuous perceived movement. This is accomplished by verifying consecutive real-time data transmissions. All NDBC buoys are equipped with GPS devices that provide position in real-time data stream transmissions. Additionally, CWBs and DART buoys are equipped with redundant locating systems due to their proximity to coastal zones. The second step is to send a notification

to a predetermined group that may have to perform a response action. This includes, but is not limited to, USCG Operations personnel, U.S. Navy maritime safety, and the NDBC web team for ensuring locations are promulgated via NDBC website. At the local level, NDBC works with the relevant USCG District to issue a Local Notice to Mariners to warn and inform mariners of adrift buoy positions. At national and international levels, NDBC works with the National Geospatial-Intelligence Agency to issue nationwide U.S. Notice to Mariners. The U.S. Notice to Mariners provides timely marine safety information for the correction of all U.S. Government navigation charts and publications from a wide variety of sources, both foreign and domestic. When an adrift buoy is in an USCG Operational area, a request for use of a vessel to recover is made to the respective USCG District. Existing vessel charters or other assets are also evaluated for recovery feasibility. If an adrift buoy is determined to be an exceptional risk due to its location and drift course, and resources are available for salvage effort, a special charter procurement package would be prepared for the recovery mission. The request is processed through the approval chain and sent to the NOAA Acquisition and Grants Office for execution.

After notices have been disbursed, other ancillary data are compiled in order to determine pertinent information, such as, components of the remaining mooring, potential damage to buoy components (e.g., navigation lighting), and the potential cause of the mooring breach. An examination of vessel traffic at the time of untethering is also conducted to determine if a vessel may have contributed or caused the mooring failure.

Finally, after gathering the metadata, maintenance notifications are provided. The locations are added to daily notification emails that are sent at the end of the night watch. If a buoy represents an eminent threat to a particular area, it is discussed during the morning briefing or if warranted, a special email notice is sent to parties that may need to take immediate action (e.g., supplemental notifications). Particular attention is given to buoys that may enter another country's territorial waters or make landfall. In this situation, NDBC contacts NOAA International Affairs, who notifies the State Department for possible action. The coordination and details of securing the adrift buoy are handled on a case-by-case basis by senior personnel. This process continues until the buoy has lost its real-time data feed for several months and no longer provides buoy position or the buoy is recovered.

2.1.2.5 Improvements to Prevent the Fouling of Buoy Hulls and the Transport of Aquatic Invasive Species

In accordance with the National Invasive Species Act and EO 13112, Invasive Species, NDBC has established processes to prevent the spread of invasive and non-native species to other waters. The predominant vector for the human transport of invasive and non-native species in marine environments is via vessels and ships (Sea Grant Law Center 2005). While ballast water receives the most attention, hull fouling is also a significant vector. The results of a study published in 2003 revealed that 36 percent of the non-native coastal marine species established in continental North America could be attributed to hull fouling alone (NOAA NMS 2013).

Fouling refers to the process by which sessile plants and invertebrates settle on submerged artificial surfaces, such as boat hulls, floating docks, underwater cables, oil platforms, and buoys. To combat hull fouling, antifouling paints were developed. Antifouling paints contain biocidal agents to prevent larvae from settling on the hulls. The use of these paints has significantly reduced the

risk of introductions of fouling organisms. In the 1980s, tributyltin oxide-based (TBTO) antifouling paints became widely used. TBTO is an endocrine-disrupting chemical, which has been linked to masculinization of certain female gastropods and deformities in oyster shells and certain snail species. Environmental concerns led to a U.S. ban of TBTO in 1988 and a global phase-out of antifouling systems that utilize TBTO and other organotins is underway. NDBC does not use TBTO as a hull antifouling paint but does use other U.S. Environmental Protection Agency (EPA) -approved antifouling paints to reduce the effects of hull fouling and risk of aquatic invasive species transport.

Additionally, NDBC implements cleaning processes to prevent invasive species from being transported to another area. Once a buoy is recovered from the water and is aboard the ship, it is cleaned by pressure washing and scraping. The cleaning occurs in the area that the buoy was recovered from so any species that were attached to the buoy are returned to the water.

2.1.2.6 Improvements for Establishing or Relocating C-MAN Stations

Prior to deploying a new C-MAN station, NDBC considers various factors to determine the appropriate location. Once a general location is selected based on mission requirements for additional data, NDBC researches to determine if there is an existing structure (e.g., lighthouse, tower) that could be used to collocate the sensors. Additional factors that are considered include natural and biologically important areas (e.g., critical habitat, USFWS lands). Using this information, NDBC selects the most suitable location based on mission requirements and environmental factors. If permits are required for access to lands, consultation with the appropriate Federal or state agencies is completed. C-MAN station components and sensors are constructed and assembled at Stennis Space Center and then transported via trucks to the location for deployment.

The majority of C-MAN stations are on existing structures or on previously disturbed land. However, in rare instances a C-MAN station could be constructed on undisturbed land. During installation, construction and installation activities for C-MAN stations could involve the use of gasoline or diesel-powered digging equipment. Installation of a C-MAN station and its associated tower (i.e., that is not on an existing structure/lighthouse) would consist of approximately 16 ft^2 of ground disturbance. The towers are approximately 15 to 30 feet tall and have a 4-foot-by-4-foot concrete base.

2.2 NO ACTION ALTERNATIVE

CEQ regulations specify the inclusion of the No Action Alternative in the alternatives analysis (40 CFR 1502.14). Under the No Action Alternative, the NDBC would continue operations as currently performed. No additional buildings or facilities would be constructed at Stennis Space Center. No additional buoys or C-MAN stations would be deployed as described in Section 1.1.3. However, the buoys that are currently deployed would continue to be operated and maintained.

As discussed in Section 2.1.2.1, buoys in the Great Lakes are deployed and recovered every year prior to the winter freeze of the lakes. All buoy components (i.e., anchor, mooring, instruments, and buoy) are removed from the water and redeployed the following spring in the same general location. The recovery and redeployment of these buoys would continue under the No Action Alternative.

If a buoy were to become untethered from its mooring and go adrift in the ocean, it would be recovered when operationally practicable. Buoys and their associated moorings that become adrift could pose navigational risks and environmental risks to sensitive and protected marine areas, habitat, and marine life.

NDBC would continue to provide real-time meteorological and oceanographic data to the various groups of stakeholders. Weather forecasters and Federal, State, and Local Emergency Managers would continue to use data provided by NDBC to aid in the prediction of tsunamis, hurricanes, and other large weather events. However, without the deployment of additional buoys and C-MAN stations in the future, additional research data needed to support the SBAs described in Section 1.1.2 would not be realized.

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3. AFFECTED ENVIRONMENT

This section describes the affected environment and existing conditions for the resource categories applicable to the regions of influence (ROI) affected by the NDBC Program. The regions were created by using natural delineations in the physical characteristics of the area, as well as considering the operations of the NDBC Program. For purposes of this PEA, the regions are defined as listed in Table 3-1. The regions identified are for the purpose of providing a relative grouping of buoys and are not intended to infer states' governance authority. Additionally, the majority of NDBC buoys are in Federal waters, outside of a state's seaward boundary. Maps showing the general ROI boundaries are at the beginning of each regional description in Section 3.1. The affected environment at Stennis Space Center is also included in subsequent sections.

Table 3-1. PEA Regions of Influence

Region of Influence	State, Country, or Body of Water Included in Region	
Northeast	• Maine • New Hampshire • Massachusetts • Connecticut	• Rhode Island • New York • Pennsylvania • New Jersey
Mid-Atlantic	• Delaware • Maryland	• Virginia • North Carolina
Southeast	• South Carolina • Georgia	• Florida (Atlantic Ocean side) • Bermuda
Gulf of Mexico	• Florida (GOM side) • Alabama • Mississippi • Louisiana	• Texas • Mexico (west of Yucatan Peninsula)
Caribbean/Tropical Atlantic	• Bahamas • Cuba • Jamaica • Mexico (Cozumel/east of Yucatan Peninsula)	• Puerto Rico • Dominican Republic • British Virgin Islands
Great Lakes	• Minnesota • Wisconsin • Michigan • Illinois • Indiana	• Ohio • Pennsylvania (western border of lake) • New York (western border of lake) • Canada (areas bordering the Great Lakes)
Northwest	• Washington • Oregon • Northern California (from the California/Oregon border south to San Francisco	

California	• Southern California (from San Francisco south to the California/Mexico border)	
Gulf of Alaska	• Alaska • Aleutian Islands	• Bering Sea
Western Pacific	• Russia • Japan • Philippines	• Saipan • Guam • New Guinea
Central Pacific	• TAO buoys • Tonga • New Zealand	• Peru • Panama • Mexico (west coast)

NOAA's Policy is that the scope of its NEPA analyses includes consideration of the impacts of actions on the marine environment within and beyond the EEZ (NAO 216-6A). Therefore, if NDBC-funded equipment is deployed in foreign territorial waters or on foreign soil, then EO 12114, *Environmental Effects Abroad of Major Federal Actions*, would apply. However, Section 2.5(a)(i) of EO 12114 states that "actions not having a significant effect on the environment outside the United States as determined by the agency" are exempted from further environmental analysis.

NOAA NDBC reviewed environmental and cultural resource categories for applicability to the project. Through the analysis, certain resource categories clearly not affected by the NDBC Program were eliminated from further evaluation. Only the resources potentially affected by the project are discussed further in this section and analyzed in section 4.0, *Environmental Consequences*. Below is a summary of those resources that were eliminated from further environmental analysis because the specific locations of the Proposed Action are unknown at this point. Tiered environmental analyses may include some of the resources, if necessary.

Resources Not Affected by the Proposed Action or the Alternatives

Air Quality. The air quality varies greatly depending on the geographic location and the time of year. The proposed activities would include installation of buoys and C-MAN stations, however, specific equipment installation locations, and O&M schedules are unknown at this time. Planned construction and installation activities for C-MAN stations could involve the use of gasoline or diesel-powered digging equipment. Offshore installation of monitoring buoys and sensors would require the use of ships. Ship and equipment exhaust emissions would be limited in duration to the time required for installation/buoy deployment. All ships and equipment used for installation would adhere to Federal, State and local environmental laws and regulations. For these reasons, detailed discussion of air quality emissions was eliminated from further consideration in this PEA. However, a tiered environmental document may include analysis of air quality emissions, if necessary.

Climate. The climate varies greatly depending on the geographic location and the time of year. The proposed activities would include installation of buoys and C-MAN stations. However, specific equipment installation locations and O&M schedules are unknown at this time. Planned construction activities for C-MAN stations could involve the use of gasoline or diesel-powered digging equipment. The deployment of buoys, moorings, and sensors would require the use of ships. Ship and equipment emissions of greenhouse gases would be singular events and would not

have expected measureable impacts on the climate. Therefore, detailed discussion of climate was eliminated from further consideration in this PEA. However, a tiered environmental document may include analysis of climate and greenhouse gases, if necessary.

Recreation Resources. The amount of recreational resources varies greatly depending on the geographic location. Specific equipment installation locations and O&M schedules are unknown at this time. C-MAN stations including lighthouse, pier, and shoreline-mounted instrumentation, would be installed in accordance with local zoning requirements and site-specific regulations. For these reasons, detailed discussion of recreational resources was eliminated from further consideration in this PEA. However, a tiered environmental document may include analysis of recreational resources, if necessary.

Land Use. NDBC buoy operations are performed in or on the open water and are not land based. Additionally, buoys placed in the ocean environment are a typical sight to commercial and recreational boaters and anglers. The installation of a C-MAN station would not require a change in land use or zoning for the installation of a tower or associated sensors on an existing platform. Therefore, a detailed discussion of land use was eliminated from further consideration in this PEA. However, a tiered environmental document may include analysis of land use, if necessary.

Aesthetics and Visual Resources. BPRs, anchors, and moorings deposited on the seafloor or underwater, are not visible from the surface or the shore and therefore have no aesthetic or visual impact above water. It is unlikely that recreational divers would encounter the equipment because of the remote location of buoys. Buoys have a minimal above-surface profile and in a vast majority of cases are out of view from shorelines. Additionally, buoys placed in the ocean environment are a typical sight to commercial and recreational boaters and anglers. When a new tower is installed for a C-MAN station, the overall footprint is small. Due to the lack of specific information regarding equipment installation locations and schedules, detailed discussion of aesthetics and visual resources was eliminated from further consideration in this PEA. However, a tiered environmental document may include analysis of aesthetics and visual resources, if necessary.

Human Health and Safety. Buoys and associated sensors would pose no risk to human health and safety. Sensors are passive arrays that would not pose a health risk. The installation, operation, and maintenance of all buoys would be performed in compliance with all relevant Federal, State, local and tribal health and safety regulations. Buoys also provide beneficial services to human health and safety by serving as aids to navigation and gathering essential data needed to identify potentially life threatening weather events (i.e., tsunamis and hurricanes). Therefore, a detailed discussion of human health and safety was eliminated from further consideration in this PEA. However, a tiered environmental document may include analysis of human health and safety, if necessary.

3.1 PHYSICAL RESOURCES

3.1.1 Applicable Laws, Regulations, and Executive Orders

The following description of relevant laws, regulations, and executive orders that pertain to physical resources were included to provide a framework for identifying existing resources, impacts to the resource, and determining thresholds for significance of those impacts.

Clean Water Act. The primary law governing U.S. water quality is the Clean Water Act (CWA) of 1972, 33 U.S.C. §§ 1251 et seq. This act provides for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. CWA Section 301(a) specifies that the discharge of any pollutant is unlawful unless it is in compliance with the CWA. The CWA (Section 402) established the federal limits (through the National Pollutant Discharge Elimination System) for the amount of pollutants discharged into surface waters from point (e.g., a vessel) and nonpoint (e.g., storm water runoff) sources. It emphasizes technology-based control strategies and requires dischargers to have permits to use public resources for waste discharge. The CWA also limits the amount of pollutants that may be discharged and requires wastewater to be treated with the best treatment technology economically achievable regardless of receiving water conditions. CWA Section 402 also regulates the incidental discharge of pollutants from the normal operation of commercial vessels through the Vessel Discharge Permit Program. In many states, CWA compliance has been delegated to the state agencies for implementation and compliance.

The operation of vessels used for deploying buoys and associated sensors are subject to CWA regulations. NDBC uses vessels operated by other organizations, such as USCG, other NOAA departments, and universities. Ultimately, the vessel operator is responsible for compliance with the CWA. However, NDBC is committed to operating in an environmentally sustainable way and would ensure compliance under the CWA prior to initiating any buoy deployment, maintenance, or recovery that requires vessel operation. In the unlikely event of pollutant discharge, NDBC would comply with all applicable CWA regulations. In an effort to prevent the accidental discharge of pollutants, NDBC ensures that the equipment in use is in proper working condition. NDBC maintains compliance with these applicable CWA regulations by obtaining the required discharge permits.

Coastal Zone Management Act. The Coastal Zone Management Act of 1972 (CZMA), 16 U.S.C. §§ 1451 et seq., authorized the National Coastal Zone Management Program which comprehensively addresses the nation's coastal issues through a voluntary partnership between the federal government and coastal and Great Lakes states and territories. This program is administered at the federal level by NOAA's Office for Coastal Management. If a state chooses to participate in the National Coastal Zone Management Program, it must develop and implement a federally-approved coastal zone management program. Section 307 of the CZMA requires that federal actions, inside or outside the coastal zone, which have reasonably foreseeable effects on any coastal use (land or water) or natural resource of the coastal zone be consistent with the enforceable policies of a state's federally-approved coastal management program. Federal actions include federal agency activities, federal license or permit activities, and federal financial assistance activities. Federal agency activities must be consistent to the maximum extent practicable with the enforceable policies of a state coastal management program, and license and permit and financial assistance activities must be fully consistent. When appropriate, NDBC will work with state coastal management programs to ensure any federal actions are consistent with the enforceable policies of the state's coastal management program.

Estuary Protection Act. The Estuary Protection Act, 16 U.S.C. §§ 1221 et seq., establishes a process to protect, conserve, and restore estuaries in a manner that adequately and reasonably maintains a balance between the conservation of natural resources interests and the need to develop estuaries for the growth and development of the nation. The Secretary of the Interior is authorized to cooperate with states and federal agencies in undertaking studies and inventories of U.S. coastal

estuaries to determine whether such areas should be acquired by the Federal Government for protection. The statute further requires the Secretary of the Interior to assess impacts of commercial and industrial developments on estuaries, enter into cost-sharing agreements with states and subdivisions for permanent management of estuarine areas in their possession, and encourage state and local governments to consider the importance of estuaries in their planning activities related to federal natural resource grants. In planning for the use or development of water and land resources, Federal agencies are also required to consider impacts of commercial and industrial developments on estuaries. The information developed and distributed by NDBC will facilitate the intent of this Act.

Estuary Restoration Act of 2000. The Estuaries and Clean Waters Act of 2000, 33 U.S.C. §§ 2901 et seq., encourages the restoration of estuary habitat through more efficient project financing and enhanced coordination of Federal and non-Federal restoration programs. The Secretary of the Army is responsible for establishing an estuary habitat restoration program, carrying out estuary habitat restoration projects, and providing technical assistance through the award of contracts and cooperative agreements to non-Federal entities. The Under Secretary for Oceans and Atmosphere of the Department of Commerce is a member of the Estuary Habitat Restoration Council which is responsible for: (1) developing an estuary habitat restoration strategy designed to ensure a comprehensive approach to maximize benefits derived from estuary habitat restoration projects and foster coordination of Federal and non-Federal activities related to restoration of estuary habitat; (2) soliciting, reviewing, and evaluating project proposals and developing recommendations for consideration by the Secretary of the Army; and (3) maintaining a database and monitoring all estuary habitat restoration projects. The information developed and distributed by NDBC will facilitate the intent of the Act.

Rivers and Harbors Act. The Rivers and Harbors Act of 1899, 33 U.S.C. §§ 401 et seq., regulates the following: (1) construction activities associated with bridges, causeways, dams, or dikes; (2) obstruction, excavation, or filling of navigable waters (often associated with construction of wharves, piers, and similar structures); (3) establishment of harbor lines and conditions related to grants for extensions of piers; and (4) penalties related to the regulated actions and to the removal of existing structures. Section 10 of the Rivers and Harbors Act authorizes the USACE to regulate the dredging, filling, excavation, or other modifications to navigable waters of the United States. NDBC will demonstrate compliance with the Rivers and Harbors Act requirements as applicable.

Executive Order 11988, Floodplain Management (May 24, 1977) and Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input (January 30, 2015). EO 11988, *Floodplain Management*, directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practical alternative. In order to comply, the following must be analyzed: the potential for encroachment into floodplains by different alternatives; risks of the action; impacts on natural and beneficial floodplain values; support of incompatible floodplain development; and measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values affected by the project. The base floodplain is currently defined as "the area subject to flooding by the flood or tide having a 1 percent chance of being exceeded in any given year." An encroachment is defined as "an action within the limits of the base floodplain." However, on January 30, 2015, EO 13690 amended EO 11988, creating a new flood risk reduction standard for federally funded projects. The Federal Flood Risk Management Standard was

established to reduce the risk and cost of future flood disasters by ensuring that Federal investments in and affecting floodplains are constructed to better withstand the impacts of flooding. The new standard seeks to increase resilience against flooding by expanding management from the current base flood level to a higher vertical elevation and corresponding horizontal floodplain. The flood elevation and corresponding floodplain is to be determined by an agency using one of three approaches: (1) a climate informed science approach that uses the best-available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science; and (2) an approach using the freeboard value, reached by adding an additional 2 feet to the base flood elevation for non-critical actions and by adding an additional 3 feet to the base flood elevation for critical actions (i.e., any activity for which even a slight chance of flooding would be too great); and (3) calculating floodplain by determining the area subject to flooding by the 0.2 percent annual chance flood. On October 8, 2015, the Federal Emergency Management Agency published the Guidelines for Implementing EO 11988 and EO 13690. NOAA will take necessary action to adopt and implement the new flood risk management standard.

National Invasive Species Act and Executive Order 13112, Invasive Species (February 3, 1999). The National Invasive Species Act of 1966 was established to prevent invasive species from entering inland waters via ship ballast water. EO 13112 was created to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts caused by invasive species. Under the authority of this EO, Federal agencies may not authorize, fund, or carry out actions that they believe are likely to cause or promote the introduction or spread of invasive species.

3.1.2 Physical Resources Common to All Regions

3.1.2.1 Geological Resources

Geologic hazards that could affect offshore activities are mainly associated with the scouring action of ocean currents and seafloor instability caused by geologic characteristics and processes. Tidal, tsunami, and storm driven waves can affect sediment transport, undermining foundational structures and possibly leading to failure. Energy from currents and waves can also pose a hazard to submarine cables and moorings. Unconsolidated surface sediments are susceptible to liquefaction and mass movement as a result of earthquakes and storm surges. These surfaces can pose a hazard to foundation structures, submarine cables, and moorings. Gaseous sediments, a result of decomposing matter or gas rising along fault planes, can be present on the ocean floor. Faults, mapped throughout U.S. waters, can lead to ground-shaking, fault displacements, and tectonic wrapping associated with earthquake activities. Additionally, variable bottom types and irregular topography can affect the mooring and anchoring of structures (MMS 2007a).

3.1.2.2 Water Resources

In coastal environments, water quality is influenced by river drainage, erosion, and atmospheric deposition (e.g., precipitation and dust). In open-ocean environments, water quality is affected by evaporation; water currents and movement; El Niño and La Niña events; weather patterns; and surface winds. Human activities can affect water quality through nonpoint source runoff, pollutant discharges, dumping, hazardous material spills, and air emissions (NOAA 2009). The CWA

provides for the regulation of pollutant discharges into the waters of the United States and quality standards for surface waters.

3.1.3 Stennis Space Center

3.1.3.1 Geological Resources

Stennis Space Center is located in the Coastal Flatwoods physiographic region of Mississippi composed of young deposits of clay, silt, sand, and gravel from the Pleistocene and recent eras. This area is generally flat with a gentle rise from shore to inland areas. The soils are mostly acidic with boggy soils of high organic content (Stewart 2003).

3.1.3.2 Water Quality

Stennis Space Center is located in the Coastal Lowlands Aquifer system, which extends eastward from Texas across southern and central Louisiana into southern Mississippi and further to the Florida panhandle. The aquifer is composed mainly of unconsolidated sand and clay sediments and yields large quantities of water for public supply and agricultural, commercial, and industrial uses. Groundwater flow travels southward towards lower lying topographic areas and the Gulf of Mexico (USGS 2016).

Stennis Space Center is located within the watersheds of two rivers: the East Pearl River and the Jourdan River; therefore, hydric soils and wetlands are present throughout many areas. According to the USFWS, National Wetland Inventory (Version 2), there are no wetlands in the immediate vicinity of the NDBC campus. The NDBC campus is located north and east of the canals that are connected to the Pearl River (FWS 2016a).

3.1.4 Northeast Region

The Northeast region consists of the land and waters that border the following U.S. states: Maine, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, Pennsylvania, and New Jersey (see Figure 3-1).

3.1.4.1 Geological Resources

Coastal geology of the Northeast region consists mostly of coastal and estuarine features such as salt marshes, mud flats, rocky intertidal zones, sand beaches, and submerged aquatic vegetation. Rocky intertidal zones are periodically submerged, high-energy environments, found extensively on the northeastern region. Sandy beaches and salt marshes, and their corresponding intertidal zones are also found extensively on the northeastern region (NEFMC 2003).

The Northeast region sits on a broad continental shelf that is up to 200 km wide (Wilkinson et al. 2009). In the north, the shelf extends out about 193 km off Cape Cod, narrows gradually to 113 km off New Jersey. The most notable geologic features within this region are the Gulf of Maine, George's Bank, Stellwagen Bank, and the Great South Channel (Wilkinson et al. 2009). The Gulf of Maine is a glacially derived, semi-enclosed coastal basin, covering an area of 93,000 km^2

Figure 3-1. Northeast Region

(36,000 mi^2) and with an average depth of 150 m (492 feet). It contains 12,000 km (7,500 miles) of rocky coastline by its northern boundary of Nova Scotia and western boundaries of Maine, New Hampshire, and Massachusetts. To the south, the Gulf is open at the surface, but at depths greater than 50 m (164 feet) it forms a boundary with George's Bank, and to the east it is open to the ocean (NECWA 2016). The Gulf of Maine is topographically unique, containing 21 separate basins with depths exceeding 250 m (820 feet), and a maximum depth of 350 m (1,148 feet) to the north at Georges Basin. It also has high points, which can reach peaks at 9 m (30 feet) below the surface consisting of moraines, outcroppings of bedrock, or remnants of sedimentary shelf. The substrate of the Gulf is varied and can consist of bedrock, mud, boulders, gravel (mixed with shell), and sand. Bedrock is the predominant substrate along the western edge of the Gulf (out to a depth of approximately 60 m [197 feet]), and mud is the second most common substrate on the inner continental shelf (NEFMC 2007).

Georges Bank is a large shallow submarine bank south of the Gulf of Maine. It is 120 km (75 miles) wide and 240 km (149 miles) long, and rises more than 100 m (328 feet) above the Gulf of Maine seafloor (NECWA 2016). The Bank is characterized by linear ridges on the west; a smooth, gently dipping sea floor on the east; highly energetic peaks with sand ridges on the north; and steep, smooth topography with extensive gravel pavement on the south. Bottom sediments on the Bank include sand, clay, and gravel (AMNH 2002). Georges Bank is bordered to the north by the Northeastern Channel and to the south by the Great South Channel (approximately 75 m [246 feet] deep), which connect the Gulf of Maine to the Atlantic Ocean (AMNH 2002).

Stellwagen Bank is a kidney-shaped plateau covering 2,181 km^2 (842 mi^2), lying southwest of the Gulf of Maine and north of Cape Cod, Massachusetts. Stellwagen Bank is the most prominent feature of the Stellwagen Bank National Marine Sanctuary. Depths range from 20 m (65 feet) in the southwest corner and up to 183 m (600 feet) in the passages in the northeast corner. Its sediments consist mostly of sand and gravel. Stellwagen Bank contains a series of shallow banks along the southern border and deeper basins to the north (NOAA NMS 2013).

The Baltimore Canyon Trough is an oblong, northeast-trending basin characterized by extensional tectonic features. Its south-north range stretches from North Carolina to Long Island, New York, and its west-east range is from within the continental shelf to beyond the continental slope. It is the deepest basin along the U.S. Atlantic margin and consists of up to 14 kilometers of sediment above basement crustal rocks (USGS 2015).

3.1.4.2 Water Quality

The National Coastal Condition Report IV provides the most comprehensive ecological assessments of the condition of our nation's coastal bays and estuaries. The overall condition of coastal waters of the Northeast Coast (which included coastal waters from Virginia to Maine) was rated as fair. Specifically, the EPA rated the water quality index and sediment quality index as fair, the benthic index as poor, and the fish tissue contaminant index as fair to poor (USEPA 2012).

The interaction of currents and bodies of waters entering the Gulf of Maine results in an intense seasonal cycle of winter cooling and turnover, springtime freshwater runoff from rivers, and summer warming, which in turn influences oceanographic and biologic processes in the Gulf. Localized areas of upwelling interaction can also occur in numerous places throughout the Gulf as a result of tides, winds, currents, and wave interactions (NEFMC 2003; NEFMC 2007). The well-mixed water environment within the center of Georges Bank is a key contributor to the productivity, abundance, and diversity of marine populations on the Bank (NEFMC 2003).

Waters in the Gulf of Maine flow in a counterclockwise non-tidal current around the coastal margin. This flow is driven mainly by fresh, cold water entering from the northeast over the Scotian Shelf and the Northeast Channel, and freshwater river runoff, which is particularly important in the spring. Dense, warmer waters, influenced by the continental slope of the Northeast Channel, enter the bottom of the Gulf (NEFMC 2003). Circular surface currents are more pronounced in the spring and summer seasons creating a layered water system within the Gulf and its Banks. The surface water is warm and nutrient poor; followed by a nutrient rich intermediate layer; and a cool, highly saline bottom layer (NEFMC 2003).

Waters in Georges Bank circulate in a clockwise direction, strongest in the spring and summer (NEFMC 2003). Flow in Georges Bank is also influenced by semidiurnal tidal flows and intermittent storm-induced currents. Tidal currents have a strong influence on circulation within Georges Bank and maintain a well-mixed vertical water column within the bank (NEFMC 2003). This constant movement allows for the distribution of planktonic communities (i.e., larval fish) throughout the area.

3.1.5 Mid-Atlantic Region

The Mid-Atlantic region consists of the land and waters that border the following U.S. states: Delaware, Maryland, Virginia, and North Carolina (see Figure 3-2).

Figure 3-2. Mid-Atlantic Region

3.1.5.1 Geological Resources

The coastal geology of the Mid-Atlantic region is characterized by a mix of estuaries, rocky coastlines, mainland beaches, barrier islands, and tidal inlets, large embayments, and extensive wetlands and marshes. The shape and morphology of beaches and barrier islands throughout the Mid-Atlantic region are a function of tidal range, and wave energy and direction (MMS 2007a).

The Mid-Atlantic region has a relatively broad, glacially-deposited, continental shelf, with a width greater than 120 km (75 miles) throughout most of the shoreline, reaching depths of about 100 m for most of the region (MMS 2007a). The shelf extends to 113 km (70 miles) off New Jersey and at the south end extends about 32 km (20 miles) off Cape Hatteras, North Carolina. The Atlantic Continental Margin is tectonically passive and characterized by a series of platforms, basins, and fracture zones (MMS 2007a). The continental shelf is relatively flat, and slopes toward the continental slope (MAFMC 2011). A mantle of sand covers most of the shelf, ranging in thickness from 20 m (66 feet) throughout most of the mid-Atlantic region, and increasing to about 40 m (131 feet) on the northern portion of the region. Linear sand ridges are also characteristic of the continental shelf in this region (MMS 2007a).

Beyond the continental shelf is the continental slope, dissected by deep canyons and valleys. Sediments on the slope are mainly sandy silts on the upper slope and silts and clays on the lower slope (MMS 2007a). The Baltimore Canyon Trough, as discussed under the Northeast Region, also covers a large area of the Mid-Atlantic Region. The Trough extends as far south as North Carolina and west beyond the continental slope. This sedimentary basin has up to 14 kilometers of sediment above basement crustal rocks (USGS 2015).

The Mid-Atlantic Bight includes the shelf and slope waters from Georges Bank (south of the Gulf of Maine) to Cape Hatteras, North Carolina. The Mid-Atlantic Bight was caused by fluctuations from past ice ages and is composed of fine grain sandy sediments (NEFMC 2007). The sediments covering the shelf in the Mid-Atlantic Bight is sand with small areas of gravel and gravelly sand whereas the slope is predominately mud and muddy sand (NEFMC 2007).

The Mid-Atlantic region includes the two largest estuaries in the United States: the Chesapeake Bay and the Albemarle Pamlico Sound. The Chesapeake Bay stretches approximately 322 km (200 miles) from Havre de Grace, Maryland, to Norfolk, Virginia, with a width varying from 5.5 km to 56 km (3.4 miles to 35 miles). The average depth of the Chesapeake Bay is approximately 6.4 m (21 feet) and has a few channels that are more than 30 m (100 feet) deep. The Chesapeake Bay assumed its present shape about 2,000 years ago on the submerged Susquehanna River Valley (CBP 2012). The Albemarle Pamlico Sound lies behind the North Carolina Outer Banks. The North Carolina coast is characterized by sandy capes, barrier islands, tidal inlets, shell bottom, submerged aquatic vegetation, wetlands, soft bottom, and hard bottom.

3.1.5.2 Water Resources

The National Coastal Condition Report IV provides the most comprehensive ecological assessments of the condition of our nation's coastal bays and estuaries. The overall condition of coastal waters of the Northeast Coast (includes coastal waters from Virginia to Maine) and the Southeast Coast (includes coastal waters from North Carolina to Florida) were rated as fair (USEPA 2012). The specific water quality ratings are reported in the National Coastal Condition Report IV for the Northeast and Southeast Coasts are shown in Table 3-2.

Table 3-2. National Coastal Condition Report IV Water Quality Ratings for the Northeast and Southeast Coasts

	Northeast Coast	Southeast Coast
Water Quality Index	Fair	Fair
Sediment Quality Index	Fair	Fair to Poor
Benthic Index	Poor	Good
Fish Tissue Contaminants Index	Fair to Poor	Good

Source: USEPA 2012

Continental shelf waters in the Mid-Atlantic Bight are subjected to tidal effects, while offshore waters on the continental slope circulate in an elongated gyre. Waters on the continental shelf and slope can be affected by the equatorial Gulf Stream current, and flow slowly to the southwest

(NEFMC 2007). In general, coastal waters in the Mid-Atlantic Bight circulate on the continental shelf on a southwesterly pattern from Cape Cod to Cape Hatteras, where they become entrained in the Gulf Stream System. On occasions the Labrador Current, usually north of Cape Cod, will extend down to Cape Hatteras (MMS 2007a).

Coastal waters of the Mid-Atlantic Bight exhibit strong seasonal variations, with surface water temperatures ranging from 5-30 °C throughout the year (NOAA Fisheries 2016a). Coastal waters are subject to large fresh water inputs from the Delaware Bay and the Chesapeake Bay, which can influence salinity. The Mid-Atlantic region is highly populated, and coastal waters are severely influenced by large inputs of nutrients and sediments from agricultural operations and urban sources (MMS 2007a).

Circulation within the Chesapeake Bay is influenced by the influx of freshwater from rivers and tributaries, mainly north of the Bay, and the influx of salty oceanic water from the south. This results in a slightly stratified system, with a saltier bottom layer flowing northward and a fresher water layer flowing southward in the Bay. Wind can also impact circulation in the Bay, either disrupting or reinforcing this two-layered flow of fresh and salt water. It can also mix the two layers and reverse the direction of flow. During the summer time, as a result of increased stratification, large areas of low or no oxygen bottom waters occur throughout the Bay (CBP 2012).

Water quality in the Chesapeake Bay remains in critical condition despite efforts to decrease sediment and nutrient loading, however it is slowly improving (CBF 2014). Waters in the Chesapeake Bay are impaired by nitrogen, phosphorus, and sediment pollution which can lead to algal blooms and hypoxic zones. Excess nutrients and sediments are mainly from agriculture, sewage, storm water, and air pollution. Decline of oysters, underwater grasses, and other natural filters has also contributed to decreased water clarity in the Bay. EPA has developed a Bay-wide "pollution diet" plan to determine the amount of nitrogen, phosphorus, and sediment pollution that each state in the Chesapeake Bay watershed contributes and to improve water quality in the Chesapeake Bay (CBF 2014).

3.1.6 Southeast Region

The Southeast region consists of the land and waters that border the following U.S. states and country: South Carolina, Georgia, Florida (Atlantic Ocean side), and Bermuda (see Figure 3-3).

3.1.6.1 Geological Resources

The Southeast region can be divided into three sub-regions: the South Atlantic Bight (between Cape Hatteras, North Carolina, and Cape Canaveral, Florida); eastern Florida (south of Cape Canaveral, Florida); and the waters surrounding Bermuda.

Figure 3-3. Southeast Region

The South Atlantic Bight and the area south of Cape Canaveral sit on the same continental shelf, which ranges in width from 1 to 130 km (0.62 to 81 miles) and encompasses an area over 100,000 km^2 (38,610 mi^2) (MMS 2007a). The shelf is 25 km (16 miles) wide off the Dry Tortugas narrowing to approximately 5 km (3 miles) off Palm Beach; it broadens to reach about 120 km (75 miles) in width off of Georgia and South Carolina and narrows to about 30 km (19 miles) off Cape Hatteras (SAFMC 2011). Two platforms are contained within this shelf, the Florida Platform, off the northern Florida coast, and the Carolina Platform, off the North Carolina coast. These platforms extend out forming thick sediment wedges which are truncated by the Gulf Stream.

The shelf surface is covered mostly by a layer of thin sand less than 5 m (16 feet) thick. In areas where there is no sand coverage, harder cemented sand exposures form, consisting of smooth outcrops or rough bottoms with reliefs up to 15 m (49 feet) (MMS 2007a). One of the main geologic features in this region is the Blake Plateau, an intermediate depth outer shelf with depths ranging from 350 to 1,000 m (1, 148 to 3,281 feet). This plateau is composed of older sediments due to the Gulf Stream, which lies above it and transports most sediment along its current. The western and northern portions of the plateau have deep elongated and flat bottomed erosional depressions caused by the scouring action of the Gulf Stream (MMS 2007a). Beyond the continental shelf is the continental slope, a gentle, transitional drop from the shallow shelf edge of about 60 m (197 feet) onto the Blake Plateau and the Straits of Florida. Shelf-edge reefs occur near the top of the slope (MMS 2007a).

Bermuda is the most northerly group of coral islands in the world, lying just beyond the Gulf Stream, approximately 1,046 km (650 miles) east of the coast of South Carolina. Bermuda is a

volcanic sea mountain with a limestone cap, formed approximately 100 million years ago. Bermuda is an archipelago of seven islands and 150 other islands and islets. The island is 35 km (22 miles) long and the average width is less than 1.6 km (1 mile), totaling approximately 51.8 km^2 (20 mi^2) (Encyclopedia.com 2002).

3.1.6.2 Water Resources

South of Cape Hatteras, the Florida Current is the major current. The Florida Current starts in south Florida and flows northward along the east coast until reaching Cape Hatteras. It is considered to be the beginning of the Gulf Stream (MMS 2007a).

The National Coastal Condition Report IV provides the most comprehensive ecological assessments of the condition of our nation's coastal bays and estuaries. The overall condition of coastal waters of the Southeast Coast (includes coastal waters from North Carolina to Florida) were rated as fair (USEPA 2012). Specifically, the EPA rated the water quality index as fair; sediment quality index as fair to poor; and the benthic and fish tissue contaminant indexes as good (USEPA 2012).

The area south of Cape Hatteras, North Carolina, to Cape Canaveral, Florida, is characterized by mainly turbid and productive waters, influenced by the Gulf Stream, with a small tidal range (MMS 2007a). Water quality of southeast Atlantic coast estuaries and the eastern Gulf of Mexico is affected by the increasing coastal population (NOAA 2009). Strong surface winds can induce upwelling and down welling regimes in the southeast region that affects the ecosystem in profound ways. Similarly, significant upwelling events are induced by the passage of tropical storms. These events, which also may cause the mixing of surface waters with cooler thermocline waters, can produce significant cooling episodes that affect ecosystem function. Wintertime cyclogenesis also occurs over the Gulf Stream creating severe weather such as extra-tropical cyclones that impact both the southeast and mid-Atlantic (SECOORA 2011).

Bermuda is located on the western edge of the Sargasso Sea, which is bound on the west by the Gulf Stream. The currents in the Sargasso Sea rotate in a clockwise gyre creating the North Atlantic Gyre. The Sargasso Sea is 1,107 km (700 mi) wide and 3,200 km (2,000 mi) long. The Sea is known for carrying large quantities of free-floating seaweed that serve as food and shelter for many species of marine life (e.g., whales, sea turtles, eels, shrimp, crab and fish) (NOS 2015).

3.1.7 Gulf of Mexico Region

The Gulf of Mexico region consists of the land and waters that border the following U.S. states and country: Texas, Louisiana, Mississippi, Alabama, and the west coast of Florida and the Yucatan Peninsula of Mexico (see Figure 3-4).

3.1.7.1 Geological Resources

The Gulf of Mexico encompasses a surface area of 1.7 million km^2, with a mean water depth of 1,615 m. The continental shelf is the shallowest part in the Gulf, extending from the coastline to a depth of about 200 m with a gentle slope of a few meters per kilometer. The shallower part of the shelf, with depths up to 100 m, extends out from the coast for less than 16 km around the Mississippi delta to 160 km off the southwestern Florida tip (MMS 2007a).

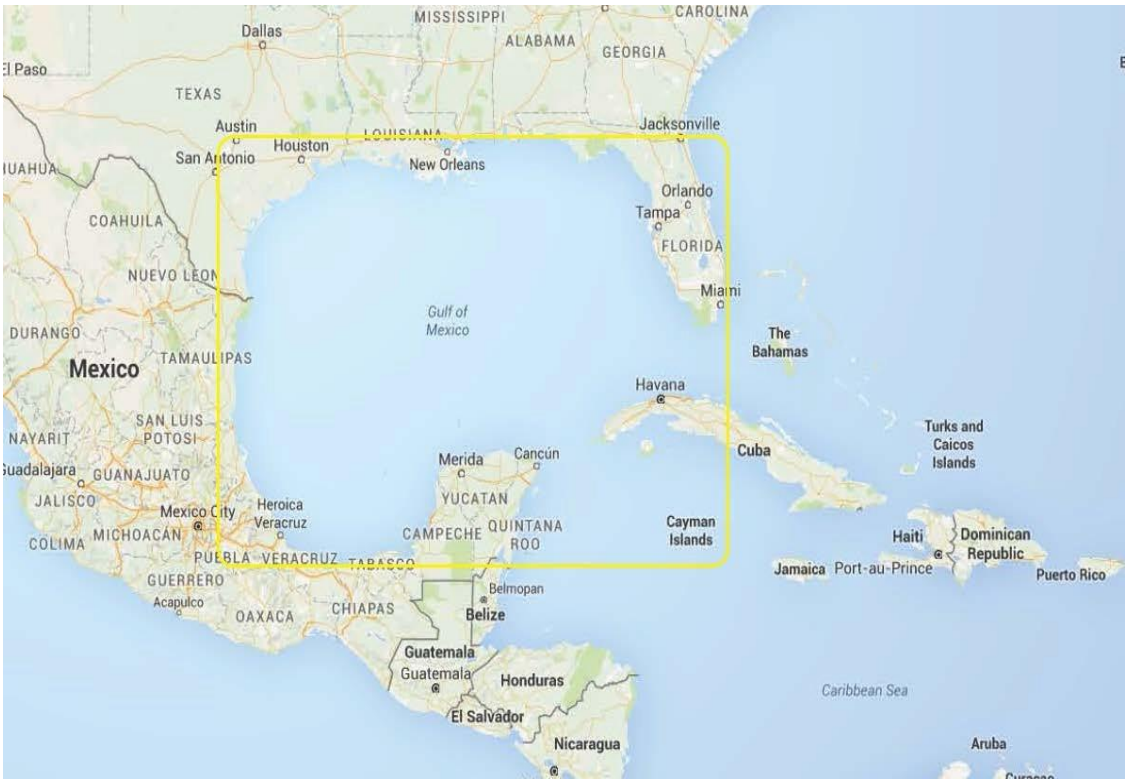

Figure 3-4. Gulf of Mexico Region

The geology of the Gulf of Mexico within U.S. waters can be subdivided into three regions: northern Gulf of Mexico, northeast Gulf of Mexico, and the south Florida continental shelf and slope.

- The northern Gulf of Mexico encompasses Texas, Louisiana, Mississippi, and Alabama; the major geologic feature in this area is the Mississippi Fan extending from the Mississippi Delta to the central abyssal plain.
- The northeast Gulf of Mexico extends from the Mississippi Delta to the Apalachee Bay in western Florida, and it is composed of soft sediments.
- The south Florida continental shelf and slope is the submerged portion of the Florida peninsula, extending from south from Apalachee Bay to the Straits of Florida, including the Florida Keys and Dry Tortugas (MMS 2007a).

Beyond the continental shelf lie the continental slope and the Gulf of Mexico Basin. The continental slope is a steep area containing diverse geomorphic features such as canyons, troughs, and salt structures. At the base of the continental slope is the Gulf of Mexico Basin, the deepest portion of the Gulf. The Basin is on the western part of the Gulf and includes the Sigsbee Abyssal Plain, the Sigsbee Deep, and the Mississippi Cone (MMS 2007a). The maximum depth ranges from 3,000 m (9,800 ft) to 4,300 m (14,100 ft) in the Basin (BOEM 2012).

The Gulf of Mexico coastline is characterized by mainland shores, bays and lagoons, deltaic plains, chenier plains, barrier islands and peninsulas, and tidal inlets. The coast of Florida is characterized

by mangrove swamps, sandy barriers and mainland beaches, irregular drowned karst topography, salt marshes, sea grass beds, coral reefs, and soft bottoms. Barrier islands are a main feature in the southwestern Florida shore; the northwestern coast is mostly drowned karst topography, and marsh and upland hammocks (BOEM 2012). In the southernmost end of Florida is the Florida Keys reef tract, one of the largest bank-barrier reef systems in the world. Ranging in depth from near the surface to 70 m, the reef extends 356 km from near Miami to the Tortugas region (NOAA 2010). The main features of the Alabama coast are sandy barrier islands that are separated from the mainland by lagoons, unfilled river valleys, salt marshes, sea grass beds, and soft and hard bottoms. The Mississippi Coast is composed of mainly chain barrier islands separated by tidal inlets, mainland bluffs covered by pine forest, salt marshes crossed by tidal creeks and bayous, sea grass beds, soft sediments, and hard bottoms. The Louisiana coast is characterized by delta lobes from the Mississippi Delta, eroding beaches, high sandy beaches with intervening marsh swales, short barrier islands, sea grass beds, and soft and hard bottoms. The Texas coast is characterized by beaches and barrier islands, bays, lagoons, salt marshes, sea grass beds, and soft and hard bottoms. Additionally, deepwater corals and chemosynthetic communities can be found in deeper water beyond the continental shelf (BOEM 2012).

3.1.7.2 Water Resources

The National Coastal Condition Report IV provides the most comprehensive ecological assessments of the condition of our nation's coastal bays and estuaries. The overall condition of coastal waters of the Gulf Coast region were rated as fair (USEPA 2012). Specifically, the EPA rated the water quality index as fair; benthic index as fair to poor; sediment quality index as poor; and the fish tissue contaminant indexes as good (USEPA 2012).

The dominant circulation current in the Gulf is the Loop Current, which enters through the Yucatan Channel and exits through the Florida Straits. The Loop Current is mainly confined the southeastern region of the Gulf of Mexico, but it may extend into the northeastern or north-central Gulf. The main circulation currents in the western and central Gulf of Mexico are closed-ring Loop Current Eddies, which may change their orientation and location depending on the season. Noncoastal marine waters in the Gulf of Mexico are influenced by the configuration of the Gulf of Mexico Basin and runoff from land. The configuration of the Gulf of Mexico Basin controls oceanic waters entering the Gulf from the Caribbean Sea and freshwater from the Mississippi River system. Near the Dry Tortugas, the Florida Current creates gyres that can persist for several months (SAFMC 2011). Gyres are rotating water masses created by merging currents that characterize the overall circulation patterns of the ocean (NOAA Fisheries 2014).

Coastal water in the Gulf of Mexico is influenced by rivers draining into the area, atmospheric deposition, and sediment influx. The Mississippi River drains nearly half of the conterminous United States and is the major river discharging into the Gulf of Mexico. The main variables affecting coastal water quality in this region are water temperature, salinity, suspended solids, and nutrients. Hydrologic influences include tides, near shore circulation, freshwater discharge, and precipitation (MMS 2007a).

Oceanic water and freshwater containing land runoff mix in the Gulf, creating a water composition different from deep oceanic waters. Marine waters in the Gulf of Mexico contain a turbid surface layer, with high concentrations of nitrate, phosphates, and silicates. During the summer months,

water discharging from the Mississippi spreads over most of the shelf resulting in a stratified water column and hypoxic bottom waters known as The Hypoxic Zone. The Hypoxic Zone forms each spring and summer following peak discharge periods and has been growing since 1985. The Hypoxic Zone persists until local wind-driven circulation mixes the water column (MMS 2007a).

3.1.8 Caribbean/Tropical Atlantic Region

The Caribbean/Tropical Atlantic region consists of the land and waters that border the following countries: the Bahamas, Cuba, Jamaica, the eastern portion of Mexico along the Yucatan Peninsula Mexico (near Cozumel), Haiti, Dominican Republic, Puerto Rico, and the British Virgin Islands (see Figure 3-5).

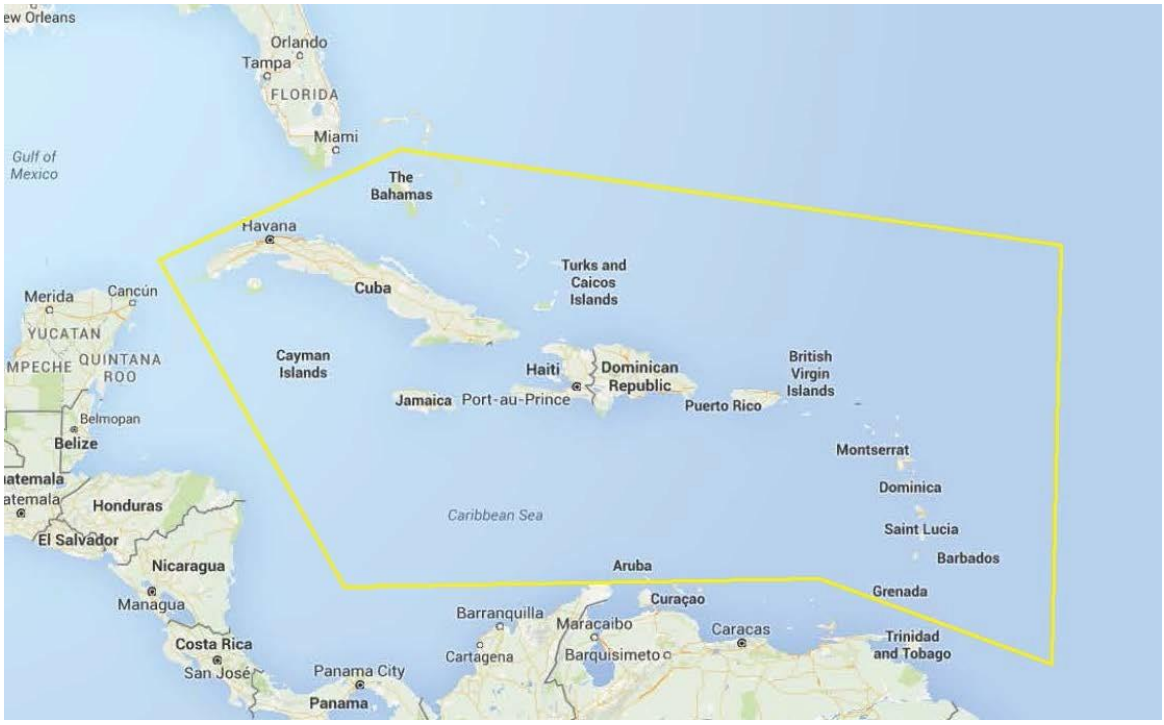

Figure 3-5. Caribbean/Tropical Atlantic Region

3.1.8.1 Geological Resources

The majority of the Caribbean/Tropical Atlantic region lies on the Caribbean Plate which has boundaries with the North American and South American Plates. Along the boundary at northeast corner of the Caribbean Plate and the North American Plate is the Puerto Rico Trench, which is the deepest part of the Atlantic Ocean at depths up to 8,400 meters (27,559 feet). The trench was created as the two plates slid past one another, which is unlike other trenches in the Pacific Ocean where one plate slides under another plate. The eastern boundary of the Caribbean Plate overrides the North American Plate creating an arc of islands and volcanoes along the Lesser Antilles trench (NOAA 2006). Earthquakes and tsunamis are very common in this region. The islands of Caribbean are composed mainly of volcanic sediments and limestone.

3.1.8.2 Water Resources

The Caribbean Sea covers an area of more than 3,500 km (2,175 mi) by 2,500 km (1,553 mi). The Sea is semi-enclosed by Central and South America and the Caribbean Islands. The water column ranges from highly stratified in the upper depths (surface to 1,200 m) to nearly homogenous in the lower depths (below 2,000 m). The Caribbean Current flows in a northwesterly direction into the Gulf of Mexico (Gyory et al. 2013).

3.1.9 Great Lakes Region

The Great Lakes region consists of the land and waters that border the five Great Lakes (Lake Superior, Lake Michigan, Lake Huron, Lake Erie, and Lake Ontario) (see Figure 3-6).

Figure 3-6. Great Lakes Region

3.1.9.1 Geological Resources

The Great Lakes are the largest system of freshwater on Earth, which is 84% and 21% of North America's and the world's supply of fresh surface water, respectively (USEPA 1995, USEPA 2015a). The Great Lakes are glacier lakes were formed during the Pleistocene Epoch, as the glaciers advanced and retreated many times, forming the basins, cliffs, and hills in the region. As the glaciers retreated, sand, silt, clay, and boulders were deposited in various mixtures.

Topography and soils of the lakes varying from north to south. The northern areas are dominated by granite bedrock and the southern areas have deeper soils that are a mixture of clay, silt, sand, gravel, and boulders. Each lake is different even though they compose one larger, single system (USEPA 1995). The shoreline geology in the Great Lakes region is characterized mainly by sand beaches, sand dunes, and wetlands consisting of marshes, bogs, and swamps. Wetlands range in

size from small wetlands in scattered bays to extensive shoreline wetlands (e.g., the southwestern region of Lake Erie) (USEPA 1995).

Lake Superior is the largest of the lakes by volume; it has an average depth of 147 m (483 feet), and a maximum depth of 406 m (1,332 feet). Lake Michigan is the second largest of the Great Lakes and is the only one entirely within the United States; it has an average depth of 85 m (279 feet) and a maximum depth of 282 m (925 feet). Lake Huron is the third largest of the lakes by volume and includes Georgian Bay; and it has an average depth 59 m (195 feet). Lake Erie is the smallest of the lakes by volume; it has an average depth of 19 m (62 feet) and a maximum depth of 64 m (210 feet). Lake Ontario encompasses a smaller area than Lake Erie but is much deeper; it has an average depth of 86 m (293 feet) and a maximum depth of 244 m (802 feet) (USEPA 2015b). The lakes are connected by a series of rivers and straits and the St. Lawrence River connects the Great Lakes to the Atlantic Ocean (USEPA 1995). A significant feature of the Great Lakes region is Niagara Falls, which is located between Lake Erie and Lake Ontario.

3.1.9.2 Water Resources

Water in the Great Lakes system is replenished through precipitation, surface runoff, groundwater, or flow from tributaries to the lakes. Surface runoff is affected by erosion, agricultural uses of nearby soils, and clearing of forested lands, which can affect water quality of the lakes. The groundwater in the Great Lakes Basin provides a source of drinking water for neighboring communities. The human uses of the area (i.e., industrial, urbanization, agriculture) have caused contamination of soils and the groundwater, which is carried into the lakes (USEPA 1995).

Water level in lakes can be affected by day-to-day factors such as weather, or by seasonal variations due to climate. Day-to-day changes caused by winds can create a "wind set-up," blowing water from one side of the lake to the other. A *seiche* is another form of water oscillation occurring as a result of a rapid change in winds and barometric pressure. Annual or seasonal variations occur mainly due to changes in precipitation and runoff. Generally, the lowest water levels occurring in the Great Lakes occur during the winter, because most of the precipitation is locked in ice and snow on land. Water levels are the highest during the summer time after the spring thaw when runoff to lakes increases (USEPA 1995).

The National Coastal Condition Report IV assesses the overall condition of all five of the Great Lakes, the St. Lawrence River, and the St. Clair River Lake. The overall condition of the waters within the entire Great Lake system were rated as fair to poor. Specifically, the EPA rated the water quality and fish tissue contaminant indices as fair; coastal habitat and benthic indices as fair to poor; sediment quality index as poor (USEPA 2012).

Despite their large size, the Great Lakes are very susceptible to pollutants because of their vulnerability of direct contamination from atmospheric conditions via large surface areas and the limited amount of outflow via rivers and straits. Each of the lakes has different characteristics, influences, and retention times (i.e., the amount of time it takes for the total volume of water to flow out). Below are short descriptions of each lake.

- Lake Superior has the longest retention times (191 years), largest volume (2,900 mi^3), surface area (31,700 mi^2), and maximum depth (1,332 ft). Most of its basin is forested and

the surrounding human population is relatively small, resulting in relatively low levels of pollutants entering Lake Superior from runoff or groundwater inflow.

- Lake Michigan has a retention time of 99 years and is the second largest of the Great Lakes, in terms of volume (1,180 mi^3). It receives the waste from the world's largest concentration of pulp and paper mills, and its southern basin is among the most urbanized areas in the Great Lakes system, influenced by Milwaukee, Wisconsin and the Chicago, Illinois metropolitan areas.
- Lake Huron has a retention time of 22 years and has the second largest surface area (23,000 mi^2) and third largest volume (850 mi^3). The Georgian Bay extends the lake to northeast and is approximately 5,800 mi^2. The Saginaw River basin, which is at the southern end of the lake, is an intensely farmed area.
- Lake Erie has a retention time of 2.6 years and the smallest volume (116 mi^3) of the Great Lakes. The soils surrounding the lake are fertile and intensely farmed. It receives runoff from the agricultural areas of southwestern Ontario and parts of Ohio, Indiana, and Michigan. Seventeen metropolitan areas (with populations over 50,000 people) are located within its basin.
- Lake Ontario has a retention time of 6 years and the smallest surface area (7,340 mi^2). The cities of Hamilton and Toronto, Ontario, are located along its shores (USEPA 1995).

3.1.10 Central Pacific Region

The Central Pacific Region consists of the waters in which the TAO buoys are deployed, as well as the land and waters the border Hawaii, Tonga, New Zealand, Peru, Panama, and the western coast of Mexico (see Figure 3-7).

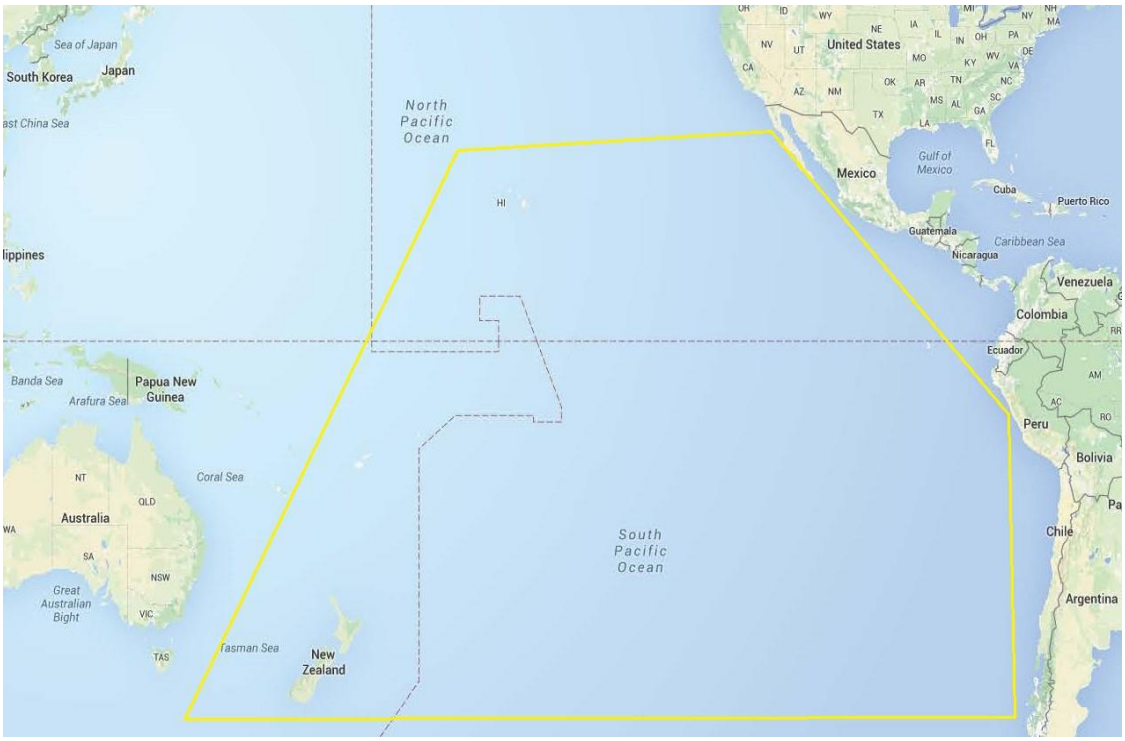

Figure 3-7. Central Pacific Region

3.1.10.1 Geological Resources

The most distinctive geologic formation in the Pacific Ocean is the Ring of Fire, which runs from along the northern coast of Antarctica, past New Zealand to the eastern coast of Asia, along the Aleutian Islands and then south along the coasts of North and South America. The Central Pacific Region contains the eastern side of the Ring of Fire. The Ring of Fire, which is the convergence of multiple tectonic plates throughout the basin of the Pacific Ocean, and includes a series of oceanic trenches, mountains, and more than 450 active and dormant volcanoes. The Ring of Fire is the convergence of the Pacific Plate with the North American Plate, and the Australian Plate. The interactions of the Plates causes many earthquakes and volcanic eruptions (WPRFMC 2009a).

The Central Pacific Region contains the eastern side of the Ring of Fire. Key features include: the Middle America Trench, the Tonga trench, and the Peru-Chile trench.

The Middle America Trench runs along the western coast of Central America for more than 2,750 km (1,700 miles) from Mexico to Costa Rica with a maximum depth of 6,669 meters (21,880 feet) (Encyclopedia Britannica 2016a).

The Tonga trench is in the Southern Pacific Ocean and runs parallel to the eastern shore of Australia. It is 850 miles long, has an maximum depth of 10,882 m (35,702 feet) and is the second deepest place on Earth, behind the Mariana Trench (located in the Western Pacific Region, see Section 3.1.11.1). The Tonga Trench was created from tectonic activities on the convergent plate boundary, known as the Karmadec-Tonga subduction zone (AFO 2016).

The Peru-Chile trench, approximately 100 miles off the coast of South America in the southwestern Pacific Ocean. It is approximately 5,900 km (3,666 mi) long and has a maximum depth of 8,065 m (26,460 feet) (Encyclopedia Britannica 2016b).

3.1.10.2 Water Resources

The El Niño-Southern Oscillation is the warming and cooling of climate patterns across the tropical Pacific Ocean. El Niño-Southern Oscillation events shift irregularly every two to seven years. Each phase or shift, triggers predictable disruptions of temperature, precipitation, and winds. The two distinct forms of El Niño-Southern Oscillation in the Pacific Ocean are known as El Niño and La Niña (NOAA 2014). Large-scale oceanographic events such as El Niño change the characteristics of water temperature and productivity across the Pacific, and these events have a significant effect on the habitat range and movements of pelagic species (NOAA Fisheries 2014). El Niño occurs when sea surface temperatures increase and low-level surface winds weaken or blow in the opposite direction (west to east) (NOAA 2014). During La Niña, sea surface temperatures in the eastern tropical Pacific are below average, and temperatures in the western tropical Pacific are above average (NOAA Fisheries 2014).

3.1.11 Western Pacific Region

The Western Pacific region consists of the land and waters that border Russia, Japan, Philippines, Commonwealth of Northern Mariana Islands (CNMI), Federated States of Micronesia, and New Guinea (see Figure 3-8).

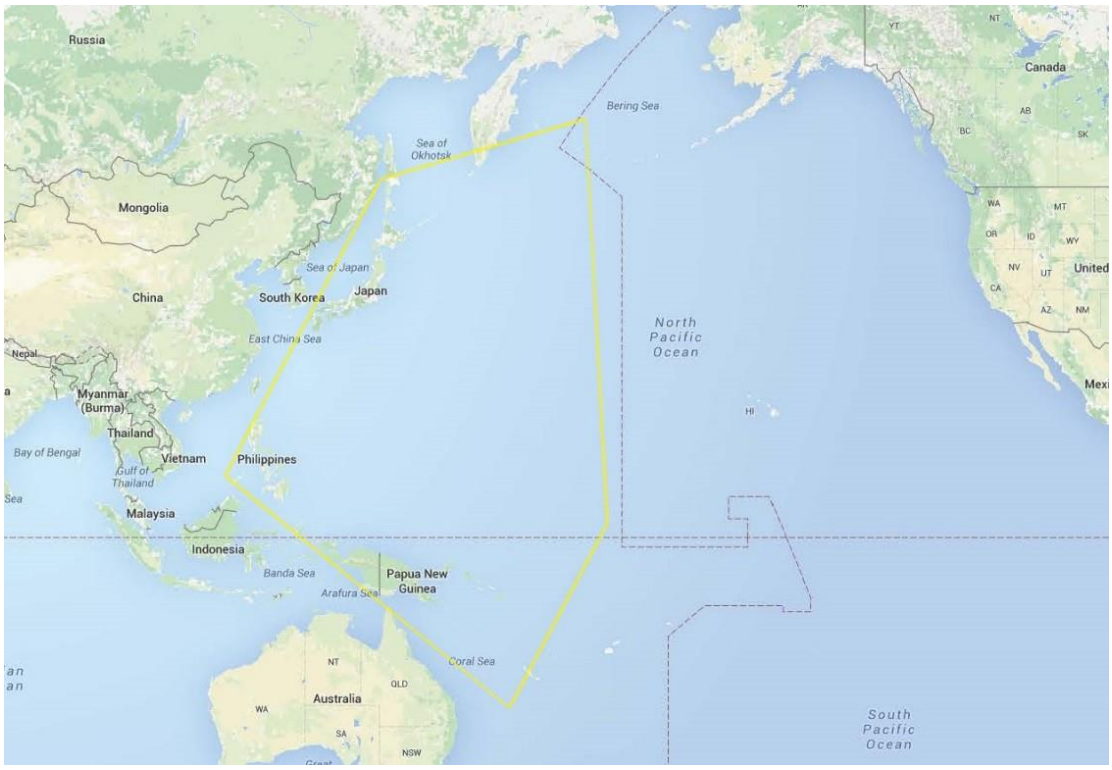

Figure 3-8. Western Pacific Region

3.1.11.1 Geological Resources

The geological resources described in Section 3.1.10 for the Central Pacific Region are the same as those of the Western Pacific Region. Geologic processes associated with plate tectonics, volcanism, and reef accretion are responsible for the formation of Pacific islands. The most distinctive geologic formation in the Pacific Ocean is the Ring of Fire. The Western Pacific Region contains the western side of the Ring of Fire and is the convergence of the Pacific Plate with the North American Plate, Eurasian Plate, Philippine Plate, and Indo-Australian Plate (WPRFMC 2009a).

There are many groups of islands in the Western Pacific Region. They are typically divided based on culturally characteristics into 3 main groups: Micronesia, Polynesia, and Melanesia (Encyclopedia Britannica 2016c). The most prominent islands that are in the three cultural areas are shown in Table 3-3.

Table 3-3. Islands Located in the Western Pacific Region

Culture Area	Prominent Island Groups/Nations
Micronesia	Federated States of Micronesia, Republic of Palau, Marshall Islands, CNMI (Guam, Saipan, Rota, and Tinian)
Polynesia	American Samoa, Cook Islands
Melanesia	New Guinea, Solomon Islands, Fiji

Source: Encyclopedia Britannica 2016c

Micronesia

The Federated States of Micronesia is composed of 607 islands for a total landmass of 702 km^2 (438 mi^2) (NBSAP 2002). The coral reef ecosystem is the dominant shallow marine feature of the Federated States of Micronesia. Mangrove forests and seagrass beds are well developed especially along the fringes of the high islands and some atolls. The Federated States of Micronesia are affected by storms and typhoons that are generally more severe in the western islands (NBSAP 2002).

The Republic of Palau consists of approximately 350 volcanic, high-limestone, low platform, reef, or atoll islands (SOPAC 2007). The coastlines of the Palau islands are comprised of coral and sand beaches and rock along large expanses of mangrove swamp. The barrier reef surrounding the main island group averages 2.5 km in width on the west side of the islands. Well-developed stands of mangrove forests are found along rivers and coastal mudflats. Sea grass beds also provide coastal habitat. Limestone forests found on lime outcrops, and coralline limestone islands are susceptible to any disturbance. Palau lies outside of the typhoon belt of the northern equatorial Pacific. However, wind speeds increase during typhoon events that veer close to the islands (SOPAC 2007).

The Marshall Islands (approximately 466 km^2) are made up of 34 low-lying atolls separated into two chains: the southeastern Ratak Chain and the Ralik Chain. The Marshall Islands consists of low-lying atolls, remnants of high volcanic islands with low coral limestone terrain, and sand islands.

CNMI (approximately 1,026 km^2) is composed of a submerged mountain chain of 15 volcanic islands that stretches from Guam to Japan, almost 2,414 km. All of the Mariana Islands have some nearshore coral reef development. Most of the islands have only a narrow fringing reef system, while others such as Saipan have extensive reef flats extending seaward for hundreds of meters. The seafloor of this region is characterized by the Mariana Trench, the Mariana Trough, ridges, numerous seamounts, hydrothermal vents, and volcanic activity (Navy 2010). The Mariana Trench is the deepest part of the world's oceans at 11,034 meters (36,201 ft). The CNMI runs along the crescent shaped trench on the Mariana Ridge (a volcanic arc), west of the Mariana Trench. Earthquake activity is common across the entire Mariana Island chain due to its location on the Ring of Fire, along with typhoons, tropical storms, and associated storm surges (Guampedia 2014).

Polynesia

New Zealand is 1,600 km from the eastern coast of Australia and is an archipelago with over 700 offshore islands and most are small and lie within 50 km (31 miles) of the coast. New Zealand runs along the boundaries of the Pacific and Australian tectonic plates, where the dense Pacific plate moves beneath the lighter, Australian plate. Plate movements cause volcanic activity, tsunamis, landslides, and earthquakes that can be felt throughout the country. The continental shelf surrounding New Zealand is gently sloping to about 200 m (656 feet) below sea level (GNS Science undated).

American Samoa (approximately 200 km^2) is surrounded by an EEZ of approximately 390,000 km^2 and includes Tutuila (approximately 142 km^2), the Manua Islands (a group of three volcanic islands with a total land area of less than 52 km^2), and two coral atolls (Rose Atoll and Swains Island). The Hawaiian Islands extend nearly 2,414 km and are comprised of 137 islands, islets, and coral atolls. The exposed islands are part of an undersea mountain range, which was formed by a by a hot spot within the Pacific Plate (WPRFMC 2009a).

American Samoa is the only U.S. territory located south of the equator. The largest island, Tutuila, features Pago Pago Harbor, the deepest and one of the most sheltered bays in the South Pacific. All of the islands have fringing coral reefs and a large and complex relict barrier reef surrounds Tutuila. Coastal wetlands are limited in American Samoa, which is the eastern-most natural limit for mangroves (WPFMC 2016). Geologic hazards in American Samoa include earthquakes, tsunamis, and volcanic eruptions locations. Earthquakes in American Samoa originate from the Tonga Trench, where the Pacific and Australian tectonic plates collide. Most tsunamis and volcanic activity that affect American Samoa are generated by earthquakes from fault movements along the Pacific Rim, South America, and the Tonga Trench (FEMA 2008).

The Hawaiian Archipelago is chain of islands located in the central North Pacific Ocean. The eight main islands are approximately 3,800 km (2,361 miles) from the west coast of the United States and span approximately 600 km (373 miles) in length. The Hawaiian Islands are a part of the Hawaiian Ridge-Emperor Seamounts chain and were formed as a result of volcanic activity (NOAA Fisheries 2014). Geologic hazards in the Hawaiian Islands include earthquakes, tsunamis, and volcanic eruptions. The Hawaiian Islands are affected by tsunamis that are typically generated by earthquakes from fault movements around the Pacific Rim.

Melanesia

Melanesia is an arc of islands located south of the equator and northeast and east of Australia. The most prominent islands are New Guinea, Solomon Islands, and Fiji. The islands of this region are along the Ring of Fire and therefore volcanic in nature. There is also a small amount of coral atolls. Earthquakes are relatively common, with accompanying tsunamis.

New Guinea is located just north of Australia, the Solomon Islands are southeast of New Guinea, and Fiji is southeast of the Solomon Islands. The Solomon Islands are a double chain of volcanic islands and coral atolls. There are six main islands and more than 900 smaller islands (Encyclopedia Britannica 2016d). Fiji is an archipelago of more than 330 islands, of which approximately 100 are inhabited (World Atlas 2016).

3.1.11.2 Water Resources

Surface currents in the Pacific Ocean are driven by the trade winds and westerlies, such that surface flows are predominantly westward in low latitudes and eastward in high latitudes. Gyres are formed when these flows are diverted north and south by land masses to form coastal currents, characterizing the overall circulation patterns of the ocean (NOAA Fisheries 2014). Cold ocean water from Antarctica flows north into the Pacific Ocean until it reaches waters off the coast of Alaska and then flows south.

Ocean currents of the waters in the Western Pacific Region are also influenced by the El Niño-Southern Oscillation, as described in Section 3.1.10.2. During El Niño events, winds blow from west to east and circulate warmer waters towards North and South America. La Niña events cause the opposite effects with winds flowing from east to west and moving warmer waters away from North and South America (NOAA Fisheries 2014, NOAA 2014).

3.1.12 Gulf of Alaska Region

The Gulf of Alaska region consists of the land and waters that border Alaska and the Aleutian Islands, as well as the Bering Sea (see Figure 3-9).

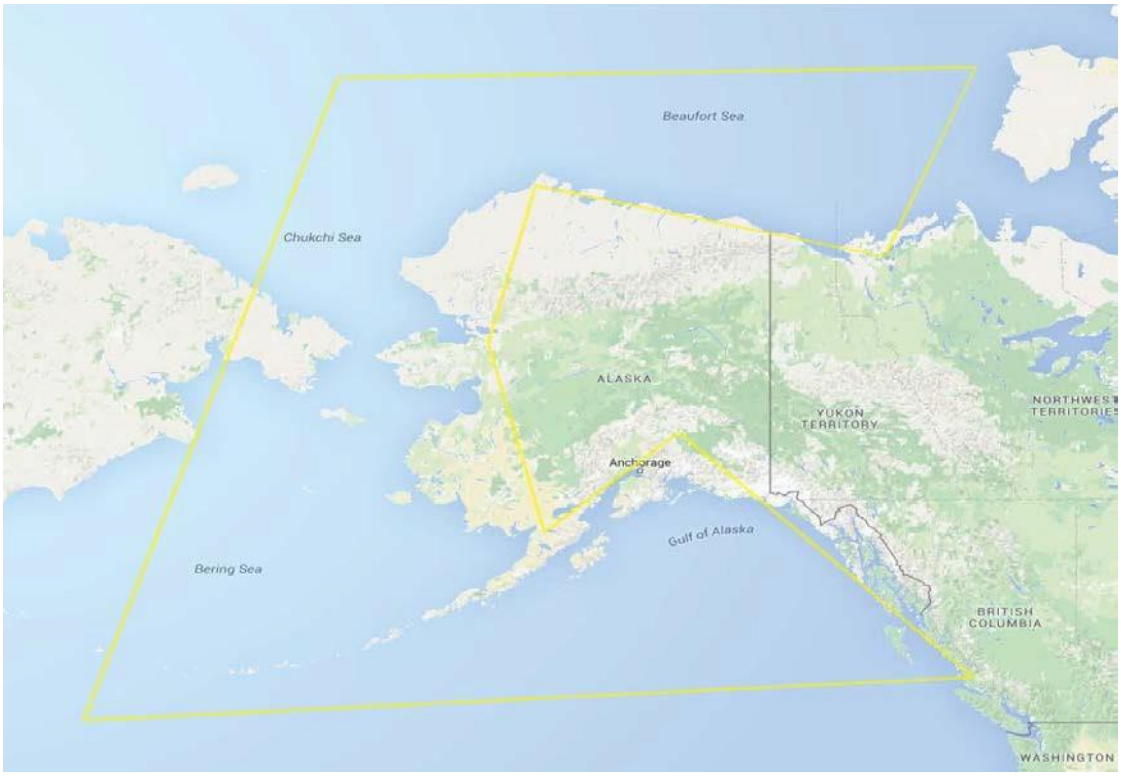

Figure 3-9. Gulf of Alaska Region

3.1.12.1 Geological Resources

Alaska is bounded on the east by Canada and bounded by water bodies on the north (Artic Ocean and Beaufort Sea), west (Chukchi and Bering Seas), and south (Gulf of Alaska and the Pacific Ocean). Although separated from the main ocean body by the Aleutian Islands, the Bering Sea is considered to be a northern extension of the northeast Pacific Ocean by virtue of hydraulic communication through the numerous passes and channels between the islands (MMS 2007a).

Alaska has 54,563 km (33,904 miles) of shoreline (SOA 2016). Along the land boundary, the continental shelf (depth less than or equal to 200 m [656 feet]) is relatively narrow (less than 50 km [31 miles]) along the British Columbia and southeast Alaska coasts, and then broadens to 100 km or more along the southcentral Alaska coast. Along portions of the Kenai and Alaska peninsulas, the continental shelf attains a width of nearly 200 km (124 miles). Although dotted by numerous seamounts rising to within 1,000 m (0.62 miles) of the surface, seabed depths over most of the northeast Pacific Ocean tend to be greater than 4,000 m (2.49 miles).

The Aleutian Islands comprise approximately 150 islands and extend about 2,260 km (1.4 miles) in length (NOAA 2005). The Islands are located along the Pacific Ring of Fire, where the Pacific Plate is being subducted beneath the North American Plate (WPRFMC 2009a). The result is the Aleutian Trench which is 2,900 km (1,801 mi) in length and a maximum depth of approximately 7,680 meters (25,196 feet) (Rosenberg 2016, AMNH undated). The Islands are composed of a mix hard substrates, such as, pebbles, cobbles, boulders, and rock. The Aleutian Islands form an arc that is a partial geographic barrier between the northern Pacific marine waters and the Eastern Bering Sea waters. The continental shelf of the Aleutian Islands is relatively narrow with widths on the north of the islands ranging from approximately 4 km or less and 42 to 46 km on the south side of the islands. The shelf broadens in the eastern portion of the Aleutian Islands arc (NOAA 2005).

The Bering Sea is a semi-enclosed, high-latitude sea. Of its total area of 2.3 million km^2, 44 percent is continental shelf (depths less than 200 m), 13 percent is continental slope, and 43 percent is deep water basin (depths up to 3,800 m along the western margin of the sea). The Eastern Bering Sea is characterized by an exceptionally broad (more than 500 km) shelf region with a narrow continental slope adjoining an extensive Aleutian Basin. Its broad continental shelf on the east side of the Bering Sea is one of the most biologically productive areas in the world (NOAA 2005).

The Gulf of Alaska generally includes all waters within the EEZ along the southeastern, southcentral, and southwestern coasts of Alaska from Dixon Entrance to Unimak Pass, a distance along the Alaskan coastline of more than 2,500 km (MMS 2007a). Areas in the ROI that are located off of the Gulf of Alaska include Prince William Sound, Resurrection Bay, Cook Inlet, and Kachemak Bay (an arm of Cook Inlet). The Gulf of Alaska has approximately 160,000 km^2 of continental shelf, which is less than 25 percent of the Eastern Bering Sea shelf (NOAA 2005). Numerous troughs and shallow banks characterize the topography of the western Gulf of Alaska (MMS 2007a).

The Gulf of Alaska has a variety of seabed types such as gravely sand, silty mud, and muddy to sandy gravel, as well as areas of hard rock. The dominant shelf sediment consists of clay silt and the shoreline sediments are predominately sand (NOAA 2007). Most of the western Gulf of Alaska

shelf consists of many banks and reefs with numerous coarse, clastic, or rocky bottoms, as well as patchy bottom sediments. In contrast, the shelf near Kodiak Island consists of flat relatively shallow banks cut by transverse troughs (NOAA 2005).

The Beaufort and Chukchi seas are the northernmost seas bordering Alaska. The Beaufort and Chukchi seas are parts of the Arctic Ocean, but both are linked, atmospherically and oceanographically, to the Pacific Ocean. Annual formation and decay of sea ice influence the oceanography and dynamics of the Beaufort and Chukchi seas (NOAA 2013a).

The Beaufort Sea is a semi-enclosed basin with a narrow continental shelf extending 30 to 80 km (19 to 50 miles) from the coast. The Alaskan coast of the Beaufort Sea is about 600 km in length, reaching from the Canadian border in the east, to the Chukchi Sea at Point Barrow in the west. The continental shelf of the Beaufort Sea is relatively shallow, with an average water depth of about 37 m (121 feet). Numerous narrow and low relief barrier islands within 1.6 to 32 km (1 to 20 miles) of the coast influence nearshore processes in the Beaufort Sea (NOAA 2013a).

The Chukchi Sea is predominantly a shallow sea characterized by gentle mounds and shallow troughs with a mean depth of 40 to 50 m (131 to 164 feet). The Chukchi Sea shelf is approximately 500 km (311 miles) wide and extends roughly 800 km (497 miles) northward from the Bering Strait to the continental shelf break. Beyond the shelf break, water depths increase quickly beyond 1,000 m (3,280 feet) (NOAA 2013a). The two major sea valleys in the Chukchi Sea are the Herald Canyon and Barrow Canyon. The shoreline west of Barrow Canyon is characterized by nearly continuous sea cliffs up to 12 m high and cut into perennially frozen ice-rich sediments, which separates the Beaufort and Chukchi Seas (NOAA 2013a).

3.1.12.2 Water Resources

A special feature of the Bering Sea is the pack ice that covers most of its eastern and northern continental shelf during winter and spring. The dominant circulation of the water begins with the passage of North Pacific water (the Alaskan Stream) into the Bering Sea through the major passes in the Aleutian Islands (MMS 2007a). There is net water transport eastward along the north side of the Aleutian Islands, and a turn northward at the continental shelf break and at the eastern perimeter of Bristol Bay. Eventually, Bering Sea water exits northward through the Bering Strait, or westward and south along the Russian coast, entering the western North Pacific via the Kamchatka Strait. Some resident water joins new North Pacific water entering Near Strait, which sustains a permanent gyre around the deep basin in the central Bering Sea (MMS 2007a).

The dominant circulation in the Gulf of Alaska is characterized by the cyclonic flow of the Alaska gyre. The circulation consists of the eastward-flowing Subarctic Current system at approximately 50º N and the Alaska Coastal Current (Alaska Stream) system along the northern Gulf of Alaska (NOAA 2005). The Alaskan Stream, which flows southwesterly and roughly parallel to the shelf break at 50-100 centimeters per second, dominates offshore, near-surface circulation. Nearshore, the Alaska Coastal Current is the dominant feature (MMS 2007a).

The National Coastal Condition Report IV assesses the overall condition of coastal waters. Due to the scale and geographic complexity of the Alaska's shoreline, a comprehensive assessment in the National Coastal Condition Report IV could not be completed. According to the report, the

Southcentral Alaska, Southeastern Alaska, Aleutian Islands, and Upper Chukchi Sea were evaluated. The Beaufort Sea, Lower Chukchi Sea, and Bering Sea were not evaluated. The overall condition of the waters within this region was rated good. Specifically, the EPA rated the water quality, sediment quality, coastal habitat, and fish tissue contaminant indices as good; and the benthic index could not be evaluated (USEPA 2012).

El Niño-Southern Oscillation events account for approximately one-third of the ice and sea surface temperature variability in the Bering Sea (NOAA 2007). During El Niño events, the Aleutian Low pressure system tends to be more intense and is positioned further to the south, thereby producing stronger winds, larger waves, and cooler water temperatures (NOAA 2011g).

3.1.13 Northwest Region

The Northwest region consists of the land and waters that border Washington, Oregon, and northern California (from the California/Oregon border south to San Francisco) (see Figure 3-10).

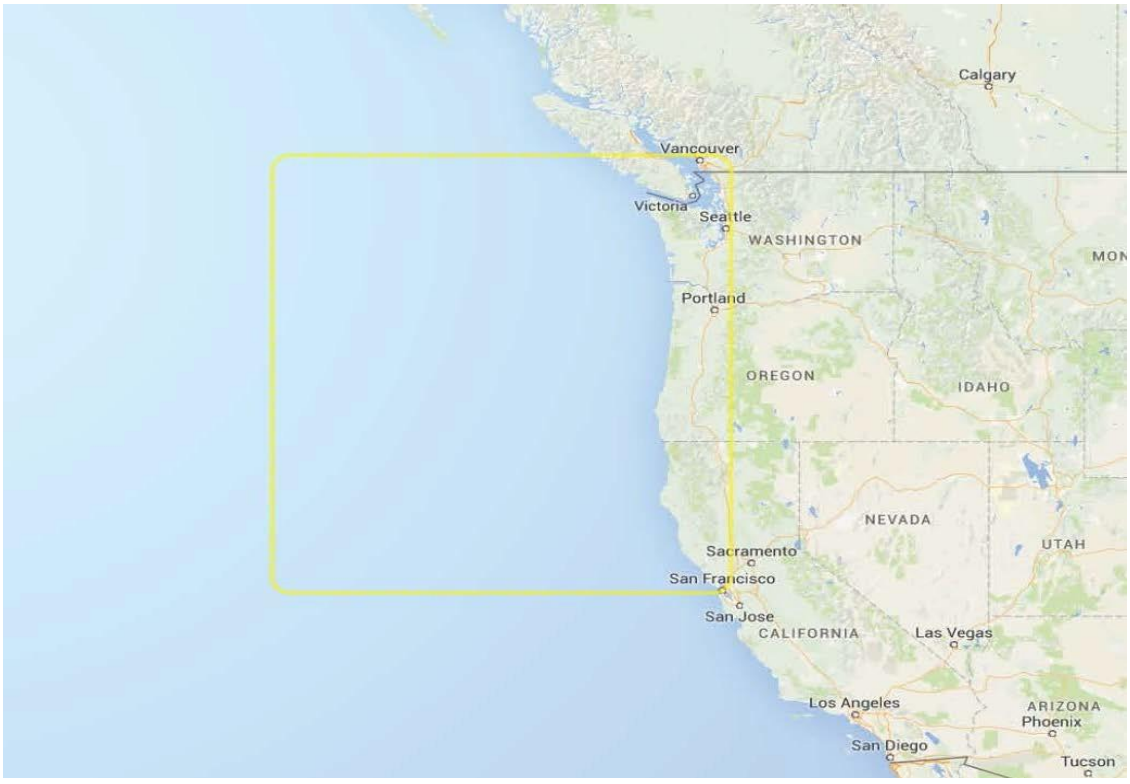

Figure 3-10. Northwest Region

3.1.13.1 Geological Resources

The Northwest region was formed by tectonic activity of the Pacific Plate and its interaction with the North American Plate and several smaller plates and microplates (MMS 2007b). The Northwest region is along the eastern boundary of the Pacific Ring of Fire (Rosenberg 2016).

The width of the continental shelf in the Northwest region is narrow, measuring at less than 80 km (50 mi) wide (MMS 2007b). The 100-m water-depth contour occurs fairly close to shore, usually within 40 km. Marine sediments are dominated by fine grained sands with grains increasing in size with increased distance from the shoreline (BOEM 2010). The continental shelf in this region is characterized by physiographic features that include a series of deep-water ridges, submarine canyons and channels, submarine fans, sea stacks and small islands, a broad terrace, submarine banks (shoals), and seamount chains (MMS 2007b).

Major coastal habitat types in the northwest include sandy beaches and dunes; rocky shores and intertidal zones; mudflats; rocky cliffs; lagoons and estuaries; freshwater and salt marshes; and tidal creeks (MMS 2007b). Physical hazards that could affect the marine and coastal environment in the northwest are mainly associated with the scouring action of ocean currents and seafloor instability, either from seismic activity or sedimentary processes. Hazards include scouring action of ocean currents; slope failures, which can be triggered by earthquakes, storm surges, faulting, sediment loading, dissociation of hydrates, dewatering processes, or human activity; faulting and warping; tsunamis; subsurface fluid and gas expulsion; and irregular topography (MMS 2007b).

3.1.13.2 Water Resources

Two of the principal currents that occur along the western coast of the United States are the California Current and the Davidson Current. The main California Current begins off southern British Columbia and ends off southern Baja California and is usually located several kilometers offshore (MMS 2007b). The current proceeds southwards along the U.S. west coast and is slow, meandering, broad, and indistinct. The Davidson Current is a narrower, weaker countercurrent that runs north along the west coast of the United States from northern California to Washington to at least latitude of 48°N during the winter (NOAA 2007).

Prevailing winds cause down welling close to the coast in winter and upwelling of cold, nutrient-laden oceanic water close to the coast in summer (NOAA 2007). The movement of northern waters southward by the California Current makes the coastal waters cooler than coastal areas of comparable latitude on the east coast of the United States, despite the occasional movement of somewhat warmer water northward during the winter by the Davidson Current (MMS 2007b).

The National Coastal Condition Report IV provides the most comprehensive ecological assessments of the condition of our nation's coastal bays and estuaries. The overall condition of coastal waters of the west coast were rated as good to fair (USEPA 2012). Specifically, the EPA rated the water quality, benthic, and fish tissue contaminant indexes as good; sediment quality index as fair; and the coastal habitat index as poor (USEPA 2012).

3.1.14 California Region

The California region consists of the land and waters that border California from San Francisco south to the California/Mexico border (see Figure 3-11).

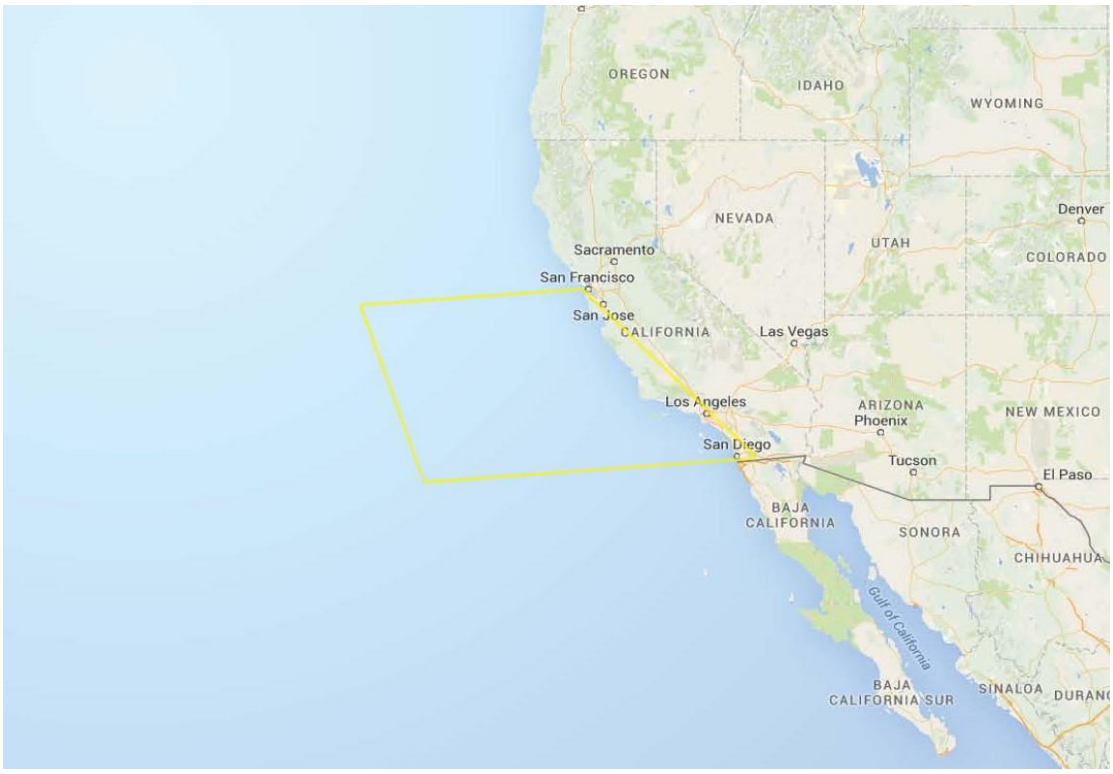

Figure 3-11. California Region

3.1.14.1 Geological Resources

The California region was formed by tectonic activity of the Pacific Plate and its interaction with the North American Plate and several smaller plates and microplates (MMS 2007b). The California region is along the eastern boundary of the Pacific Ring of Fire (Rosenberg 2016). The continental shelf in the California region is wider than that of the Northwest region. This region includes many geologic features such as basins and ridges that were formed by past and recent tectonic processes. The California region can be divided into two main areas based on the geological formations. The area north of Port Conception, California has a narrower continental shelf (1-45 km) that is oriented north-south, as compared to the area to the south (280 km). Unlike the northern area, the area south of Point Conception contains a complex series of basins and ridges with various islands on the ridges (BOEM 2010).

The California region overall is seismically active and characterized by a variety of coastal features, including narrow beaches and high bluffs, rocky headlands, mountains, dune-backed shores, marine terraces, estuaries, bays and lagoons, and tidal inlets. Erosion rates are high along the California coast and are typically episodic, with major cliff retreat, land sliding, and sand removal taking place during large storms. However, as a result of tectonic uplift, the coastline continues to rise relative to sea level (MMS 2007b).

3.1.14.2 Water Resources

Two of the principal currents that occur along the western coast of the United States are the California Current and the Davidson Current. The California Current begins off southern British Columbia and ends off southern Baja California. It is a broad, shallow, slow-moving current that exhibits high spatial and temporal variability and is usually located several kilometers offshore (MMS 2007b). The California Current represents the eastward portion of the North Pacific Gyre and transports cool water with low salinity toward the equator (MMS 2007b). The movement of northern waters southward makes the coastal waters cooler than coastal areas of comparable latitude on the east coast of the United States. Additionally, extensive upwelling of colder subsurface waters occurs, caused by prevailing northwesterly winds. The Davidson Current is a narrower, weaker countercurrent that occasionally moves somewhat warmer water northward during the winter. The Davidson Current runs north along the west coast of the United States from northern California to Washington to at least latitude 48°N during the winter (MMS 2007b).

As the California Current flows southward along the Pacific Coast during the spring and summer, a combination of the northwesterly winds and the earth's rotation causes the surface waters to be deflected offshore. As the surface water moves offshore, it is replaced with cold, nutrient-rich waters from below, which introduces the nutrients (nitrates, phosphates, and silicates) to the water column (MMS 2007b).

Physical hazards that could affect the marine and coastal environment in the California region overall include coastal storms, scouring of coastline, earthquakes, tsunamis, sediment loading, and irregular topography.

The National Coastal Condition Report IV provides the most comprehensive ecological assessments of the condition of our nation's coastal bays and estuaries. The overall condition of coastal waters of the west coast were rated as good to fair (USEPA 2012). Specifically, the EPA rated the water quality, benthic, and fish tissue contaminant indexes as good; sediment quality index as fair; and the coastal habitat index as poor (USEPA 2012).

Off the northern California coast, factors affecting water quality include municipal sewage outfalls and riverine input. Marine and coastal water quality along the northern California coast is generally excellent with select contaminants (e.g., heavy metals, petroleum, and chlorinated hydrocarbons) producing only localized degradation. Coastal and marine water quality off the central California coast is very good, with minor exceptions. Portions of Monterey Bay have degraded water quality as a result of sewage effluent and riverine input from several local rivers (MMS 2007b).

3.2 BIOLOGICAL RESOURCES

3.2.1 Applicable Laws, Regulations, and Executive Orders

The following description of relevant laws, regulations, and executive orders that pertain to biological resources were included to provide a framework for identifying existing resources, impacts to the resource, and determining thresholds for significance of those impacts.

National Marine Sanctuaries Act. The 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 or international significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or esthetic qualities as national marine sanctuaries (16 U.S.C. 1431). Management of national marine sanctuaries has been delegated to NOAA's Office of National Marine Sanctuaries. Pursuant to Section 304(d) of NMSA, proposed actions undertaken by federal agencies that could likely destroy, cause the loss of, or injure any sanctuary resource are subject to consultation with the NOAA Office of National Marine Sanctuaries. Consultation will require a statement describing the action and its potential effects on sanctuary resources, as well as reasonable and prudent alternatives to protect sanctuary resources, prior to undertaking any action. Sanctuary permits are required when an agency wishes to conduct an activity within a sanctuary that is otherwise prohibited. NDBC operates buoys in the following National Marine Sanctuaries, which are permitted through the Office of National Marine Sanctuaries: Gray's Reef National Marine Sanctuary (NMS), Monterey Bay NMS, Greater Farallones NMS, Cordell Bank NMS, and Olympic Coast NMS.

Executive Order 13158, Marine Protected Areas (May 26, 2000). The purpose of EO 13158, *Marine Protected Areas* (MPAs), is to help protect the significant natural and cultural resources within the marine environment for the benefit of present and future generations by strengthening and expanding the nation's system of MPAs. Under EO 13158, NOAA Office of National Marine Sanctuaries created the MPA Center to work in partnership with federal, state, tribal, and local governments and stakeholders to build a National System of Marine Protected Areas, and to support and enhance existing marine protected area programs. MPAs are defined as "any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein."

Marine Mammal Protection Act. The Marine Mammal Protection Act (MMPA), 16 U.S.C. 1361 et seq., was enacted in 1972 to protect marine mammals, and ensure that population stocks and essential habitats of marine mammals are maintained at, or restored to, healthy population levels. Jurisdiction over marine mammals under the MMPA is shared between U.S. Fish and Wildlife Service (US FWS) and NOAA Fisheries. USFWS has jurisdiction over sea and marine otters, polar bears, manatees, dugongs, and walruses, while NOAA Fisheries has jurisdiction over all other marine mammals (i.e., all cetaceans and pinnipeds, except walrus). The MMPA established a moratorium on the taking (i.e., meaning to or attempt to hunt, harass, capture, or kill) or importing of marine mammals. The MMPA provides NOAA Fisheries and USFWS with authority to allow, upon request, the incidental take of small numbers of marine mammals by U.S. citizens who engage in specified activities (i.e., scientific research, non-commercial fishing). An incidental take is an unintentional, but not unexpected take. NOAA Fisheries (and USFWS) can grant requests for an incidental take if it is determined that the take would have no more than a negligible impact on the species or stock and would not have an "unmitigable adverse impact" on the availability of the species or stock for subsistence use (where relevant) (NOAA Fisheries 2015a). Consultation with NOAA Fisheries or USFWS, depending on the species, would be conducted prior to any activities that could affect protected marine mammals.

Magnuson-Stevens Fishery Conservation and Management Act. The Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSFCMA), 16 U.S.C. 1801 et seq.,

conserves and manages fishery resources, including anadromous species, found within the U.S. EEZ. The purpose of the MSFCMA is to support and encourage implementation and the

conservation and management of highly migratory species, promote commercial and recreational fishing under sound conservation and management principles, provide for the preparation and implementation of fishery management plans (FMPs), and establish eight regional fishery management councils to exercise sound judgment in the stewardship of fishery resources. Section 305(b) of the MSFCMA requires that federal agencies must consult with the NOAA Fisheries on those activities authorized, funded, or undertaken that may directly (e.g., physical disruption) or indirectly (e.g., loss of prey species) cause adverse effects on essential fish habitat (EFH). The MSFCMA defines EFH as "those waters and substrates necessary for spawning, breeding, feeding, and growth to maturity (NEFMC 2011)." A discreet subset of EFH that are high priority areas for conservation, management, or research because they are rare, sensitive, stressed by development, or important to ecosystem function is referred to as a habitat areas of particular concern (HAPC).

The MSFCMA also created eight regional fishery management councils (FMC) (see Table 3-4). Federal agencies retain the discretion to define what actions would have an "adverse effect." Additionally, during consultation or the development of an EA, NOAA Fisheries staff assists with the determination of the level (i.e., negligible, minor, temporary, or minimal) of an adverse effect on EFH. Temporary or minimal impacts are not always considered as adverse effects. "Temporary impacts" are those that are limited in duration and that allow the particular environment to recover without measurable impact. "Minimal impacts" are those that may result in relatively small changes in the affected environment and insignificant changes in ecological functions. Each FMC is responsible for the conservation and management of fishery and fishery stocks within their region, which spans from the coasts to 200 nautical miles (nm) into the ocean. The FMCs are responsible for developing FMPs of the federal waters in the Exclusive Economic Zone (EEZ) and designating EFH and HAPCs (NOAA Fisheries 2016b).

Table 3-4. Fishery Management Councils

Regional Fishery Management Council	States Included in FMC Jurisdiction
New England FMC	Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut
Mid-Atlantic FMC	New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina
South Atlantic FMC	North Carolina, South Carolina, Georgia, and Florida
Caribbean FMC	Puerto Rico and the United States Virgin Islands
Gulf of Mexico FMC	Texas, Louisiana, Alabama, Mississippi, and Florida
Pacific FMC	Oregon, Washington, Idaho, and California
Western Pacific FMC	Hawaii, American Samoa, Guam, and the Northern Mariana Islands
North Pacific FMC	Alaska

Source: NOAA Fisheries 2016b

Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703 et seq., implements a series of treaties the United States has entered into with Canada, Mexico, Japan, and Russia for the conservation of migratory birds. The USFWS has statutory authority and responsibility of enforcing the MBTA. Under this Act, it is federally prohibited, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport or cause to be transported, carry or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird" (16 U.S.C. 703). The Secretary of the Interior is authorized, subject to limitations, to allow exceptions to the regulations. If federal actions are likely to negatively impact migratory bird populations, the federal agency must consult with USFWS.

Endangered Species Act. The ESA of 1973, 16 U.S.C. 1531 et seq., establishes policy to protect and conserve threatened and endangered species and the habitats in which they are found and on which they depend. The ESA is administered by the U.S. Fish and Wildlife Service (USFWS) and the NOAA National Marine Fisheries Service (NOAA Fisheries). Section 7 of the ESA requires federal agencies to consult with USFWS, NOAA Fisheries, and the appropriate state agencies to determine if a proposed action might affect listed or candidate species or designated critical habitat. Pursuant to the ESA, certain areas are designated as critical habitat for species listed under the ESA. Critical habitats are defined as a geographical areas that:

- are occupied by the species at the time of listing;
- contain physical or biological features essential to species conservation and may require special management considerations or protection; and
- are not currently occupied by the species but are essential for conservation.

In addition to protection of threatened and endangered species under the ESA, individual states offer protection for state-listed threatened or endangered species. Consultation with the appropriate state agency would be conducted prior to any activities that might impact state-listed threatened or endangered species.

Executive Order 13089, Coral Reef Protection (June 11, 1998). EO 13089, *Coral Reef Protection,* requires federal agencies to protect coral reef ecosystems and, to the extent permitted by law, prohibits them from authorizing funding or carrying out any actions that will degrade these ecosystems. Federal agencies whose proposed actions might affect U.S. coral reef ecosystems must provide for implementation of measures needed to research, monitor, manage, and restore affected ecosystems, including, but not limited to, measures reducing impacts from pollution, sedimentation, and fishing.

Executive Order 13112, Invasive Species (February 3, 1999). EO 13112, *Invasive Species,* defines an invasive species as a species that is nonnative to a particular ecosystem and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Under EO 13112, federal agencies are required to:

- Identify any actions that may affect invasive species;
- Prevent invasive species introduction;
- Detect and rapidly respond to and control populations of invasive species in a cost-effective and environmentally sound manner;
- Monitor invasive species populations accurately and reliably;
- Provide for restoration of native species and habitat conditions in invaded ecosystems;
- Conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species;
- Promote public education on invasive species and the means to address them; and
- Abstain from authorizing, funding, or carrying out actions that are likely to cause or promote invasive species introduction or spread, unless the agency has determined that the benefits of such actions clearly outweigh the potential harm caused by invasive species and that all feasible and prudent measures to minimize risk of harm will be taken.

3.2.2 Biological Resources Common to All Regions

3.2.2.1 Marine Protected Areas & National Marine Sanctuaries

The MPA Center (NOAA Office of National Marine Sanctuaries and the Department of Interior) has developed a national system of MPAs to ensure conservation and sustainable use of the nation's marine resources and formally recognize areas of the marine environment that have been reserved by federal, state, territorial, tribal, or local laws to provide lasting protection natural and cultural resources (EO 13158). The purpose of this system is to support the effective conservation, restoration, and sustainable use of significant cultural and natural resources. MPAs can be classified as Eligible, Member, Nominated, and Not Eligible. Currently, there are 437 Member MPAs listed in the List of National System of MPAs (NOAA 2013b, NOAA 2015). Eligible MPAs can be nominated to the National System through a science-based process (NOAA 2015). Only member sites have been accepted into the system and are listed in the official List of National System of MPAs, published in the Federal Register (FR), and at http://marineprotectedareas.noaa.gov/nationalsystem/nationalsystemlist/.

3.2.2.2 Marine Mammals

Marine mammals are protected under the MMPA and are addressed in detail within each regional discussion, below. Orders of marine mammals found in U.S. waters include cetaceans, sirenians, and carnivores (i.e., pinnipeds and fissipeds). Cetaceans include mysticetes (i.e., baleen whales) and odontocetes (i.e., toothed whales and dolphins). Sirenians include dugongs and manatees. Pinnipeds include walruses, fur seals and sea lions, and true seals. Fissipeds include polar bears and otters.

3.2.3 Stennis Space Center

3.2.3.1 Marine Protected Areas & National Marine Sanctuaries

The NDBC Campus is a land-based facility; therefore, there are no MPAs or National Marine Sanctuaries within its boundaries. However, the Stennis Space Center is east of Pearl River Wildlife Management Area, which is approximately 35,000 acres.

3.2.3.2 Wildlife

There are four major vegetation types within Stennis Space Center. The most prominent type is Pine flatwoods, which contains mainly slash pine interspersed with cypress, loblolly pine, swamp tupelo, red maple, and sweet gum. Also present are bottomland hardwood; pitcher plant bogs and swamps; and grasslands and marshes. Bottomland hardwoods occur in low, poorly drained soils with standing or slow moving water. Grasslands typically occur in disturbed or previously cleared areas. Pitcher plant bogs are a unique ecosystem to the coastal plains of the southeastern United States, which have acidic soils and low-lying, poor draining areas (NASA 2007).

Because of the different types of vegetation and habitat present, there is a large variety of wildlife species at Stennis Space Center. Surveys conducted at Stennis Space Center in 1991, 1994, and 2002 identified 20 species of frogs, 14 species of snakes, one species of alligator, more than 100 bird species, and 26 species of mammals (NASA 2007).

Stennis Space Center is a land-based facility that contains man-made canals that feed the Pearl and Jourdan Rivers. Several species of sport fish have been identified, including mullet, yellow bass, blue catfish, bluegill, and largemouth bass in the East Pearl River. Most of the species identified in surveys are also known to be present in the canals (NASA 2007).

3.2.3.3 Marine Mammals

The NDBC Campus is a land-based facility that is connected to the Gulf of Mexico via canals and the Pearl River. The only marine mammal that could potentially occur in this area is the West Indian manatee (*Trichechus manatus*), which primarily occur in coastal and brackish areas of Florida, but can range from Texas to Massachusetts in U.S. coastal waters.

3.2.3.4 Threatened and Endangered Species

Several species listed as threatened or endangered under the ESA could be found at Stennis Space Center (see Table 3-5). However, due to the industrial nature of the NDBC Campus at Stennis Space Center, it is unlikely that these species would be present. NOAA Fisheries has jurisdiction over marine species and USFWS has jurisdiction over land and freshwater species (FWS 2016b).

Table 3-5. Threatened and Endangered Species at Stennis Space Center

Common Name	Scientific Name	Status
Mollusk		
Alabama heelsplitter	*Potamilus inflatus*	Threatened
Fish		
Smalltooth sawfish	*Pristis pectinata*	Endangered
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	Threatened
Mammals		
West Indian manatee	*Trichechus manatus*	Threatened
Birds		
Piping plover	*Charadrius melodus*	Endangered
Red knot	*Calidris canutus rufa*	Threatened
Red-cockaded woodpecker	*Picoides borealis*	Endangered
Wood stork	*Mycteria americana*	Threatened
Plants		
Louisiana quillwort	*Isoetes louisianensis*	Endangered
Reptiles		
Black pine snake	*Pituophis melanoleucus lodingi*	Threatened
Gopher tortoise	*Gopherus Polyphemus*	Threatened
Ringed map turtle	*Graptemys oculifera*	Threatened

Source: FWS 2016b

3.2.4 Northeast Region

The Northeast region consists of the land and waters that border the following U.S. states: Maine, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, Pennsylvania, and New Jersey.

3.2.4.1 Marine Protected Areas & National Marine Sanctuaries

Of the 437 Member MPAs listed in the List of National System of MPAs, 70 of them are located in the Northeast Region (NOAA NOS 2013a). These areas include National Estuarine Research Reserves, restricted use fishing areas, National Parks, National Wildlife Refuges, and state marine protected areas. Appendix D contains a full list of these areas for each region.

3.2.4.2 Fish

The New England Fishery Management Council (FMC) and the Mid-Atlantic FMC are responsible for the conservation and management of fish stocks and fishery resources within the federal 200 nautical miles (nm) limit of the coasts of the states in the Northeast Region. The states within the Northeast Region under New England FMC's jurisdiction include Connecticut, Rhode Island,

Massachusetts, New Hampshire, and Maine and the states under the Mid-Atlantic FMC's jurisdiction includes New York, Pennsylvania, and New Jersey (NOAA Fisheries 2016b).

The New England FMC manages nine fisheries, including northeast multispecies (groundfish), sea scallop, monkfish, Atlantic herring, skates, small mesh multispecies (whiting), Atlantic deep-sea red crab, dogfish, and Atlantic salmon. The Mid-Atlantic FMC manages seven fisheries, including summer flounder, scup, and black sea bass; Atlantic mackerel, squid (long- and short-finned) and butterfish; surf clam and ocean quahog; bluefish; golden tilefish; spiny dogfish; and monkfish (NEFMC 2016, MAFMC 2016a). For both of the FMCs, there are 44 designated EFH areas for the managed species and has 16 designated HAPCs (see Table 3-6) (NEFMC 2011).

Table 3-6. Designated EFH and HAPCs by the Mid-Atlantic and New England FMCs

Designated EFHs		
• American plaice	• Haddock	• Silver hake (whiting)
• Atlantic cod	• Illex squid	• Smooth skate
• Atlantic halibut	• King mackerel	• Spanish mackerel
• Atlantic herring	• Little skate	• Spiny dogfish
• Atlantic mackerel	• Loligo	• Summer flounder
• Atlantic salmon	• Monkfish	• Surf clams
• Atlantic sea scallops	• Ocean pout	• Thorny skate
• Atlantic wolffish	• Ocean quahog	• Tilefish
• Barndoor skate	• Offshore hake	• White hake
• Black sea bass	• Pollock	• Windowpane flounder
• Bluefish	• Red drum	• Winter flounder
• Butterfish	• Red hake	• Winter skate
• Clearnose skate	• Redfish	• Witch flounder
• Cobia	• Rosette skate	• Yellowtail flounder
• Golden crab	• Scup	
Designated HAPCs		
• Inshore Juvenile Cod HAPC		• Veatch Canyon HAPC
• Great South Channel Juvenile Cod HAPC		• Alvin /Atlantis Canyon HAPC
• Cashes Ledge Area HAPC		• Hudson Canyon HAPC
• Jeffrey's Ledge/Stellwagen Bank HAPC		• Hendrickson/Toms/Middle Toms Area HAPC
• Bear and Retriever Seamounts with identifiable EFH HAPC		• Wilmington Canyon HAPC
• Heezen Canyon HAPC		• Baltimore Canyon HAPC
• Lydonia/Gilbert/Oceanographers Canyons HAPC		• Washington Canyon HAPC
• Hydrographer Canyon HAPC		• Norfolk Canyon HAPC

Source: NEFMC 2011, NEFMC 2014, NOAA Fisheries undated

3.2.4.3 Marine Mammals

Odontocetes (i.e., dolphins and toothed whales) are the most common order of marine mammals observed in the Northeast Region. Sperm whales occur in Georges Bank, the Northeast Channel, and the continental shelf south of New England during the summer time; sperm whale appearance peaks on the New England continental shelf in the fall. Risso's dolphin, striped dolphins, Atlantic and pantropical spotted dolphins, false and pygmy killer whales (*Pseudorca crassidans* and *Feresa attenuata*), short-finned and long-finned pilot whales (*Globicephala* spp.), and various species of beaked whales (*Mesoplodon* spp.) occur offshore in the shelf edge, canyons, other pronounced seafloor features, and areas of ocean current convergence. Other species such as the bottlenose dolphin and harbor porpoise commonly occur inshore of the slope break and in nearshore and coastal habitats (MMS 2007a).

Baleen whales (*Mysticeti* spp.) (i.e., humpback, right, and fin whales) are also common in the Northeast Region. Various areas of the Northeast Region such as the Scotian Shelf, George's Bank, and Bay of Fundy are important for feeding, nursery, and mating grounds for the Northern right whale. Atlantic waters off New England are also major feeding grounds for the fin whale (MMS 2007a). Humpback whales are known to congregate on feeding grounds in the Gulf of Maine, the Great South Channel, Georges Bank, and Stellwagen Bank during the summer (MMS 2007a).

Pinnipeds are known to occur in the Northeast Region. Occurrences of harp seal have been increasing on the northeastern coast from Maine to New Jersey. The gray seal (*Halichoerus grypus*) is also known to occur in the Northeast Region. The harbor seal is a known year-round resident in Maine.

Except for the occasional, rare visit, no Sirenia (i.e., dugongs and manatees) occur in the Northeast Region (MMS 2007a).

Six marine mammal species that occur in the Northeast Region are listed as threatened or endangered under the ESA (see Section 3.2.4.3).

3.2.4.4 Threatened and Endangered Species

Several marine and coastal species listed as threatened or endangered under the ESA are found throughout the Northeast Region (see Table 3-7). NOAA Fisheries has jurisdiction over marine species and USFWS has jurisdiction over land and freshwater species (FWS 2016b).

Designated Critical Habitat

Atlantic salmon. All perennial, rivers, streams, estuaries, and lakes connected to the marine environment, except those areas specifically excluded, and marine coastal zones have been designated as critical habitat areas for the Atlantic salmon (NOAA Fisheries 2016d).

North Atlantic right whale. Portions of Cape Cod Bay, Stellwagen Bank, and the Great South Channel (each off the coast of Massachusetts) have been designated as critical habitat areas for the North Atlantic right whale (NOAA Fisheries 2016d).

Table 3-7. Threatened and Endangered Species in the Northeast Region

Common Name	Scientific Name	Status
Fish		
Atlantic salmon	*Salmo salar*	Endangered, CH
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	Threatened and Endangered (depending on location)
Shortnose sturgeon	*Acipenser brevrostrum*	Endangered
Mammals		
Blue whale	*Balaenoptera musculus*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
North Atlantic right whale	*Eubalaena glacialis*	Endangered, CH
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered
Birds		
Piping plover	*Charadrius melodus*	Threatened (except Great Lakes watershed, where Endangered)
Red knot	*Calidris canutus rufa*	Threatened
Roseate tern	*Sterna dougallii dougallii*	Endangered
Reptiles		
Green turtle	*Chelonia mydas*	Threatened
Hawksbill turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley turtle	*Lepidochelys kempii*	Endangered
Leatherback turtle	*Dermochelys coriacea*	Endangered
Loggerhead turtle	*Caretta caretta*	Threatened

Sources: FWS 2016b, NOAA Fisheries 2016c

Note: CH = designated critical habitat

3.2.5 Mid-Atlantic Region

3.2.5.1 Marine Protected Areas & National Marine Sanctuaries

Of the 437 Member MPAs listed in the List of National System of MPAs, 34 of them are located in the Mid-Atlantic Region (NOAA NOS 2013a). These areas include National Parks, National Wildlife Refuges, national marine sanctuaries, natural area preserves, and state marine protected areas. Appendix D contains a full list of these areas for each region.

3.2.5.2 Fish

The Mid-Atlantic FMC is responsible for the conservation and management of fish stocks and fishery resources within the federal 200-nm limit off the coasts of New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina (NOAA Fisheries 2016b). Fisheries of North Carolina are also managed by the South Atlantic FMC (see Section 3.2.6.2). The Mid-Atlantic FMC manages seven fisheries, including summer flounder, scup, and black sea bass; Atlantic mackerel, squid (long- and short-finned) and butterfish; surf clam and ocean quahog; bluefish; golden tilefish; spiny dogfish; and monkfish (MAFMC 2016b).

The Mid-Atlantic and South Atlantic FMCs have designated EFH for 40 species and two HAPCs in the Mid-Atlantic Region (see Table 3-8) (NOAA Fisheries undated, MAFMC 2016c). Within identified EFH, the Mid-Atlantic FMC has designated the summer flounder HAPC which includes all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH (Mid-Atlantic FMC 1998).

Table 3-8. Designated EFH and HAPCs by the Mid-Atlantic FMC

Designated EFHs		
• Atlantic cod	• King mackerel	• Spanish mackerel
• Atlantic herring	• Loligo	• Spiny dogfish
• Atlantic mackerel	• Monkfish	• Spiny lobster
• Atlantic sea scallops	• Ocean pout	• Snapper grouper
• Black sea bass	• Ocean quahog	• Summer flounder
• Bluefish	• Offshore hake	• Surf clams
• Butterfish	• Pollock	• Tilefish
• Cobia	• Red drum	• White hake
• Dolphin-wahoo	• Red hake	• Windowpane flounder
• Golden crab	• Scup	• Winter flounder
• Haddock	• Shrimp	• Witch flounder
• Illex squid	• Silver hake (whiting)	• Coastal migratory pelagics
Designated HAPCs		
• Deepwater Coral HAPC	• Norfolk Canyon HAPC	
• Coral/Coral Reef HAPC	• Tilefish HAPC	
• Coastal Migratory Pelagics HAPC		

Source: NOAA Fisheries undated, MAFMC 2016c

3.2.5.3 Marine Mammals

Several species of marine mammals inhabit the coastal and offshore waters in the Mid-Atlantic Region. Common odontocetes including sperm whales can be found throughout the Mid-Atlantic

Region during the spring and towards the continental shelf during the fall, and dolphins, which can be found on the continental shelf or on the slope, depending on the species. Sperm whales are known to concentrate in offshore areas east of Cape Hatteras during the wintertime. Some dolphins, such as the bottlenose dolphin, inhabit coastal and estuarine waters of the mid-Atlantic region south of Long Island, New York. Most other odontocetes are common mostly on the continental slope and deeper waters beyond the slope.

Mysticetes (baleen whales), such as North Atlantic right whale, fin whale, and humpback whale, can be found in coastal waters, over the continental shelf, on the continental slope, and beyond. North Atlantic right whales can be seen offshore from New Jersey to North Carolina during the winter. Some occasional sightings of humpback whales have been observed from Cape Hatteras to south Florida.

Pinnipeds that occur in the Mid-Atlantic Region include harp seals (*Pagophilus groenlandicus*), which have been observed on the coast north of New Jersey, and harbor seals, which are seasonal inhabitants from southern New England to New Jersey (MMS 2007a).

The only sirenian that occurs in U.S. waters is the federally threatened West Indian manatee, which is primarily located in eastern Florida and southern Georgia, but travels as far north as North Carolina on a regular basis. Manatees use open coastal (shallow nearshore) areas and estuaries, as well as freshwater tributaries. Manatees use coastal and riverine habitats for feeding, resting, mating, and calving (MMS 2007a).

Six marine mammal species that occur in the Mid-Atlantic Region are listed as threatened or endangered under the ESA (see Section 3.2.5.4).

3.2.5.4 Threatened and Endangered Species

Several marine and coastal species listed as threatened or endangered under the ESA are found throughout the Mid-Atlantic Region (see Table 3-9). NOAA Fisheries has jurisdiction over marine species and USFWS has jurisdiction over land and freshwater species (FWS 2016b).

Designated Critical Habitat

North Atlantic Right Whale. Nearshore and offshore waters of North Carolina have been designated as critical habitat areas for the North Atlantic right whale (NOAA Fisheries 2016d).

Loggerhead turtle. Approximately 1,102 km (685 miles) of loggerhead sea turtle nesting beaches are defined as critical habitat in North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi. The critical habitat contains nearshore reproductive habitat, winter areas, breeding areas, migratory corridors, and areas that contain *Sargassum* habitat (NOAA Fisheries 2016d).

Table 3-9. Threatened and Endangered Species in the Mid-Atlantic Region

Common Name	Scientific Name	Status
Fish		
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	Endangered
Shortnose sturgeon	*Acipenser brevrostrum*	Endangered
Mammals		
West Indian manatee	*Trichechus manatus*	Threatened
Blue Whale	*Balaenoptera musculus*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
North Atlantic right whale	*Eubalaena glacialis*	Endangered, CH
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter catodon*	Endangered
Birds		
Piping plover	*Charadrius melodus*	Threatened (except Great Lakes watershed, where Endangered)
Red knot	*Calidris canutus rufa*	Threatened
Red-Cockaded woodpecker	*Picoides borealis*	Endangered
Roseate tern	*Sterna dougallii dougallii*	Endangered
Wood stork	*Mycteria americana*	Threatened
Reptiles		
Green turtle	*Chelonia mydas*	Threatened
Hawksbill turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley turtle	*Lepidochelys kempii*	Endangered
Leatherback turtle	*Dermochelys coriacea*	Endangered
Loggerhead turtle	*Caretta caretta*	Threatened, CH

Sources: FWS 2016b, NOAA Fisheries 2016c

Note: CH = designated critical habitat

3.2.6 Southeast Region

3.2.6.1 Marine Protected Areas & National Marine Sanctuaries

Of the 437 Member MPAs listed in the List of National System of MPAs, 19 of them are located in the Southeast Region (NOAA NOS 2013a). These areas include National Estuarine Research Reserves, National Parks, National Wildlife Refuges, National Marine Sanctuaries, and state

marine protected areas. In the Southeast Region, NDBC operates one buoy in the Gray's Reef NMS. Appendix D contains a full list of these areas for each region.

3.2.6.2 Fish

The South Atlantic FMC is responsible for the conservation and management of fish stocks and fishery resources within the federal 200-nm limit off the coasts of North Carolina, South Carolina, Georgia, and eastern Florida to Key West (NOAA Fisheries 2016b). The South Atlantic FMC manages nine fisheries, including calico scallop, coastal migratory pelagics (including King and Spanish mackerel, and cobia), coral/coral reefs, dolphin-wahoo, golden crab, Saragassum, shrimp (including rock shrimp), snapper/grouper, and spiny lobster and has identified EFH for each. Snapper grouper is currently the only fishery that is considered to be overfished and is highly regulated both recreationally and commercially (SAFMC undated).

Designated EFH and HAPCs for the Southeast Region are shown in Table 3-10 (NOAA Fisheries undated, MAFMC 2016c).

Table 3-10. Designated EFH and HAPCs by the South Atlantic FMC

Designated EFHs	
• Calico scallop • Coastal migratory pelagics (including King and Spanish mackerel, and cobia) • Coral/coral reefs • Dolphin-wahoo	• Golden crab • Saragassum • Shrimp (including rock shrimp) • Snapper/grouper • Spiny lobster
Designated HAPCs	
• Coral, Coral Reef, and Live Bottom HAPC • Coastal Migratory Pelagics HAPC • Dolphin-Wahoo EFH-HAPCs	• Penaeid Shrimp EFH-HAPCs • Snapper-Grouper HAPC • Spiny lobster HAPC • Tilefish HAPC

Source: MAFMC 2016c, SAFMC undated

3.2.6.3 Marine Mammals

In the Southeast Region, odontocetes are the most common mammal and occur in coastal habitats (e.g., dolphins and porpoise) as well as continental shelf and slope/deep habitats (e.g., dolphins and whales). Risso's dolphin (*Grampus griseus*) and striped and spotted dolphins (*Stenella* spp.) are known to occur offshore. Bottlenose dolphins and harbor porpoise are the most common odontocete found in coastal waters inhabiting estuaries, harbors, and river mouths (MMS 2007a).

Mysticetes are occasionally present and can occur in coastal, continental shelf, and continental slope habitats. Areas of coastal Florida and Georgia have been identified as major breeding and nursing grounds for North Atlantic right whales (*Eubalaena glacialis*); occasional sightings have been reported from coastal waters in North Carolina. Some occasional sightings of humpback whales have been observed from Cape Hatteras to south Florida. Many of the large whales and

populations of smaller toothed whales migrate seasonally along the U.S. Atlantic coast (MMS 2007a).

The only sirenian that occurs in U.S. waters is the federally threatened West Indian manatee, which is primarily located in eastern Florida and southern Georgia and uses open coastal (shallow nearshore) areas and estuaries, as well as freshwater tributaries. Manatees use coastal and riverine habitats for feeding, resting, mating, and calving. North Carolina is the northernmost area occupied seasonally on a regular basis by manatees (MMS 2007a).

Pinnipeds (seals, sea lions, and walruses) do not normally occur in southeastern Atlantic waters (MMS 2007a).

Six marine mammal species that occur throughout the Southeast Region are listed as threatened or endangered under the ESA (see Section 3.2.6.4).

3.2.6.4 Threatened and Endangered Species

Several marine or coastal species listed as threatened or endangered under the ESA are found throughout the Southeast Region (Table 3-11). NOAA Fisheries has jurisdiction over marine species and USFWS has jurisdiction over land and freshwater species (FWS 2016b).

West Indian Manatee. Critical habitats are located in coastal areas in many parts of Florida. The West Indian manatee inhabits marine, estuarine, and freshwater environments along the coasts of North Carolina, South Carolina, Georgia, and Florida and in the coastal waters of the Gulf of Mexico (NOAA Fisheries 2016d).

Designated Critical Habitat

Staghorn and Elkhorn corals. Staghorn and Elkhorn corals commonly grow in shallow waters with a depth range of less than 98 ft (30 m) (73 FR 72227). The south and southeastern coasts of Florida, including the Florida Keys and a portion to the southwest of Florida, are designated elkhorn coral and staghorn coral critical habitat (NOAA Fisheries 2016d, 73 FR 72227).

Johnson's seagrass. Coastal areas from central eastern Florida in Brevard County to southeastern Florida in Miami-Dade County are designated Johnson's Seagrass critical habitat. The physical habitat that supports Johnson's seagrass includes both shallow intertidal and deeper subtidal zones. The species prospers and is able to colonize and maintain stable populations in water that is clear and deep (2-5 m) or in water that is shallow and turbid. In tidal channels, it inhabits coarse sand substrates (NOAA Fisheries 2016d, 65 FR 17789).

North Atlantic right whale. Designated critical habitat include nearshore and offshore waters of the southeastern United States, extending from Cape Fear, North Carolina south to approximately 27 nm below Cape Canaveral, Florida (81 FR 4837).

Piping Plover. Piping plovers nest and feed on open sandy habitats of outer beaches. Critical habitats have been designated along the coasts of the Atlantic Ocean from North Carolina to Florida (FWS 2001a).

Loggerhead turtle. Approximately 1,102 km (685 miles) of loggerhead sea turtle nesting beaches

are defined as critical habitat in North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi. The critical habitat contains nearshore reproductive habitat, winter areas, breeding areas, migratory corridors, and areas that contain *Sargassum* habitat (NOAA Fisheries 2016d).

Table 3-11. Threatened and Endangered Species in the Southeast Region

Common Name	Scientific Name	Status
Marine Plants and Invertebrates		
Elkhorn coral	*Acropora palmata*	Threatened, CH
Staghorn coral	*Acropora cervicornis*	Threatened, CH
Johnson's seagrass	*Halophila johnsonii*	Threatened, CH
Fish		
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	Threatened
Shortnose sturgeon	*Acipenser brevrostrum*	Endangered
Largetooth sawfish	*Pristis perotteti*	Endangered
Smalltooth sawfish	*Pristis pectinata*	Endangered
Nassau grouper	*Epinephelus striatus*	Threatened
Scalloped hammerhead shark	*Sphyrna lewini*	Threatened
Mammals		
Blue whale	*Balaenoptera musculus*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
North Atlantic right whale	*Eubalaena glacialis*	Endangered, CH
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter catodon*	Endangered
West Indian manatee	*Trichechus manatus*	Threatened, CH
Birds		
Piping plover	*Charadrius melodus*	Threatened, CH
Red knot	*Calidris canutus rufa*	Threatened
Roseate tern	*Sterna dougallii dougallii*	Endangered (Atlantic coast south to North Carolina), Threatened
Wood stork	*Mycteria americana*	Threatened
Reptiles		
American crocodile	*Crocodylus acutus*	Threatened
Green turtle	*Chelonia mydas*	Threatened
Hawksbill turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley turtle	*Lepidochelys kempii*	Endangered
Leatherback turtle	*Dermochelys coriacea*	Endangered
Loggerhead turtle	*Caretta caretta*	Threatened, CH

Source: FWS 2016b, NOAA Fisheries 2016c
Note: CH = designated critical habitat

3.2.7 Gulf of Mexico Region

3.2.7.1 Marine Protected Areas & National Marine Sanctuaries

Of the 437 Member MPAs listed in the List of National System of MPAs, 35 of them are located in the Gulf of Mexico Region (NOAA NOS 2013a). These areas include National Estuarine Research Reserves, National Marine Sanctuaries, National Parks, and National Wildlife Refuges. Appendix D contains a full list of these areas for each region.

3.2.7.2 Fish

The Gulf of Mexico FMC is responsible for the conservation and management of fish stocks and fishery resources within the federal 200-nm limit off the coasts of Texas, Louisiana, Mississippi, Alabama, and western Florida to Key West (NOAA Fisheries 2016b). The Gulf of Mexico FMC manages seven fisheries including coastal migratory pelagic, red drum, reef fish, shrimp, spiny lobster, stone crab, and coral and coral reefs. The coastal migratory pelagics fisheries management unit and the spiny lobster fisheries management units are managed through a joint plan of the Gulf of Mexico and South Atlantic FMCs (GMFMC 2015).

EFH has been designated for all seven managed fisheries to protect the essential habitats for each life history stage of 26 representative species. Within identified EFH the Gulf of Mexico FMC has designated HAPC in the following areas (GMFMC 2010):

- Florida Middle Grounds,
- Madison-Swanson Marine Reserve,
- Tortugas North and South Ecological Reserves,
- Pulley Ridge,
- East and West Flower Garden Banks,
- Stetson Bank,
- Sonnier Bank,
- MacNeil,
- 29 Fathom Bank,
- Rankin Bright Bank,
- Geyer Bank,
- McGrail Bank,
- Bouma Bank,
- Rezak Sidner Bank,
- Alderice Bank, and
- Jakkula Bank.

3.2.7.3 Marine Mammals

Twenty-nine marine mammal species occur in the Gulf of Mexico Region (BOEM 2012). The bottlenose dolphin (*Tursiops truncatus*), typically found in coastal waters is the most common species in the region (MMS 2007a). Twenty-one species of odontocetes (toothed whales) are found in the Gulf of Mexico Region. The sperm whale is considered a resident species (BOEM 2012).

Mysticetes (baleen whales) are rare and extralimital and are usually only found during migration in the northern Gulf of Mexico. Seven species of baleen whales can be found in the Gulf of Mexico, including the north Atlantic right, Bryde's, fin, humpback, minke, sei, and blue whales (BOEM 2012).

The only sirenian occurring in U.S. waters is the West Indian manatee (*Trichechus manatus*), which primarily occur in coastal and brackish areas of Florida, but can range from Texas to Massachusetts in U.S. coastal waters.

Pinnipeds (e.g., seals) do not normally occur in Gulf of Mexico waters (MMS 2007a).

Five marine mammal species that occur in the Gulf of Mexico are listed as threatened or endangered under the ESA (see Section 3.2.7.4).

3.2.7.4 Threatened and Endangered Species

Several marine or coastal species listed as threatened or endangered under the ESA are found throughout the Gulf of Mexico (Table 3-12). NOAA Fisheries has jurisdiction over marine species and USFWS has jurisdiction over land and freshwater species (FWS 2016b).

Designated Critical Habitat

Staghorn and Elkhorn corals. Staghorn and Elkhorn corals commonly grow in shallow waters with a depth range of less than 98 ft (30 m) (73 FR 72227). The south and southeastern coasts of Florida, including the Florida Keys and a portion to the southwest of Florida, are designated elkhorn coral and staghorn coral critical habitat (NOAA Fisheries 2016c, 73 FR 72227).

Gulf sturgeon. The gulf sturgeon spends most of the year in freshwater, where it reproduces, and migrates to saltwater in the fall. Adult fish are bottom feeders, feeding primarily on invertebrates in the Gulf of Mexico and its estuaries. Critical habitat for the Gulf sturgeon are designated along the coasts of Florida, Alabama, Mississippi, and Louisiana (NOAA Fisheries 2016d).

West Indian Manatee. Critical habitats are located in coastal areas in many parts of Florida. The West Indian manatee inhabits marine, estuarine, and freshwater environments in the Florida coastal waters of the Gulf of Mexico (NOAA Fisheries 2016d).

Cape Sable Seaside Sparrow. The Cape Sable seaside sparrow inhabits the Florida Everglades and areas south into the Florida Keys (FWS 2016b). Critical habitat has been designated in the Florida Everglades (NOAA Fisheries 2016d).

Piping Plover. Piping plovers nest and feed on open sandy habitats of outer beaches. Critical habitats have been designated along the coasts of the Atlantic Ocean from North Carolina to Florida (FWS 2001a).

American Crocodile. The American crocodiles inhabit coastal areas, swamps, lagoons, and small islands. Critical habitat for the American crocodile has been designated in coastal areas in south Florida (NOAA Fisheries 2016d).

Table 3-12. Threatened and Endangered Species in the Gulf of Mexico Region

Common Name	Scientific Name	Status
Marine Invertebrates		
Staghorn coral	*Acropora cervicornis*	Threatened, CH
Elkhorn coral	*Acropora palmata*	Threatened, CH
Fish		
Nassau grouper	*Epinephelus striatus*	Threatened
Largetooth sawfish	*Pristis perotteti*	Endangered
Smalltooth sawfish	*Pristis pectinata*	Endangered
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	Threatened, CH
Mammals		
West Indian manatee	*Trichechus manatus*	Threatened, CH
Blue whale	*Balaenoptera musculus*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
North Atlantic right whale	*Eubalaena glacialis*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter catodon*	Endangered
Birds		
Cape Sable Seaside sparrow	*Ammodramus maritimus mirabilis*	Endangered, CH
Least tern	*Sterna antillarum*	Endangered
Mississippi sandhill crane	*Grus canadensis pulla*	Endangered
Piping plover	*Charadrius melodus*	Endangered, CH
Red knot	*Calidris canutus rufa*	Threatened
Roseate tern	*Sterna dougallii dougallii*	Threatened
Whooping crane	*Grus americana*	Endangered
Wood stork	*Mycteria americana*	Threatened
Reptiles		
American crocodile	*Crocodylus acutus*	Threatened, CH
Green turtle	*Chelonia mydas*	Threatened
Hawksbill turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley turtle	*Lepidochelys kempii*	Endangered
Loggerhead turtle	*Caretta caretta*	Threatened, CH
Leatherback turtle	*Dermochelys coriacea*	Endangered
Olive ridley turtle	*Lepidochelys olivacea*	Threatened

Source: FWS 2016b, NOAA Fisheries 2016c

Note: CH = designated critical habitat.

Loggerhead turtle. Approximately 1,102 km (685 miles) of loggerhead sea turtle nesting beaches are defined as critical habitat in North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi. The critical habitat contains nearshore reproductive habitat, winter areas, breeding areas, migratory corridors, and areas that contain *Sargassum* habitat (NOAA Fisheries 2016d).

3.2.8 Caribbean/Tropical Atlantic Region

3.2.8.1 Marine Protected Areas & National Marine Sanctuaries

Of the 437 Member MPAs listed in the List of National System of MPAs, 13 of them are located in the Caribbean/Tropical Atlantic Region (NOAA NOS 2013a). These areas include a National Estuarine Research Reserve, National Parks, and state marine protected areas. Appendix D contains a full list of these areas for each region.

3.2.8.2 Fish

Only a portion of the Caribbean/Tropical Atlantic Region is governed by the Caribbean FMC, which is responsible for the conservation and management of fish stocks and fishery resources within the federal 200-nm limit off the coasts of Puerto Rico and the U.S. Virgin Islands (NOAA Fisheries 2016b). The Caribbean FMC manages five fisheries including queen conch; reef fish; spiny lobster; corals and reef associated plants; and highly migratory species (CFMC 2016).

EFH has been designated for all five managed fisheries to protect the essential habitats for each life history stage of the representative species. Within identified EFH the Caribbean FMC has designated HAPC in the following areas (NOAA and CFMC 2011):

- Puerto Rico
    - Tourmaline Bank/Buoy 8
    - Abrir La Sierra Bank/Buoy 6
    - Bajo de Sico
    - Vieques, El Seco
- St. Croix
    - Mutton snapper spawning aggregation area
    - East of St. Croix (Lang Bank)
- St. Thomas
    - Hind Bank MCD
    - Grammanik Bank

Additionally, the Caribbean Regional Fisheries Mechanism (CRFM) was established in 2003 to "promote the responsible utilization of the region's fisheries and other aquatic resources for the economic and social benefits of the current and future population of the region." Countries included in this organization include: Anguilla; Antigua and Barbuda; The Bahamas; Barbados; Belize; Dominica; Grenada; Guyana; Haiti; Jamaica; Montserrat; St. Kitts and Nevis; St. Lucia; St. Vincent and the Grenadines; Suriname; Trinidad and Tobago; and the Turks and Caicos Islands (CRFM 2017).

3.2.8.3 Marine Mammals

The Caribbean Environment Programme (CEP) of the United Nations Environment Programme is responsible for the management and protection of marine mammal species in the Caribbean waters. The CEP has 33 member states and territories within the Caribbean region (CEP 2015). There are at least 32 species of marine mammals in the region. The most common genus in the region is toothed whales (Odontoceti) (24 species), followed by baleen whales (Mysticeti) (6 species), pinnipeds (3 species), and one sirenian species. The Caribbean region provides primary habitat for feeding, mating, and calving for many marine mammal species (UNEP 2008).

3.2.8.4 Threatened and Endangered Species

Several marine or coastal species listed as threatened or endangered under the ESA are found throughout the Caribbean/Tropical Atlantic Region. Additionally, the Convention on the Conservation of Migratory Species of Wild Animals (CMS) has also listed species that are endangered (CMS 2015). These include the following species managed by NMFS, FWS, and/or the CEP (Table 3-13).

Designated Critical Habitat

Staghorn and Elkhorn coral. Staghorn and Elkhorn corals commonly grow in shallow waters with a depth range of less than 98 ft (30 m) (73 FR 72227). Waters surrounding most of Puerto Rico and the USVI have been designated as critical habitat areas for elkhorn and staghorn coral (NOAA Fisheries 2016d).

Green turtle. Green turtles are primarily restricted to tropical and subtropical waters. Critical habitats occur in coastal waters of the Atlantic Ocean (from Massachusetts to Texas), the Gulf of Mexico, and the U.S. Virgin Islands (63 FR 46693). All of the waters surrounding Culebra Island, Puerto Rico, have been designated as critical habitat areas for the green sea turtle (NOAA Fisheries 2016d).

Hawksbill turtle. The hawksbill turtle occurs in tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean. Critical habitats occur in coastal waters of the Atlantic Ocean (from Massachusetts to Texas), the Gulf of Mexico, and the U.S. Virgin Islands (63 FR 46693). All of the waters surrounding Mona Island, Puerto Rico, have been designated as critical habitat areas for the hawksbill turtle (NOAA Fisheries 2016d).

Leatherback turtle. Areas in the southwest of St. Croix, USVI, have been designated as critical habitat areas for the leatherback sea turtle (NOAA Fisheries 2016d). In 2011, NOAA accepted a petition recommending designation of additional critical habitat for the leatherback turtle on the beaches and in near-shore waters of Puerto Rico (76 FR 25660).

Loggerhead turtle. A connected area along the east coast of the United States and the Gulf of Mexico are designated as critical habitat. The critical habitat contains nearshore reproductive habitat, winter areas, breeding areas, migratory corridors, and areas that contain *Sargassum* habitat (NOAA Fisheries 2016d).

Table 3-13. Threatened and Endangered Species in the Caribbean/ Tropical Atlantic Region

Common Name	Scientific Name	Status
Macro Invertebrates		
Staghorn coral	*Acropora cervicornis*	Threatened, CH
Elkhorn coral	*Acropora palmata*	Threatened, CH
Fish		
Nassau grouper	*Epinephelus striatus*	Threatened
Largetooth sawfish	*Pristis perotteti*	Endangered
Scalloped hammerhead shark	*Sphyrna lewini*	Threatened (Central and Southwest Atlantic DPS)
Mammals		
West Indian manatee	*Trichechus manatus*	Threatened
Blue whale	*Balaenoptera musculus*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered*
North Atlantic right whale	*Eubalaena glacialis*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter catodon*	Endangered
Reptiles		
Green turtle	*Chelonia mydas*	Threatened, CH
Hawksbill turtle	*Eretmochelys imbricata*	Endangered, CH
Kemp's ridley turtle	*Lepidochelys kempii*	Endangered
Olive ridley turtle	*Lepidochelys olivacea*	Endangered*
Leatherback turtle	*Dermochelys coriacea*	Endangered, CH
Loggerhead turtle	*Caretta caretta*	Threatened, CH
Birds		
Roseate tern	*Sterna dougallii dougallii*	Endangered

Source: FWS 2016b, NOAA Fisheries 2016c, CMS 2015

Note: CH = designated critical habitat, * = Endangered according to CMS

3.2.9 Great Lakes Region

3.2.9.1 Marine Protected Areas & National Marine Sanctuaries

Of the 437 Member MPAs listed in the List of National System of MPAs, 6 of them are located in the Great Lakes Region (NOAA NOS 2013a). These areas include National Parks, a National

Marine Sanctuary, and a National Wildlife Refuge. Appendix D contains a full list of these areas for each region.

3.2.9.2 Fish

The Great Lakes represent one of the most important freshwater resources in the United States and Canada. Fisheries in this region are managed by the transboundary cooperative agency, the Great Lakes Fishery Commission through the *Joint Strategic Plan for Management of Great Lakes Fisheries* (GLFC 2007). This plan was developed by the eight U.S. states bordering the Great Lakes, the Canadian province of Ontario, two intertribal agencies, and several federal agencies. Implementation of the plan is accomplished through Lake Committees for each lake. Some of the initiatives covered under this Plan include rehabilitation of native species; disease prevention and management; exotic species research and control; stocking levels; and determination of total allowable catch and allocation agreements. Lake Commissions from each lake meet regularly to determine how best to regulate and protect commercial fisheries from the Great Lakes (GLFC 2004). There is no Regional FMC (with NOAA Fisheries) in the Great Lakes region, and thus EFH and HAPCs are not designated for any of its fisheries.

Average annual catches for commercial fisheries in the Great Lakes average 50 million pounds (22,679 metric tons) (GLEAM undated). This number has drastically decreased from historic annual catches for commercial fisheries in the 1950's, the peak of commercial fisheries landings (USEPA 1995). The decline in fisheries has largely been due to over-fishing, pollution, toxic contaminants, habitat destruction, and introduction of exotic species, especially the parasitic sea lamprey and zebra mussels. Some native species such as the lake trout, sturgeon, and lake herring were able to survive in reduced numbers, but have been largely replaced by introduced species as smelt, alewife, splake, and Pacific salmon (USEPA 1995). Lake Erie supports the most productive commercial fisheries in the Great Lakes with harvests of walleye and yellow perch. Lakes Huron, Michigan, and Superior maintain commercial fisheries of lake whitefish, lake trout, and chub. Lake targeted species include: channel catfish, carp, Pacific salmon, yellow perch, and walleye (Lake Huron); smelt and yellow perch (Lake Michigan); and lake herring and smelt (Lake Superior). Lake Ontario has the least productive commercial fishery and includes harvests of yellow perch, lake whitefish, bullhead, and American eel (GLEAM undated).

3.2.9.3 Marine Mammals

The Great Lakes Region is a freshwater lake system, therefore there are no marine mammals present in this area.

3.2.9.4 Threatened and Endangered Species

Several aquatic or coastal species listed as threatened or endangered species under the ESA are found throughout the Great Lakes region. These include the following species managed by NMFS and/or FWS (Table 3-14). There is no designated critical habitat in the Great Lakes region.

Table 3-14. Threatened and Endangered Species in the Great Lakes Region

Common Name	Scientific Name	Status
Mollusks		
Purple cat's paw	*Epioblasma obliquata obliquata*	Endangered
Riffleshell	*Epioblasma torulosa rangiana*	Endangered
Pink mucket	*Lampsilis abrupta*	Endangered
Ring pink	*Obovaria retusa*	Endangered
White wartyback	*Plethobasus cicatricosus*	Endangered
Orangefoot pimpleback	*Plethobasus cooperianus*	Endangered
Clubshell	*Pleurobema clava*	Endangered
Rough pigtoe	*Pleurobema plenum*	Endangered
Birds		
Piping plover	*Charadrius melodus*	Endangered
Roseate tern	*Sterna dougallii dougallii*	Threatened

Sources: FWS 2012a, NOAA 2012f

3.2.10 Central Pacific Region

3.2.10.1 Marine Protected Areas & National Marine Sanctuaries

Of the 437 Member MPAs listed in the List of National System of MPAs, 15 of them are located in the Central Pacific Region (NOAA NOS 2013a). These areas include a Marine National Monument, National Marine Sanctuaries, National Parks, National Wildlife Refuges, and state marine protected areas. Appendix D contains a full list of these areas for each region.

3.2.10.2 Fish

The Central Pacific Region contains a vast variety of fish species, such as skipjack tuna, yellowfin tuna, bigeye tuna, reef finfish, pelagic fish, mangrove crab, lobster, trochus, giant clam, beche-de-mer, and other invertebrates. Reef fish include barracuda, eel, emperor, goatfish, grouper, jacks, jobfish, mackerel, milkfish, mojarra, mullet, parrotfish, rabbitfish, ray, rudderfish, sardines, scad, sea bream, snapper, surgeonfish, trevally, unicornfish, and wrasse (FAO 2002).

The Western Pacific FMC and the Western and Central Pacific Fisheries Commission (WCPFC) are responsible for the management of fisheries in the Central Pacific Region. In the Central Pacific Region, the Western Pacific FMC has established a Fishery Ecosystem Plan (FEP) for the Hawaiian Archipelago. The FEP for the Hawaiian Archipelago includes management and establishment of EFH for the following species: bottomfish and seamount groundfish; crustaceans; precious corals and coral reef ecosystems (WPFMC 2009). Additionally, the Western Pacific FMC has designated the following areas as HAPCs:

- the water column down to 1,000 meters that lies above seamounts and banks with summits shallower than 2,000 meters,
- all escarpments/slopes between 40 and 280 meters throughout the Western Pacific Region (bottomfish HAPC);
- the three known areas of juvenile Hawaiian pink snapper (opakapaka) habitat (two off Oahu and one off Molokai in the Hawaiian Island archipelago);
- all banks within the Northwestern Hawaiian Islands with summits less than 30 meters (spiny and slipper lobster complex);
- all no-take MPAs and numerous existing MPAs, research sites, and coral reef habitats throughout the western Pacific (coral reef taxa);
- the Makapuu, Wespac, and Brooks Banks beds in Hawaii (precious corals); and
- the Auau Channel in Hawaii (black corals) (WPFMC 2009).

The WCPFC is an international fisheries agreement that seeks to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks (i.e., tunas, billfish, and marlin) in the western and central Pacific Ocean, in accordance with the 1982 United Nations Convention on the Law of the Sea and the 1995 United Nations Fish Stocks Agreement. The WCPFC includes members from 34 countries and territories (see Table 3-15) (WPFMC 2015).

Table 3-15. Members of the WCPFC

Australia	Futuna	Palau
American Samoa	Guam	Papua New Guinea
Canada	Indonesia	Philippines
China	Japan	Samoa
Chinese Taipei	Kiribati	Solomon Islands
Commonwealth of the Northern Mariana Islands	Republic of Korea	Tokelau
Cook Islands	Republic of Marshall Islands	Tonga
European Union	Nauru	Tuvalu
Federated States of Micronesia	New Caledonia	United States of America
Fiji	New Zealand	Vanuatu
French Polynesia	Niue	Wallis
France		

Source: WPFMC 2015

3.2.10.3 Marine Mammals

More than half of the world's species of cetaceans can be found in the Pacific Ocean. Of the odontocetes, sperm whales (*Physeter macrocephalus*) are the most common (WPFMC undated). Mysticetes such as humpback whales migrate throughout the Pacific Ocean, feeding in the

Antarctic Ocean in the summer and breeding in tropical waters of the Pacific Ocean in the winter (NZ DOC 2007). Other mysticetes such as the sei (*Balaenoptera borealis*), minke (*Balaenoptera acutorostrata*), fin (*Balaenoptera physalus*), and Bryde's whales (*Balaenoptera edeni*) are also present throughout the region (NZ DOC 2007).

The only sirenian that occurs in the Pacific region is the dugong (*Dugong dugon*), which is present throughout the Central Pacific Region. The dugong is listed as endangered under the ESA (SPREP 2012).

Two pinnipeds are known to occur in the Central Pacific Region, the Hawaiian monk seal (*Monachus schauinslandi*) and the Guadalupe fur seal (*Arctocephalus townsendi*) (MMS 2002). Eight marine mammal species that occur throughout the Central Pacific Region are listed as threatened or endangered under the ESA (see Section 3.2.10.4).

3.2.10.4 Threatened and Endangered Species

Several marine or coastal species listed as threatened or endangered under the ESA are found throughout the Central Pacific Region (Table 3-16). NOAA Fisheries has jurisdiction over marine species and USFWS has jurisdiction over land and freshwater species (NOAA Fisheries 2016c, FWS 2016b).

Table 3-16. Threatened and Endangered Species in the Central Pacific Region

Common Name	Scientific Name	Status
Mollusks		
Black abalone	*Haliotis cracherodii*	Endangered
White abalone	*Haliotis sorenseni*	Endangered
Fish		
Largetooth sawfish	*Pristis pristis*	Endangered
Scalloped hammerhead shark	*Sphyrna lewini*	Threatened (Eastern Pacific DPS) Endangered (Indo-West Pacific DPS)
Mammals		
Hawaiian monk seal	*Monachus schauinslandi*	Endangered, CH
Guadalupe fur seal	*Arctocephalus townsendi*	Threatened
Dugong	*Dugong dugon*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Blue whale	*Balaenoptera musculus*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Threatened
Sperm whale	*Physeter macrocephalus*	Endangered

Common Name	Scientific Name	Status
Birds		
Short-tailed albatross	*Phoebastria albatrus*	Endangered
Hawaiian dark-rumped petrel	*Pterodroma phaeopygia sandwichensis*	Endangered
Newell's Townsend's Shearwater	*Puffinus auricularis newelli*	Threatened
Reptiles		
Green turtle	*Chelonia mydas*	Threatened (Central North Pacific and East Pacific DPSs), Endangered (Central South Pacific and Central West Pacific DPSs)
Hawksbill turtle	*Eretmochelys imbricata*	Endangered
Leatherback turtle	*Dermochelys coriacea*	Endangered
Loggerhead turtle	*Caretta caretta*	Endangered (North and South Pacific Ocean DPSs)
Olive Ridley turtle	*Lepidochelys olivacea*	Endangered (Mexico Pacific Ocean breeding areas); Threatened (all other areas)

Sources: NOAA Fisheries 2016c, FWS 2016b

Notes: CH = designated critical habitat; DPS = Distinct Population Segments

Designated Critical Habitat

Hawaiian monk seal. In June 2015, NMFS issued a Final Rule on the designation of critical habitat for the Hawaiian monk seal that includes sixteen areas in the Hawaiian Islands. These areas contain one or a combination of the following habitat types: preferred pupping and nursing areas, significant haul-out areas, and/or marine foraging areas, that will support conservation for the species. Critical habitat extends from the water's edge (i.e., the seafloor and all subsurface waters within 10 meters of the seafloor) to the 200-m depth contour line around all of the Hawaiian Islands. Specific areas include all beach areas, sand spits, islets, beach crest vegetation (to its deepest extent inland), lagoon waters, and inner reef waters (NOAA Fisheries 2015b).

3.2.11 Western Pacific Region

3.2.11.1 Marine Protected Areas & National Marine Sanctuaries

Of the 437 Member MPAs listed in the List of National System of MPAs, 35 of them are located in the Western Pacific Region (NOS 2013a). These areas include a National Marine Sanctuary, National Parks, National Wildlife Refuges, and state/territorial marine protected areas. Appendix D contains a full list of these areas for each region.

3.2.11.2 Fish

Fisheries in the Western Pacific Region are managed by the Western Pacific FMC and WCPFC. As discussed in Section 3.2.10.2, the WCPFC is an international agreement between 34 countries and territories to manage the long-term conservation and sustainable use of highly migratory fish stocks in the western and central Pacific Ocean in accordance with the 1982 United Nations Convention on the Law of the Sea and the 1995 United Nations Fish Stocks Agreement (WPFMC 2015).

The Western Pacific Regional FMC has established Fishery Ecosystem Plans for American Samoa, the Mariana Archipelago, Pacific Remote Island Areas (including Wake Island), and Pacific pelagic fisheries. The Western Pacific FMC established EFH for bottomfish and seamount ground fish; coral reefs; precious corals; crustaceans; and pelagic species (WPFMC 2009).

3.2.11.3 Marine Mammals

Marine mammals in the Western Pacific Region are very similar to those discussed for the Central Pacific Region. More than half of the world's species of cetaceans can be found in the Pacific Ocean. Of the odontocetes, sperm whales (*Physeter macrocephalus*) are the most common (WPFMC undated). Mysticetes such as humpback whales migrate throughout the Pacific Ocean, feeding in the Antarctic Ocean in the summer and breeding in tropical waters of the Pacific Ocean in the winter (NZ DOC 2007). Other mysticetes such as the sei (*Balaenoptera borealis*), minke (*Balaenoptera acutorostrata*), fin (*Balaenoptera physalus*), and Bryde's whales (*Balaenoptera edeni*) are also present throughout the region (NZ DOC 2007).

The only sirenian that occurs in the Pacific region is the dugong (*Dugong dugon*), which is present throughout the Central Pacific Region. The dugong is listed as endangered under the ESA (SPREP 2012).

Three pinniped species are known to occur in the Western Pacific Region, the northern fur seal (*Callorhinus ursinus*), ribbon seals (*Histriophoca fasciata*), spotted seal (NOAA Fisheries 2016e). Ten marine mammal species that occur throughout the Western Pacific Region are listed as threatened or endangered under the ESA (see Section 3.2.11.4).

3.2.11.4 Threatened and Endangered Species

Several marine or coastal species listed as threatened or endangered under the ESA are found throughout the Central Pacific Region (Table 3-17). NOAA Fisheries has jurisdiction over marine species and USFWS has jurisdiction over land and freshwater species (FWS 2016b).

Table 3-17. Threatened and Endangered Species in the Western Pacific Region

Common Name	Scientific Name	Status
Fish		
Chinook salmon	*Oncorhynchus tshawytscha*	Threatened

Common Name	Scientific Name	Status
Chum salmon	*Oncorhynchus keta*	Threatened
Coho salmon	*Oncorhynchus kisutch*	Threatened
Sockeye salmon	*Oncorhynchus nerka*	Threatened
Steelhead trout	*Oncorhynchus mykiss*	Threatened
Scalloped hammerhead shark	*Sphyrna lewini*	Endangered (Indo-West Pacific DPS)
Mammals		
Dugong	*Dugong dugon*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Blue whale	*Balaenoptera musculus*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
Gray whale	*Eschrichtius robustus*	Endangered (Western North Pacific population)
Humpback whale	*Megaptera novaeangliae*	Endangered (Western North Pacific DPS)
North Pacific right whale	*Eubalaena japonica*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered
Stellar sea lion	*Eumetopias jubatus*	Endangered (Western DPS)
Spotted seal	*Phoca largha*	Threatened
Birds		
Short-tailed albatross	*Phoebastria albatrus*	Endangered
Reptiles		
Green turtle	*Chelonia mydas*	Threatened (Central North Pacific and East Pacific DPSs), Endangered (Central South Pacific and Central West Pacific DPSs)
Hawksbill turtle	*Eretmochelys imbricata*	Endangered
Leatherback turtle	*Dermochelys coriacea*	Endangered
Loggerhead turtle	*Caretta caretta*	Endangered (North and South Pacific Ocean DPSs)
Olive Ridley turtle	*Lepidochelys olivacea*	Endangered (Mexico Pacific Ocean breeding areas); Threatened (all other areas)

Sources: NOAA Fisheries 2016c, FWS 2016b

Notes: CH = designated critical habitat; DPS = Distinct Population Segments

3.2.12 Gulf of Alaska Region

3.2.12.1 Marine Protected Areas & National Marine Sanctuaries

Of the 437 Member MPAs listed in the List of National System of MPAs, four of them are located in the Gulf of Alaska Region (NOS 2013a). These areas include a National Park and National Wildlife Refuges. Appendix D contains a full list of these areas for each region.

3.2.12.2 Fish

The North Pacific FMC is responsible for the conservation and management of fish stocks within the federal 200-NM limit off the coast of Alaska (NOAA Fisheries 2016b). The North Pacific FMC has established six FMPs for the following species: Groundfish for the Bering Sea and Aleutian Islands Management Area; Groundfish for the Gulf of Alaska Management Area; Bering Sea/Aleutian Islands King and Tanner Crabs; salmon; scallop; and Fish Resources of the Arctic Management Area (NPFMC 2016). Specifically, the FMP for Fish Resources of the Arctic Management Area restricts all commercial fishing in federal waters of the U.S. Arctic for any species of finfish, mollusks, crustaceans, and all other forms of marine animal and plant life.

The FMP for Salmon Fisheries in the EEZ Off Alaska was amended in 2012 and subsequently updated in 2014, to exclude three historical net commercial salmon fishing areas and the sport salmon fishery from the West Area EEZ. The FMP prohibits commercial salmon fisheries in the modified West Area and delegates management authority to the State of Alaska for the directed commercial salmon troll fishery and the sport salmon fishery in the East Area EEZ (NPFMC 2012a).

Within identified EFH, the North Pacific FMC has designated HAPC, which include the Alaska Seamount Habitat Protection Areas, Bowers Ridge Habitat Conservation Zone, and Gulf of Alaska Coral Habitat Protection Areas, Gulf of Alaska Slope Habitat Conservation Areas, and Skate Nursery Areas. Within the Alaska Seamount Habitat Protection Areas, which encompass approximately 5,300 nm^2, no federally permitted vessel may fish with bottom contact gear (nonpelagic trawl, dredge, dinglebar, pot, or hook-and-line gear). Within the Bowers Ridge Habitat Conservation Zone, which encompasses approximately 5,300 nm^2, no federally permitted vessel may fish with mobile bottom contact gear (nonpelagic trawl, dredge, or dinglebar gear) (NPFMC 2012b). Within the Gulf of Alaska Coral Habitat Protection Areas, which encompasses approximately 14 nm^2, no federally permitted vessel may fish with bottom contact gear (nonpelagic trawl, dredge, dinglebar, pot, or hook-and-line gear) (NPFMC 2012b). Within the Gulf of Alaska Slope Habitat Conservation Areas, which encompasses approximately 3,000 nm^2, no federally permitted fishing vessel may fish with bottom contact gear. However, there are Skate Nursery Areas (designated as HAPC) in the Gulf of Alaska, which encompasses approximately 82 nm^2. In these HAPCs, a priority must be given to monitoring for skate eggs (NPFMC 2012b).

3.2.12.3 Marine Mammals

There are more than 20 species of marine mammals in the Gulf of Alaska region (MMS 2002). Seven species of odontocetes are present in this region, including the sperm whale, beluga whale (*Delphinapterus leucas*), killer whale (*Orcinus orca*), Dall's porpoise (*Phocoenoides dalli*), and

harbor porpoise (*Phocoena phocoena*), Pacific white-sided dolphin, and Cuvier's beaked whale. Mysticetes such as the blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), sei whale (*Balaenoptera borealis)*, minke whale, humpback whale (*Megaptera novaeangliae*), gray whale (*Eschrichtius robustus*), bowhead whale (*Balaena mysticetus*), and North Pacific right whale (*Eubalaena japonica*) are also present. Sirenians no longer occur in Alaskan waters; the Steller sea cow (*Hydrodamalis gigas*) used to occur in Alaskan waters but was hunted to extinction. Pinnipeds include the ringed seal (*Phoca hispida*), ribbon seal (*Histriophoca fasciata*), Pacific walrus (*Odobenus rosmarus divergens*), harbor seal (*Phoca vitulina*), spotted seal (*Phoca largha*), bearded seal (*Erignathus barbatus*), northern fur seal (*Callorhinus ursinus*), Steller sea lion (*Eumetopias jubatus*), and California sea lion (*Zalophus californianus*). Marine fissipeds include the polar bear (*Ursus maritimus*) and northern sea otter (*Enhydra lutris kenyoni*) (MMS 2002; BOEM 2012). Eleven marine mammal species that occur throughout the Gulf of Alaska Region are listed as endangered under the ESA (see Section 3.2.12.4).

3.2.12.4 Threatened and Endangered Species

Several marine or coastal species listed as threatened or endangered under the ESA are found throughout the Gulf of Alaska region (Table 3-18). NOAA Fisheries has jurisdiction over marine species and USFWS has jurisdiction over land and freshwater species (FWS 2016b).

Designated Critical Habitat

Northern sea otter. Units of designated critical habitat for the Alaska DPS include approximately 18,000 km of coastline and are subdivided as the (1) Western Aleutian Unit; (2) Eastern Aleutian Unit; (3) South Alaska Peninsula Unit; (4) Bristol Bay Unit; and (5) Kodiak, Kamishak, Alaska Peninsula Unit (NOAA Fisheries 2016d, 74 FR 51988).

Steller sea lion. Critical habitat has been designated for the Western DPS and includes marine waters, terrestrial rookeries (breeding sites), and haulouts (resting sites) in the Bering Sea and Gulf of Alaska, around the Aleutian Islands (78 FR 66140).

Beluga whale. Critical habitat includes two marine areas (approximately 7,809 km^2 [3,016 mi^2]) in Cook Inlet, Alaska (NOAA Fisheries 2016d, 76 FR 20180).

North Pacific right whale. There are two distinct areas of critical habitat in the Bering Sea Critical and the Gulf of Alaska (NOAA Fisheries 2016d, 73 FR 19000).

Spectacled eider. The spectacled eider is a large sea duck that breeds on the coasts of Alaska and northeastern Siberia. Critical habitat includes areas on the Yukon–Kuskokwim Delta, in Norton Sound, Ledyard Bay, and the Bering Sea between St. Lawrence and St. Matthew Islands (FWS 2001b, 66 FR 9146).

Steller's eider. The Steller's eider is a small sea duck that breeds along the Arctic coasts of Alaska and eastern Siberia. Units of designated critical habitat are the Yukon–Kuskokwim Delta, Kuskokwim Shoals, Seal Islands, Nelson Lagoon, and Izembek Lagoon, on the Bering Sea coast of Alaska (FWS 2001c, 66 FR 8850).

Table 3-18. Threatened or Endangered Species in the Gulf of Alaska Region

Common Name	Scientific Name	Status
Fish		
Pacific euchalon/smelt	*Thaleichthys pacificus*	Threatened
Mammals		
Northern sea otter	*Enhydra lutris kenyoni*	Threatened (Southwest Alaska DPS), CH
Polar bear	*Ursus maritimus*	Threatened, CH
Steller sea lion	*Eumetopias jubatus*	Endangered (Western DPS), CH
Beluga whale	*Delphinapterus leucas*	Endangered (Cook Inlet DPS), CH
Bowhead whale	*Balaena mysticetus*	Endangered
Blue whale	*Balaenoptera musculus*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
North Pacific right whale	*Eubalaena japonica*	Endangered, CH
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered (Western North Pacific DPS)
Birds		
Eskimo curlew	*Numenius borealis*	Endangered
Short-tailed albatross	*Phoebastria albatrus*	Endangered
Spectacled eider	*Somateria fischeri*	Threatened, CH
Steller's eider	*Polysticta stelleri*	Threatened (Alaska breeding population only), CH
Reptiles		
Leatherback turtle	*Dermochelys coriacea*	Endangered

Source: NOAA Fisheries 2016d, FWS 2016b

Note: CH = designated critical habitat, DPS = distinct population segment

3.2.13 Northwest Region

3.2.13.1 Marine Protected Areas & National Marine Sanctuaries

Of the 437 Member MPAs listed in the List of National System of MPAs, 112 of them are located in the Northwest Region (NOS 2013a). These areas include a National Marine Sanctuaries, National Parks, National Wildlife Refuges, and state marine protected areas. In the Northwest Region, NDBC operates buoys in the Cordell Bank NMS, the Gulf of Farallones NMS, and the Olympic Coast NMS that are permitted by the NOAA Office of National Marine Sanctuaries (see Appendix D). Appendix D contains a full list of these areas for each region and the research permit for operation in the abovementioned NMSs.

3.2.13.2 Fish

The Pacific FMC is responsible for the conservation and management of fish stocks and fishery resources within the federal 200-nm limit off the coasts of Washington, Oregon, and California, an area that covers approximately 317,690 mi^2. The Pacific FMC manages fisheries and EFH for approximately 119 species of salmon, groundfish, coastal pelagic fish (e.g., sardines, anchovies, and mackerel), and highly migratory species (e.g., tunas, sharks, and swordfish). The Pacific FMC also collaborates with other organizations, including the International Pacific Halibut Commission that manages fish stocks that migrate through the Council's jurisdiction (PFMC undated).

Within identified EFH, the Pacific FMC has designated HAPC, which include estuaries, canopy kelp, seagrass, rocky reefs, and "areas of interest" (i.e., banks, seamounts, and canyons) for groundfish. Additionally, the Pacific FMC has established closed areas to protect groundfish habitat, including bottom trawl closed areas, bottom contact closed areas, and a bottom trawl footprint closure (PFMC 2016). EFH for coastal pelagic species includes all marine and estuary waters from the coasts to the 200-mile EEZ limit and above the thermocline (i.e., a range of sea surface temperatures between 10–26 °C). The Pacific FMC has designated HAPC for salmon that includes complex channels and floodplain habitats, thermal refugia, spawning habitat, estuaries, and marine and estuarine submerged aquatic vegetation. Salmon EFH extends from the shoreline to the 200-mile EEZ limit. EFH for highly migratory species covers a wide range of areas defined by temperature ranges, salinity, oxygen levels, currents shelf edges, and seamounts; rather than specific habitat areas (PFMC 2016).

3.2.13.3 Marine Mammals

At least 34 species of marine mammals occur in the Northwest region, including cetaceans (i.e., whales, porpoises, and dolphins), pinnipeds (i.e., seals and sea lions), and one fissiped (i.e., sea otter, which includes the northern and southern subspecies). Sirenians do not occur in Washington, Oregon, and Californiaaters. Pinnipeds present include the harbor seal, California sea lion, northern elephant seal (*Mirounga angustirostris*), and Guadalupe fur seal (*Arctocephalus townsendi*) (MMS 2002). While some species are year-round residents, others occur as seasonal residents or as migrants. Several species, such as some of the *Mesoplodon* beaked whales, are rarely observed (MMS 2002). Among the nonendangered cetaceans, the short-beaked common dolphin is the most abundant. Other relatively abundant species are the northern right-whale dolphin (*Lissodelphis borealis*), long- beaked common dolphin (*Delphinus capensis*), Pacific white-sided dolphin (*Lagenorhynchus*

obliquidens), and Dall's porpoise. The harbor porpoise is relatively common and widely distributed along the entire Pacific Coast. Eleven marine mammal species that occur throughout the Northwest Region are listed as threatened or endangered under the ESA (see Section 3.2.13.4).

3.2.13.4 Threatened and Endangered Species

Several marine or coastal species listed as threatened or endangered under the ESA are found throughout Northwest Region (Table 3-19). NOAA Fisheries has jurisdiction over marine species and USFWS has jurisdiction over land and freshwater species (FWS 2016b).

Table 3-19. Threatened or Endangered Species in the Northwest Region

Common Name	Scientific Name	Status
Mollusks		
Black abalone	*Haliotis cracherodii*	Endangered, CH
Fish		
Bull trout	*Salvelinus confluentus*	Threatened, CH
Bocaccio	*Sebastes paucispinis*	Endangered (Puget Sound/Georgia Basin DPS), CH
Canary rockfish	*Sebastes pinniger*	Threatened (Puget Sound/Georgia Basin DPS), CH
Yelloweye rockfish	*Sebastes ruberrimus*	Threatened (Puget Sound/Georgia Basin DPS), CH
Pacific euchalon/smelt	*Thaleichthys pacificus*	Threatened (Southern DPS), CH
Green sturgeon	*Acipenser medirostris*	Threatened, CH
Chinook salmon	*Oncorhynchus tshawytscha*	Threatened (California Coastal ESU), CH
Chum salmon	*Oncorhynchus keta*	Threatened
Coho salmon	*Oncorhynchus kisutch*	Endangered (Central California coast ESU), CH Threatened (Central Oregon/ Northern California coasts ESU), CH
Sockeye salmon	*Oncorhynchus nerka*	Threatened or Endangered (depending on location)
Steelhead trout	*Oncorhynchus mykiss*	Threatened (Central California coast and Northern California ESUs), CH
Birds		
California clapper rail	*Rallus longirostris obsoletus*	Endangered
California least tern	*Sterna antillarum browni*	Endangered

Common Name	Scientific Name	Status
Marbled murrelet	*Brachyramphus marmoratus*	Threatened, CH
Short-tailed albatross	*Phoebastria albatrus*	Endangered
Western snowy plover	*Charadrius alexandrinus nivosus*	Threatened (Pacific coastal population), CH
Mammals		
Blue whale	*Balaenoptera musculus*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered (Western North Pacific population)
Killer whale	*Orcinus orca*	Endangered (Southern Resident DPS)
North Pacific right whale	*Eubalaena japonica*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered
Steller sea lion	*Eumetopias jubatus*	Threatened (Eastern DPS), CH
Guadalupe fur seal	*Arctocephalus townsendi*	Threatened
Southern sea otter	*Enhydra lutris nereis*	Threatened
Reptiles		
Green turtle	*Chelonia mydas*	Threatened
Leatherback turtle	*Dermochelys coriacea*	Endangered, CH
Loggerhead turtle	*Caretta caretta*	Endangered (North Pacific Ocean DPS)
Olive Ridley turtle	*Lepidochelys olivacea*	Threatened

Source: FWS 2016b, NOAA Fisheries 2016c
Note: CH = designated critical habitat

Designated Critical Habitat

Black abalone. Areas designated as critical habitat in the Northwest Region include rocky intertidal and subtidal habitats within central and northern California marine coastal areas, from Del Mar Landing Ecological Reserve (Sonoma County) to Point Bonita (Marin County). Critical habitat has also been designated in intertidal and subtidal areas around the Farallon Islands (San Francisco County) (76 FR 66806).

Bull Trout. An anadromous form of bull trout also exists in the Coastal-Puget Sound population, which spawns in rivers and streams but rears young in the ocean. A total of 31,750 km (19,729 mi)

of streams, including 1,213 km (754 mi) of marine shoreline, has been designated as critical habitat for the bull trout (75 FR 63898).

Bocaccio, Canary rockfish, and Yelloweye rockfish. The specific areas designated as critical habitat in the Puget Sound/Georgia Basin include 1,529 km^2 (590 mi^2) of nearshore habitat for canary rockfish and bocaccio; and 1,072 km^2 (414 mi^2) of deepwater habitat for yelloweye rockfish, canary rockfish, and bocaccio.

Pacific euchalon/smelt. There are 16 specific areas designated as critical habitat within the states of California, Oregon, and Washington. In estuarine areas, critical habitat includes tidally influenced areas as defined by the elevation of mean higher high water (76 FR 65324).

Green sturgeon. Critical habitat includes all U.S. coastal marine waters to the 60-fathom depth bathymetry line from Monterey Bay, California and to the Strait of Juan de Fuca, Washington. Additionally, all tidally influenced areas up to the mean higher high water elevation of San Francisco Bay, San Pablo Bay, Suisun Bay, and Humboldt Bay, California are designated as critical habitat (74 FR 52300).

Chinook salmon. Specified areas of critical habitat have been designated for the California Coastal ESU in the following counties: San Humboldt, Trinity, Mendocino, Sonoma, Lake, Napa, Glenn, Colusa, and Tehama. Critical habitat in estuaries is defined by the perimeter of the water body as displayed on standard 1:24,000 scale topographic maps or the elevation of extreme high water, whichever is greater (70 FR 52488).

Coho salmon. Critical habitat has been designated for the Central California Coast and Southern Oregon/Northern California Coasts ESUs. For the Central California Coast ESU, critical habitat includes all river reaches accessible to listed coho salmon from Punta Gorda in northern California south to the San Lorenzo River in central California, including Arroyo Corte Madera Del Presidio and Corte Madera Creek, tributaries to San Francisco Bay. Critical habitat consists of the water, substrate, and adjacent riparian zone of estuarine and riverine reaches (including off-channel habitats) in specified hydrologic units and counties. For the Southern Oregon/Northern California Coasts ESU, critical habitat has been designated to include all river reaches accessible to listed coho salmon between Cape Blanco, Oregon, and Punta Gorda, California. Critical habitat consists of the water, substrate, and adjacent riparian zone of estuarine and riverine reaches (including off-channel habitats) in specified hydrologic units and counties (64 FR 24049).

Steelhead trout. Critical habitat has been designated for the Central California Coast, Northern California, and South-Central California Coast ESUs. For the Central California Coast ESU, this includes specified areas in the following counties: Lake, Mendocino, Sonoma, Napa, Marin, San Francisco, San Mateo, Santa Clara, Alameda, and Contra Costa. For the Northern California ESU, critical habitat includes specified areas in the following counties: Humboldt, Trinity, Mendocino, Sonoma, Lake, Glenn, Colusa, and Tehama. Critical habitat in estuaries is defined by the perimeter of the water body as displayed on standard 1:24,000 scale topographic maps or the elevation of extreme high water, whichever is greater (70 FR 52488).

Marbled murrelet. Approximately 3,698,100 acres of critical habitat in the States of Washington, Oregon, and California have been designated for the marbled murrelet (76 FR 61599).

Western snowy plover. Approximately 24,527 acres of critical habitat for the western snowy plover has been designated in Washington, Oregon, and California. The primary characteristics of critical habitat for the Pacific coast population of western snowy plover are sparsely vegetated areas above daily high tides, such as sandy beaches, dune systems adjacent to an active beaches, salt flats, seasonally exposed gravel bars, dredge spoil sites, artificial salt ponds, and adjoining levees. Critical habitat also includes areas that are relatively undisturbed by the presence of humans, pets, vehicles or human-attracted predators (77 FR 36728).

Steller sea lion. Critical habitat for the Eastern DPS has been designated as a 20 nautical mile buffer around all major haul-outs and rookeries. The specific areas in the Northwest region include Long Brown & Seal Rocks, Oregon; Pyramid Rock, Oregon; Sugarloaf Island and Cape Mendocino, California; and Southeast Farallon Islands, California. The habitat area at these locations extends 3,000 feet seaward, as well as an air zone, 3,000 feet above (NOAA Fisheries 2016f).

Leatherback turtle. Critical habitat includes coastal marine waters along Washington, Oregon, and California. The critical habitat of the leatherback turtle is approximately 43,798 km^2 (16,910 mi^2) stretching along the California coast from Point Arena to Point Arguello east of the 3,000 meter depth contour; and 64,760 km^2 (25,004 mi^2) stretching from Cape Flattery, Washington to Cape Blanco, Oregon east of the 2,000 meter depth contour. The designated areas comprise approximately 108,558 km^2 (41,914 mi^2) of marine habitat and include waters from the ocean surface down to a maximum depth of 80 m (262 feet) (77 FR 4170).

3.2.14 California Region

3.2.14.1 Marine Protected Areas & National Marine Sanctuaries

Of the 437 Member MPAs listed in the List of National System of MPAs, 116 of them are located in the California Region (NOS 2013a). These areas include National Marine Sanctuaries, National Parks, a National Wildlife Refuge, and state marine protected areas. In the California Region, NDBC operates three buoys in the Monterey Bay NMS that are permitted by the NOAA Office of National Marine Sanctuaries (see Appendix D). Appendix D contains a full list of these areas for each region and the research permit for operation in the abovementioned NMS.

3.2.14.2 Fish

As discussed for the Northwest Region (Section 3.2.13.2), the Pacific FMC is responsible for the conservation and management of fish stocks and fishery resources within the federal 200-nm limit off the coasts of Washington, Oregon, and California, an area that covers approximately 317,690 mi^2. In the California Region, the Pacific FMC has established FMPs and manages fisheries for groundfish, coastal pelagic fish (e.g., sardines, anchovies, and mackerel), and highly migratory species (e.g., tunas, sharks, and swordfish). The Pacific FMC also collaborates with other organizations, including the International Pacific Halibut Commission that manages fish stocks that migrate through the Council's jurisdiction (PFMC undated).

Within identified EFH, the Pacific FMC has designated HAPC, which include estuaries, canopy kelp, seagrass, rocky reefs, and "areas of interest" (i.e., banks, seamounts, and canyons) for

groundfish. Additionally, the Pacific FMC has established closed areas to protect groundfish habitat, including bottom trawl closed areas, bottom contact closed areas, and a bottom trawl footprint closure (PFMC 2016). EFH for coastal pelagic species includes all marine and estuary waters from the coasts to the 200-mile EEZ limit and above the thermocline (i.e., a range of sea surface temperatures between 10–26 °C). EFH for highly migratory species covers a wide range of areas defined by temperature ranges, salinity, oxygen levels, currents shelf edges, and seamounts; rather than specific habitat areas (PFMC 2016).

3.2.14.3 Marine Mammals

At least 34 species of marine mammals occur in the California region, including cetaceans (i.e., whales, porpoises, and dolphins), pinnipeds (i.e., seals and sea lions), and one fissiped (i.e., southern sea otter). Sirenians do not occur in southern California waters. Pinnipeds present include the harbor seal, California sea lion, northern elephant seal (*Mirounga angustirostris*), and Guadalupe fur seal (*Arctocephalus townsendi*), as well as a fissiped, the southern sea otter (MMS 2002). While some species are year-round residents, others occur as seasonal residents or as migrants. Several species, such as some of the *Mesoplodon* beaked whales, are rarely observed (MMS 2002). Among the nonendangered cetaceans, the short-beaked common dolphin is the most abundant. Other relatively abundant species are the northern right-whale dolphin (*Lissodelphis borealis*), long-beaked common dolphin (*Delphinus capensis*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), and Dall's porpoise. The harbor porpoise is relatively common and widely distributed along the entire Pacific Coast. Nine marine mammal species that occur throughout the California Region are listed as threatened or endangered under the ESA (see Section 3.2.14.4).

3.2.14.4 Threatened and Endangered Species

Several marine or coastal species listed as threatened or endangered under the ESA are found throughout California Region (Table 3-20). NOAA Fisheries has jurisdiction over marine species and USFWS has jurisdiction over land and freshwater species (FWS 2016b).

Table 3-20. Threatened or Endangered Species in the California Region

Common Name	Scientific Name	Status
Mollusks		
Black abalone	*Haliotis cracherodii*	Endangered, CH
White abalone	*Haliotis sorenseni*	Endangered
Fish		
Green sturgeon	*Acipenser medirostris*	Threatened, CH
Chinook salmon	*Oncorhynchus tshawytscha*	Threatened
Coho salmon	*Oncorhynchus kisutch*	Endangered (Central California Coast ESU), CH
Pacific euchalon/smelt	*Thaleichthys pacificus*	Threatened (Southern DPS), CH

Common Name	Scientific Name	Status
Scalloped hammerhead shark	*Sphyrna lewini*	Endangered (Eastern Pacific DPS)
Steelhead trout	*Oncorhynchus mykiss*	Threatened (Central California coast, South-Central California coast, and Southern California ESUs), CH
Birds		
California clapper rail	*Rallus longirostris obsoletus*	Endangered
California least tern	*Sterna antillarum browni*	Endangered
Light-footed clapper rail	*Rallus longirostris levipes*	Endangered
Marbled murrelet	*Brachyramphus marmoratus*	Threatened, CH
Short-tailed albatross	*Phoebastria albatrus*	Endangered
Western snowy plover	*Charadrius alexandrinus nivosus*	Threatened (Pacific coastal population), CH
Reptiles		
Green turtle	*Chelonia mydas*	Threatened (East Pacific DPS)
Leatherback turtle	*Dermochelys coriacea*	Endangered, CH
Loggerhead turtle	*Caretta caretta*	Endangered (North Pacific Ocean DPS)
Olive Ridley turtle	*Lepidochelys olivacea*	Threatened
Mammals		
Steller sea lion	*Eumetopias jubatus*	Threatened (Eastern DPS), CH
Guadalupe fur seal	*Arctocephalus townsendi*	Threatened
Southern sea otter	*Enhydra lutris nereis*	Threatened
Blue whale	*Balaenoptera musculus*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
North Pacific right whale	*Eubalaena japonica*	Endangered
Killer whale	*Orcinus orca*	Endangered (Southern Resident DPS)
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered

Source: FWS 2016b, NOAA Fisheries 2016c
Note: CH = designated critical habitat.

Designated Critical Habitat

Black abalone. Areas designated as critical habitat in the California Region include rocky intertidal and subtidal habitats within central and southern California marine coastal areas, from San Francisco Bay to the California/Mexico border. Critical habitat has also been designated in intertidal and subtidal areas around the following offshore coastal islands: Año Nuevo Island, San Miguel Island, Santa Rosa Island, Santa Cruz Island, Anacapa Island, Santa Barbara Island, and Santa Catalina Island) (76 FR 66806).

Green sturgeon. Critical habitat in the California Region includes all U.S. coastal marine waters to the 60-fathom depth bathymetry line from San Francisco Bay to Monterey Bay, California. Additionally, all tidally influenced areas up to the mean higher high water elevation within San Francisco Bay, California are designated as critical habitat (74 FR 52300).

Coho salmon. Critical habitat has been designated for the Central California Coast ESUs. For the Central California Coast ESU, critical habitat includes all river reaches accessible to listed coho salmon from San Francisco Bay south to the San Lorenzo River in central California, including Arroyo Corte Madera Del Presidio and Corte Madera Creek, tributaries to San Francisco Bay. Critical habitat consists of the water, substrate, and adjacent riparian zone of estuarine and riverine reaches (including off-channel habitats) in specified hydrologic units and counties (64 FR 24049).

Pacific euchalon/smelt. There are 16 specific areas designated as critical habitat within the states of California, Oregon, and Washington. In estuarine areas, critical habitat includes tidally influenced areas as defined by the elevation of mean higher high water (76 FR 65324).

Steelhead trout. Critical habitat has been designated for the Central California Coast and South-Central California Coast ESUs in the following counties: San Mateo, Santa Clara, Santa Cruz, Monterey, San Benito, and San Luis Obispo. Critical habitat in estuaries is defined by the perimeter of the water body as displayed on standard 1:24,000 scale topographic maps or the elevation of extreme high water, whichever is greater (70 FR 52488).

Marbled murrelet. Approximately 3,698,100 acres of critical habitat in the States of Washington, Oregon, and California have been designated for the marbled murrelet (76 FR 61599).

Western snowy plover. Approximately 24,527 acres of critical habitat for the western snowy plover has been designated in Washington, Oregon, and California. The primary characteristics of critical habitat for the Pacific coast population of western snowy plover are sparsely vegetated areas above daily high tides, such as sandy beaches, dune systems adjacent to an active beaches, salt flats, seasonally exposed gravel bars, dredge spoil sites, artificial salt ponds, and adjoining levees. Critical habitat also includes areas that are relatively undisturbed by the presence of humans, pets, vehicles or human-attracted predators (77 FR 36728).

Leatherback turtle. Critical habitat includes coastal marine waters from the extreme low water line west to the 200 m isobath from Point Arena to Point Arguello, California west to the 3,000 m isobath (77 FR 4170).

Steller sea lion. Critical habitat designated for the Eastern DPS has been designated as a 20 nautical mile buffer around all major haul-outs and rookeries. The specific areas in the California

Region include aquatic zones extending 914 m seaward and air zones extending 914 m upward from mapped points at Southeast Farallon Islands and Ano Nuevo Island, California (NOAA Fisheries 2016f).

3.3 CULTURAL RESOURCES

3.3.1 Applicable Laws, Regulations, and Executive Orders

The following description of relevant laws, regulations, and executive orders that pertain to cultural resources were included to provide a framework for identifying existing resources, impacts to the resource, and determining thresholds for significance of those impacts.

National Historic Preservation Act (NHPA). The NHPA of 1966 (16 U.S.C. §§ 470 et seq.), as amended, requires federal agencies to consider the preservation of historic districts, buildings, structures, or objects that might be impacted by a proposed action. The intent of the NHPA is to integrate consideration of historic preservation issues into the early stages of project planning by a federal agency. Under the NHPA, State Historic Preservation Officers (SHPOs) are responsible for managing historic properties within their state. Section 106 of the NHPA requires federal agencies to take into account the effects of their proposed actions on historic properties and provide the Advisory Council on Historic Preservation with the opportunity to comment on proposed actions. The Advisory Council on Historic Preservation oversees and ensures the consideration of historic properties in the federal planning process. The Section 106 process attempts to accommodate historic preservation concerns with the needs of federal actions through early stage consultations (36 CFR 800.1). Additionally, consultation under Section 106 with federal agencies and interested parties assists with the identification of historic properties potentially affected by the proposed action; assess effects; and find ways to avoid, minimize, or mitigate any adverse effects on historic properties (36 CFR 800.2).

The installation and deploying of buoys on or near historic properties would be subject to NHPA regulations. NDBC would consult with the applicable SHPO to maintain compliance with the NHPA to avoid direct or visual impacts to a historic property.

Archaeological and Historic Preservation Act. The Archaeological and Historic Preservation Act provides for the preservation of historical and archeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as the result of federal or federally funded actions. If actions performed by a federal agency are found to cause irreparable loss or destruction of significant scientific, pre-historical, historical, or archeological data by an appropriate historical or archaeological authority, the agency shall notify the Secretary of the Interior and provide appropriate information concerning the activity. Such agency may request the Secretary to undertake the recovery, protection, and preservation of such data or it may, with funds appropriated for such project, undertake preservation activities themselves.

Abandoned Shipwreck Act. Under the Abandoned Shipwreck Act of 1987 (43 U.S.C. §§ 2101 et seq.), the Federal Government identified three categories of abandoned shipwrecks:

- abandoned shipwrecks embedded in a State's submerged lands;

- abandoned shipwrecks embedded in coralline formations protect by a State on its submerged lands; and
- abandoned shipwrecks located on a State's submerged lands and included in or determined eligible for inclusion in the National Register of Historic Places.

Upon claiming the shipwreck, the U.S. transferred the title of those shipwrecks to the State in which the shipwreck or submerged lands were located (with the exception of shipwrecks owned by Indian tribes).

The installation of anchors, buoys, or stations on or in an abandoned shipwreck site would be subject to regulations established in the Abandoned Shipwreck Act and by the applicable State. NDBC would consult with the necessary state agencies to avoid direct impacts and maintain compliance with the Abandoned Shipwrecks Act.

Executive Order 13175 (November 6, 2000): Consultation and Coordination with Indian Tribal Governments. EO 13175, *Consultation and Coordination with Indian Tribal Governments* establishes regular and meaningful consultation and collaboration with tribal officials in the development of federal policies or actions that have tribal implications. Under this EO, federal agencies must respect Indian tribal self-government and sovereignty, honor tribal treaty and other rights, and strive to meet the responsibilities that arise from the unique legal relationship between the federal government and Indian tribal governments. For actions that affect Tribal lands or traditional fishing practices, consultation with the appropriate Tribal government would be conducted as required.

The procedures outlined in the *NOAA Procedures for Government-to-Government Consultation with Federally Recognized Indian Tribes and Alaska Native Corporations* (NOAA Tribal Consultation Handbook) provide guidance to NOAA to support a more consistent, effective and proactive approach to conducting tribal consultations. The Handbook is NOAA's interpretation and implementation of EO 13175. The Handbook is intended to improve NOAA's management of its relations and cooperative activities with Native American tribes, and to provide for meaningful and timely input from Native American into the Federal decision-making process on policy matters having substantial direct effects on them.

3.3.2 Cultural Resources Common to All Regions

The NHPA of 1966 is the primary federal statute that addresses the management of cultural resources. Each state has a SHPO that administers state cultural resource programs and ensures the conservation and protection of cultural resources within the state. Cultural resources can refer to any prehistoric or historic sites, buildings, districts, structures, traditional use areas, or objects considered important to a culture or community. Cultural resources can include traditional resources related to fishing and other marine or nearshore resources, such as traditional or tribal fishing rights. Additionally, MPAs can have cultural designations to protect archaeological sites or shipwrecks (NOAA NOS 2016).

3.3.3 Stennis Space Center

The NDBC campus is located on previously disturbed land at Stennis Space Center, so it is unlikely that archaeological resources would be found. NASA completed a cultural resources survey in 2009, which surveyed four areas in the southwestern portion of Stennis Space Center. Survey areas 1 and 2 are west and south of the NDBC Campus, respectively. The surveys concluded that the surface conditions, topography, and soil associations are not typically affiliated with past human settlement and there was no evidence of significant cultural resources. The survey also noted that there was significant previous disturbance from a variety of sources (i.e., logging, infrastructure, facility construction, and tropical storms) (USACE 2009). The SHPO for Stennis Space Center is the Mississippi Department of Archives and History (http://mdah.state.ms.us/).

3.3.4 Northeast Region

The SHPOs for the Northeast Region are shown in Table 3-21. The Maine Department for Inland Fisheries and Wildlife recognizes Maine Native American traditional fishing rights and issues a set number of trapping and fishing licenses for individuals belonging to the Passamaquoddy Tribe, Penobscot Nation, Houlton Band of Maliseet Indians, Aroostook Band of Micmacs, or Aroostook Micmac Council (MIF&W 2013).

Table 3-21. SHPOs for the Northeast Region

State	SHPO Information
Maine	Maine Historic Preservation Commission (http://www.maine.gov/mhpc/)
New Hampshire	New Hampshire Division of Historical Resources (http://www.nh.gov/nhdhr/)
Massachusetts	Massachusetts Historical Commission (http://www.sec.state.ma.us/mhc/)
Connecticut	Connecticut Department of Economic and Community Development (http://www.cultureandtourism.org/cct/cwp)
Rhode Island	Rhode Island Historical Preservation & Heritage Commission (http://www.preservation.ri.gov/)
New York	New York State Historic Preservation Office (http://nysparks.com/shpo/)
Pennsylvania	Pennsylvania Bureau for Historic Preservation (http://www.phmc.pa.gov/Preservation/Pages/default.aspx)
New Jersey	New Jersey Historic Preservation Office (http://www.nj.gov/dep/hpo/)

3.3.5 Mid-Atlantic Region

The SHPOs for the Mid-Atlantic Region are shown in Table 3-22.

Table 3-22. SHPOs for the Mid-Atlantic Region

State	SHPO Information
Delaware	Delaware Division of Historical and Cultural Affairs (http://history.delaware.gov/preservation/)
Maryland	Maryland Historical Trust (http://mht.maryland.gov/)
Virginia	Virginia Department of Historic Resources (http://www.dhr.virginia.gov/)
North Carolina	North Carolina State Historic Preservation Office (http://www.hpo.ncdcr.gov/)

3.3.6 Southeast Region

The SHPOs for the Southeast Region are shown in Table 3-23.

Table 3-23. SHPOs for the Southeast Region

State	SHPO Information
South Carolina	South Carolina Department of Archives and History, SHPO (http://shpo.sc.gov)
Georgia	Georgia Department of Natural Resources, Historic Preservation Division (http://georgiashpo.org/)
Florida	Florida Division of Historical Resources (http://www.flheritage.com/)
Bermuda	Bermuda Department of Environment and Natural Resources (http://environment.bm/marine-heritage)

3.3.7 Gulf of Mexico Region

The SHPOs for the Gulf of Mexico Region are shown in Table 3-24.

Table 3-24. SHPOs for the Gulf of Mexico Region

State	SHPO Information
Florida	Florida Division of Historical Resources (http://www.flheritage.com/)
Alabama	Alabama Historical Commission (http://preserveala.org/)
Mississippi	Mississippi Department of Archives and History (http://mdah.state.ms.us/)
Louisiana	Louisiana Office of Cultural Development, Division of Historic Preservation (http://www.crt.state.la.us/)
Texas	Texas Historical Commission (http://www.thc.state.tx.us/)

3.3.8 Caribbean/Tropical Atlantic Region

The SHPOs for the Caribbean/Tropical Atlantic Region are shown in Table 3-25.

Table 3-25. SHPOs for the Caribbean/Tropical Atlantic Region

State	SHPO Information
Puerto Rico	Institute of Puerto Rican Culture (http://www.icp.gobierno.pr/)
U.S. Virgin Islands	Virgin Islands State Historic Preservation Office (http://dpnr.vi.gov/vi-state-historic-preservation-office/)
British Virgin Islands	Ministry of Education and Culture, Department of Culture (http://www.bvi.gov.vg/departments/department-culture-0)

3.3.9 Great Lakes Region

The SHPOs for the Great Lakes Region are shown in Table 3-26.

Table 3-26. SHPOs for the Great Lakes Region

State	SHPO Information
Minnesota	Minnesota Historical Society, SHPO (http://www.mnhs.org/shpo/)
Wisconsin	Wisconsin Historical Society, SHPO (http://www.wisconsinhistory.org/)
Illinois	Illinois Historic Preservation Agency (http://www.illinoishistory.gov/)
Indiana	Indiana Division of Historic Preservation and Archaeology (https://www.illinois.gov/ihpa/Preserve/Pages/Resource-Protection.aspx)
Michigan	Michigan SHPO (http://www.michigan.gov/shpo)
Ohio	Ohio Historic Preservation Office (https://www.ohiohistory.org/preserve/state-historic-preservation-office/hpreviews)
Pennsylvania	Pennsylvania Bureau for Historic Preservation (http://www.phmc.pa.gov/Preservation/Pages/default.aspx)
New York	New York State Office of Parks, Recreation, and Historic Preservation (http://nysparks.com/shpo/)

Two tribal organizations, the Great Lakes Indian Fish and Wildlife Commission and the Chinnewa Ottawa Resources Authority, manage traditional fishing rights and resources in the Great Lakes. The Great Lakes Indian and Wildlife Commission is an agency of 11 Ojibwe nations in Minnesota, Wisconsin, and Michigan managing traditional fishing rights in Lake Superior for individuals belonging to these nations (GLIFWC 2016). The Chippewa Ottawa Resource Authority manages fishing rights from five different tribal organizations under 1836 Treaties (CORA 2016).

3.3.10 Central Pacific Region

Many tropical islands in the Pacific Ocean are confronted by rapidly growing human populations, but have few economic resources that their residents can use. In addition to supporting island economies, fishing also continues to contribute to the cultural integrity and social cohesion of Pacific island communities (Western Pacific Regional FMC 2009b). In Hawaii, participation in recreational and subsistence fishing represents a substantial proportion of the local population

(estimated at more than 8 percent of Hawaii's population) (State of Hawaii 2005, as cited in Western Pacific Regional FMC 2009c).

The SHPOs for the Central Pacific Region are shown in Table 3-27. The governments of Tonga, New Zealand, Peru, Panama, and Mexico do not have any specifically identified departments that manage cultural resources.

Table 3-27. SHPOs for the Central Pacific Region

State	SHPO Information
Hawaii	State Historic Preservation Division of the Hawaii Department of Land and Natural Resources (http://hawaii.gov/dlnr/hpd/)

3.3.11 Western Pacific Region

The Federated States of Micronesia have traditionally used subsistence farming and fishing practices to meet the needs of the population, although there has more recently been a shift towards a commercial economy (NBSAP 2002). Subsistence fishery landings in Palau (estimated as nearly 1.5 times the amount of commercial fishery landings in 1999) occur throughout the coastal areas and outer islands of the country (FAO 2002). Coastal fisheries in the Marshall Islands are composed principally of small operations in the outer islands that provide benefits to the local community (MIMRA 2013). Fishing in Guam and the CNMI continues to be important not only in terms of contributing to the subsistence needs of the Chamorro people but also in terms of preserving their history and identity. Fishing assists in perpetuating traditional knowledge of marine resources and maritime heritage of the Chamorro culture (WPRFMC 2009b). In American Samoa, fishery types include a shoreline subsistence fishery, an artisanal fishery for offshore pelagic fishes, an artisanal fishery for offshore bottomfish, and a recreational tournament fishery (WPRFMC 2009a).

The SHPOs for the Western Pacific Region are shown in Table 3-28. The governments of the Cook Islands, New Guinea, Solomon Islands, and Fiji do not have any specifically identified departments that manage cultural resources.

Table 3-28. SHPOs for the Western Pacific Region

Territory/ Country	SHPO Information
Federated States of Micronesia	Office of National Archives, Culture, and Historic Preservations
Republic of Palau	Ministry of Community & Cultural Affairs (http://palaugov.pw/executive-branch/ministries/community/)
CNMI	Department of Community and Cultural Affairs, Division and Historic Preservation (http://www.cnmihpo.net/)
Guam	Guam Historic Resources Division (http://historicguam.org/about.htm)
American Samoa	American Samoa Historic Preservation Office (http://ashpo.org/)
Republic of the Marshall Islands	Marshall Islands Historic Preservation Office (http://www.rmihpo.com/)

3.3.12 Gulf of Alaska Region

Federal and Alaska law define subsistence as the customary and traditional uses of wild resources for food, clothing, fuel, transportation, construction, art, crafts, sharing, and customary trade. Alaska holds exclusive authority to manage subsistence on lands and waters on state and private property in Alaska, including some marine waters in the state (ADFG 2016). Most marine waters under federal jurisdiction for subsistence are located in southwest Alaska and along the Alaska Peninsula. The federal subsistence priority means that subsistence uses by rural residents are accorded priority over non-subsistence uses (commercial or sport).

Alaska state law directs the Board of Game and Board of Fisheries to provide a reasonable opportunity for subsistence uses first, before providing for other uses of any harvestable surplus of a fish or game population. This is often referred to as the "subsistence preference" or sometimes the "subsistence priority" (ADFG 2016). Subsistence uses are central to the customs and traditions of many native groups in Alaska, including Aleut, Athabaskan, Alutiiq, Euromamerican, Haida, Inupiat, Tlingit, Tsimshian, and Yup'ik (ADFG 2016).

Subsistence fishing and hunting are important sources of employment and nutrition in almost all rural coastal communities. Of 129 coastal towns, not including boroughs, 108 participate in the subsistence lifestyle for traditional lifestyle, nourishment, sociocultural, and/or economic purposes. Ninety-five percent of rural households consume subsistence-caught fish (NOAA 2005). Fish varieties include salmon, halibut, herring, and whitefish. Seals; sea lions; walruses; beluga and bowhead whales; and sea otters comprise the marine mammal harvest. The subsistence

food harvest in rural areas represents about 2 percent of the fish and game harvested annually in Alaska (NOAA 2005).

The SHPO for the Gulf of Alaska Region is the Alaska SHPO (http://dnr.alaska.gov/parks/oha/shpo/shpo.htm).

3.3.13 Northwest Region

There are more than 30 federally-recognized tribes with recognized treaty/tribal fishing rights in the Northwest Region (NOAA Fisheries 2011). The Olympic Coast National Marine Sanctuary on the coast of Washington is entirely encompassed by the traditional harvest areas of the Hoh, Makah, and Quileute tribes, and the Quinault Indian Nation. As sovereign nations, the tribes have treaty fishing rights and co-management responsibilities with the State of Washington for fishery resources and fishing activities within the sanctuary (NOS 2013b). Tribal interest and management authority extends beyond reservation boundaries to include the Usual and Accustomed fishing areas, as defined for each tribe in *United States v. State of Washington*, 384 F. Supp. 312 (W. Dist Wash. 1974). The Hoh, Makah, and Quileute tribes, the Quinault Indian Nation, the state of Washington, and the NOAA Office of National Marine Sanctuaries created the Olympic Coast Intergovernmental Policy Council in 2007, which provides a regional forum for resource managers to exchange information, coordinate policies, and develop recommendations for resource management within the sanctuary (NOS 2013b). Additionally, the Northwest Indian Fisheries Commission provides natural resources management support for 20 treaty Indian tribes in western Washington (NWIFC 2016).

The SHPOs for the Northwest Region are shown in Table 3-29.

Table 3-29. SHPOs for the Northwest Region

State	SHPO Information
Washington	Washington Department of Archaeology and Historic Preservation (http://www.dahp.wa.gov/)
Oregon	Oregon Parks and Recreation Department, Heritage Programs, SHPO (http://www.oregon.gov/OPRD/HCD/SHPO/)
California	California State Parks, Office of Historic Preservation (http://ohp.parks.ca.gov/?page_id=21755)

3.3.14 California Region

The SHPO for the California Region is the California State Parks, Office of Historic Preservation (http://ohp.parks.ca.gov/?page_id=21755).

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4. ENVIRONMENTAL CONSEQUENCES

This section describes the possible impacts on existing environmental conditions within the NDBC Program areas. Based upon a preliminary analysis of the potential impacts of the proposed activities associated with the installation and subsequent O&M of proposed NDBC assets, some resource areas typically analyzed in an EA are not addressed in this PEA because impacts to these resource areas are considered unlikely. These resource areas include air quality; climate; recreation resources; land use; aesthetics and visual resources; and human health and safety. Accordingly, the discussion of the affected environment and associated environmental impact analyses focuses on marine and terrestrial physical resources, including geology and water quality; marine and terrestrial biological resources; and traditional cultural resources.

IMPACT ASSESSMENT METHODOLOGY

For the purposes of this PEA, the evaluation criteria for potential impacts to physical, biological, and traditional cultural resources from the implementation of the Proposed Action are described in Table 4-1. The evaluation criteria include the type, intensity, and duration of potential impacts. Additionally, impacts are described in terms of whether they are a direct or indirect result of the Proposed Action. *Direct impacts* would be an immediate result of project-related activities (e.g., direct mortality of species or removal of vegetation and habitat) and may be either temporary (reversible) or permanent (irreversible). Most direct impacts are confined to the project footprint, but some (e.g., noise) may extend beyond the project boundary. Indirect impacts would be spatially removed from project-related activities, or occur later in time, but are reasonably certain to occur. Indirect impacts tend to be diffuse, resource-specific, and less amenable to quantification or mapping than direct impacts.

Table 4-1. Evaluation Criteria for Analyzing Potential Environmental Impacts

Type	
Beneficial	The impact would result in some level of environmental improvement.
Adverse	The impact would result in some level of environmental degradation.
Intensity	
Negligible	No impact to resources or the impact would be at or below levels of detection.
Minor	A detectable change to resources; however, the impact would be small, localized, and of little consequence.
Moderate	A readily apparent change to the human environment, which would not be major.
Major	A substantial change to the character of the resource over a large area.
Duration	
Short-term	Occurs only during the period of NDBC installation or O&M activities.
Long-term	Continues after the period of NDBC installation or O&M activities.

As discussed in Section 1.3.1, site-specific details regarding the placement of the proposed buoys and C-MAN stations are not known at this time. Therefore, the following impact analysis provides a programmatic assessment based on the installation of these resources and their associated O&M once they are deployed.

4.1 PROPOSED ACTION

4.1.1 Physical Resources

4.1.1.1 Geological Resources

Facility-based Operations

NDBC operations at Stennis Space Center would continue as currently implemented and additional facilities would be constructed or renovated to support future operations as the needs arise. Manufacturing and testing of new buoys and C-MAN stations would occur in existing facilities; therefore, short-term, negligible, adverse impacts on geological resources would be expected. If additional facilities were constructed or renovated in the future, a tiered environmental analysis would be completed once the project details have been determined.

Marine and Coastal Operations

Buoy Deployment Operations

Under the Proposed Action, potential impacts to marine geological resources from installation and operation and maintenance of the NDBC buoys would be associated with the placement of mooring anchors and associated sensors or fixed platforms on the seafloor. The placement of these anchors, sensors, and platforms could result in short-term, negligible adverse, impacts on marine geological sediments in the immediate vicinity of the NDBC buoy. Additional negligible impacts on marine geological sediments would be expected if a buoy or instrumentation broke loose from its anchor and disturbed sediments. Therefore, negligible impacts on marine geological resources from implementation of the Proposed Action would be expected. As new buoy locations and project details are determined, a tiered environmental analysis would be completed as necessary.

Prior to deployment, the area would be surveyed for physical features, such as trenches or craters that could affect buoy anchor placement. The anchor would be positioned directly on the seafloor. Anchors for CWBs are approximately 5 feet by 5 feet in diameter and each buoy requires one anchor. The anchor for a CWB covers approximately 25 ft^2 and there are currently 106 CWB anchors for total area of 2,650 ft^2. This total is a minimal area compared to the total area of the ocean floor (140 million mi^2 [362 million km^2]). Therefore, long-term, minor, adverse impacts would be expected from the continued deployment and operation of CWBs.

For the 39 DART buoys currently deployed, the anchors are 3 feet in diameter, covering an area of approximately 7 feet. The BPRs are 3 feet by 4 feet, covering an area of 12 ft^2. Therefore, the equipment for each DART buoy covers approximately 19 ft^2 of seafloor surface for a total area of 741 ft^2. Therefore, long-term, negligible, adverse impacts would be expected from the continued deployment and operation of DART buoys.

Buoys in the Great Lakes Region are deployed and recovered every year prior to the winter freeze of the lakes. The redeployment of buoys in the Great Lakes Region would occur in the same general location of the previously recovered buoy. Therefore, redeployment of these buoys would result in short and long-term, negligible to minor, adverse impacts on marine geological resources.

Vessels may be owned and operated by a variety of entities (i.e., NOAA or privately owned). The type of vessel used depends on the type of action and agreement between NDBC and the vessel owner. Short-term, negligible adverse impacts on marine geological resources would be expected if a vessel accidentally runs aground during deployment activities. If a vessel is required to use an anchor during deployment, short-term, negligible, adverse impacts on marine geological resources would be expected.

Improvements to NDBC Moorings

Under the Proposed Action, NDBC would seek improvements in mooring materials and mooring design concepts as new technologies are developed. These improvements, when implemented, have the potential to reduce the number of adrift events, which can reduce the amount of mooring material left behind and reduces the need for replacing mooring materials. Therefore, by improving the buoy moorings short- and long-term, moderate, beneficial impacts on geological resources would expected by limiting the amount of seafloor disturbance.

At-sea Mooring Recovery Operations

Long-term, minor, beneficial impacts on geological resources would be expected from the use of acoustic releases and line cutters on mooring equipment. Using acoustic releases to remove the mooring ropes, chains, or wires from the ocean it eliminates the potential adverse impacts that would arise from disturbing geological resources on the seafloor during mooring line scuttling. Once the mooring is disconnected, the anchor is abandoned in place. No additional impacts to geological resources would be expected from the abandoned anchor.

Buoy recovery operations in the Great Lakes Region occur every year prior to the winter freeze of the lakes. All buoy components (i.e., anchor, mooring, instruments, and buoy) are removed from the water. The recovery operation of these buoys would result in short-term, negligible, adverse impacts on marine geological resources.

Improved Adrift Buoy Recovery Operations

Short-term, negligible, adverse impacts on marine geological sediments would be expected if a buoy or instrumentation broke loose from its anchor and caused sediments disturbance. However, short- and long-term, minor to moderate, beneficial impacts on geological resources would be expected by improving the response times in recovering buoys. When a buoy is adrift, the mooring chains or other remaining components can drag along the seafloor if the length of the remaining mooring is greater than the encountered depth and disturb marine sediments, which, increases turbidity in the immediate area and alters seafloor habitat.

Improvements to Prevent the Fouling of Buoy Hulls and the Transport of Aquatic Invasive Species

No impacts on marine geological resources would be expected from improvements to preventing biofouling of buoy hulls.

Improvements for Establishing or Relocating C-MAN Stations

No impacts on marine geological resources would be expected from the establishing or relocating a C-MAN station to an existing structure (e.g., lighthouse, tower). However, if the C-MAN station were not installed on an existing structure, approximately 16 ft^2 of ground disturbance would be expected from the installation of a tower. Short-term, minor, adverse impacts on geological resources would be expected during installation activities from the use of vehicles and equipment. The installation of a C-MAN station in a previously undisturbed area would result in long-term, minor, adverse impacts on soils.

4.1.1.2 Water Quality

Facility-based Operations

NDBC operations at Stennis Space Center would continue as currently implemented and additional facilities would be constructed or renovated to support future operations as the needs arise. Short-term, negligible, adverse impacts on water quality would be expected during construction of additional facilities. Manufacturing and testing of new buoys and C-MAN stations would occur in existing facilities and therefore, no adverse impacts on water quality would be expected from continued operations. If additional facilities were constructed or renovated in the future, a tiered environmental analysis would be completed once the project details have been determined.

Marine and Coastal Operations

Buoy Deployment Operations

Under the Proposed Action, small-scale increases in turbidity could occur from the installation of sensors and moorings and the operation and maintenance of the mooring anchors and BPRs on the seafloor. Increases in turbidity from anchor placement would result in short-term, localized, minor, adverse impacts during installation activities. However, sediments would disperse or settle back to the seafloor following disturbance. Coarse sediments (i.e., sand) would resettle within seconds in the immediate area, whereas fine sediments (i.e., silt or clay) would tend to drift and remain in suspension for minutes to hours, depending on particle sizes and bottom currents. The installation of buoys would not alter currents or circulation regimes. Therefore, the short-term increase in suspended sediment concentrations and turbidity levels from the implementation of the Proposed Action would be expected to result in short-term, negligible, adverse impacts on marine water quality.

Marine vessels would be used to deploy, operate, and maintain NDBC buoys. Short-term, negligible, adverse impacts on water quality would be expected from accidental vessel discharge, spills, or ballast/bilge water discharge during deployment or maintenance activities. However, vessels would be operated according to applicable laws and regulations that restrict onboard hazardous material use and the discharge of bilge water.

To measure changes and variability in the chemical, biological, and geological processes in the ocean, NDBC uses a variety of oceanographic sensors. These sensors would be deployed from buoys and their associated moorings. No impacts on marine water resources would be expected from the operation of the oceanographic sensors as they passively collect data from the water column (e.g., salinity and water temperature).

Long-term, moderate, beneficial impacts on water quality would be expected from the data obtained via buoys. The meteorological and oceanographic observations collected provides much needed data used to help predict weather events, such as El Niño and La Niña; and monitor evaporation, water currents and movement, weather patterns, and surface winds. Without this data, scientists and meteorologists would be unable to predict and warn residents of potential major weather events (e.g., hurricanes, tsunamis).

Under the Proposed Action, NDBC buoys and its associated sensors would not be expected to introduce any materials or substances into the marine environment that would adversely affect marine water quality. A potential source of hazardous materials contamination could be the unanticipated spill or discharge of fuel, lubricants, or sensor components (e.g., batteries) from a vessel or associated NDBC equipment and sensors. However, such spills are unlikely to occur because the installation, operation, and maintenance activities would be compliant with existing federal, state, and research vessel owner/operator requirements regarding hazardous materials and waste management (UNOLS 2009). If a spill did occur, vessels would adhere to Section 311 of the CWA regarding the containment, cleanup, and reporting of spills to ensure that the impacts would be minimized. Therefore, short- and long-term, negligible, adverse impacts on marine water quality would be expected from the implementation of the Proposed Action. Additionally, potential spills associated with NDBC buoys, sensors, and associated equipment would be negligible in comparison with other large-scale industrial ocean activities.

Improvements to NDBC Moorings

Under the Proposed Action, NDBC would seek improvements in mooring materials and mooring design concepts as new technologies are developed. These improvements, when implemented, have the potential to reduce the number of adrift events, which can reduce the amount of mooring material left behind and reduces the need for replacing mooring materials. Adrift buoys would be expected to have short-term, minor, adverse impacts on water quality if a buoy or instrumentation broke loose from its anchor and disturbed sediments. Therefore, by improving the buoy moorings short- and long-term, moderate, beneficial impacts on water resources would expected by limiting the amount of seafloor disturbance and increased turbidity.

At-sea Mooring Recovery Operations

The use of acoustic releases for the removal of the mooring equipment would have short-term, negligible, adverse impacts on marine water quality at the affected locations. There would be a short-term negligible increase in suspended sediment concentrations and turbidity levels from the implementation of acoustic releases and removal of the mooring. Additional short-term, minor, beneficial impacts on water quality would be expected from the use of acoustic releases by not dropping the entire mooring line to the seafloor, which increases turbidity.

Buoy recovery operations in the Great Lakes Region occur every year prior to the winter freeze of the lakes. All buoy components (i.e., anchor, mooring, instruments, and buoy) are removed from the water. The recovery operation of these buoys would result in short-term, negligible, adverse impacts on water quality from the increased turbidity.

Improved Adrift Buoy Recovery Operations

When a buoy is adrift, the mooring chains can drag along the seafloor and disturb marine sediments, which, increases turbidity in the immediate area. Therefore, short- and long-term, minor to moderate, beneficial impacts on water quality would be expected by improving the response times in recovering buoys and therefore limiting the amount of disturbed sediments.

Improvements to Prevent the Fouling of Buoy Hulls and the Transport of Aquatic Invasive Species

Short and long-term, minor to moderate, beneficial impacts on water quality would be expected from improving biofouling procedures of buoy hulls. Once a buoy hull is removed from the water, it is cleaned prior to transferring it to a new location. Scraping and pressure washing the hull removes any biological species that were attached to the buoy, which are returned to the water to prevent the spread of species to other areas. Short-term, negligible, adverse impacts on water quality would be expected from the cleaning process (i.e., water washed off the vessel). Long-term, minor, beneficial impacts on water quality would be expected by preventing the spread of biological species to new habitats.

Marine vessels would be used to deploy, operate, and maintain NDBC buoys. Short-term, negligible, adverse impacts on water quality would be expected from accidental vessel discharge, spills, or ballast/bilge water discharge during maintenance activities. However, vessels would be operated according to applicable laws and regulations that restrict onboard hazardous material use and the discharge of bilge water.

Improvements for Establishing or Relocating C-MAN Stations

Some C-MAN stations are installed on existing towers in the ocean; therefore, short-term, negligible, adverse impacts on water quality would be expected from the installation, operation, and maintenance of these stations and sensors. Marine vessels would be used to access the C-MAN station and would be operated according to applicable laws and regulations that restrict onboard hazardous material use and the discharge of bilge water. Short-term, negligible, adverse impacts on water quality would be expected from accidental vessel discharge, spills, or ballast/bilge water discharge during deployment or maintenance activities.

4.1.2 Biological Resources

4.1.2.1 Terrestrial Biological Resources

Facility-based Operations

NDBC operations at Stennis Space Center would continue as currently implemented and additional facilities would be constructed or renovated to support future operations as the needs arise. Manufacturing and testing of new buoys and C-MAN stations would occur in existing facilities and therefore, short- and long-term, negligible, adverse impacts on terrestrial biological resources (i.e., plants, native species, and habitats) would be expected. Long-term, negligible, adverse impacts on terrestrial biological resources would be expected from continued operations. If additional facilities were constructed or renovated in the future, a tiered environmental analysis would be completed once the project details have been determined.

4.1.2.2 Marine Biological Resources

Marine and Coastal Operations

Buoy Deployment Operations

Marine vessels would be used to deploy, operate, and maintain NDBC buoys. The vessels used would be similar to vessels already in use; therefore, no additional adverse impacts on marine biological resources would be expected. The equipment used during deployment would be used for a short time period and then removed from the water once complete. Short-term, negligible adverse impacts on marine mammals would be expected from potential vessel strikes during deployment and maintenance activities. Prior to deployment of a buoy, the area would be surveyed by a biological monitor for the presence of threatened or endangered species. If species are present within the area, deployment would not take place until the species have vacated the area.

Placement of moorings and anchors could have the potential to affect benthic communities if non-mobile species are crushed and benthic area is no longer productive; however, these impacts would be avoided to the maximum extent possible. Once a location for a new buoy and its associated mooring and anchor has been identified, additional site-specific environmental documentation (e.g., CE Memorandum, tiered site-specific EA) would be completed, if necessary, prior to installation to assess the potential site-specific impacts on marine biological resources.

To measure changes and variability in the chemical, biological, and geological processes in the ocean, NDBC uses a variety of oceanographic sensors. These sensors would be deployed from buoys and their associated moorings. No impacts would be expected from the operation of the oceanographic sensors on marine biological resources as they passively collect data from the water column (e.g., salinity and water temperature).

Currently there are six buoys operated in NMSs (3 buoys in the Northwest Region and 3 buoys in the California Region). These buoys are operated under a permit through the NOAA Office of National Marine Sanctuaries (see Appendix D). Operation and maintenance of buoys within NMSs would be in compliance with the permitted activities included in the permit and would not be expected to result in additional adverse impacts. If a new buoy would be sited in an MPA, NOAA NMS, or a national park, consultation with, and permits from the appropriate agency would be completed prior to infrastructure deployment.

Entanglement of marine species with mooring lines (i.e., lines connecting the topside buoy to the anchor) in the water column is considered highly unlikely due to the ability of marine species to detect and avoid the mooring lines. Additionally, the mooring cables for DART and TAO buoys are taut (approximately two to three percent less than the height of the water column) to eliminate the slack that causes entanglement. Therefore, long-term, negligible to minor, adverse impacts to marine mammals would be expected from the potential for entanglement.

Based on observations of underwater cables (ONR 2001; Navy 2004; Dollar and Brock 2006), the cables, anchors, and scientific sensors would be covered with marine growth or buried by sand. The presence of cables and other man-made structures may enhance the physical complexity of marine habitats and provide settling or sheltering locations for marine organisms, which would result in a long-term, minor, beneficial impact. No long-term adverse impacts on marine biological

resources or critical habitat would be expected from the installation of proposed mooring anchors on the seafloor (NOAA 2008).

Essential Fish Habitat. Under the provisions of MSFCMA, federal agencies must consult with NMFS prior to authorizing, funding, or undertaking any actions that may adversely affect EFH. Correspondence with NOAA Fisheries, Office of Habitat Conservation would be initiated prior to any proposed buoy deployment operation. All designated EFH must be considered when determining the potential effects of a Proposed Action on EFH. Effects on EFH could include temporary disturbance of the substrate, and long-term coverage of relatively small areas of substrate by proposed mooring anchors and scientific sensors. Although site-specific locations of proposed buoys and associated moorings and anchors are unknown at this time, short-term, negligible, adverse effects on EFH would be expected from the installation of moorings and associated anchors.

Over time, the natural movement of sediments by ocean currents and burrowing organisms would reestablish natural bottom topography. The short-term minor increase in turbidity and sedimentation would not be expected to adversely affect the ability of EFH to support healthy fish populations and affected areas are expected to recover quickly. The site-specific placement of anchors and moorings would avoid sensitive habitats (e.g., corals, rocky outcrops, or HAPCs). Through best management practices (BMPs) and mitigation measures (see Section 4.4), regular operation and maintenance activities of NDBC buoys would have effects on EFH similar to those that occur during installation. Due to the small footprint of the buoy's anchor and the preference for anchoring away from submerged aquatic vegetation and hard bottom habitats, long-term negligible adverse impacts from mooring activity on the quality or quantity of EFH would not be expected. Therefore, negligible adverse effects on EFH would be expected from the deployment, operation, and maintenance of the proposed NDBC buoys.

Improvements to NDBC Moorings

Currently, the mooring cables for DART and TAO buoys are taut and CWBs have slack moorings. Under the Proposed Action, NDBC would implement design improvements for moorings that would further reduce the potential for marine mammal entanglement. Therefore, long-term, negligible adverse impacts on marine mammals would expected from the potential for entanglement.

Additionally, these mooring design improvements have the potential to reduce the number of adrift events, which can reduce the amount of mooring material left behind and reduces the need for replacing mooring materials. An adrift buoy creates a hazard (e.g., dragging mooring lines) and could potentially destroy marine habitats, which indirectly cause minor to moderate adverse impacts on marine species. Therefore, by improving the buoy moorings, short- and long-term moderate beneficial impacts on marine biological species would expected by limiting the amount of seafloor and habitat disturbance.

At-sea Mooring Recovery Operations

The presence of cables and other man-made structures might enhance the physical complexity of the marine habitats and provide settling or sheltering locations for marine organisms. By using acoustic releases to retrieve mooring lines and chains it would eliminate this potential habitat;

therefore long-term, minor, adverse impacts would be expected. Once the mooring is disconnected, the anchor would be abandoned in place. Long-term, moderate, beneficial impacts would be expected from additional habitat that is provided by the anchor.

Buoy recovery operations in the Great Lakes Region occur every year prior to the winter freeze of the lakes. All buoy components (i.e., anchor, mooring, instruments, and buoy) are removed from the water. The recovery operation of these buoys would result in short-term, negligible to minor, adverse impacts on marine biological resources would be expected from the removal of potential habitat provided by the anchor.

Improved Adrift Buoy Recovery Operations

Short- and long-term, minor to moderate, adverse impacts on marine biological resources would be expected if a buoy or instrumentation broke loose from its anchor and disturbed sediments. When a buoy is adrift, the mooring chains can drag along the seafloor and disturb or destroy seafloor habitats, coral reef, or critical habitat. If a coral reef is struck by a mooring chain or line from an adrift buoy, the coral polyps will break off and eventually die. Coral reef systems are a vital part of the ocean ecosystem and provide food and shelter for many marine species. Coral regrowth is a very slow process – less than 1 inch per year – so recovery of the coral reef system takes many years (Smithsonian 2016). Therefore, short- and long-term, minor to moderate, beneficial impacts on marine biological resources would be expected by improving the response times in recovering buoys.

Improvements to Prevent the Fouling of Buoy Hulls and the Transport of Aquatic Invasive Species

Short- and long-term, moderate, beneficial impacts on marine biological resources would be expected from improving the NDBC process of buoy hull cleaning to prevent the spread of non-native or invasive species to other areas. Short- and long-term, minor, adverse impacts on native aquatic species would be expected from buoy hull cleaning by removing the potential habitat that the buoy hull provides.

Improvements for Establishing or Relocating C-MAN Stations

Short-term, negligible, adverse impacts on marine biological resources would be expected from maintenance activities of aquatic based C-MAN stations. Vessels used for deployment and maintenance activities on C-MAN stations on offshore platforms or structures would be similar to vessels already in use. Short-term, negligible, adverse impacts on marine mammals would be expected from potential vessel strikes during deployment and maintenance activities. Additional short-term, negligible, adverse impacts on marine species would be expected from accidental vessel discharge, spills, or ballast/bilge water discharge during deployment or maintenance activities. No impacts on marine biological resources from establishing a terrestrial based C-MAN tower.

4.1.3 Cultural Resources

Facility-based Operations

NDBC operations at Stennis Space Center would continue as currently implemented and additional facilities would be constructed or renovated to support future operations as the needs arise.

Manufacturing and testing of new buoys and C-MAN stations would occur in existing facilities and therefore, no impacts on cultural resources would be expected. If additional facilities were constructed or renovated in the future, a tiered environmental analysis would be completed once the project details have been determined.

Marine and Coastal Operations

NDBC Program activities cover a variety of locations and environmental conditions. Given that site-specific project locations are unknown at this time, a programmatic discussion of cultural resources was developed. Letters notifying each potentially affected SHPO have been sent to notify them of the nature of the NDBC activities (see Appendix C). Since specific locations are not known, consultation under Section 106 of the NHPA is not possible at this time. Prior to the installation or deployment of NDBC assets, a tiered NEPA analysis would be completed, if necessary, to address specific project areas.

Buoy Deployment Operations

Prior to deploying a NDBC buoy in state, territorial, or federal waters, NDBC would consult with the appropriate SHPO to ensure that their ocean observing activities do not adversely affect any traditional cultural resources. A site-specific evaluation of potential impacts on cultural resources would be completed, if necessary, prior to any infrastructure installation as a part of the tiered analysis. Additionally, prior to buoy deployment, the area would be surveyed for shipwrecks or other cultural resources. If the area is within state waters, coordination with the state SHPO would be also completed. Previously identified shipwrecks or other cultural resources would be avoided to the maximum extent practicable.

Prior to deployment of any buoys within tribal boundaries or usual and accustomed fishing areas, NDBC would initiate a consultation with affected tribes or tribal nations under Section 106 of the NHPA and consistent with EO 13175. NDBC would obtain information from affected tribes or tribal nations on proposed buoy and C-MAN locations and tribal fishing regulations in order to avoid disruption of tribal fishing patterns. Therefore, implementation of the Proposed Action would result in short- and long-term, negligible, adverse effects on traditional cultural resources and fishing rights.

Improvements to NDBC Moorings

Under the Proposed Action, NDBC would seek design improvements in mooring materials and mooring design concepts as new technologies are developed. These improvements, when implemented, have the potential to reduce the number of adrift events, which can reduce the amount of mooring material left behind and reduces the need for replacing mooring materials. An adrift buoy creates a hazard (e.g., dragging mooring lines) and could potentially damage or destroy submerged cultural resources (i.e., shipwrecks). Therefore, by improving moorings, short- and long-term, moderate, beneficial impacts on cultural resources would expected by limiting the amount of seafloor disturbance from dragging mooring lines.

At-sea Mooring Recovery Operations

Short-and long-term, negligible to minor, beneficial impacts on cultural resources would be expected from the use of acoustic releases and line cutters on mooring equipment. Without the

use of line cutters and acoustic releases, the mooring lines would be released from the water surface and scuttled to the seafloor. Scuttled mooring lines have the potential to hit and damage a submerged cultural resource if it is in proximity to the buoy.

Improved Adrift Buoy Recovery Operations

Short-term, negligible, adverse impacts on submerged cultural resources would be expected if a buoy or instrumentation broke loose from its anchor and caused damage to a shipwreck. When a buoy is adrift, the remaining mooring components can drag along the seafloor and could damage shipwrecks. However, short- and long-term, minor to moderate, beneficial impacts on cultural resources would be expected by improving the response times in recovering buoys.

Improvements to Prevent the Fouling of Buoy Hulls and the Transport of Aquatic Invasive Species

No impacts on cultural resources would be expected from improvements to preventing biofouling of buoy hulls and the transport of aquatic invasive species.

Improvements for Establishing or Relocating C-MAN Stations

Under the Proposed Action, NDBC would continue the operation and maintenance of existing C-MAN stations and would deploy new C-MAN stations. No impacts on cultural resources would be expected from establishing a C-MAN station on an existing structure. However if the C-MAN station were not installed on an existing structure, approximately 16 ft^2 of ground disturbance would be expected from the installation of a tower. Consultation with SHPOs and Federally recognized tribes would be completed to avoid impacts to buried, archaeological resources in areas where digging is required to install new C-MAN towers. If cultural resources are identified during C-MAN installation activities, the SHPO and appropriate stakeholders would be notified and consulted with to determine the necessary course of action. However, if an archaeological resource is disturbed, long-term, minor, adverse impacts on cultural resources would be expected from the localized disturbance.

4.2 NO ACTION ALTERNATIVE

Facility-based Operations

Under the No Action Alternative, NDBC operations at Stennis Space Center would remain unchanged as currently operated and additional facilities would not be constructed or renovated in the future. Therefore, existing conditions would continue and there would be no impact to physical, biological, or cultural resources.

Marine and Coastal Operations

Under the No Action Alternative, NDBC would not deploy any new buoys. The buoys that are currently deployed would remain at sea and would continue to be operated and maintained. If a buoy became adrift, it would be recovered when operationally practicable and would not be replaced. Without the deployment of new buoys and C-MAN stations, short- and long-term, moderate, adverse impacts on the various stakeholder groups would be expected from the lack of data and continued research. Additional short- and long-term, minor to moderate, adverse impacts would also be expected if an adrift buoy no longer transmits valuable data.

The continued research that supports the prediction of tsunamis, hurricanes, and other large weather events would not be further developed. Therefore, short- and long-term, adverse, minor, indirect impacts would be expected from the potential loss of life and property damage from these large weather events.

Buoy Deployment Operations, Improvements to NDBC Moorings, At-sea Mooring Recovery Operations, and Improved Adrift Buoy Recovery Operations

Under the No Action Alternative, buoys in the Great Lakes Region would continue to be deployed and recovered every year prior to the winter freeze of the lakes. The redeployment of buoys in the Great Lakes Region would occur in the same general location of the previously recovered buoy. Therefore, redeployment of these buoys would result in short and long-term, negligible to minor, adverse impacts on marine geological resources, water quality, and biological resources. The recovery operation of these buoys would result in short-term, negligible to minor, adverse impacts on marine geological and biological resources. No additional buoy deployment or mooring improvements would occur under the No Action Alternative; therefore, no impacts would be expected from the buoys located at-sea.

Under the No Action Alternative, adrift buoys would be recovered when operationally practicable. Adrift buoys and their associated moorings, which are dragged along the seafloor, pose navigational risks and environmental risks to sensitive and protected marine areas, habitat, and marine life. Short- and long-term, minor to moderate, adverse impacts on geological resources, water quality, marine biological resources, and cultural resources would be expected from adrift buoys remaining at sea for longer period.

Improvements to Prevent the Fouling of Buoy Hulls

Under the No Action Alternative, adrift buoys would be recovered when operationally practicable. If a buoy became untethered from its mooring and was adrift, non-native species attached to a buoy could be transferred to a different area of the ocean. Therefore, short- and long-term, minor, adverse impacts on biological resources and short-term negligible adverse impacts on water quality would be expected from the buoy remaining adrift for a longer period. No impacts on geological or cultural resources would be expected.

Improvements for Establishing or Relocating C-MAN Stations

Under the No Action Alternative, C-MAN stations would continue to be maintained, however no new C-MAN stations would be deployed. Similar to the NDBC buoy network, short- and long-term, moderate, adverse impacts on various stakeholder groups would be expected from this lack of data. No additional short- or long-term, adverse impacts would be expected from abandoning the C-MAN stations and sensors in place.

4.3 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

As site-specific projects are planned, appropriate monitoring measures would be proposed as part of the design, deployment, and maintenance activities. Site-specific monitoring efforts would be more fully described in the appropriate tiered NEPA document (e.g., tiered site-specific EA, CE Memorandum, etc.). Appropriate potential monitoring and mitigation measures would be implemented at the site-specific stage through consultation with federal and state agencies,

adherence to federal/state/local regulations, and development and implementation of environmental management plans and BMPs. All vessels operating in support of NDBC projects would be required to follow vessel owner/operator BMPs during deployment and maintenance activities. Prior to deployment of a buoy which would have the potential for marine geological, cultural, or biological impacts (e.g., dropping mooring anchors), NDBC personnel or vessel crew would survey the bottom to assure that the mooring and anchor are not sited in an area such that adverse impacts could occur (e.g., adverse impacts to submerged aquatic vegetation, EFH, shipwrecks). Additionally, NDBC would consult and file permits, as appropriate, with federal, state and tribal agencies prior to deploying a NDBC buoy or C-MAN station.

4.4 SUMMARY OF POTENTIAL IMPACTS

Table 4-2 provides a summary of the potential impacts from the deployment and maintenance activities associated with the Proposed Action and the No Action Alternative.

Table 4-2. Summary of Potential Impacts on Resources from the Proposed Alternatives of the NDBC Program

	Proposed Action	No Action Alternative
Physical Resources		
Facility-based Operations	Short-term, negligible, adverse impacts on geological resources and water quality if additional buildings are required.	Environmental baseline conditions would remain unchanged and no impacts would be expected on geological resources or water quality.
Buoy Deployment Operations	Short- and long-term, negligible to minor, adverse impacts on geological resources. Short-term, negligible to minor, adverse impacts and long-term, moderate, beneficial impacts on water quality.	Environmental baseline conditions would remain unchanged and no impacts would be expected on geological resources or water quality for buoys located in the oceans. However, short and long-term, negligible to minor, adverse impacts on marine geological resources and water quality would be expected from the redeployment of buoys in the Great Lakes.
Improvements to NDBC Moorings	Short- and long-term, moderate, beneficial impacts on geological resources and water quality.	Short- and long-term, minor to moderate, adverse impacts on geological resources and water quality.

	Proposed Action	**No Action Alternative**
At-sea Mooring Recovery Operations	Long-term, minor, beneficial impacts on geological resources. Short-term, negligible, adverse and minor, beneficial impacts on water quality.	Environmental baseline conditions would remain unchanged and no impacts would be expected on geological resources or water quality for buoys located in the oceans. However, short and long-term, negligible to minor, adverse impacts on marine geological resources and water quality would be expected from the annual recovery of buoys in the Great Lakes.
Improved Adrift Buoy Recovery Operations	Short- and long-term, minor to moderate, beneficial impacts on geological resources and water quality.	Short- and long-term, minor to moderate, adverse impacts on geological resources and water quality.
Improvements to Prevent the Fouling of Buoy Hulls	No impacts on geological resources. Short and long-term, minor to moderate, beneficial impacts and short-term, negligible, adverse impacts on water quality.	Short-term, negligible, adverse impacts on water quality. Environmental baseline conditions would remain unchanged and there would no impacts would be expected on geological resources.
Improvements for Establishing or Relocating C-MAN Stations	No impacts on marine geological resources. Short-term, negligible, adverse impacts on water quality from installing C-MAN stations on existing structures. Short- and long-term, minor, adverse impacts on terrestrial geological resources from establishing a new C-MAN tower.	Environmental baseline conditions would remain unchanged and no impacts would be expected on geological resources or water quality.
Biological Resources		
Facility-based Operations	Short- and long-term, negligible, adverse impacts on terrestrial biological resources if additional buildings are required.	Environmental baseline conditions would remain unchanged and no impacts would be expected on biological resources.

	Proposed Action	No Action Alternative
Buoy Deployment Operations	Short- and long-term, negligible to minor, adverse impacts on marine mammals. No long-term adverse impacts on marine biological resources or critical habitat. Short-term, negligible, adverse effects on EFH. No impacts from oceanographic sensors on marine biological resources.	Short- and long-term, minor to moderate, adverse impacts on biological resources. Short and long-term, negligible to minor, adverse impacts on biological resources would be expected from the redeployment of buoys in the Great Lakes.
Improvements to NDBC Moorings	Long-term, negligible adverse impacts on marine mammals from potential entanglement. Short- and long-term, moderate, beneficial impacts on marine biological species from improving buoy moorings.	Short- and long-term, minor to moderate, adverse impacts on biological resources.
At-sea Mooring Recovery Operations	Long-term, minor, adverse and long-term, moderate, beneficial impacts on marine biological species.	Short- and long-term, minor to moderate, adverse impacts on biological resources. Short and long-term, negligible to minor, adverse impacts on biological resources would be expected from the annual recovery of buoys in the Great Lakes.
Improved Adrift Buoy Recovery Operations	Short- and long-term, moderate, beneficial impacts on marine biological resources. Short- and long-term, minor, adverse impacts on native aquatic species.	Short- and long-term, minor to moderate, adverse impacts on biological resources.
Improvements to Prevent the Fouling of Buoy Hulls	Short- and long-term, moderate, beneficial impacts on marine biological resources.	Short- and long-term, minor, adverse impacts on biological resources.
Improvements for Establishing or Relocating C-MAN Stations	No impacts on marine biological resources from establishing a terrestrial based C-MAN tower. Short-term, negligible, adverse impacts on marine mammals from installing C-MAN stations on existing structures.	Environmental baseline conditions would remain unchanged and no impacts would be expected on biological resources.

	Proposed Action	No Action Alternative
	Cultural Resources	
Facility-based Operations	No impacts on cultural resources.	Environmental baseline conditions would remain unchanged and no impacts would be expected on cultural resources.
Buoy Deployment Operations	Short- and long-term, negligible, adverse impacts on cultural resources.	Short- and long-term, minor to moderate, adverse impacts on cultural resources.
Improvements to NDBC Moorings	Short- and long-term, moderate, beneficial impacts on cultural resources.	Short- and long-term, minor to moderate, adverse impacts on cultural resources.
At-sea Mooring Recovery Operations	Short- and long-term, negligible to minor, beneficial impacts on cultural resources.	Short- and long-term, minor to moderate, adverse impacts on cultural resources.
Improved Adrift Buoy Recovery Operations	Short- and long-term, minor to moderate, beneficial impacts on cultural resources.	Short- and long-term, minor to moderate, adverse impacts on cultural resources.
Improvements to Prevent the Fouling of Buoy Hulls	No impacts on cultural resources.	No impacts on cultural resources.
Improvements for Establishing or Relocating C-MAN Stations	No impacts on cultural resources from establishing a C-MAN station on an existing structure. Long-term, minor, adverse impacts on cultural resources if an archaeological resource is disturbed.	No impacts on cultural resources.

5. CUMULATIVE IMPACTS

CEQ regulations stipulate that the cumulative impact analysis should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). The first step in assessing cumulative impacts involves identifying and defining the scope of other actions and their interrelationship with the proposed action or alternatives (CEQ 1997). The scope must consider other projects that coincide with the location and timetable of the proposed action and other actions. Cumulative impact analyses evaluate the interactions of multiple actions.

5.1 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

5.1.1 U.S. Integrated Ocean Observing System® Program

NOAA established the U.S. IOOS Program to provide readily accessible marine environmental data and data products in an interoperable, reliable, timely, and user-specified manner to end-users/customers to serve seven critical and expanding societal needs. The IOOS Program is composed of six subsystems that represent a collection of components organized to accomplish a specific function or set of functions: 1) observing systems, (2) data management and communication (DMAC), and (3) modeling and analysis, (4) governance and management, (5) research and development (R&D), and (6) training and education. A Final PEA and signed FONSI were prepared for the IOOS Program in June 2016 stating that expanding and implementing the national network of observing systems would not significantly affect the human environment (NOAA 2016a). Additionally, the IOOS Program operates buoys and equipment that report data directly to NDBC, which contributes to the overall number of deployed technological assets. Impacts associated with those assets would be similar to those associated with NDBC, therefore long-term, negligible to minor, cumulative, adverse impacts would be expected.

5.1.2 National Ocean Policy Implementation Plan

In April 2013, The National Ocean Council published the *National Ocean Policy Implementation Plan*, which describes actions the federal government will take to improve the health of the ocean, coasts, and Great Lakes. These actions include steps that would be taken to further implement NDBC observational and data management components. Actions under this plan may include inventory of IOOS assets and capabilities, and data management integration. NOAA will develop the NDBC Program consistent with the *National Ocean Policy Implementation Plan*. Implementation of the *National Ocean Policy* would not be expected to result in adverse environmental impacts relative to the implementation of the NDBC Program.

5.1.3 Ocean Observatories Initiative

The Ocean Observatories Initiative (OOI) is a long-term program funded by the National Science Foundation (NSF) to provide sustained ocean measurements to study climate variability, ocean circulation and ecosystem dynamics, air-sea exchange, seafloor processes, and plate-scale

geodynamics (WHOI 2011). The OOI consists of a network of observatories across the globe collecting ocean and seafloor data through the deployment of different assets and technologies (i.e., moorings, buoys, sensors, gliders, and autonomous underwater vehicles). Four of the OOI stations off the coasts of Washington and Oregon report data to NDBC.

The OOI complements the broader effort of the NDBC Program and continues to be a contribution to the NDBC Program. The OOI contributes to the overall number of deployed technological assets, but impacts associated with those assets would be similar to those associated with the NDBC Program, therefore long-term, negligible to minor, cumulative, adverse impacts would be expected.

5.1.4 Physical Oceanographic Real-Time Systems (PORTS®)

PORTS® is a program of NOAA's National Ocean Service that integrates real-time environmental observations, forecasts and other geospatial information to improve the safety and efficiency of maritime commerce. The components of a PORTS® system varies by location and is comprised of separate instruments, including water-level gauges and meteorological instruments. There are 29 PORTS® systems operational in the United States as of March 2017, located in the following locations: Cape Cod; Charleston Harbor; Cherry Point; Chesapeake Bay (north); Chesapeake Bay (south); Cuyahoga: Delaware Bay and River; Houston/Galveston; Humboldt Bay; Jacksonville; Lake Charles; Los Angeles/Long Beach; Lower Columbia River; Lower Mississippi River; Mobile Bay; Morgan City; Narragansett Bay; New Haven; New London; New York/New Jersey Harbor; Pascagoula; Port of Anchorage; Sabine Neches; San Francisco Bay; Soo Locks; Tacoma; and Tampa Bay (NOAA NOS 2013).

PORTS® would contribute to the overall number of deployed technological assets, but impacts associated with those assets would be similar to those associated with the NDBC Program; therefore, long-term, negligible to minor, cumulative, adverse impacts would be expected.

5.1.5 Offshore Energy Development

Offshore oil and gas drilling on the U.S. outer continental shelf is managed by the Bureau of Ocean Energy Management (BOEM). Offshore oil drilling currently occurs in four regions: Alaska, Pacific, Gulf of Mexico, and Atlantic (BOEM 2012). Offshore oil and gas drilling has the potential to lead to accidental oil spills that could have severe adverse effects on biological and cultural resources in a particular region, such as the Exxon Valdez oil spill and the Deepwater Horizon oil spill, the two biggest oil spills in U.S. waters.

The Exxon Valdez oil spill occurred in March 1989, when the tanker *Exxon Valdez* ran aground on Bligh Reef in Prince William Sound, spilling approximately 11 million gallons of North Slope crude oil. This oil spill cased injury to both natural resources and services (human uses) in the area. Some 756 km of shoreline were oiled by the spill, and several months later, oil from the spill was found as far as 966 km from the site of the grounding (Exxon 1994).

The Deepwater Horizon oil spill occurred in April 2010, when the mobile drilling unit *Deepwater Horizon* exploded and sank, releasing an approximately 3.19 million barrels (134 million gallons) over an 87-day period. The magnitude of the oil spill was unprecedented, affecting coastal and oceanic ecosystems, as well as resources of ecological, recreational, and commercial importance.

In approximately 4 months, the spill reached coastlines from Texas to Louisiana and stretched over 1,300 miles (NOAA 2016b). In July 2015, the Deepwater Horizon Trustees reached a settlement with BP to pay up $8.8 billion for restoration.

BOEM is also responsible for offshore renewable energy development in Federal waters and has issued eleven offshore commercial wind energy leases. BOEM continues to further offshore energy development by working closely with several states, such as Oregon, California, Hawaii, Maine, Massachusetts, Rhode Island, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida (BOEM undated).

Drilling related to offshore energy development can also affect the local geology and disturb the sea floor. Offshore development of wind and alternative energy may disrupt the biological community in a particular area. Additional adverse impacts on the noise environment from offshore exploration activities would also be expected. Beneficial impacts could include emissions reductions and increased energy security. However, since most technologies are under development these impacts are not fully known. Severity and extent of impacts due to offshore energy development is dependent on the type of activity and magnitude of event.

5.1.6 National and Homeland Security Activities

The U.S. Navy, USCG, and U.S. Customs and Border Protection conduct operations and training exercises within the EEZ to ensure that their security missions are fulfilled. These activities include deployment of surface and subsurface vessels from small craft to large ships. Activities may include high-speed pursuits, live fire actions, underway refueling, and vessel anchoring. These activities have the potential to impact water quality through spills or releases of fuels and lubricants; introduction of munition related contaminants such as, metals and polycyclic aromatic hydrocarbons; impacts to marine mammals, sea turtles, and other protected species through animal strikes or avoidance responses; and impacts to habitat areas and seafloor areas from anchoring and anchor chain sweep. Additional adverse impacts on marine species and recreation from the increased noise of live fire actions would also be expected. Cumulatively, long-term, direct and indirect, minor to moderate, adverse impacts would be expected from the Proposed Action and National and Homeland Security activities. However, all Federal agencies are subject to compliance with all federal requirements to minimize impacts and for the protection of these marine and terrestrial resources.

5.1.7 Commercial Activities

Commercial activities such as fisheries, aquaculture, and marine transport can impact the physical and biological environment. Commercial fishing may cause physical disruption of the seafloor and impact fisheries stocks. Aquaculture facilities may impact seafloor and coastal habitats, water quality, and the biological community. Marine transport activities may cause physical disruption of the seafloor, impact water quality, result in contamination and pollution, and present the potential for oil and fuel spills (NOAA 2011). Marine transport activities present a strike hazard for marine mammals. The number of vessels and size of vessels used for marine transportation has been increasing, resulting in an increased potential for detrimental impacts. The combination of increased number and size of marine vessels may lead to deepening and widening of marine channels, increased number of marine mammal strikes, and possible collisions with buoys and

moorings. Dredging of marine channels and bottom habitats is commonly performed for marine navigation purposes. Dredging can negatively impact bottom surface habitat, sediment placement, water turbidity, and flow regimes in localized areas.

Impacts from commercial activities, such as fisheries, aquaculture, and marine transport, would be short- or long-term, widespread or localized depending on the activity or event causing the impact (NOAA 2011).

5.1.8 Runoff and Waste Disposal

Runoff from residential, industrial, and agricultural sources could have an adverse impact on water quality. Depending on the type of activity, these impacts can be localized or more widespread. Some forest and agricultural activities can lead to erosion, and runoff of fertilizers, pesticides or other chemicals, nutrient increases, and alteration of water flow. Waste disposal and ocean dumping can also decrease water quality, but these impacts may be localized to the dumping site (NOAA 2011). Impacts from NDBC activities would be expected to have negligible adverse impacts on water quality, which may occur in the unlikely event of a spill or discharge from a vessel. Therefore, cumulatively, the impacts from runoff and waste disposal and NDBC activities would be expected to be short-term, negligible to minor, and adverse.

5.1.9 Climate Change

Climate change may have varied adverse impacts on the biological, physical, and cultural resources in coastal and oceanic regions. Impacts from climate change may include rising sea level, changes in water temperature, increased ocean acidification, increases in extreme weather events, changes in climatic patterns, change in ocean currents, and changes in freshwater flow (NOAA 2011). NDBC activities would include the use of vessels and fuels for sampling activities would increase the amount of carbon dioxide released to the atmosphere. However, the purpose of and need for the Proposed Action is to provide a comprehensive, reliable, and sustainable network of in-situ real-time meteorological and oceanographic observations. The negligible impact that would occur from the proposed action would be outweighed by the beneficial impacts on the analysis of climate change.

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7. LIST OF AGENCIES COORDINATED OR CONSULTED WITH

NOAA – National Weather Service

Ms. Vicki Wedell
Office of National Marine Sanctuaries

NOAA – National Marine Fisheries Service (NMFS)

Patricia Montanio, Director
NMFS, Office of Habitat Conservation
Habitat Conservation (F/HC)

Trevor Spradlin, Director
NMFS, Office of Protected Resources
Marine Mammal and Sea Turtle Conservation Division (F/PR2)

Cathy Tortorici, Director
NMFS, Office of Protected Resources
ESA Interagency Coordination Division (F/PRS)

U.S. Fish and Wildlife Service

Bridget Fahey, Chief
USFWS, Division of Conservation and Classification

State Historic Preservation Office

Letters were sent to SHPOs in the following states, territories, and republics:

- Alabama
- Alaska
- American Samoa
- California
- CNMI
- Commonwealth of Puerto Rico
- Connecticut
- Delaware
- Federated States of Micronesia
- Florida
- Guam
- Hawaii
- Illinois
- Indiana
- Louisiana
- Maine
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- New Hampshire
- New Jersey
- New York
- North Carolina
- Ohio
- Oregon
- Pennsylvania
- Republic of Palau
- Republic of the Marshall Islands
- Rhode Island
- South Carolina
- Texas
- US Virgin Islands
- Virginia
- Washington
- Wisconsin

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APPENDIX A

TEMPLATE FOR FIELD SERVICE PLAN AND CRUISE PLAN

Mission			
Station		Date of Service	
Current position:			
Shipping Document #			

Hazardous Atmosphere Testing	
Comments	

Attach an electronic copy of completed Hazardous entry test as an appendix to this report. Original will be entered in the log book.

Mooring :			
Inspection Results			
Portion Replaced		PIP#	
Comments			

Attach corrected copy of mooring diagram as an appendix to this report. If no corrections are needed attach copy and note in comments.

SDR	Description	Corrective Action	SDR Cleared			
			☐	Y	☐	N
			☐	Y	☐	N
			☐	Y	☐	N
			☐	Y	☐	N
			☐	Y	☐	N

If SDR remains open provide reason in general comments section.

General Comments		
Verify system operation with MCC	Departed station:	

Three rounds of ground truth to be completed before departure from station. Provide comments if unable to complete ground truth.

Photographs:	
Format Photographs as: Mission_Station_Description	
Present photographs to Roseann Bork with the initial trip report.	

Special equipment:

Equipment Status:					
Return inventory attached:		☐	Y	☐	N
Stored inventory attached:		☐	Y	☐	N
Status/Location					
Point of Contact					
Fed Ex Label Numbers					
Calgas bottle disposed of properly		☐	Y	☐	NA
Hazardous materials and/or lithium batteries disposed of properly or documented correctly for shipment.		☐	Y	☐	NA

APPENDIX B

CONSULTATION REGARDING BIOLOGICAL RESOURCES

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

Memorandum for: Bridget Fahey, Chief
Division of Conservation and Classification
U.S. Fish and Wildlife Service

From: Helmut H. Portmann, Director
NOAA National Data Buoy Center

Date: August 30, 2017

Subject: Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) Consultation for the NDBC Programmatic Environmental Assessment

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the potential environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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NDBC operates in all U.S. coastal states and territories. At this point in time, the specific locations of future actions have not been identified. As discussed in the Draft PEA, additional review will be conducted for specific actions that may potentially affect marine mammals and sea turtles. At this time, we are making the Draft PEA for the NDBC Program available for your review and comment with respect to potential impacts on marine mammals and sea turtles under the MMPA and ESA. You can access the Draft PEA at www.ndbc.noaa.gov/pea/ndbc_draft_pea.pdf.

Any comments should be returned by September 17, 2017, to: Mr. Joe Swaykos, NOAA NDBC, Building 3205, Stennis Space Center, MS 39529, joe.swaykos@noaa.gov. If you have any questions or concerns, please contact Mr. Swaykos at (228) 688-4766, or via email.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

Memorandum for: Cathy Tortorici, Director
ESA Interagency Coordination Division (F/PRS)
National Marine Fisheries Service

From: Helmut H. Portmann, Director
NOAA National Data Buoy Center

Date: August 30, 2017

Subject: Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) Consultation for the NDBC Programmatic Environmental Assessment

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

Memorandum for: Patricia Montanio, Director
Habitat Conservation (F/HC)
NOAA Fisheries, Office of Habitat Conservation

From: Helmut H. Portmann, Director
NOAA National Data Buoy Center

Date: August 30, 2017

Subject: Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) Consultation for the NDBC Programmatic Environmental Assessment

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

Memorandum for: Trevor Spradlin, Director
Marine Mammal and Sea Turtle Conservation Division (F/PR2)
NOAA Fisheries, Office of Protected Resources

From: Helmut H. Portmann, Director
NOAA National Data Buoy Center

Date: August 30, 2017

Subject: Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) Consultation for the NDBC Programmatic Environmental Assessment

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APPENDIX C

CONSULTATION REGARDING CULTURAL RESOURCES

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Kevin Cherry Ph.D.
North Carolina - State Historical Preservation Officer
4610 Mail Service Center
Raleigh, NC 27699-4610

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Dr. Cherry:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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NDBC operates in all U.S. coastal states and territories. At this point in time, the specific locations of future actions have not been identified. As discussed in the Draft PEA, additional review will be conducted for specific actions that may affect historic properties and consultation will be initiated with your office as required at that time. At this time, we are making the Draft PEA available for your review and comment. You can access the Draft PEA at www.ndbc.noaa.gov/pea/ndbc_draft_pea.pdf.

Any comments should be returned by September 17, 2017, to: Mr. Joe Swaykos, NOAA NDBC, Building 3205, Stennis Space Center, MS 39529, joe.swaykos@noaa.gov. If you have any questions or concerns, please contact Mr. Swaykos at (228) 688-4766, or via email.

Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Burt Logan
Ohio - State Historical Preservation Officer
800 E. 17th Avenue
Columbus, OH 43211-2474

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Logan:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Lisa Sumption
Oregon - State Historical Preservation Officer
725 Summer Street, NE
Suite C
Salem, OR 97301

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Sumption:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. James M. Vaughan
Pennsylvania - State Historical Preservation Officer
Commonwealth Keystone Building
400 North Street – Second Floor
Harrisburg, PA 17120-0093

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Vaughan:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Sunny O. Mgirmang
Historic Preservation Officer
Republic of Palau
P.O. Box 100
Koror, PW 96940

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Mgirmang:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Holly Helkena
Acting State Historical Preservation Officer
Republic of the Marshall Islands
P.O. Box #1454
Majuro Atoll, MH 96960

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Helkena:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Edward Sanderson
Rhode Island - State Historical Preservation Officer
Old State House
150 Benefit Street
Providence, RI 02903

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Sanderson:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Eric Emerson Ph.D.
South Carolina - State Historical Preservation Officer
8301 Parkland Road
Columbia, SC 29223-4905

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Dr. Emerson:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Mark Wolfe
Texas - State Historical Preservation Officer
P.O. Box 12276
Austin, TX 78711-2276

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Wolfe:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Jean-Pierre Oriol
Acting State Historic Preservation Officer
U.S. Virgin Islands
8100 Lindberg Bay, Suite #6
St. Thomas, VI 00802

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Oriol:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Julie Langan
Virginia - State Historical Preservation Officer
2801 Kensington Avenue
Richmond, VA 23221

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Langan:

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Allyson Brooks, Ph.D.
Washington - State Historical Preservation Officer
1110 Capitol Way South
Suite 30
Olympia, WA 98501

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Dr. Brooks:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Jim Draeger,
Wisconsin - State Historical Preservation Officer
816 State Street
Madison, WI 53706-1482

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Draeger:

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Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Lisa D. Jones
Alabama State Historical Preservation Office
468 South Perry Street
Montgomery, AL 36104

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Jones:

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Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Judith E. Bittner
Alaska - State Historical Preservation Officer
550 W. 7th Avenue
Suite 1310
Anchorage, AK 99501-3565

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Bittner:

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Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. David J. Hedrich
American Samoa - State Historical Preservation Officer
Pago Pago
American Samoa 96799

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Hedrich:

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Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Julianne Polanco
California - State Historical Preservation Officer
1725 23rd Street
Suite 100
Sacramento, CA 95816

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Polanco:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Any comments should be returned by September 17, 2017, to: Mr. Joe Swaykos, NOAA NDBC, Building 3205, Stennis Space Center, MS 39529, joe.swaykos@noaa.gov. If you have any questions or concerns, please contact Mr. Swaykos at (228) 688-4766, or via email.

Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Carlos Rubio
State Historic Preservation Officer
Commonwealth of Puerto Rico
P.O. Box 9023935
San Juan, PR 00902-3935

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Rubio:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Merti T. Kani
Commonwealth of the Northern Mariana Islands - State Historical Preservation Officer
P.O. Box 500090CK
Japanese Bunker, Asilto Airport Road
Saipan, MP 96950

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Kani:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Kristina Newman-Scott
Connecticut - State Historical Preservation Officer
One Constitution Plaza
Second Floor
Hartford, CT 06103

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Newman-Scott:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Timothy A. Slavin
Delaware - State Historical Preservation Officer
21 The Green
Dover, DE 19901

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Slavin:

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Augustine Kohler
State Historical Preservation Officer
Federated States of Micronesia
P.O. Box PS 175
Palikir, Pohnpei, FM 96941

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Kohler:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Timothy Parsons, Ph.D.
Florida - State Historical Preservation Officer
500 South Bronough Street
R.A. Gray Building, Room 305
Tallahassee, FL 32399-0250

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Dr. Parsons:

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Lynda Aguon
Guam - State Historical Preservation Officer
490 Chalan Palasyo
Agana Heights, Guam 96910

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Aguon:

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Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Susan Case
Hawaii - State Historical Preservation Officer
1151 Punchbowl Street
Honolulu, HI 96813

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Case:

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Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Heidi Brown-McCreery
Illinois - State Historical Preservation Officer
313 South 6th Street
Springfield, IL 62701

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Brown-McCreery:

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Cameron F. Clark
Indiana - State Historical Preservation Officer
402 W. Washington Street
Room W256
Indianapolis, IN 46204

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Clark:

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Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Phil Boggan
Louisiana - State Historical Preservation Officer
PO Box 4427
Baton Rouge, LA 70804

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Boggan:

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Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Kirk F. Mohney
Maine - State Historical Preservation Officer
55 Capitol Street
Station 65
Augusta, ME 04333

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Mohney:

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Elizabeth Hughes
Maryland - State Historical Preservation Officer
100 Community Place
3rd Flour
Crownsville, MD 21032-2023

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Hughes:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Brona Simon
Massachusetts - State Historical Preservation Officer
220 Morrissey Boulevard
Boston, MA 02125

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Simon:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Brian D. Conway
Michigan - State Historical Preservation Officer
735 East Michigan Avenue
Lansing, MI 48909

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Conway:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Stephen Elliott
Minnesota - State Historical Preservation Officer
345 Kellogg Blvd, W
St. Paul, MN 55102-1906

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Elliott:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Katherine Blount
Mississippi - State Historical Preservation Officer
P.O. Box 571
Jackson, MS 39205-0571

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Blount:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Elizabeth H. Muzzey
New Hampshire - State Historical Preservation Officer
19 Pillsbury Street
2nd Floor
Concord, NH 03301-3570

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Muzzey:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Mr. Bob Martin
New Jersey – State Historical Preservation Officer
P.O. Box 420
Trenton, NJ 08625

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Mr. Martin:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Stennis Space Center, Mississippi 39529-6000

August 30, 2017

Ms. Rose Harvey
New York - State Historical Preservation Officer
Peebles Island Resource Center
P.O. Box 189
Waterford, NY 21288-0189

RE: Draft Programmatic Environmental Assessment for the National Oceanic and Atmospheric Administration National Data Buoy Center

Dear Ms. Harvey:

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) is notifying you of the availability of the Draft Programmatic Environmental Assessment (PEA) for the NDBC Program. The Draft PEA evaluates the environmental impacts from the development, operation, and maintenance of the national data buoy network and coastal stations. NDBC deploys a variety of technologies throughout the world's oceans, seas, and lakes for the purpose of civil earth marine observations. These observations add value to a diverse spectrum of civil use applications including severe and routine weather forecasting; improved coastal ocean circulation models; commercial and recreational marine transportation and fishing; and environmental monitoring and research. The PEA considers enhancements to its infrastructure and technologies to improve its capabilities to collect, analyze, and share oceanographic and meteorological observations with a wide variety of users such as federal, state, academic, and private industry stakeholders.

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Sincerely,

Helmut H. Portmann
Director, NDBC

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APPENDIX D

LIST OF THE NATIONAL SYSTEM MARINE PROTECTED AREAS AND ASSOCIATED PERMITS

MPA Name	State
Northeast Region	
Waquoit Bay National Estuarine Research Reserve	Massachusetts
Jacques Cousteau National Estuarine Research Reserve	New Jersey
Lydonia Canyon Gear Restricted Area	Massachusetts
Oceanographer Canyon Gear Restricted Area	Massachusetts
Veatch Canyon Gear Restricted Area	New Jersey
Gerry E. Studds/Stellwagen Bank National Marine Sanctuary	Massachusetts
Cape Cod National Seashore	Massachusetts
Fire Island National Seashore	New York
Gateway National Recreation Area	New York
Stewart B. McKinney National Wildlife Refuge	Connecticut
Cross Island National Wildlife Refuge	Maine
Pond Island National Wildlife Refuge	Maine
Rachel Carson National Wildlife Refuge	Maine
Mashpee National Wildlife Refuge	Massachusetts
Monomoy National Wildlife Refuge	Massachusetts
Nomans Land Island National Wildlife Refuge	Massachusetts
Parker River National Wildlife Refuge	Massachusetts
Great Bay National Wildlife Refuge	New Hampshire
Cape May National Wildlife Refuge	New Jersey
Edwin B. Forsythe National Wildlife Refuge	New Jersey
Supawna Meadows National Wildlife Refuge	New Jersey
Conscience Point National Wildlife Refuge	New York
Oyster Bay National Wildlife Refuge	New York
Seatuck National Wildlife Refuge	New York
Target Rock National Wildlife Refuge	New York
Wertheim National Wildlife Refuge	New York
Block Island National Wildlife Refuge	Rhode island
John H. Chafee National Wildlife Refuge	Rhode island
Ninigret National Wildlife Refuge	Rhode island
Sachuest Point National Wildlife Refuge	Rhode island
Albert Gallatin Exempt Site	Massachusetts
Alice M. Colburn Exempt Site	Massachusetts
Alice M. Lawrence Exempt Site	Massachusetts
Ardandhu Exempt Site	Massachusetts
Barge and Crane Exempt Site	Massachusetts
California Exempt Site	Massachusetts
Charles S. Haight Exempt Site	Massachusetts
Chelsea Exempt Site	Massachusetts
Chester A. Poling Exempt Site	Massachusetts
City of Salisbury Exempt Site	Massachusetts
Corvan Exempt Site	Massachusetts

MPA Name	State
Northeast Region (continued)	
Dixie Sword Exempt Site	Massachusetts
Edward Rich Exempt Site	Massachusetts
French Van Gilder Exempt Site	Massachusetts
H.M.C.S. Saint Francis Exempt Site	Massachusetts
Henry Endicott Exempt Site	Massachusetts
Herbert Exempt Site	Massachusetts
Herman Winter Exempt Site	Massachusetts
Hilda Garston Exempt Site	Massachusetts
James S. Longstreet Exempt Site	Massachusetts
John Dwight Exempt Site	Massachusetts
Kershaw Exempt Site	Massachusetts
Kiowa Exempt Site	Massachusetts
Lackawana Exempt Site	Massachusetts
Lunet Exempt Site	Massachusetts
Mars Exempt Site	Massachusetts
Pemberton Exempt Site	Massachusetts
Pendleton Exempt Site	Massachusetts
Pinthis Exempt Site	Massachusetts
Port Hunter Exempt Site	Massachusetts
Pottstown Exempt Site	Massachusetts
Romance Exempt Site	Massachusetts
Seaconnet Exempt Site	Massachusetts
Trojan Exempt Site	Massachusetts
U.S.S. Grouse Exempt Site	Massachusetts
U.S.S. New Hampshire Exempt Site	Massachusetts
U.S.S. Triana Exempt Site	Massachusetts
U.S.S. Yankee Exempt Site	Massachusetts
U.S.S. YSD Exempt Site	Massachusetts
Vineyard Sound Lightship Exempt Site	Massachusetts
Mid-Atlantic Region	
Bombay Hook National Wildlife Refuge	Delaware
Prime Hook National Wildlife Refuge	Delaware
Blackwater National Wildlife Refuge	Maryland
Eastern Neck National Wildlife Refuge	Maryland
Martin National Wildlife Refuge	Maryland
Susquehanna National Wildlife Refuge	Maryland
Assateague Island National Seashore	Maryland, Virginia
Chincoteague National Wildlife Refuge	Maryland, Virginia
NOAA's Monitor National Marine Sanctuary	North Carolina
Cape Hatteras National Seashore	North Carolina
Cape Lookout National Seashore	North Carolina

MPA Name	State
Mid-Atlantic Region (continued)	
Alligator River National Wildlife Refuge	North Carolina
Cedar Island National Wildlife Refuge	North Carolina
Currituck National Wildlife Refuge	North Carolina
Mackay Island National Wildlife Refuge	North Carolina
Pea Island National Wildlife Refuge	North Carolina
Swanquarter National Wildlife Refuge	North Carolina
Norfolk Canyon Gear Restricted Area	Virginia
Back Bay National Wildlife Refuge	Virginia
Eastern Shore of Virginia National Wildlife Refuge	Virginia
Featherstone National Wildlife Refuge	Virginia
Fisherman Island National Wildlife Refuge	Virginia
Mackay Island National Wildlife Refuge	Virginia
Occoquan Bay National Wildlife Refuge	Virginia
Plum Tree Island National Wildlife Refuge	Virginia
Wallops Island National Wildlife Refuge	Virginia
U-1105 Black Panther Historic Shipwreck Preserve	Maryland
Bethel Beach Natural Area Preserve	Virginia
Blue Crab Sanctuary	Virginia
Dameron Marsh Natural Area Preserve	Virginia
False Cape State Park	Virginia
Hughlett Point Natural Area Preserve	Virginia
Kiptopeke State Park	Virginia
Savage Neck Dunes Natural Area Preserve	Virginia
Southeast Region	
Biscayne National Park	Florida
Canaveral National Seashore	Florida
Merritt Island National Wildlife Refuge	Florida
Pelican Island National Wildlife Refuge	Florida
Guana Tolomato Matanzas National Estuarine Research Reserve	Florida
Gray's Reef National Marine Sanctuary	Georgia
Cumberland Island National Seashore	Georgia
Fort Pulaski National Monument	Georgia
Blackbeard Island National Wildlife Refuge	Georgia
Harris Neck National Wildlife Refuge	Georgia
Wassaw National Wildlife Refuge	Georgia
Wolf Island National Wildlife Refuge	Georgia
Tybee National Wildlife Refuge	Georgia, South Carolina
ACE Basin National Wildlife Refuge	South Carolina
Cape Romain National Wildlife Refuge	South Carolina
Pinckney Island National Wildlife Refuge	South Carolina
Waccamaw National Wildlife Refuge	South Carolina

MPA Name	State
Southeast Region (continued)	
Ashley River Heritage Canoe Trail	South Carolina
Cooper River Heritage Dive Trail	South Carolina
Gulf of Mexico Region	
Bon Secour National Wildlife Refuge	Alabama
Grand Bay National Wildlife Refuge	Alabama, Mississippi
Florida Keys National Marine Sanctuary	Florida
Dry Tortugas National Park	Florida
Everglades National Park	Florida
Cedar Keys National Wildlife Refuge	Florida
Chassahowitzka National Wildlife Refuge	Florida
Crocodile Lake National Wildlife Refuge	Florida
Crystal River National Wildlife Refuge	Florida
Great White Heron National Wildlife Refuge	Florida
Island Bay National Wildlife Refuge	Florida
J.N. Ding Darling National Wildlife Refuge	Florida
Key West National Wildlife Refuge	Florida
Lower Suwannee National Wildlife Refuge	Florida
Matlacha Pass National Wildlife Refuge	Florida
National Key Deer Refuge	Florida
Pine Island National Wildlife Refuge	Florida
Pinellas National Wildlife Refuge	Florida
St. Marks National Wildlife Refuge	Florida
St. Vincent National Wildlife Refuge	Florida
Ten Thousand Islands National Wildlife Refuge	Florida
Rookery Bay National Estuarine Research Reserve	Florida
Jean Lafitte National Historical Park and Preserve, Barataria Preserve	Louisiana
Big Branch Marsh National Wildlife Refuge	Louisiana
Breton National Wildlife Refuge	Louisiana
Delta National Wildlife Refuge	Louisiana
Sabine National Wildlife Refuge	Louisiana
Shell Keys National Wildlife Refuge	Louisiana
Flower Garden Banks National Marine Sanctuary	Texas
Padre Island National Seashore	Texas
Anahuac National Wildlife Refuge	Texas
Aransas National Wildlife Refuge	Texas
Big Boggy National Wildlife Refuge	Texas
Brazoria National Wildlife Refuge	Texas
San Bernard National Wildlife Refuge	Texas

MPA Name	State
Caribbean/Tropical Atlantic Region	
Jobos Bay National Estuarine Research Reserve	Puerto Rico
Buck Island Reef National Monument	U.S. Virgin Islands
Salt River Bay National Historic Park and Ecological Preserve	U.S. Virgin Islands
Virgin Islands Coral Reef National Monument	U.S. Virgin Islands
Virgin Islands National Park	U.S. Virgin Islands
Arrecifes de la Cordillera Natural Reserve	Puerto Rico
Canal Luis Peña Natural Reserve	Puerto Rico
Isla de Desecheo Marine Reserve	Puerto Rico
Isla de Mona Natural Reserve	Puerto Rico
Isla de Mona Natural Reserve	Puerto Rico
Tres Palmas de Rincón Marine Reserve	Puerto Rico
St. Croix East End Marine Park	U.S. Virgin Islands
St. Thomas East End Reserves	U.S. Virgin Islands
Great Lakes Region	
Indiana Dunes National Lakeshore	Indiana
Thunder Bay National Marine Sanctuary and Underwater Preserve	Michigan
Isle Royale National Park	Michigan
Pictured Rocks National Lakeshore	Michigan
Sleeping Bear Dunes National Lakeshore	Michigan
Huron National Wildlife Refuge	Michigan
Gulf of Alaska Region	
Glacier Bay National Park & Preserve	Alaska
Alaska Maritime National Wildlife Refuge	Alaska
Arctic National Wildlife Refuge	Alaska
Yukon Delta National Wildlife Refuge	Alaska
Western Pacific Region	
National Marine Sanctuary of American Samoa	American Samoa
National Park of American Samoa	American Samoa
Guam National Wildlife Refuge	Guam
Baker Island National Wildlife Refuge	U.S. Minor Outlying Pacific Island
Howland Island National Wildlife Refuge	U.S. Minor Outlying Pacific Island
Jarvis Island National Wildlife Refuge	U.S. Minor Outlying Pacific Island
Rose Atoll National Wildlife Refuge	U.S. Minor Outlying Pacific Island
Alofau Village Marine Protected Area	American Samoa
Amanave Village Marine Protected Area	American Samoa
Amaua & Auto Village Marine Protected Area	American Samoa
Aoa Village Marine Protected Area	American Samoa

MPA Name	State
Western Pacific Region (continued)	
Aua Village Marine Protected Area	American Samoa
Fagamalo Village Marine Protected Area	American Samoa
Masausi Village Marine Protected Area	American Samoa
Matu'u & Faganeanea Village Marine Protected Area	American Samoa
Poloa Village Marine Protected Area	American Samoa
Sa'ilele Village Marine Protected Area	American Samoa
Vatia Village Marine Protected Area	American Samoa
Central Pacific Region	
Papahanaumokuakea Marine National Monument	Hawaii
Hawaiian Islands Humpback Whale National Marine Sanctuary	Hawaii
Kalaupapa National Historical Park	Hawaii
Kaloko-Honokohau National Historical Park	Hawaii
Midway Atoll National Wildlife Refuge	Hawaii
Johnston Island National Wildlife Refuge	U.S. Minor Outlying Pacific Island
Kingman Reef National Wildlife Refuge	U.S. Minor Outlying Pacific Island
Palmyra Atoll National Wildlife Refuge	U.S. Minor Outlying Pacific Island
Ahihi-Kinau Natural Area Reserve	Hawaii
Hanauma Bay Marine Life Conservation District	Hawaii
Kaho'olawe Island Reserve	Hawaii
Kealakekua Bay Marine Life Conservation District	Hawaii
Molokini Shoal Marine Life Conservation District	Hawaii
Pupukea Marine Life Conservation District	Hawaii
West Hawaii Regional Fishery Management Area	Hawaii
Northwest Region	
Cordell Bank National Marine Sanctuary	California
Gulf of the Farallones National Marine Sanctuary	California
Golden Gate National Recreation Area	California
Point Reyes National Seashore	California
Redwood National Park	California
Don Edwards San Francisco Bay National Wildlife Refuge	California
Farallon National Wildlife Refuge	California
Marin Islands National Wildlife Refuge	California
San Pablo Bay National Wildlife Refuge	California
Bandon Marsh National Wildlife Refuge	Oregon
Nestucca Bay National Wildlife Refuge	Oregon
Siletz Bay National Wildlife Refuge	Oregon
Lewis and Clark National Wildlife Refuge	Oregon, Washington
Olympic Coast National Marine Sanctuary	Washington

MPA Name	State
Northwest Region (continued)	
Ebey's Landing National Historical Reserve	Washington
Olympic National Park	Washington
San Juan Island National Historical Park	Washington
Dungeness National Wildlife Refuge	Washington
Grays Harbor National Wildlife Refuge	Washington
Nisqually National Wildlife Refuge	Washington
Protection Island National Wildlife Refuge	Washington
Willapa National Wildlife Refuge	Washington
Big Flat State Marine Conservation Area	California
Big River Estuary State Marine Conservation Area	California
Bodega ASBS State Water Quality Protection Area	California
Bodega Head State Marine Conservation Area	California
Bodega Head State Marine Reserve	California
Castle Rock Special Closure	California
Del Mar Landing ASBS State Water Quality Protection Area	California
Del Mar Landing State Marine Reserve	California
Double Cone Rock State Marine Conservation Area	California
Double Point ASBS State Water Quality Protection Area	California
Double Point/Stormy Stack Special Closure	California
Drakes Estero State Marine Conservation Area	California
Duxbury Reef ASBS State Water Quality Protection Area	California
Duxbury State Marine Conservation Area	California
Estero Americano State Marine Recreational Management Area	California
Estero de Limantour State Marine Reserve	California
False Klamath Rock Special Closure	California
Farallon Islands ASBS State Water Quality Protection Area	California
Gerstle Cove ASBS State Water Quality Protection Area	California
Gerstle Cove State Marine Reserve	California
Jughandle Cove ASBS State Water Quality Protection Area	California
King Range ASBS State Water Quality Protection Area	California
MacKerricher State Marine Conservation Area	California
Mattole Canyon State Marine Reserve	California
Navarro River Estuary State Marine Conservation Area	California
North Farallon Islands & Isle of St. James Special Closure	California
North Farallon Islands State Marine Reserve	California
Point Arena State Marine Conservation Area	California
Point Arena State Marine Reserve	California
Point Resistance Special Closure	California
Point Reyes Headlands ASBS State Water Quality Protection Area	California
Point Reyes Headlands Special Closure	California
Point Reyes State Marine Conservation Area	California

MPA Name	State
Northwest Region (continued)	
Point Reyes State Marine Reserve	California
Point St. George Reef Offshore State Marine Conservation Area	California
Pyramid Point State Marine Conservation Area	California
Reading Rock State Marine Conservation Area	California
Reading Rock State Marine Reserve	California
Redwoods National Park ASBS State Water Quality Protection Area	California
Redwoods National Park ASBS State Water Quality Protection Area	California
Rockport Rocks Special Closure	California
Russian Gulch State Marine Conservation Area	California
Russian River State Marine Conservation Area	California
Russian River State Marine Recreational Management Area	California
Salt Point State Marine Conservation Area	California
Samoa State Marine Conservation Area	California
Saunders Reef ASBS State Water Quality Protection Area	California
Saunders Reef State Marine Conservation Area	California
Sea Lion Cove State Marine Conservation Area	California
Sea Lion Gulch State Marine Reserve	California
South Cape Mendocino State Marine Reserve	California
South Humboldt Bay State Marine Recreational Management Area	California
Southeast Farallon Island State Marine Conservation Area	California
Southeast Farallon Island State Marine Reserve	California
Southeast Farallon Special Closure A	California
Southeast Farallon Special Closure B	California
Southwest Seal Rock Special Closure	California
Steamboat Rock Special Closure	California
Stewarts Point State Marine Conservation Area	California
Stewarts Point State Marine Reserve	California
Sugarloaf Island Special Closure	California
Ten Mile Beach State Marine Conservation Area	California
Ten Mile Estuary State Marine Conservation Area	California
Ten Mile State Marine Reserve	California
Trinidad Head ASBS State Water Quality Protection Area	California
Van Damme State Marine Conservation Area	California
Vizcaino Rock Special Closure	California
Admiralty Head Marine Preserve	Washington
Argyle Lagoon San Juan Islands Marine Preserve	Washington
Blake Island Underwater Park	Washington
Brackett's Landing Shoreline Sanctuary Conservation Area	Washington
Cherry Point Aquatic Reserve	Washington
Cypress Island Aquatic Reserve	Washington
Deception Pass Underwater Park	Washington

MPA Name	State
Northwest Region (continued)	
False Bay San Juan Islands Marine Preserve	Washington
Fidalgo Bay Aquatic Reserve	Washington
Friday Harbor San Juan Islands Marine Preserve	Washington
Haro Strait Special Management Fishery Area	Washington
Maury Island Aquatic Reserve	Washington
Nisqually Reach Aquatic Reserve	Washington
Orchard Rocks Conservation Area	Washington
Protection Island Aquatic Reserve	Washington
San Juan Channel and Upright Channel Special Management Fishery Area	Washington
San Juan County/Cypress Island Marine Biological Preserve	Washington
Shaw Island San Juan Islands Marine Preserve	Washington
Smith and Minor Island Aquatic Reserve	Washington
South Puget Sound Wildlife Area	Washington
Sund Rock Conservation Area	Washington
Yellow and Low Islands San Juan Islands Marine Preserve	Washington
Zella M. Schultz/Protection Island Seabird Sanctuary	Washington
California Region	
Channel Islands National Marine Sanctuary	California
Monterey Bay National Marine Sanctuary	California
Cabrillo National Monument	California
Channel Islands National Park	California
San Diego Bay National Wildlife Refuge	California
Abalone Cove State Marine Conservation Area	California
Anacapa Island Special Closure (A)	California
Anacapa Island Special Closure (B)	California
Anacapa Island State Marine Conservation Area	California
Anacapa Island State Marine Reserve	California
Ano Nuevo ASBS State Water Quality Protection Area	California
Ano Nuevo State Marine Conservation Area	California
Arrow Point to Lion Head Point (Catalina Island) State Marine Conservation Area	California
Asilomar State Marine Reserve	California
Batiquitos Lagoon State Marine Conservation Area	California
Begg Rock (San Nicolas Island Quad) State Marine Reserve	California
Big Creek State Marine Conservation Area	California
Big Creek State Marine Reserve	California
Bird Rock (Catalina Island) State Marine Conservation Area	California
Bird Rock ASBS State Water Quality Protection Area	California
Blue Cavern (Catalina Island) State Marine Conservation Area	California
Bolsa Bay State Marine Conservation Area	California
Bolsa Chica Basin State Marine Conservation Area	California

MPA Name	State
California Region (continued)	
Cabrillo State Marine Reserve	California
Cambria State Marine Conservation Area	California
Campus Point State Marine Conservation Area	California
Carmel Bay ASBS State Water Quality Protection Area	California
Carmel Bay State Marine Conservation Area	California
Carmel Pinnacles State Marine Reserve	California
Carrington Point (Santa Rosa Island) State Marine Reserve	California
Casino Point (Catalina Island) State Marine Conservation Area	California
Cat Harbor (Catalina Island) State Marine Conservation Area	California
Crystal Cove State Marine Conservation Area	California
Dana Point State Marine Conservation Area	California
Edward F. Ricketts State Marine Conservation Area	California
Egg (Devil's Slide) Rock to Devil's Slide Special Closure	California
Elkhorn Slough State Marine Conservation Area	California
Elkhorn Slough State Marine Reserve	California
Estero de San Antonio State Marine Recreational Management Area	California
Famosa Slough State Marine Conservation Area	California
Farnsworth Bank ASBS State Water Quality Protection Area	California
Farnsworth Offshore (Catalina Island) State Marine Conservation Area	California
Farnsworth Onshore (Catalina Island) State Marine Conservation Area	California
Footprint State Marine Reserve	California
Goleta Slough State Marine Conservation Area	California
Greyhound Rock State Marine Conservation Area	California
Gull Island (Santa Cruz Island) State Marine Reserve	California
Harris Point (San Miguel Island) State Marine Reserve	California
Heisler Park ASBS State Water Quality Protection Area	California
Irvine Coast ASBS State Water Quality Protection Area	California
James V. Fitzgerald ASBS State Water Quality Protection Area	California
Judith Rock (San Miguel Island) State Marine Reserve	California
Julia Pfeiffer Burns ASBS State Water Quality Protection Area	California
Kashtayit State Marine Conservation Area	California
La Jolla ASBS State Water Quality Protection Area	California
Laguna Beach State Marine Conservation Area	California
Laguna Beach State Marine Reserve	California
Laguna Point to Latigo Point ASBS State Water Quality Protection Area	California
Long Point (Catalina Island) State Marine Reserve	California
Lover's Cove (Catalina Island) State Marine Conservation Area	California
Lovers Point State Marine Reserve	California
Matlahuayl State Marine Reserve	California
Montara State Marine Reserve	California
Moro Cojo Slough State Marine Reserve	California

MPA Name	State
California Region (continued)	
Morro Bay State Marine Recreational Management Area	California
Morro Bay State Marine Reserve	California
Naples State Marine Conservation Area	California
Natural Bridges State Marine Reserve	California
Northwest Santa Catalina Island ASBS State Water Quality Protection Area	California
Pacific Grove ASBS State Water Quality Protection Area	California
Pacific Grove Marine Gardens State Marine Conservation Area	California
Painted Cave (Santa Cruz Island) State Marine Conservation Area	California
Piedras Blancas State Marine Conservation Area	California
Piedras Blancas State Marine Reserve	California
Pillar Point State Marine Conservation Area	California
Point Buchon State Marine Conservation Area	California
Point Buchon State Marine Reserve	California
Point Cabrillo State Marine Reserve	California
Point Conception State Marine Reserve	California
Point Dume State Marine Conservation Area	California
Point Dume State Marine Reserve	California
Point Lobos ASBS State Water Quality Protection Area	California
Point Lobos State Marine Conservation Area	California
Point Lobos State Marine Reserve	California
Point Sur State Marine Conservation Area	California
Point Sur State Marine Reserve	California
Point Vicente State Marine Conservation Area	California
Portuguese Ledge State Marine Conservation Area	California
Richardson Rock (San Miguel Island) State Marine Reserve	California
Robert E. Badham ASBS State Water Quality Protection Area	California
Salmon Creek Coast ASBS State Water Quality Protection Area	California
San Clemente Island ASBS State Water Quality Protection Area	California
San Diego-Scripps ASBS State Water Quality Protection Area	California
San Diego-Scripps Coastal State Marine Conservation Area	California
San Dieguito Lagoon State Marine Conservation Area	California
San Elijo Lagoon State Marine Conservation Area	California
San Miguel Island Special Closure A-1	California
San Miguel, Santa Rosa, and Santa Cruz Islands ASBS State Water Quality Protection Area	California
San Miguel, Santa Rosa, and Santa Cruz Islands ASBS State Water Quality Protection Area	California
San Nicolas Island and Begg Rock ASBS State Water Quality Protection Area	California
San Nicolas Island and Begg Rock ASBS State Water Quality Protection Area	California

MPA Name	State
California Region (continued)	
Santa Barbara and Anacapa Islands ASBS State Water Quality Protection Area	California
Santa Barbara Island State Marine Reserve	California
Scorpion (Santa Cruz Island) State Marine Reserve	California
Skunk Point (Santa Rosa Island) State Marine Reserve	California
Soquel Canyon State Marine Conservation Area	California
South La Jolla State Marine Conservation Area	California
South La Jolla State Marine Reserve	California
South Point (Santa Rosa Island) State Marine Reserve	California
Southeast Santa Catalina Island ASBS State Water Quality Protection Area	California
Swami's State Marine Conservation Area	California
Tijuana River Mouth State Marine Conservation Area	California
Upper Newport Bay State Marine Conservation Area	California
Vandenberg State Marine Reserve	California
Western Santa Catalina Island ASBS State Water Quality Protection Area	California
White Rock (Cambria) State Marine Conservation Area	California

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Office of National Marine Sanctuaries
1305 East-West Highway
Silver Spring, Maryland 20910

Dr. George Sedberry
Acting Superintendent
Gray's Reef National Marine Sanctuary
10 Ocean Science Circle
Savannah, GA 31411

Dear Dr. Sedberry:

The National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries (ONMS) has approved the issuance of permit number GRNMS-2014-001 to conduct activities within Gray's Reef National Marine Sanctuary (sanctuary). Activities are to be conducted in accordance with the terms and conditions of permit number GRNMS-2014-001 (enclosed).

This permit is not valid until signed and returned to the ONMS. Retain one signed copy and carry it with you while conducting the permitted activities. An additional copy must be signed and returned, by either mail or email, to the following individual within 30 days of issuance and before commencing any activity authorized by this permit:

Vicki Wedell
National Permit Coordinator
NOAA Office of National Marine Sanctuaries
1305 East-West Highway (N/NMS-2)
Silver Spring, MD 20910

Your permit contains specific terms, conditions and reporting requirements. Review them closely and fully comply with them while undertaking permitted activities.

If you have any questions, please contact Vicki Wedell at 301-713-7237.

Sincerely,

for Daniel J. Basta
Director

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Office of National Marine Sanctuaries
1305 East-West Highway
Silver Spring, Maryland 20910

GRAY'S REEF NATIONAL MARINE SANCTUARY
SUPERINTENDENT'S PERMIT

Permittee:
Dr. George Sedberry
Acting Superintendent
Gray's Reef National Marine Sanctuary
10 Ocean Science Circle
Savannah, GA 31411

Permit Number: GRNMS-2014-001
Effective Date: January 1, 2014
Expiration Date: December 31, 2018

Project Title: Superintendent's Permit

This permit is issued for activities in accordance with the National Marine Sanctuaries Act (NMSA), 16 USC §1431 *et seq.*, and regulations thereunder (15 CFR Part 922). All activities must be conducted in accordance with those regulations and law. No activity prohibited in 15 CFR Part 922 is allowed except as specified in the activity description below.

Subject to the terms and conditions of this permit, the National Oceanic and Atmospheric Administration (NOAA), Office of National Marine Sanctuaries (ONMS) hereby authorizes the permittee named above, along with specific individuals who may be authorized by the permittee, to conduct activities within Gray's Reef National Marine Sanctuary (GRNMS or sanctuary). These activities must be those reasonable and necessary to fulfill management responsibilities consistent with the purposes of the sanctuary management plan, the NMSA, and the regulations cited above.

Permitted Activity Description:
The following activities are authorized by this permit:

1. Alteration of the seabed, placement on the submerged lands, and discharging matter for the following purposes:
   a. Placement and maintenance of scientific equipment (e.g., temperature recording devices, PVC grids, monitoring stations, collecting devices) on the seabed to monitor physical and biological parameters; and weighted marker buoys;
   b. Reef coring to set eyebolts for subsurface or surface moorings and to take reef samples for scientific investigation;
   c. Reef cleanup activities to remove garbage and other foreign materials from the reef; and
   d. Maintenance of two permanent 3000 pound anchors in sand patches.

2. Collection of marine organisms, or any part thereof, either living or dead.
   a. Collection of marine organisms, or any part thereof, either living or dead for monitoring and assessment, through the use of hand nets, traps and spearfishing, or by hand.
   b. Possession of such gear necessary to collect marine organisms is allowed on board authorized vessels.

3. Breaking, cutting, damaging, or removing any bottom formation.

4. Movement or recovery of historical or cultural resources or archaeological site disturbance to protect cultural, historical, or archeological resources from loss, destruction or injury.

5. Emergency response, injury assessment, mitigation, restoration, monitoring, and planning as approved by ONMS headquarters, consistent with (where appropriate) NOAA Damage Assessment and Restoration policies and procedures.

6. Within the Research area it is permitted to conduct activities 1, 3, 4 and 5 above and activity 2 inclusive of collection by use of rod and reel and handline. Stopping a vessel and diving are also allowable in the Research area.

No further violation of sanctuary regulations is allowed.

Permitted Activity Location:
The permitted activity is allowed only in the following location(s):

Throughout the Gray's Reef National Marine Sanctuary.

Special Terms and Conditions:

1. The permitee is responsible for management of all activities within the sanctuary that are authorized by this permit and must approve any such activities prior to their execution.

2. Any ONMS staff member (including contract employees) may conduct activities under this permit if authorized to do so by the permittee. Authorized staff must carry a copy of this permit while conducting any such activities.

3. Any non-ONMS staff member may conduct work under this permit if they have a letter from the permittee stating that their activities are being carried out under permit number GRNMS-2014-001 and stipulating the scope and duration of the authorization. These individuals must carry a copy of this permit and the authorizing letter while conducting any such activities. Copies of any letters authorizing others to act under this permit shall be uploaded to the OSPREY database under permit record GRNMS-2014-001.

4. Any activities taken under the authority of this permit (including both staff and non-staff activities) shall be recorded and uploaded to the OSPREY database under permit record GRNMS-2014-001 using the attached form.

5. Any activities that may result in marine mammal, sea turtle, or seabird disturbance are to be conducted only in coordination with NOAA Fisheries, the U.S. Fish and Wildlife Service, and other resource trustees, as may be required by law.

6. The activities allowed under this permit were contemplated in and covered by NEPA analyses prepared for the sanctuary when designated and/or during subsequent management plan reviews, or are otherwise categorically excluded from further analysis under NEPA. However, for any actions proposed to occur under this permit for which this may not be the case, the permittee is required to complete any required further assessment under NEPA that may be necessary prior to taking that action. The permittee can contact the ONMS National Permit Coordinator for assistance in making this determination, if needed.

7. No activity may result in greater than negligible short-term adverse effects on sanctuary resources and qualities.

8. In the event that site disturbance or artifact movement or recovery is required, the permittee or designated staff member must first consult with both the state archeologist and a NOAA/ONMS archeologist to determine the threat for removal and the appropriate response. Even when time is of the essence, all activities must be carried out in compliance with the laws, regulations and guidelines of the Federal Archeological Program and under the supervision of a professional underwater archeologist, as designated by a NOAA/ONMS archeologist. Any site disturbance or historical or cultural resource movement or recovery must be conducted under a separate permit consistent with the requirements of Section 106 of the National Historic Preservation Act.

General Terms and Conditions:

1. Within 30 (thirty) days of the date of issuance, the permittee must sign and date this permit for it to be considered valid. Once signed, the permittee must send copies, via mail or email, to the following individuals:

   National Permit Coordinator
   NOAA Office of National Marine Sanctuaries
   1305 East-West Highway (N/NMS-2)
   SSMC4, 11th Floor
   Silver Spring, MD 20910

2. This permit may only be amended by the ONMS Director. Should the permittee wish to have this permit modified to cover activities not previously covered herein, the permittee may apply for an amendment in writing.

3. This permit is non-transferable; however, the permittee can authorize other individuals to conduct activities under this permit as described in the Special Terms and Conditions.

4. This permit does not authorize the conduct of any activity prohibited by 15 CFR § 922, other than those specifically described in the "Permitted Activity Description" section of this permit.

5. Any publications and/or reports resulting from activities conducted under the authority of this permit must include the notation that the activity was conducted under National Marine Sanctuary Permit Number GRNMS-2014-001.

6. Any question of interpretation of any term or condition of this permit will be resolved by the ONMS Director.

Your signature below, as permittee, indicates that you accept and agree to comply with all terms and conditions of this permit. This permit becomes valid when you, the permittee, countersign and date below. Please note that the expiration date on this permit is already set and will not be extended by a delay in your signing.

for: [signature] 12/31/13
Daniel J. Basta Date
Director

[signature] 2 January 2014
George Sedberry Date
Acting Superintendent
Gray's Reef National Marine Sanctuary

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Monterey Bay National Marine Sanctuary
99 Pacific Street, Building 455A
Monterey, CA 93940

November 22, 2016

Bill Hansen
NOAA National Data Buoy Center
Building 3205
Stennis Space Center, MS 39529

Dear Mr. Hansen:

The National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries (ONMS) has approved the issuance of permit number MULTI-2016-011 (enclosed) to conduct activities within Monterey Bay, Greater Farallones, Cordell Bank, and Olympic Coast national marine sanctuaries (sanctuaries) for research purposes. Activities are to be conducted in accordance with the permit application and all supporting materials submitted to the sanctuary, and the terms and conditions of permit number MULTI-2016-011.

This permit is not valid until signed and returned to the ONMS. Retain one signed copy and carry it with you while conducting the permitted activities. Additional copies must be signed and returned, by either mail or email, to the following individuals within 30 days of issuance and before commencing any activity authorized by this permit:

Sophie De Beukelaer
Research Permit Coordinator
Monterey Bay National Marine Sanctuary
99 Pacific Street, Building 455A
Monterey, CA 93940
Sophie.De Beukelaer@noaa.gov

National Permit Coordinator
NOAA Office of National Marine Sanctuaries
1305 East-West Highway (N/ORM6)
SSMC4, 11th Floor
Silver Spring, MD 20910
onmspermits@noaa.gov

Your permit contains specific terms, conditions and reporting requirements. Review them closely and fully comply with them while undertaking permitted activities.

If you have any questions, please contact Sophie De Beukelaer at (831) 647-1286. Thank you for your continued cooperation with the ONMS.

Sincerely,

Paul Michel
Superintendent

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Monterey Bay National Marine Sanctuary
99 Pacific Street, Building 455A
Monterey, CA 93940

MONTEREY BAY, GREATER FARALLONES, CORDELL BANK, AND OLYMPIC COAST NATIONAL MARINE SANCTUARIES
RESEARCH PERMIT

Permittee:
Bill Hansen
National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC)
Building 3205
Stennis Space Center, MS 39529

Permit Number: MULTI-2016-011
Effective Date: November 22, 2016
Expiration Date: November 30, 2021

Project Title: NOAA Weather Buoys 46012, 46042, 46FLO, 46013, 46041 and 46026

This permit is issued for activities in accordance with the National Marine Sanctuaries Act (NMSA), 16 USC §1431 *et seq.*, and regulations thereunder (15 CFR Part 922). All activities must be conducted in accordance with those regulations and law. No activity prohibited in 15 CFR Part 922 is allowed except as specified in the activity description below.

Subject to the terms and conditions of this permit, NOAA Office of National Marine Sanctuaries (ONMS) hereby authorizes the permittee listed above to conduct research activities within Monterey Bay, Greater Farallones, Cordell Bank, and Olympic Coast National Marine Sanctuaries (MBNMS, GFNMS, CBNMS, and OCNMS or sanctuaries). All activities are to be conducted in accordance with this permit, the permit application received June 23, 2015, and supplemental information received July 1, 10, 14, 23 and 24, 2015; and June 9, August 15, October 6, and October 24, 2016. The permit application is incorporated into this permit by reference; provided, however, that if there are any conflicts between the permit application and the terms and conditions of this permit, the terms and conditions of this permit shall be controlling.

Permitted Activity Description:
The following activities are authorized by this permit:

Alteration of the submerged lands for deploying moorings and their anchors at six (6) locations (see details below in Permitted Activity Location and Special Terms and Conditions) in MBNMS, GFNMS, CBNMS, and OCNMS and temporary discharge of buoys, mooring components, anchors and chains to collect and disseminate oceanographic and meteorological data; replacement of buoys, mooring components, anchors and chains approximately every 3-5 years within MBNMS, GFNMS, CBNMS, and OCNMS; and abandonment of portions of some moorings and anchors as specified in the Special Terms and Conditions.

No further violation of the sanctuaries' regulations is allowed.

Permitted Activity Location:
The permitted activities are allowed only in the following location(s):

1.) NDBC Station 46042 (in MBNMS)- Monterey-27 NM WNW of Monterey: Approximately 36.79 N, 122.47 W, Depth = 2098 meters. (This is an existing mooring that will be moved approximately 3.5 nautical miles east when mooring needs to be exchanged (anticipated to be in 2018) so that it will be east of the International Maritime Organization's northbound recommended traffic lane for vessels 300 gross tons and above.)
2.) NDBC Station 46012 (in MBNMS)- Half Moon Bay-24NM SSW of San Francisco Location: Approximately 37.36N 122.88W, Depth = 209 meters.
3.) NDBC Station 46FLO (in MBNMS)-wave test buoy-near Monterey: Approximately 36.67 N, 122.56 W, Depth = 2330 meters.
4.) NDBC Station 46013 (in CBNMS)-Bodega Bay, 48 NM NNW of San Francisco: Approximately 38.24 N, 123.31 W, Depth = 127 meters.
5.) NDBC Station 46026 (in GFNMS)-San Francisco- 18 NM West of San Francisco: Approximately 37.76 N, 122.84 W, Depth = 53 meters.
6.) NDBC Station 46041 (in OCNMS)- Cape Elizabeth- 45NM NW of Aberdeen, WA: Approximately 47.35N, 124.704 W, Depth = 114 meters.

Special Terms and Conditions:

1. All authorized activities may be conducted from November 22, 2016 through November 30, 2021. The permittee may request an amendment from the MBNMS Superintendent a minimum of 60 days in advance of this expiration date, to extend the effective date of this permit. Amendments to this permit cannot be made after expiration.

2. Permitted activities include the following:
   A. Installation, maintenance, and recovery of moorings, anchors, anchoring materials, individual scientific instruments and buoys of NDBC Stations 46012 (MBNMS) and 46026 (GFNMS);
   B. Maintenance of a buoy, mooring, acoustic release and anchor for NDBC Station 46013 (CBNMS); recovery of the buoy and mooring material above the acoustic release; and discharge of the mooring materials and anchor below the acoustic release and abandonment on the submerged lands;
   C. Installation, maintenance, and recovery of buoy and mooring above the acoustic release and discharge of the anchor and mooring materials below the acoustic release for NDBC Station 46FLO (MBNMS);
   D. Installation, maintenance, and recovery of buoy and mooring and subsequent discharge of the anchor and mooring materials and abandonment on the submerged lands for NDBC Station 46042 (MBNMS);
   E. Maintenance of a buoy, mooring, acoustic release and anchor for NDBC Station 46041 (OCNMS); recovery of the buoy and mooring material above the acoustic release; and discharge and abandonment on the submerged lands of the mooring materials and anchor below the acoustic release;
   F. When the existing moorings are replaced, installation and maintenance of fully retrievable moorings at both NDBC Station 46013 (CBNMS) and NDBC Station 46041 (OCNMS) with no anchor abandonment allowed.

G. The permit holders shall contact the MBNMS Permit Coordinator (sophie.debeukelaer@noaa.gov) 14 days prior to conducting any project modifications or future research projects that may be prohibited by MBNMS, GFNMS, CBNMS, and/or OCNMS regulations, and shall receive written approval prior to conducting operations, to ensure these new activities meet the intent of Special Term and Condition 2A through 2F above.

3. The equipment and support structures authorized by this permit shall be used in accordance with techniques and intentions identified in the permit application and terms in Special Term and Condition 2, cited above. Disturbance of any other sanctuary resources is prohibited.

4. No activity authorized by this permit shall disturb or impact any historical or marine archaeological resources of the sanctuary. If historical or marine archaeological resources are encountered at any time, the permittee shall cease all further activities under this permit and immediately contact the MBNMS Superintendent.

5. All equipment and items authorized for installation under this permit shall be removed, except as specified in Special Condition 2 when such equipment and items are no longer in use, or sooner if directed by the MBNMS Superintendent if such equipment and items are causing or may cause unacceptable harm to sanctuary resources or qualities. Intentional abandonment of equipment or any item is prohibited. In the event that any mooring or equipment is damaged or dislocated due to weather or any other cause, the permittee shall use all available means to locate and recover the affected item(s). The location and description of any equipment abandoned or lost in the sanctuaries for any reason shall be noted in the annual report (see Special Condition #11) with an explanation why the equipment was not recovered.

6. The permittee shall notify all relevant sanctuary points of contact (see contacts below) in addition to MBNMS Permit Coordinator (lead sanctuary staff on this permit) within 24 hours of a mooring being damaged or dislocated. Further, the permittee will keep the sanctuaries' contacts informed of the status of the damaged or dislocated mooring. In addition, prior to replacing a mooring, the permittee will notify the relevant contact.

POINT OF CONTACT	AFFILIATION	CONTACT INFORMATION
Sophie De Beukelaer	MBNMS Permits	Sophie.Debeukelaer@noaa.gov 831-647-1286
Max Delaney	GFNMS Permits	Max.Delaney@noaa.gov 415- 970-5255
Lilli Ferguson	CBNMS Permits	Lilli.Ferguson@noaa.gov 415-464-5265
George Galasso	OCNMS Permits	George.Galasso@noaa.gov (360) 457-6622 x12

7. The permittee shall contact the U.S. Coast Guard (USCG) (contact Rachel Zamora at (510) 437-2984) to inform them about the mooring and buoy installations and determine whether it is necessary to apply for a permit and/or place a notice in the "Local Notice to Mariners" indicating the location of the buoys.

8. The permittee shall contact Tim Sloane of the Pacific Coast Federation of Fishermen's Associations at 415-561-5080 or tsloane@ifrfish.org to place a notice in "Fishermen's News" indicating the locations of the four buoy stations within GFNMS and MBNMS.

9. All items (e.g. batteries, data recorders, etc.) removed from instrument packages attached to mooring arrays or platforms must be carried to the surface and stored or disposed of properly ashore. At no time may batteries be exposed to the sea or discarded within the sanctuary.

10. If contacted by MBNMS Sanctuary Integrated Monitoring Network (SIMoN) staff, the permittee agrees to provide project metadata from these permitted activities to MBNMS SIMoN staff via a web-based interface. The permittee shall provide the information to MBNMS within three (3) months of the request date. See http://www.sanctuarysimon.org for more information.

11. The permittee shall submit an **annual report** of all activities conducted under this permit to the MBNMS Permit Coordinator no later than **December 1 of 2017, 2018, 2019 and 2020 and a final report is due no later than December 31, 2021**. The reports should include information regarding daily activities such as location (latitude and longitude) of the buoys, discovery or disturbance of historical artifacts, problems encountered, equipment lost, etc. The annual reports shall also include a schematic of the instrumentation that is deployed at each buoy and a table that identifies the data collected at each buoy plus note any interesting anomalies in the data.

12. This activity may also require permission from other agencies. The enclosed permit is not valid until all other necessary permits and/or authorizations are obtained. Any direct or incidental harassment of marine mammals requires a permit from the National Marine Fisheries Service (contact Penny Ruvelas, the Long Beach Office Branch Chief of the Protected Resources Division, at 562-980-4197 or at Penny.Ruvelas@noaa.gov) and/or U.S. Fish and Wildlife Service (contact Douglass Cooper at 805-644-1766). Direct or incidental harassment of seabirds requires a permit from the U.S. Fish and Wildlife Service. Deployment of mooring or surface buoys may require authorization from the US Coast Guard (contact Rachel Zamora at (510) 437-2984 or rachel.c.zamora@uscg.mil). Research conducted within California state waters or California state marine protected areas (MPA) may require permission from the California Department of Fish and Wildlife (contact Brian Owens at brian.owens@wildlife.ca.gov). The use and/or occupation of state-owned lands may require a lease or other authorization from the California State Lands Commission (contact Drew Simpkin at Drew.Simpkin@slc.ca.gov if working in Monterey County and/or George Asimakopoulos at george.asimakopoulos@slc.ca.gov if working North of Monterey County).

13. The permittee may be required to pay any or all expenses associated with the locating of and/or removal by NOAA or its designee of any equipment that is not recovered by the permittee including possible whale entanglement issues that may require a federal response.

General Terms and Conditions:

1. Within 30 (thirty) days of the date of issuance, the permittee must sign and date this permit for it to be considered valid. Once signed, the permittee must send copies, via mail or email, to the following individuals:

Sophie De Beukelaer
Research Permit Coordinator
Monterey Bay National Marine Sanctuary
99 Pacific Street, Bldg 455A
Monterey, CA 93940
Sophie.DeBeukelaer@noaa.gov

National Permit Coordinator
NOAA Office of National Marine Sanctuaries
1305 East-West Highway (N/ORM6)
SSMC4, 11th Floor
Silver Spring, MD 20910
onmspermits@noaa.gov

2. It is a violation of this permit to conduct any activity authorized by this permit prior to the ONMS having received a copy signed by the permittee.

3. This permit may only be amended by the ONMS. The permittee may not change or amend any part of this permit at any time. The terms of the permit must be accepted in full, without revision; otherwise, the permittee must return the permit to the Monterey Bay National Marine Sanctuary office unsigned with a written explanation for its rejection. Amendments to this permit must be requested in the same manner the original request was made.

4. All persons participating in the permitted activity must be under the supervision of the permittee, and the permittee is responsible for any violation of this permit, the NMSA, and Sanctuaries regulations for activities conducted under, or in junction with, this permit. The permittee must assure that all persons performing activities under this permit are fully aware of the conditions herein.

5. This permit is non-transferable and must be carried by the permittee at all times while engaging in any activity authorized by this permit.

6. This permit may be suspended, revoked, or modified for violation of the terms and conditions of this permit, the regulations at 15 CFR Part 922, the NMSA, or for other good cause. Such action will be communicated in writing to the applicant or permittee, and will set forth the reason(s) for the action taken.

7. This permit may be suspended, revoked or modified if requirements from previous ONMS permits or authorizations issued to the permittee are not fulfilled by their due date.

8. Permit applications for any future activities in the Sanctuaries or any other Sanctuary in the system by the permittee might not be considered until all requirements from this permit are fulfilled.

9. This permit does not authorize the conduct of any activity prohibited by 15 CFR § 922, other than those specifically described in the "Permitted Activity Description" section of this permit. If the permittee or any person acting under the permittee's supervision conducts, or causes to be conducted, any activity in the Sanctuaries not in accordance with the terms and conditions set forth in this permit, or who otherwise violates such terms and conditions, the permittee may be subject to civil penalties, forfeiture, costs, and all other remedies under the NMSA and its implementing regulations at 15 CFR Part 922.

10. Any publications and/or reports resulting from activities conducted under the authority of this permit must include the notation that the activity was conducted under National Marine Sanctuaries Permit MULTI-2016-011 and be sent to the ONMS officials listed in general condition number 1.

11. This permit does not relieve the permittee of responsibility to comply with all other federal, state and local laws and regulations, and this permit is not valid until all other necessary permits, authorizations, and approvals are obtained. Particularly, this permit does not allow disturbance of marine mammals or seabirds protected under provisions of the Endangered Species Act, Marine Mammal Protection Act, or Migratory Bird Treaty Act. Authorization for incidental or direct harassment of species protected by these acts must be secured from the U.S. Fish and Wildlife Service and/or NOAA Fisheries, depending upon the species affected.

12. The permittee shall indemnify and hold harmless the Office of National Marine Sanctuaries, NOAA, the Department of Commerce and the United States for and against any claims arising from the conduct of any permitted activities.

13. Any question of interpretation of any term or condition of this permit will be resolved by NOAA.

Your signature below, as permittee, indicates that you accept and agree to comply with all terms and conditions of this permit. This permit becomes valid when you, the permittee, countersign and date below. Please note that the expiration date on this permit is already set and will not be extended by a delay in your signing.

11/28/16

Bill Hansen
Operations Engineer
NOAA National Data Buoy Center

Date

11-25-16

Paul Michel
Superintendent
Monterey Bay National Marine Sanctuary

Date