Draft
ENVIRONMENTAL ASSESSMENT

UNIVERSITY OF HAWAIʻI (UH) MARINE CENTER AND HAWAIʻI UNDERSEA RESEARCH LABORATORY (HURL) VESSEL OPERATIONS

Papahānaumokuākea Marine National Monument
Hawaiʻi

National Oceanic and Atmospheric Administration
National Ocean Service, Office of National Marine Sanctuaries

October 2009

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EXECUTIVE SUMMARY

This Environmental Assessment was prepared in accordance with the National Environmental Policy Act of 1969 (42 United States Code §4321, *et seq*.), as implemented by the Council on Environmental Quality regulations (40 Code of Federal Regulations Parts 1500-1508), and National Oceanic and Atmospheric Administration (NOAA) Administrative Order (NAO) 216-6, which describes NOAA policies, requirements, and procedures implementing NEPA.

NOAA proposes to issue two permits (Proposed Action); one to the University of Hawai'i (UH) Marine Center and one to the Hawai'i Undersea Research Laboratory (HURL) allowing vessel operations (ship, submersible and Remote Operated Vehicle) to support a range of deep-sea marine research projects approved by the PMNM co-trustees. The UH Marine Center research vessel Ka'imikai-o-Kanaloa (KOK) would provide transportation for research teams working on permitted projects within PMNM. Researchers aboard this vessel would also have access to HURL submersibles and a Remote Operated Vehicle (ROV) for underwater work.

The purpose of the Proposed Action is to satisfy the Findings of Presidential Proclamation 8031 which authorizes research in the Monument designed to enhance understanding of Monument resources and improve resource management decisionmaking (Monument Management Plan, 2008). The Proposed Action is to issue two permits, one Research permit to HURL for operation of submersibles and the ROV and one Conservation and Management Permit to the KOK to serve as a support platform for research operations within the PMNM.

The Proposed Action is needed to support research operations which will gain a better understanding of deep-sea ecosystems 200-4000 m (660-13,123 ft) through collection of new records and new species, bathymetric habitat mapping, and tracing the contribution of large pelagic animals (through their death and sinking) to the benthic food web. This information would allow for better management of deep water areas within the PMNM.

The Proposed Action would not result in impacts on the following resource categories: terrestrial biological resources, soils and topography, land use, traffic, air quality and ambient noise, visual resources, natural hazards, and utilities and other infrastructure. The Proposed Action would not result in significant impacts to marine biological resources, physical conditions, marine traffic, solid waste and cultural resources. The Proposed Action would not create environmental health and safety risks that may disproportionately affect children and minority or disadvantaged populations, and would not result in cumulative impacts to any environmental resource category.

NOAA anticipates a Finding of No Significant Impact

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DRAFT ENVIRONMENTAL ASSESSMENT
UH MARINE CENTER AND HURL VESSEL OPERATIONS
PAPAHĀNAUMOKUĀKEA MARINE NATIONAL MONUMENT, HAWAIʻI

TABLE OF CONTENTS

List of Figures

List of Tables

ACRONYMS AND ABBREVIATIONS

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DOD	U.S. Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FONSI	Finding of No Significant Impact
FR	Federal Register
Ft	feet
HAR	Hawai‘i Administrative Record
HDOH	Hawai‘i Department of Health
HURL	Hawai‘i Undersea Research Laboratory
KOK	Ka‘imikai-o-Kanaloa
lbs	pounds
LORAN	Long Range Navigation
m	meter(s)
m^2	square meter(s)
MHI	Main Hawaiian Islands
NAAQS	National Ambient Air Quality Standards
NAO	National Oceanic and Atmospheric Administration, Administrative Order
NEPA	National Environmental Policy Act
nm	nautical miles
NOAA	National Oceanic and Atmospheric Administration
NWHI	Northwestern Hawaiian Islands
PCBs	polychlorinated biphenyls
PMNM	Papahānaumokuākea Marine National Monument
R/V	research vessel
ROV	remotely operated vehicle
SOEST	School of Ocean and Earth Science and Technology
SPA	Special Preservation Area
spp.	Species (plural)
sub	submersible
UH	University of Hawai‘i
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service

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1.0 PURPOSE AND NEED FOR ACTION

1.1 Summary of Proposed Action

The National Oceanic and Atmospheric Administration (NOAA) proposes to issue two permits for vessel, Remote Operated Vehicle (ROV) and submersible operations within the PMNM, one Conservation and Management permit would be issued to the University of Hawai'i (UH) Marine Center for operation of the UH Research Vessel Ka'imikai-o-Kanaloa (KOK) and one Research permit would be issued to the University of Hawai'i, Hawaii Undersea Research Laboratory (HURL) to allow vessel support operations for separately permitted research activities within PMNM. Both permits would be issued for a period of two years.

1.2 Purpose and Need

Need

The need for the Proposed Action is to conduct vessel, submersible, and ROV operations in support of separately permitted research activities taking place at depths between 200m - 4,000m (660-13,123 ft). Conducting vessel, submersible and ROV operations to support research activities will contribute toward a better understanding of the deep-sea benthic environment in the PMNM. This information would allow for better management of deep sea resources in the Monument.

Purpose

The purpose of the Proposed Action is to satisfy the Findings of Presidential Proclamation 8031 which authorize research and conservation and management activities designed to better enhance understanding of Monument resources and improve resource management decisionmaking (Monument Management Plan, 2008). The Proposed Action would consist of issuing two, two-year permits, one Research permit to HURL for operation of two Pisces submersibles and one ROV and one Conservation and Management permit to the University of Hawaii Marine Center for operation of the KOK. Both permits would serve as support platforms for separately permitted research activities which include the following: collection of voucher specimens and specimens that are new records for the area, bathymetric habitat mapping, and further identification of biota at depths between 2,00m – 4,000m and tracing the contribution of large pelagic animals to the benthic food web. It is noted that this activity was permitted in 2007. The Proposed Action is a continuation of the 2007 research and conservation and management activities.

1.3 Background

Papahānaumokuākea Marine National Monument (PMNM) – Regulatory Environment

President George W. Bush established the PMNM on June 15, 2006, to protect the resources of the NWHI. The purposes and management regime for the Monument, as well as restrictions and prohibitions regarding activities in PMNM, are set forth in the Proclamation 8031 (71 Federal Register 36443, June 26, 2006) (Proclamation).

The Secretary of Commerce, through NOAA, has primary responsibility regarding the management of the marine areas of the PMNM, in consultation with the Secretary of the Interior. The Secretary of the Interior, through the U.S. Fish and Wildlife Service (USFWS), has sole

responsibility for the areas of PMNM that overlay the Midway Atoll National Wildlife Refuge, the Battle of Midway National Memorial, and the Hawaiian Islands National Wildlife Refuge, in consultation with the Secretary of Commerce. Nothing in the Proclamation diminishes or enlarges the jurisdiction of the State of Hawai'i, which has primary responsibility for managing the State waters of PMNM and primary responsibility for the Kure Atoll portion of the Kure Atoll State Seabird Sanctuary.

The mission of the PMNM is:

1) prohibit unauthorized access;
2) provide for carefully regulated education and scientific activities;
3) preserve access for Native Hawaiian cultural activities;
4) enhance visitor access at Midway;
5) Phase out commercial fishing; and
6) Ban other types of resource extraction and dumping of waste.

Activities within the PMNM are subject to permit approval by the Monument Co-Trustees which include: NOAA National Ocean Service, USFWS, and State of Hawai'i. Permit categories are research, conservation and management, education Native Hawaiian practices, recreation (Midway only), and special ocean use. All Federal permits including PMNM permits are subject to National Environmental Policy Act (NEPA) compliance. Proposed Actions that impact State jurisdiction may also be subject to State of Hawaii, Hawaii Revised Statutes 343 environmental review.

According to NAO 216-6,the purpose for an EA is to determine whether significant environmental impacts could result from a proposed action. An EA is appropriate where environmental impacts from the proposed action are expected, but it is uncertain that those impacts will be significant. Specific factors that the PMNM believe are relevant include the potential effects of the proposed research on unique characteristics of this geographic region. However, the PMNM will also evaluate the potential effect of the proposed research on all factors, including several shown below.

1) degree to which effects on the human environment are likely to be highly controversial;;
2) degree to which the action establishes a precedent for future actions with significant effects or represents a decision in principle about a future consideration;;
3) individually insignificant but cumulatively significant impacts; and
4) degree to which endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973, are adversely affected

<u>UH Marine Center and Hawai'i Undersea Research Laboratory (HURL)</u>

The UH Marine Center maintains and operates three state-owned vessels: the R/V Kilo Moana, the R/V Klaus Wyrtki, and the R/V KOK. Only the KOK would be permitted to enter PMNM.

HURL is one of six national centers established by NOAA and the UH under NOAA's Undersea Research Program (NURP) to study deep water marine processes in the Pacific Ocean. HURL builds its research program through an annual request for proposals. Projects are selected through peer review and by a scientific advisory panel. In addition, HURL accepts funded requests from private, state, or federal agencies and participates in international collaborative research projects in the Pacific.

The current focus of HURL's Pacific-wide research projects is on deep-sea geology and ecosystems, and potential global climatic influences. Future projects may include research on the geology and biology of emerging and subsiding islands, marine product and fishery assessments, and processes of submarine mineral accumulations on seamounts, volcanoes, and islands.

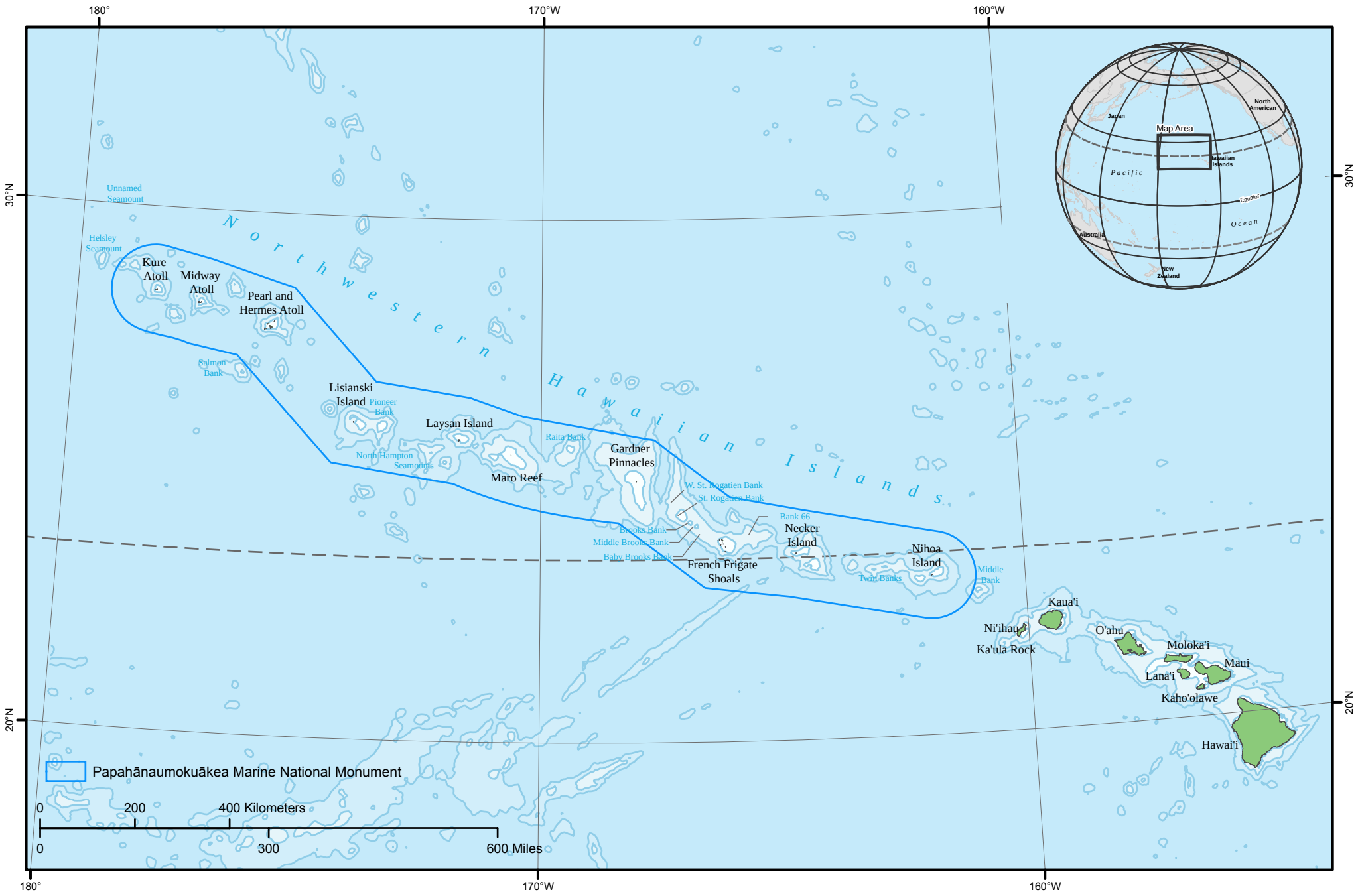

Figure 1-1
Papahānaumokuākea Marine National Monument

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2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVE

2.1 Introduction

This chapter presents a discussion of the Proposed Action, No Action Alternative, and a summary of environmental effects. The Proposed Action and the No Action Alternative are analyzed in terms of how well they meet the purpose and need of the project, as described in Chapter 1.

2.2 Description of Proposed Action and Alternative

2.2.1 Proposed Action

NOAA proposes to issue two permits for vessel support operations in deep water areas of the PMNM. One Conservation and Management permit would be issued to the UH Marine Center for operation of the KOK, a second Research permit would be issued to HURL for submersible and ROV operations in order to support separately permitted research projects in the PMNM (Figure 2-1). Objectives of the proposed action include vessel support operations by the KOK, two deep-diving subs (Pisces IV and Pisces V), and an ROV (RCV-150) (Table 2-1). The KOK would be permitted to enter and conduct operations within the PMNM. The KOK home port is Honolulu Harbor at Pier 45. The subs are housed and maintained in Waimanalo on the windward side of O'ahu.

The Ka'imikai-o-Kanaloa (KOK)

The UH Marine Center operates the State-owned KOK. On average, the KOK accommodates 30 personnel on each cruise, with a maximum capacity of 32 crew members. In addition to traditional berthing and living spaces, the KOK has wet and dry laboratory space, a rock lab, a clean room, and a dark room. The vessel is ballasted with fresh potable water from the dock in Honolulu. There are no ballast water exchanges at sea.

Vessel anchoring has the potential to impact the ecosystem depending on several factors, such as size of the ship or vessel, anchor system, weather conditions, and the location and vicinity of the anchorage relative to sensitive ecosystems (e.g. coral reefs). Anchors and chains can destroy coral and live rock affecting fishes, other benthic organisms and their habitat. The KOK would only anchor in emergency situations, and efforts would be made to drop anchor in areas that are relatively free of coral.

The KOK is dry docked every two years and the bottom and sides are cleaned using a high pressure water system to remove dirt and growth on the hull. The hull is then repainted with an anti-fouling paint, which is approved by the U.S. Environmental Protection Agency (EPA) to retard marine growth and preserve the bottom surface. The hull is also painted with a marine paint for protection in the salt water environment. The last time KOK was dry-docked was August 2008. When the KOK is not in dry-dock, divers routinely scrub the hull and propellers to remove marine growth and reduce drag.

The KOK has a Redfox Marine Sanitation Device, which uses aerobic bacteria to break down the waste material from the ships sewage system. The Redfox discharges into the grey water holding tank. The KOK can retain sewage and grey water on board for an average of two days before the holding tank reaches capacity and grey water must be

discharged. All sewage would be treated and the grey water retained until at a minimum of 3 nm from all PMNM Special Preservation Area (SPA) boundaries (Figure 2-1).

The ship would carry up to 101,000 gallons of diesel fuel and up to 1,000 gallons of lubrication oil, ten 16-ounce cans of WD-40 and 20 gallons of an EPA approved solvent. These are kept in the designated holding tanks located in the engine room. Used oil is stored in a designated labeled drum until return to port. HURL typically generates about one gallon of used oil per dive day. Excess oils from maintenance and repairs are cleaned up with cloth rags and/or oil absorbent pads. Used rags are stored in designated, labeled bins until return to port. The ship also carries approximately 40 gallons of paint and paint thinners are stored in a large box on deck. Waste and excess paint is retained on board until the ship returns to port for proper disposal.

The ship would also carry about 75 gallons spare hydraulic fluid for the ROV. The hydraulic charge cart adjacent to the ROV A-frame/winch holds about 20 gallons, and the remainder is stored in 5-gallon containers on the half deck below the hangar. The A-frame/winch power pack is located in the hangar and has a capacity of about 40 gallons of hydraulic fluid. An additional 20 gallons of spare hydraulic fluid for the A-frame/winch is stored in 5-gallon containers on the half deck below the hangar. Maintenance crews also keep small amounts of lubricants and solvents which are necessary for the proper operation and maintenance of the ROV in the Tracking room.

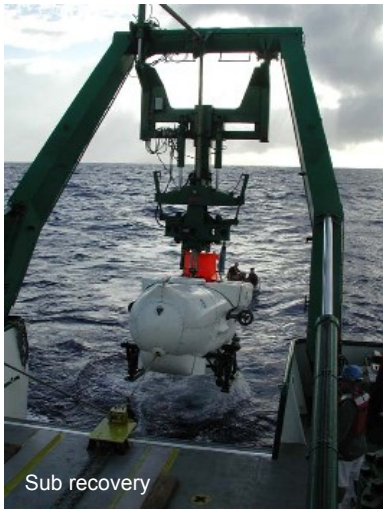
Although an oil spill at sea is unlikely, the crew would address the spill in accordance with the KOK Shipboard Oil Pollution Emergency Plan as approved by the U.S. Coast Guard (USCG). A Non-Tank Vessel Response Plan has also been submitted to the USCG. In the case of a hazardous material spill, the crew would follow procedures described in the KOK Safety Management Manual.

The KOK Safety Management Manual also addresses solid waste management. Degradable waste that is ground would be discharged overboard at a minimum distance of 3 nm from SPA boundaries, and degradable waste that is not ground would be discharge at a minimum distance of 12 nautical miles from SPA boundaries. Any degradable waste that may remain floating for some time, would be discharged at a minimum distance of 25 nm from SPA boundaries. All plastics are retained on board until the vessel returns to port. Laboratory waste is also retained on board until it can be properly disposed of at home port.

The KOK is equipped with a SeaBeam 3012 multibeam sonar bathymetric system. The system is only turned on during mapping projects. The SeaBeam system uses active sonar to map the depth and contours of the sea floor (bathymetry). The system sends a focused pulse of sound (ping) straight down and listens for the reflected echo off of the sea floor. The amount of time it takes for the noise to be sent, reflected, and received is converted into a depth measurement. Power, amplitude, pulse width, and ping rate vary depending on the depths of the ocean in the area being mapped. The SeaBeam uses a frequency of 12 kilohertz and a maximum power of 30 kilowatts for deep ocean mapping pinging every 1-25 seconds. This type of sonar is different from Low-Frequency Active Sonar used by the U.S. Navy which uses a frequency range of 100-1,000 hertz (Federation of American Scientists, 2007).

Pisces IV & Pisces V

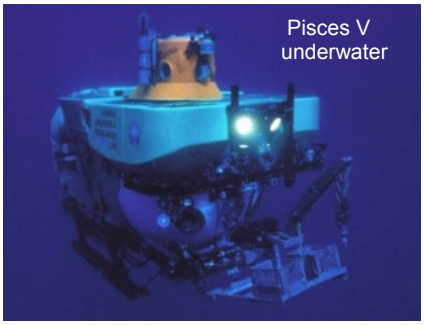
The Pisces subs can do a maximum of about 40 dives per year. Typically, on a 30-day cruise there are 3 science groups and each group conducts between 3-9 dives. Most of the sub work occurs in the aphotic zone beneath the photocline where light does not penetrate.


Sub recovery

The subs would use steel washer punches for ballast. The punches are approximately 10mm thick, with a high surface area. The punches are made of uncoated low-carbon steel, and washed before use. To land on the sea floor, the sub pilot drops one round of weights, and when the sub is ready to return to the surface, the pilot drops a second round of weights. In total, the sub would drop approximately 300-400 pounds (lbs) of washer punches per dive (150-200 per round). A 5-gallon bucket of washer punches weighs about 100 lbs. Sub operators would survey their surroundings visually and have access to detailed maps and would avoid sensitive areas, such as coral colonies, when landing and dropping weights. All ballast would be dropped in the aphotic zone. The decay rate of steel in seawater varies depending on the type of steel. It would take approximately 5 years for a 10 millimeter-thick piece of steel to corrode in seawater. Actual corrosion rate depends on the salinity, oxygen availability, and temperature of the water (National Association of Corrosion Engineers, 1984).

Up to 100 pounds of seawater may be pumped out or flooded into the hard ballast tanks of the subs, depending on the ballasting needs encountered. Under certain conditions, high pressure air may be used in soft ballast tanks to increase the buoyancy of a sub during the ascent at the end of a dive mission. The soft ballast tanks are open to the environment to avoid rupture due to rapidly expanding air near the surface. The surplus ballast air is released into the surrounding water.

The operator would perform pre-dive and post-dive maintenance checks on the subs. During these checks, all hydraulic and pressure compensating systems are examined for leaks and potential problems. Any oil leak found on these systems must be addressed prior to the next dive mission to ensure proper operation of the subs and thus the safety of observers and crew. No solvents or fuels are used to operate the subs. Silicone-based lubricants are used to treat the seals within pressure proof systems on the subs.


Pisces V underwater

All electrical and hydraulic systems on the subs are sealed to the environment as intrusion of seawater into any part of these components must be avoided to ensure the safety of observers and crew. All power generation is electrical. The battery systems emit a small amount of hydrogen gas which is released through check valves to avoid pressure build up inside the battery pods.

The subs would be launched in the morning in clean condition and remain immersed in seawater during the day. Every evening, the sub is recovered and rinsed with fresh water to remove residual seawater from the subs, which causes corrosion and crystallization issues.

Remote Operated Vehicle

The ROV system consists of the vehicle and launching garage, a winch/A-frame unit, and the associated power and control consoles. The system has been upgraded from the original design to incorporate fiber optic data transmission. The ROV is ballasted with syntactic foam and attached lead blocks. Both types of ballast are fixed to the vehicle. No liquid ballast is used. The compact hydrodynamic design and neutrally buoyant tether cable allow close up inspections with a high degree of maneuverability. The vehicle can operate to depths of 914 m (3,000 ft). Color video and a single manipulator are standard equipment on the RCV-150. The investigator can record video and vehicle data (depth, heading, etc.) and can verbally annotate the recording in real time. Other equipment may be adapted for use on the ROV.

In preparation for any research cruise, the maintenance crews would wash the ROV with fresh water and Simple Green™ prior to departure and again following any maintenance onboard the KOK. While at sea, operators would rinse the ROV with fresh water on board the KOK after each dive.

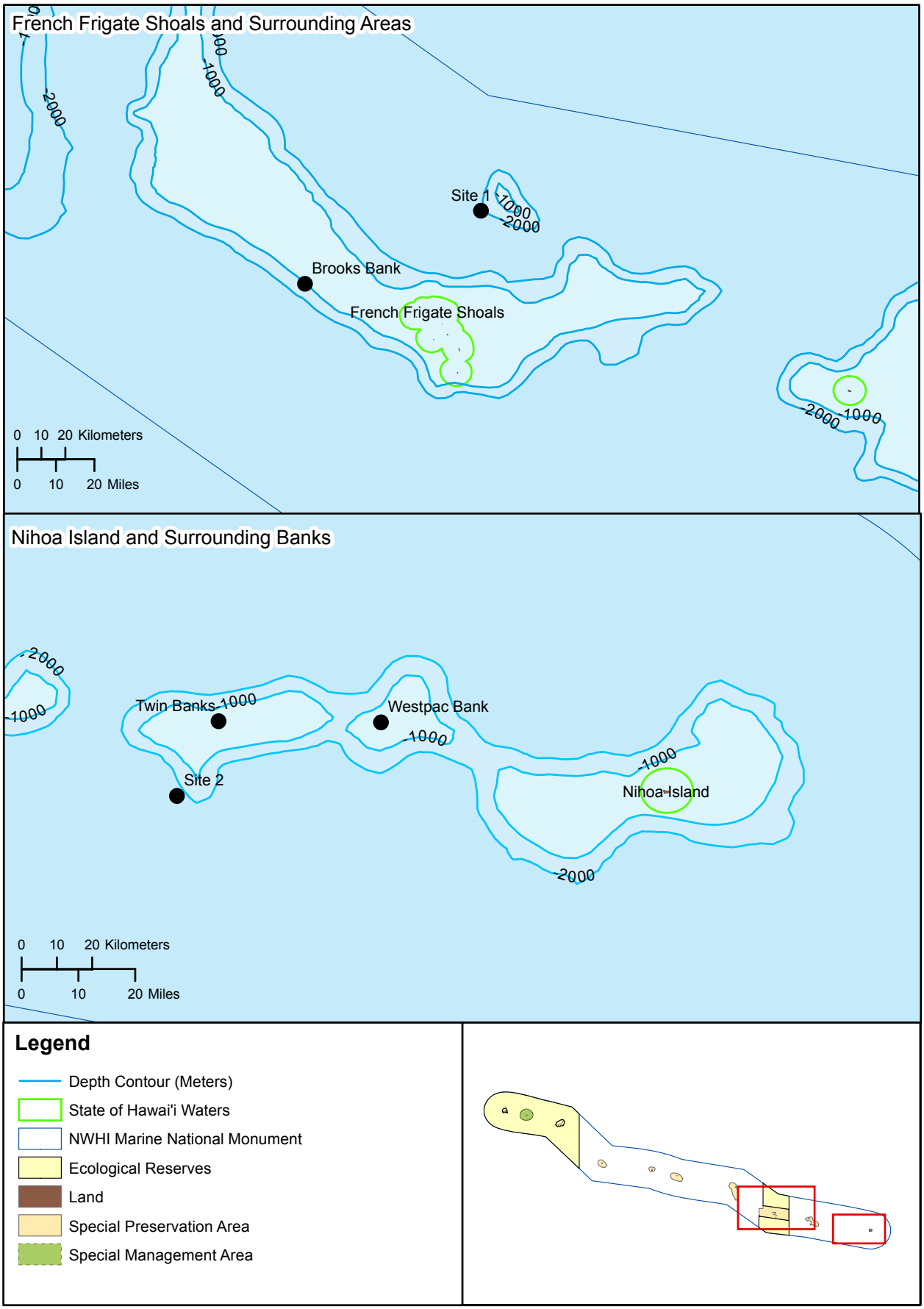


Figure 2-1
Project Location

Table 2-1 UH and HURL Facility Specifications

Facility	Specifications	
Ka'imikai O Kanaloa	Built: 1979 (Modified 1993) Ownership: State of Hawai'i Length: 223 ft Beam: 38 ft Draft: 13 ft 6 in Gross Tonnage: 259 Displacement: 1,961 tons Speed: Cruising 10 knots; Full 11 knots; Minimum 1 knot Range: 15,000 nautical miles (nm) (60 days) Fuel Capacity: 101, 000 gallons* Endurance: 50 days (food and fresh water)	
Pisces IV	Length: 20 ft Width: 10 ft 6 in Height: 11 ft Weight: 13 tons Crew: 1 Pilot 2 Observers Life Support: 140 hours for 3 people Max. Operating Depth: 6,500 ft (1981 meters) Power: 2 lead-acid battery systems Duration: 7 - 10 hours Buoyancy Control: seawater, high-pressure air and droppable descent/ascent weights.	
Pisces V	Length: 20' Width: 10' 6" Height: 11' Weight: 13 tons Crew: 1 Pilot 2 Observers Life Support: 140 hours for 3 people Max. Operating Depth: 6,280 ft. (1914 meters) Power: 2 lead-acid battery systems Duration: 7 - 10 hours Buoyancy Control: seawater, high-pressure air and droppable descent/ascent weights.	
RCV-150	Length: 52" Width: 47" Height: 43" Buoyancy in water: 15 lb Weight in air: 1,215 lb Max. Operating Depth: 3,000 ft. (914 meters) Power: 880 VAC via umbilical Operators: 2 Duration: limited by operator endurance. Propulsion: four 10" diameter thrusters, two horizontal, two vertical Speed: 1.5 knots forward, 0.5 knot vertical (approximate)	

Source: HURL, 2007
*Note: The fuel capacity differs from the source specifications sheet because some of the fuel tanks have been converted to water tanks since the specifications were initially posted. S. Winslow, personal communication via email, School of Ocean and Earth Science and Technology (SOEST), August 30.

144

2.2.2 No Action Alternative

The No Action alternative would not authorize permits for the Proposed Action. Under this alternative, NOAA would not take any action to meet the purpose and need of the project. No additional scientific information would be collected and no new knowledge on NWHI ecology would be gained. Although the No Action Alternative does not meet the project's purpose and need, it has been carried forward for analysis in order to adhere to the Council on Environmental Quality (CEQ) regulations requiring consideration of the No Action Alternative.

3.0 AFFECTED ENVIRONMENT

3.1 Overview

This chapter describes the environmental setting and baseline conditions of the environmental resources within and adjacent to the project location. The Proposed Action has potential to impact marine biological resources, cultural resources, water quality and solid waste. These resource categories are described here and carried through the impact analysis presented in Chapter 4.0. Preliminary project screening indicated that the Proposed Action would not affect many of the resources typically addressed in NEPA impact documents. These resources are described here, but not carried through the impact analysis. Terrestrial Biological Resources, Soils and Topography – There are no terrestrial or coastal components to the Proposed Action and no impacts to terrestrial biological resources or impacts to soils and topography are anticipated.

Land Use – There are no terrestrial or coastal components to the Proposed Action and no impacts or conflicts involving land use are anticipated.

Noise – No impacts to ambient noise are anticipated as a result of the Proposed Action, except for minimal boat motor noise.

Visual Resources – There are no surface or land-based components to the Proposed Action that would impact the aesthetics or visual appearance of the PMNM.

Natural Hazards – The Proposed Action would not impact, induce, or intensify the natural potential for flooding, erosion, earthquake, volcanic, or hurricane activities within the PMNM.

Utilities and Other Infrastructure – The Proposed Action would not result in the construction of utilities or permanent infrastructure in the PMNM.

These resources would not be impacted by the No Action Alternative.

178 Table 3-1 summarizes the environmental effects of the Proposed Action and the No Action
179 Alternative. This information is a summary of Chapter 4.0, Environmental Consequences.

Table 3-1 Summary of Anticipated Environmental Effects of the Proposed Action and No Action Alternative

Resource Category	Proposed Action	No Action Alternative
Terrestrial Biological Resources, Soils and Topography, Land Use, Traffic, Air Quality and Ambient Noise, Visual Resources, Natural Hazards, Utilities and Other Infrastructure, and Hazardous Materials.	No significant anticipated adverse impact.	No impact.
Marine Biological Resources	No significant adverse impact to marine biological resources with implementation of Best Management Practices (BMPs). If any endangered monk seals or sea turtles are observed, or enters the project area at any time, in-water work would be stopped until they leave the area.	No impact.
Cultural Resources	No significant adverse impact to cultural resources. If any indication of a culturally or historically significant site is found during project, work would be halted until the proper authorities can be notified.	No impact.
Water Quality	No significant adverse impact to water quality as small quantities of steel washer punches (each puncher = 10mm thick) are dropped over an extremely large area 14,000lbs per year over362,075 square km.	No impact.
Solid Waste	No significant adverse impact to solid waste is anticipated with the implementation of mitigations and operating practices as needed.	No impact.

180

3.2 Marine Biological Resources

PMNM encompasses a vast and remote chain of islands that is a part of the Hawaiian archipelago, including emergent and submerged lands and waters within a radius of approximately 50 nautical miles from the islands. PMNM encompasses an area of approximately 139,797 square miles (362,075 square kilometers),spans a distance of approximately 1,200 miles and includes islands, coral atolls, seamounts, banks, and shoals. PMNM includes State of Hawai‘i waters and submerged lands, including the NWHI State Marine Refuge and Kure Atoll Wildlife Sanctuary. PMNM also includes Midway Atoll National Wildlife Refuge/Battle of Midway National Memorial, Hawaiian Islands National Wildlife Refuge, and the NWHI Coral Reef Ecosystem Reserve. This diverse ecosystem is home to many species of coral, fish, birds, marine mammals, and other flora and fauna, including the endangered Hawaiian monk seal, the threatened green turtle, and the endangered leatherback and hawksbill turtles. The area is also rich in history and represents a place of great cultural significance to Native Hawaiians.

The KOK, Pisces Submersibles, and ROV would be operating in deep waters 200-4,000 m (660-13,123 ft) around all island areas within the PMNM. The descriptions of these target islands below are summarized from the Papahānaumokuākea Marine National Monument Final Management Plan (2008).

3.2.1 The Northwestern Hawaiian Islands (NWHI)

The NWHI can be characterized as a large marine ecosystem exposed to a wide range of oceanographic conditions and environmental and anthropogenic stressors. Submerged geomorphologic features, including reef, slope, bank, and seamount habitats, support a diverse range of shallow and deepwater marine life. Small islands and islets provide critical breeding grounds and nesting sites for endangered, threatened, and rare species that forage throughout the coral reef, deepwater, and pelagic marine ecosystems encompassing the NWHI.

The following paragraphs provide descriptions of important marine biological resources for each atoll in the NWHI. The descriptions of these target islands below are summarized from the Papahānaumokuākea Marine National Monument Final Management Plan (2008).

Nihoa Island

Nihoa Island is located about 155 miles northwest of Kaua‘i and the Main Hawaiian Islands (MHI). Nihoa is approximately 150 land acres and is the largest emergent volcanic island in the NWHI. The island’s two peaks and steep cliffs are clearly visible from sea. The northern edge is a steep cliff consisting of successive lava layers through which numerous volcanic extrusions (dikes) are visible. Nihoa’s surrounding submerged coral reef habitat totals approximately 142,000 acres. Nihoa’s seabird colony boasts one of the largest populations of Tristam’s storm-petrel (*Oceanodroma tristrami*), Bulwer’s petrel (*Bulweria bulwerii*) and blue-grey noddies (*Procelsterna cerulean*) in the Hawaiian Islands and possibly in the world.

Necker Island (Mokumanamana)

Necker Island is a dry volcanic island shaped like a fishhook and includes about 45 acres of land. Necker is also known by the Hawaiian name Mokumanamana, and is spiritually significant in the Native Hawaiian culture. Geologists believe it was once as large as O‘ahu. Today Mokumanamana’s highest peak is only 365 feet above sea level. Wave erosion has reduced the remaining land to a submerged shelf about 40 miles long and 15 miles wide. While this shelf holds more than 380,000 acres of coral reef habitat, severe waves and currents in the exposed areas inhibit coral growth.

French Frigate Shoals (Kānemiloha‘i)

French Frigate Shoals, the largest atoll in the chain, forms an 18 mile long crescent-shaped cove and consists of 67 acres of total emergent land and approximately 23,000 acres of coral reef habitat. The lagoon contains two exposed volcanic pinnacles and 12 low, sandy islets. French Frigate Shoals is home to the largest breeding colony of the endangered Hawaiian monk seal (*Monachus schauinslandi)* and supports nesting sites for 90 percent of Hawai‘i’s green sea turtle (*Chelonia mydas)* population. The shoals also have the largest diversity of breeding seabirds (18 spp.) in the NWHI.

Gardner Pinnacles (Pūhāhonu)

Gardner Pinnacles consists of two volcanic peaks. Bird guano has given the peaks a frosted appearance, indicating their importance as a roosting site and breeding habitat for 12 species of sub-tropical seabirds. In scale, these pinnacles are small, the larger reaching only 180 feet and about 590 feet in diameter. Surrounding the pinnacles is approximately 600,000 acres of coral reef habitat, most of which is in waters 60 feet in depth.

Maro Reef (Ko‘anako‘a)

Maro Reef is a submerged open atoll with less than one acre of emergent land. At very low tide, only a small coral rubble outcrop of a former island is believed to break above the surface. The shallow water reef ecosystem covers nearly half a million acres and is the largest coral reef in the NWHI. It is biologically rich with 95 percent coral cover in some areas, one of the highest observed in the NWHI. Maro has intricate “reticulated” reef crests, patch reefs and surrounding lagoons. Deepwater channels with irregular bottoms cut between shallow reef structures. Maro’s outermost reefs absorb the energy of swells that travel toward the inner lagoon. The innermost area lies within reticulated reefs and aggregated patch reefs and has the characteristics of a true lagoon, with little influence from large ocean swells. Because of Maro’s structural complexity, the shallow reef is poorly charted and has been largely unexplored.

Laysan Island (Kauō)

Laysan is the second largest island in the NWHI, with approximately 915 land acres. Laysan is surrounded by 100,000 acres of coral reef. Most of the reef area at Laysan is in deeper waters, with a small shallow-water reef area in a bay off the southwest side of the island. The land cover of Laysan consists of vegetation and sandy dunes including a 100-acre hypersaline lake (one of only five natural lakes in Hawai‘i). About two million birds nest here – boobies, frigate birds, terns, shearwaters, noddies, albatrosses – as well as the endangered Laysan duck (*Anas laysanensis*) and finch (*Telespyza cantans*).

Lisianski Island (Papa'āpoho)

Lisianski Island, the second largest NWHI atoll is over 12 miles at its widest point and includes 400 acres of land. Lisianski is a low sand and coral island approximately 20 million years old and reaches a height of 40 feet above sea level. Lisianski is part of a larger open atoll, and lies at the northern end of a reef bank called Neva Shoal, which is estimated to be close to 290,000 acres. The coral cover around the island totals 310,000 acres.

Pearl and Hermes Atoll (Holoikauaua)

Pearl and Hermes is a large atoll with several small islets forming 80 acres of land and nearly 300,000 acres of coral reef habitat. The atoll extends over 20 miles across and 12 miles wide. Pearl and Hermes reef is a true atoll, fringed with shoals, including permanent and ephemeral sandy islets. The islets provide important dry land respites for seals, turtles, and birds in need of rest, protection from predators, or nesting grounds. The islets are periodically washed over when winter storms pass through the area.

Midway Atoll (Pihemanu)

Midway Atoll consists of three small sandy islets, also known as the "Midway Islands," totaling 1,540 acres and a large elliptically shaped barrier reef measuring approximately five miles in diameter. The atoll is surrounded by approximately 88,500 acres of coral reef. Numerous patch reefs dot the lagoon. Midway originated as a volcano approximately 27 million years ago. In 1965, the U.S. Geological Survey took core samples and hit the solid basaltic rock 180 feet beneath Sand Island atoll and 1,240 feet beneath the northern reef. Despite being heavily used by humans, Midway boasts the largest nesting colonies of both Laysan and black-footed albatrosses in the world.

Kure Atoll (Mokupāpapa)

Kure Atoll is located at the northern extent of coral reef development. The atoll is nearly circular with a six-mile diameter enclosing nearly 200 acres of emergent land. The outer reef forms almost a circle around the lagoon except for passages to the southwest. The only permanent land in the atoll is crescent-shaped Green Island, located near the fringing reef in the southeastern part of the lagoon. Kure contains 80,000 acres of coral reef habitat.

Banks and Seamounts

There are approximately 30 submerged banks throughout the NWHI. Surrounding French Frigate Shoals is a series of submerged banks. An unnamed bank is located just to the east of French Frigate. To the west are South East Brooks Bank, St. Rogatien Bank, and another unnamed bank. Raita Bank is just west of Gardner Pinnacles. The crest or top of Raita Bank is nearly 60 feet from the ocean surface. Pioneer Bank is only 22 nm from Neva Shoals, and the features combine to form a major coral reef ecosystem rich in biodiversity with a variety of marine habitats. Bank areas provide extensive habitat for bottomfish and a few are known to provide foraging habitat for endangered Hawaiian monk seals. Large precious corals, such as gold, pink and black corals, are also found in the deep waters of these banks. Unlike shallow reef corals that harness sunlight as an energy source through photosynthesizing symbiotic dinoflagellates in their tissues, deep-water corals live in near-total darkness and thus for a food source, deep-water corals rely on their tentacles to capture plankton from the water column.

3.2.2 Coral Reefs

A total of 57 stony coral species are known in the shallow waters of the NWHI, of which 17 endemic species account for 37 to 53 percent of the relative abundance surveyed on each reef in the NWHI (Friedlander et al. 2005). Seven species of coral within the *Acropora* genus have been documented in the central NWHI, despite their near absence from the MHI. Coral cover varies significantly across the NWHI. Most regions have low coral cover with the exception of Maro Reef and Lisianski Island having comparatively high coral cover. Despite their high latitudes, more species of coral have been reported for the NWHI (52 spp.) than the MHI (48 spp.) (Friedlander et al. 2005).

Shallow water coral reef habitat harbors a diversity of macro algae. Currently, a total of 355 algal species have been recorded from coral reef habitats of the NWHI. The NWHI contain a large number of Indo-Pacific algal species not found in the MHI, such as the green calcareous alga (*Halimeda velasquezii*). Unlike the MHI where alien species and invasive algae have overgrown many coral reefs, the reefs of the NWHI are largely free of alien algae.

3.2.3 Bottomfish

Descriptions of bottomfish habitats in the NWHI indicate that the distribution and abundance of bottomfish are patchy, and appear to be associated with cavities or oceanic current patterns that serve as prey attractants (Kelly et al. 2004). The commercial bottomfish industry targets onaga (*Etelis coruscans*), ehu (*E. carbunculus*), opakapaka (*Pristipomoides filamentosus*), kalekale (*P. sieboldii*), lehi (*Aphareus rutilans*), gindai (*P. zonatus*), and hapuupuu (*Epinephelus quernus*). Species of Hawaii bottomfish that are federally regulated include uku (*Aprion virescens*), white ulua (*Caranx ignobilis*), black ulua (*C. lugubris*), butaguchi (*Pseudocaranx dentex*), taape (*Lutjanus kasmira*), yellow tail kalekale (*Pristipomoides auricilla*) and kahala (*Seriola dumerili*). These species together are collectively known as the Bottomfish Management Unit Species (Hawaii Bottomfish Fishery 2007).

3.2.4 Seabirds

Seabird colonies in the NWHI constitute one of the largest and most important assemblages of seabirds in the world, with approximately 14 million birds representing 20 breeding species (Naughton and Flint 2004). Birds that live at sea and migratory birds are also part of the ecosystem. The NWHI contain over 95 percent of the world's black-footed and Laysan albatrosses. The greatest threats to seabirds in the NWHI are introduced mammals and other invasive species, fishery interactions, contaminants, oil pollution, and climate change.

3.2.5 Marine Mammals

A total of 24 different species of marine mammals have been recorded by research cruises within the U.S. Exclusive Economic Zone in waters surrounding the NWHI and are afforded protection under the Marine Mammal Protection Act (Barlow 2003). Marine mammals observed in the NWHI include whales, dolphins, and Hawaiian monk seals. Use of acoustics (i.e. sound waves) is an important tool for marine mammals in communication, locating prey, and navigation.

3.2.6 Endangered Species

According to the Endangered Species Act of 1973, endangered species are those currently facing extinction. Threatened species are those likely to become endangered within the foreseeable future. Twenty-three species of plants and animals known to occur in the NWHI are listed under the Endangered Species Act (see Table 3-1). Of those listed species that occur in the marine ecosystem, the Hawaiian monk seal and the green sea turtle are discussed further as the NWHI serve as an important breeding ground for these species.

Hawaiian Green Turtle (*Chelonia mydas*)

Green sea turtles have been protected under the ESA since 1978. Over 90 percent of all sub-adult and adult green turtles found throughout Hawai'i originate from the NWHI. After more than 25 years of protecting nesting and foraging habitats in the Hawaiian Archipelago, the Hawaiian green sea turtle population is showing some signs of recovery. Green turtle nesting sites occur at Pearl and Hermes Atoll, Lisianski Island, Maro Reef, and French Frigate Shoals. French Frigate Shoals is the primary nesting site for green turtles, accounting for 400 nesting sites or 90 percent of all nesting within the Hawaiian Archipelago (NOAA 2006).

Hawaiian Monk Seal (*Monachus schauinslandi*)

The Hawaiian monk seal was listed as an endangered species under the ESA in 1976 and is protected by the State of Hawai'i under HRS 195D. The population is estimated at 1,200 individuals (Antonelis et. al 2006), however models predict that the population will fall below 1,000 individuals within the next five years, due to a variety of threats including predation, disease, and marine debris. While 80 to 100 Hawaiian monk seals coexist with humans in the main Hawaiian Islands, the great majority of the population lives among remote islands and atolls within PMNM. Their range generally consists of the islands, banks, and corridors within the PMNM, although individuals have been found farther than 50 nm from shore. Designated critical habitat for this species under the ESA encompasses all beach areas, sand spits and islets, including all beach crest vegetation to its deepest extent inland, lagoon waters, inner reefs, and ocean waters out to a depth of 20 fathoms (36.5 m) around the following: Pearl and Hermes Atoll; Kure Atoll; Midway Atoll, except Sand Island and its harbor; Lisianski Island; Laysan Island; Maro Reef; Gardner Pinnacles; French Frigate Shoals; Mokumanamana; and Nihoa (50 CFR 226.201).

3.3 Cultural Resources

3.3.1 Native Hawaiian Significance

The ocean serves as a central source of physical and spiritual sustenance for Native Hawaiians on a daily basis. Poetically referred to as Ke kai pōpolohua mea a Kāne (the deep dark ocean of Kāne), the ocean was divided into numerous smaller divisions and categories, from the nearshore to the deeper pelagic waters (Malo 1951). Likewise, channels between islands were also given names and served as connections between islands, as well as a reminder of their larger oceanic history and identity.

Today, Native Hawaiians continue to maintain their strong cultural ties to the land and sea. This concept of interconnectedness transcends geography. Native Hawaiians understand the importance of managing the islands and waters as one, as they are inextricably

connected to one another (Beckwith 1951; Lili‘uokalani 1978). Despite the fact that the NWHI were not used and experienced on a daily basis by most Hawaiians, they have always been seen as an integral part of the Hawaiian Archipelago and have been honored as a deeply spiritual location, as evidenced by the many wahi kūpuna, or sacred sites, on Nihoa and Mokumanamana.

3.3.2 Maritime Heritage Significance

In addition to the rich Native Hawaiian cultural setting, maritime activities following Western contact with the Hawaiian Islands have left behind the historical and archaeological traces of a unique past. Currently, there are over 60 known ship losses and/or confirmed sites among the NWHI, the earliest loss dating back to 1818. This, combined with 67 known aircraft crashes, gives a total of over 120 potential maritime heritage resource sites. Many of these resources reflect the distinct phases of historical activities in the remote atolls (Van Tilburg 2002).

As American and British whalers first made passage from Hawai‘i to the seas near Japan in 1820, they encountered the low and uncharted atolls of the NWHI. At times the treacherous nature of navigation in the region gave rise the Western names of the islands and atolls as we know them today. Pearl and Hermes Atoll is named for the twin wrecks of the British whalers *Pearl* and *Hermes* lost in 1822. Laysan was reportedly discovered by the American whale ship Lyra prior to 1828. The history of American whaling is a significant part of our national maritime heritage and is a topic that encompasses historic voyages and seafaring traditions set on a global stage as these voyages had political, economic and cultural impacts. As a nation we were intimately involved in the whaling industry in important and complex ways. There are 10 known whaling shipwrecks in the NWHI. Three of these have been located (American whaler Parker and British whalers Pearl and Hermes) and their archaeological assessment is underway. Whaling vessel wreck sites from the early 19th century are quite rare, and the study and preservation of heritage resources is an important concern. The NWHI provide a unique glimpse into our maritime past.

Despite being slowly integrated into navigational charts, the NWHI remained an area of low and inconspicuous reefs and atolls for many years, frequented by shipwrecks and castaways. Russian and French ships of discovery transited the NWHI, and sometimes found themselves upon the sharp coral reefs. Nineteenth century Japanese junks of the Tokugawa Shogunate period, drifting away from their home islands and into the Pacific, were reportedly washed onto the sands of the atolls. Hawaiian schooners and local fishing sampans voyaged into the archipelago, many not to return. Marine salvage expeditions based out of the main Hawaiian Islands profited from the area, although existing records of their cruising activities are scarce. These types of sites have the potential to yield information about early historic period voyages in the Pacific and about the seafaring traditions of many cultures.

3.4 Water Quality

Hawai‘i’s water quality standards (Chapter 11-54 HAR) are broadly based to protect both terrestrial (groundwater and surface waters) and marine waters. They consist of basic standards applicable to all waters, specific numerical standards for many toxic substances, and specific numerical standards for a number of classes of state waters. Due to their remote location and low level of human activities, the waters of the NWHI are relatively pristine.

3.5 Solid Waste

Marine pollution can be defined as the direct or indirect introduction by humans, of substances or energy to the marine environment resulting in deleterious effects such as hazards to the health of marine life and humans, hindrance of marine activities, and impaired water quality. Marine pollution may originate from land-based or sea-based human activities in the form of point-source discharges or non-point source runoff.

Marine debris is a form of marine pollution that may originate from sea-based activities, such as shipping and fishing or from land-based activities that discharge pollutants in surface water runoff. Marine debris, including derelict fishing gear, cargo nets, bottles, military flares, and barrels of hazardous materials, continue to wash ashore on all the NWHI causing potential localized adverse impacts. Seabirds often ingest smaller debris while foraging, impacting survival rates.

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4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Overview

This chapter evaluates the potential environmental consequences to environmental resources with implementation of the Proposed Action and the No Action Alternative.

4.2 Proposed Action

4.2.1 Marine Biological Resources

Under the Proposed Action, sub operators would implement operational practices to minimize any potential to adversely impact the environment or marine biological resources. Such mitigation measures would include avoiding deepwater corals when dropping ballast weights while performing underwater work. Sub operators would select ballast drop sites where corals are not present. The KOK would not drop anchor within PMNM, except in emergency situations. If an emergency occurs, efforts would be made to drop anchor in areas relatively free of coral.

There is no research that indicates the type of sonar that the KOK operates is harmful to marine mammals. On previous research cruises, spinner dolphins have been seen riding bow waves both while the sonar was in operation and while it was not in operation (J. Smith, personal communication via phone, SOEST, August 30).

Endangered species including monk seals and sea turtles may be seen during vessel operation activities within PMNM. However, before any in-water work is to commence, personnel aboard the KOK would perform a visual scan of the adjacent areas to locate any endangered species. If an endangered species is observed, or if any such species enters the project area at any time, all in-water activities would be stopped until all endangered species leave the area. Activities that would take place as a result of the proposed action would not occur within, near, or adjacent to any known breeding or nesting areas of endangered species.

Alien and introduced species are often spread through ballast water that has been discharged from ships as vessels transit ocean areas. In response to national concerns regarding invasive species, the National Invasive Species Act of 1996 was enacted which reauthorized and amended the Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990. In order to adhere to these policies and eliminate the introduction of any species via ballast water, the KOK would use fresh potable water for ballast. In addition, a careful washing and disinfecting regimen for the KOK, subs, and ROV would be followed to avoid the spread of invasive species. With proper attention to these guidelines, the Proposed Action would not introduce or contribute to the spread of alien species.

By following all established guidelines, mitigations and operating practices described here, the Proposed Action would not significantly affect marine biological resources.

4.2.2 Physical Conditions

Air Quality

Under the Proposed Action, the emissions from the KOK diesel engine would have no adverse affect on existing air quality within the PMNM. The subs are battery-powered and there are almost no emissions under normal operating conditions. Therefore, no significant adverse impacts to air quality would occur as a result of the Proposed Action.

Water Quality

Under the Proposed Action, the subs would drop 300-400 lbs of steel as ballast per dive. With an average of 40 dives per year, the total amount of steel washer punchings dropped as ballast per year would be 12,000-16,000 lbs (6-8 tons). The steel punches would not be recovered and would slowly dissolve, adding iron to the water. The environment where the ballast is likely to be dropped is iron-limited (J. Wiltshire, personal communication via email, SOEST, September 10, 2007). The sub would drop 150-200 lbs on the initial dive and another 150-200 lbs on the return ascent. Because the subs are submerged 7-10 hours, the subs would likely drop these two rounds of ballast in different areas. Most of the sub work occurs in deeper water below the photocline, and all ballast would be dropped in the aphotic zone. The steel ballast and added nutrients would be spread over a large area. Due to the low-light environment the ballast release would not cause localized phytoplankton blooms.

Marine vessels and their related activities can affect the water quality by discharging sewage or grey water effluent. Sewage discharge can contain bacteria, viruses, or medical wastes that can adversely impact the direct health of humans and wildlife or affect the ecosystem by increasing nutrient concentrations. Grey water is wastewater from sinks, showers, laundry and galleys. It can contain a number of pollutants such as suspended solids, ammonia, nitrogen, phosphates, heavy metals and detergents. All sewage aboard the KOK would be treated and the grey water retained until reaching a minimum of three nm from SPA boundaries, where it would then be discharged.

Bilge water collects in the bottom of the ship's hull, and as a result contains fuel, oil, and wastewater from engine and machine operations, including spills and leaks. Regulations for the PMNM, prohibit discharging or depositing any material into PMNM that could injure any resource. Exceptions were made to discharges incidental to vessel operations, such as deck wash, approved marine sanitation device effluent, cooling water, and engine exhaust.

With these operational practices in place and regulations followed, the Proposed Action would not significantly degrade the water quality within PMNM; therefore, no significant impacts to water quality would occur as a result of the Proposed Action.

Hazardous and Regulated Materials

In the event of an oil or toxic chemical spill, vessel crew would follow all established procedures detailed in the USCG approved Shipboard Oil Pollution Emergency Plan and Safety Management Manual. With these mitigation measures in place, no significant impact to resources are likely to occur as a result of the Proposed Action.

4.2.3 Marine Traffic

Under the Proposed Action, the KOK would undertake a maximum of one research cruise per year over a two-year period. The existing marine traffic is minimal and one additional research cruises would not significantly increase traffic within PMNM; therefore, no significant impacts to marine traffic would occur as a result of the Proposed Action. Other possible impacts associated with marine vessels such as vessel discharge and oil spills have been evaluated in Section 4.2.2 Physical Conditions.

4.2.4 Solid Waste

Under the Proposed Action, degradable waste would be discharged at a minimum distance of 12 nm from shore. Degradable waste that might float would be discharged at least 25 nm from shore. All laboratory waste and plastics would be retained on board and properly disposed of at home port. Adhering to these operational restrictions, the KOK would not discharge significant amounts of solid waste within PMNM.

Under the Proposed Action, the subs would drop 300-400 lbs of steel as ballast per dive. With a maximum of 40 dives per year, the maximum amount of steel washer punchings dropped as ballast per year would be 12,000-16,000 lbs (6-8 tons). The steel punches would not be recovered. The steel that would be used as ballast under the Proposed Action would have less adverse impact than the traditional lead shot ballast because it dissolves faster and does not release lead into the environment. The steel washer punchings are relatively thin with a high surface area which minimizes the time it takes to corrode. During previous visits, anecdotal evidence is that the punchings dissolve within 2 years (J. Wiltshire, personal communication via email, SOEST, September 10, 2007). The rapid corrosive rate of the ballast material, the small punch size and resultant increased surface area exposed to salt water, and anecdotal observations of researchers visiting areas of prior ballast releases suggest that the punches would not persist in the environment more than 2 years. Therefore, no significant impacts to solid waste would occur as a result of the Proposed Action.

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4.2.5 Cultural Resources

Under the Proposed Action, the actual locations of underwater work would be determined by the individual research projects. These underwater areas are unlikely to contain culturally or historically significant sites. However, if any indication of a culturally or historically significant site is found during project activities, work would be halted until the proper authorities can be notified. The Proposed Action is temporary in nature and would not significantly impact historic or cultural resources, nor interfere with traditional Hawaiian practices.

Research activities under the Proposed Action would occur underwater at depths ranging from 200-4,000m (660-13,123 ft). The locations of underwater work are unlikely to contain culturally or historically significant sites. However, if KOK personnel observe any indication of a culturally or historically significant site during, after, or prior to project activities, any work would be halted at that time until the proper authorities can be notified. The Proposed Action is temporary in nature and would not significantly impact historic or cultural resources, nor interfere with traditional Hawaiian practices.

4.3 No Action Alternative

4.3.1 Marine Biological Resources

Under the No Action Alternative, the Proposed Action would not take place. There may be some beneficial impact to marine biological resources as the subs, ROV and KOK would not enter the Monument. No ballast would be dropped and there would be no anchoring by the KOK. Therefore there would be no potential damage to coral and no chance for fuel spills, vessel grounding or other vessel hazards. That said, the No Action Alternative may reduce the overall possibility of negative impacts to Monument resources by coral damage, oil spill, vessel grounding, or other vessel hazards.

Under the No Action Alternative, there also would be no chance for any of the aforementioned research projects to occur, as the KOK and subs would not enter the Monument, therefore Monument managers would not have the opportunity to gain new information about deep water areas in the Monument.

4.3.2 Physical Conditions

Under the No Action Alternative, the Proposed Action would not take place. The existing conditions at PMNM would not change; therefore, no significant impacts would occur as a result of the No Action Alternative.

4.3.3 Marine Traffic

Under the No Action Alternative, the Proposed Action would not take place. The KOK would not enter PMNM. The existing conditions at PMNM would not change; therefore, no significant impacts would occur as a result of the No Action Alternative.

4.3.4 Solid Waste

Under the No Action Alternative, the Proposed Action would not take place. No ballast drop-weights or effluent would be discharged. The existing conditions at PMNM would not

change; therefore, no significant increases of solid waste would occur as a result of the No Action Alternative.

4.3.5 Cultural Resources

Under the No Action Alternative, the Proposed Action would not take place. The existing cultural resources and Native Hawaiian uses at PMNM would not change; therefore, no significant impacts would occur as a result of the No Action Alternative.

4.4 Cumulative Impacts

Cumulative impacts to environmental resources result from incremental effects of the Proposed Action evaluated in conjunction with the effects of other government and private past, present and reasonably foreseeable actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Activities that have been considered under cumulative impacts that could potentially intensify impacts of the Proposed Action are summarized in Table 4-1.

4.4.1 Marine Biological Resources

NOAA regulates a range of activities in PMNM, including some commercial fishing. Commercial bottomfishing has been conducted in the NWHI for the past 60 years. Bottomfish are found concentrated on the steep slopes of deepwater banks of the NWHI. The fishery includes 13 species of snapper and carangid and one species of grouper that are commonly caught at depths between 60 and 350 m (NOAA, 2007). Seven bottomfishing vessels are currently permitted to enter PMNM for commercial fishing for bottomfish and other associated pelagic species. Fishing may continue in PMNM for until June 15, 2011 when the fishery will be closed (Monument Proclamation 8031).

The Proposed Action was conducted in 2007 with no observable negative impacts to the environment. Projects that could potentially contribute to cumulative impacts with the Proposed Action are summarized in Table 4-1. The table includes short descriptions of these projects. One research project was analyzed in a separate EA entitled, “Deep Sea Camera Research Permit EA.” A Finding of No Significant Impact was signed on May, 2009. When combined with the Proposed Action, one project does occur at the same depth, but within different habitat types. Therefore, the Proposed Action will not significantly impact marine biological resources.

In the past, roughly seventeen research cruises were conducted in the Northwestern Hawaiian Islands each year. No significant adverse marine biological impacts are anticipated as a result of the Proposed Action. In addition, the proposed research locations under the Proposed Action are at a much greater depth than areas targeted by the commercial fisheries and the other research projects occurring within the PMNM. The research cruises scheduled aboard the KOK do overlap the depth range considered in this project; however those projects occur in a different habitat type and would not overlap. Therefore, the Proposed Action would not result in cumulative impacts.

4.4.2 Physical Conditions

No significant adverse impacts to existing physical conditions are anticipated as a result of the Proposed Action; therefore, the Proposed Action would not result in cumulative impacts.

4.4.3 Solid Waste

HURL has not conducted any sub operations within the NWHI since PMNM was designated. Sub dives have totaled 2 in 2000, 10 in 2001, 14 in 2002, 49 in 2003, 0 in 2004 through 2006, 17 in 2007, and 0 in 2008. The estimated ballast dropped since 2000 is approximately 32,200 lbs, or an average of approximately 3,578 lbs a year. The subs never drop ballast in the same locations; when research activities (e.g. gold coral monitoring, or

diving on same geological feature (seamount)) require subs to visit the same locations, sub operators conduct dives on different tracklines and drop ballast in different locations away from research areas. Given that the dives would take place at different sites covering a vast area (see figure 2-1), the amount of ballast discharged is negligible.

Other activities that could potentially contribute to cumulative impacts with the Proposed Action are summarized in Table 4-1.

Table 4-1 Relevant Projects within PMNM

Project Name	Time Frame	Purpose and Scope
NOAA Ship HI'IALAKAI as a Support Platform for Permitted Activities	June – October 2009-2010	The Proposed Action is to allow NOAA Ship HI'IALAKAI entry into PMNM. Personnel aboard the vessel will be permitted under separate permits. This activity was permitted in 2005 – present.
Deep Sea Camera	June – November 2009	The Proposed Action is to issue a research permit to deploy 15-20 cameras and baited traps, anchored with old chain links near Nihoa, Lisianski, Laysan, and Pearl and Hermes Atoll at depths between 1,000 to 4,000m. The iron anchors would be left on site.

4.4.4 Marine Traffic

No significant adverse impacts to marine traffic are anticipated as a result of the Proposed Action; therefore, the Proposed Action would not result in cumulative impacts.

4.4.5 Cultural Resources

No significant adverse cultural impacts are anticipated as a result of the Proposed Action; therefore, the Proposed Action would not result in cumulative impacts.

5.0 ENVIRONMENTAL PERMITS, APPROVALS, AND COMPLIANCE

5.1 Permits

The University of Hawaii Marine Center and the University of Hawaii Undersea Research Laboratory have submitted two permit applications (one Conservation and Management application and one Research application) to conduct vessel operations (KOK, Pisces IV and V submersibles, and ROV) in the PMNM.

5.1.2 Other Permits

No other permits are necessary for these activities, as the activities contained herein will not result in incidental disturbance or take of Hawaiian monk seals or cetaceans. UH Research Vessel KOK and HURL would obtain separate, respective permits.

5.2 Other Laws and Authorities Considered

5.2.1 Magnuson-Stevens Fishery Conservation and Management Act

The site for the Proposed Action comprises soft bottom substrate. Large precious corals, such as gold, pink and black corals, are found in the depth range considered in this research project, however, are primarily found on rocky substrate such as submerged banks. Soft bottoms such as the areas targeted for camera rig deployment and ballast discharge by the submersibles do not have a suitable surface for the coral to attach to (NOAA, 2006; Drazen, personal communication, May 31, 2007). The bottom habitat surrounding the project drop areas are inhabited by invertebrate fauna, burrowing fish, and bottom-dwelling fish and no adverse impacts to the habitat or the species present (see section 3.2.11) are expected. No adverse impacts to Essential Fish Habitat are anticipated. Also, cumulative or synergistic impacts are not expected as a result of the Proposed Action because a vast amount of similar habitat lies within the PMNM.

5.2.2 Endangered Species Act

The National Marine Fisheries Service (NMFS) has determined that the Proposed Action would not adversely affect the Hawaiian monk seal or green sea turtle occurring within the PMNM. The short-tailed albatross, an endangered species under USFWS' purview, has been observed on land at French Frigate Shoals and Midway Atoll in the past. The Proposed Action would take place greater than 3nm from shore at a depth range of 200m – 4,000m. Therefore, NMFS has determined that the Proposed Action would not affect the short-tailed albatross since it is highly unlikely that this seabird would occur in the vicinity of the drop camera deployment areas. All precautions would be taken not to disturb Hawaiian monk seals or green sea turtles.

In 2009, PMNM conducted an informal consultation with NMFS Pacific Islands Regional Office (PIRO) on the Proposed Action – procedures which included operation of UH Research Vessel KOK and deployment of submersibles and ROV. In the analysis, NMFS PIRO concluded that1) disturbance from humans and equipment to protected species is temporary and insignificant and does not exceed those actions previously consulted on; 2) the likelihood of an entanglement or hooking with a protected species is discountable; 3) the likelihood of a vessel colliding with a monk seal or green turtle is discountable.

5.2.3 National Historic Preservation Act (NHPA)

Under the provisions of Section 106 of the National Historic Preservation Act of 1966, the Secretary of the Interior has compiled a national register of sites and buildings of significant importance to America's history. Sites in the NWHI include cultural sites on Nihoa Island and Mokumanamana Island, and historic sites on Midway Atoll. The Proposed Action would not cause any negative impacts to registered sites or buildings on shore or any such submerged site, such as shipwrecks.

5.2.4 Marine Mammal Protection Act

The Marine Mammal Protection Act authorizes NMFS to take measures to protect marine mammals that may involve setting aside habitat required by various life stages, although the chief provision is the prohibition of "taking" marine mammals directly or indirectly. None of the activities proposed herein should directly or indirectly interact with monk seals or other protected species such as dolphins or whales.

5.2.5 Executive Order 12898 on Environmental Justice

Consistent with the President's Executive Order on Environmental Justice (February 11, 1994) and the Department of Commerce's Environmental Justice Strategy, the proposed research activities would not have any disproportionately high and adverse human health or environmental effects on minority or low income populations.

5.2.6 Executive Order 12866

Implementation of the activities herein described does not constitute a "significant regulatory action" as defined by Executive Order 12866 because (1) it would not have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) it would not create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) it would not materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; and (4) it would not raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

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