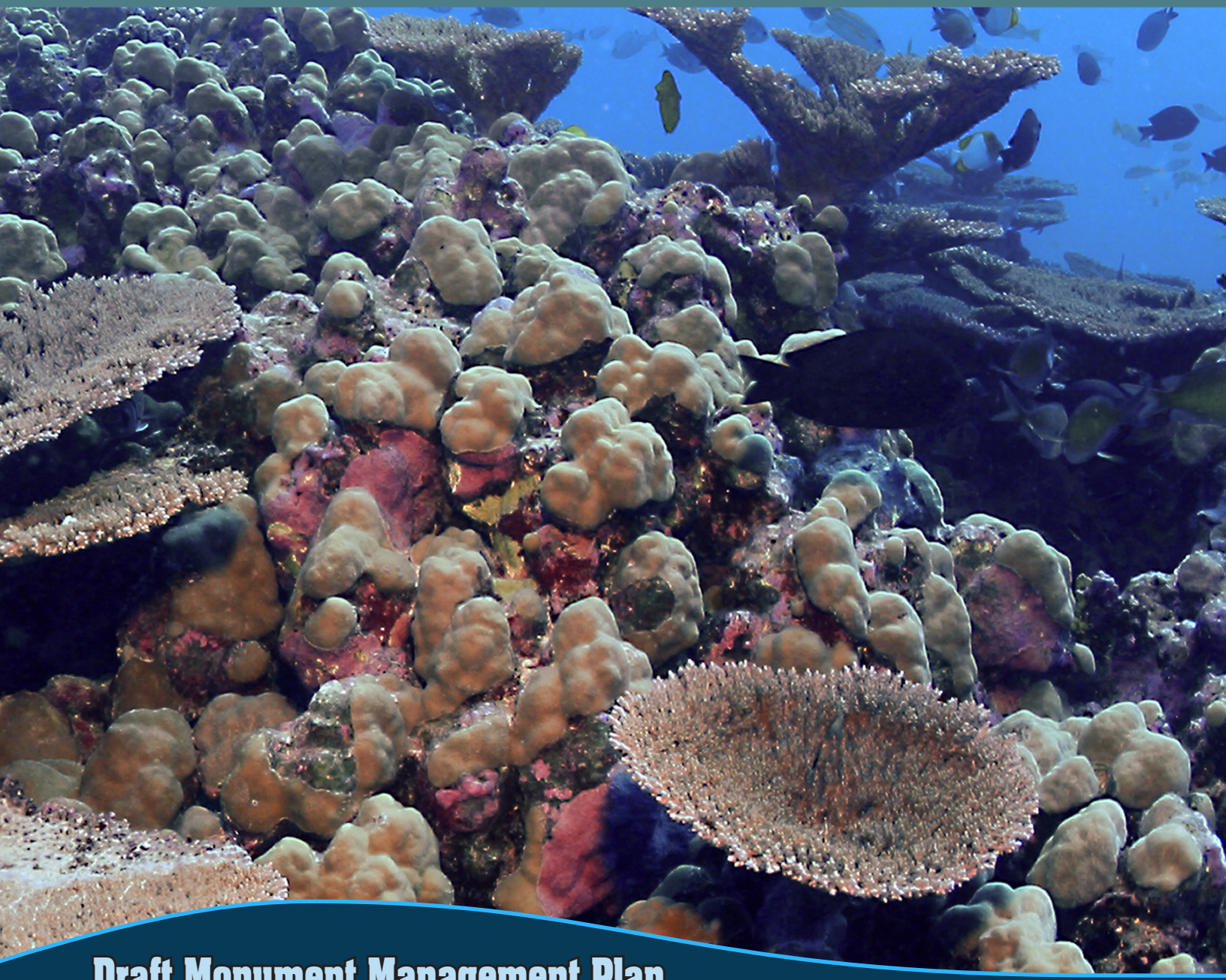
Papahānaumokuākea
Marine National Monument



Draft Monument Management Plan
Environmental Assessment

U.S. Fish & Wildlife Service * National Oceanic and Atmospheric Administration * State of Hawai'i

Volume II

Papahānaumokuākea Marine National Monument

Draft Environmental Assessment

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Draft Environmental Assessment
Note to Readers:

This Draft Environmental Assessment (EA) represents the Co-Trustees' analyses in compliance with their individual agency policies and State and Federal environmental review law and statutes, including the National Environmental Policy Act of 1969 (NEPA) and Chapter 343, Hawai'i Revised Statutes (HRS).

In keeping with the purpose of environmental review and to avoid unnecessary repetition, the EA incorporates by reference many of the descriptors and background from the draft Monument Management Plan (MMP) and other documents accompanying the MMP. Therefore, although the MMP and EA are in different volumes, the two should be read together to obtain a clear understanding of the environmental consequences of the actions in the MMP.

The Co-Trustees remind the reader that prior to its designation by Presidential Proclamation 8031 issued by President Bush on June 15, 2006, several Federal conservation areas existed within the Monument, namely the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, managed by the National Oceanographic and Atmospheric Administration (NOAA) within the Department of Commerce, and the Hawaiian Islands and Midway Atoll National Wildlife Refuges, managed by the U.S. Fish and Wildlife Service (FWS) within Department of the Interior. Nothing in the establishment of the Monument, the MMP, or the environmental assessment will diminish the responsibilities and requirements by the Federal agencies to continue to manage these areas.

Furthermore, the Proclamation establishing the Monument expressly stated it did not diminish or enlarge the jurisdiction of the State of Hawai'i, therefore, the State's responsibilities and requirments to manage its areas also remain intact. In 2005 the State designated all of its waters in the NWHI as a State Marine Refuge, and it has jurisdiction over the State Seabird Sanctuary at Kure Atoll, the northwesternmost emergent island in the NWHI. To provide for the most effective conservation and management of the natural, cultural, and historic resources of the NWHI, Governor Lingle on December 8, 2006, entered into an agreement with the two Secretaries to have State lands and waters in the NWHI managed as part of the Monument, with the three parties serving as Co-Trustees. The agreement also provided for the inclusion of the Office of Hawaiian Affairs into the monument management process to provide a voice for Native Hawaiians in the management of the Monument and its cultural resources.

Just as the Draft MMP is written with activities representing various levels of specificity; so too does the environmental assessment represent various levels of analysis. The Co-Trustees agencies provide the following summaries of their respective analyses represented in this document:

NOAA
This draft EA analyzes NOAA activities at a programmatic level. That is, the analysis focuses on the scope of actions proposed by NOAA in the context of the 6 priority management needs, each of which is focused on targeted management needs for the Monument through 22 separate action plans to address these needs. Specific actions associated with strategies outlined in each action plan have already been analyzed through project-specific environmental reviews for activities listed in the No Action Alternative. Likewise, any new or expanded activities would be analyzed as appropriate under NEPA and NOAA policy implementing the Act.

FWS
The draft EA provides the public with a description of the refuge-based alternatives considered for implementation as well as analysis of these alternatives' known and potential environmental effects. The activities within the MMP are both general and specific for the FWS, and thus require either a programmatic level or a more detailed, site specific analysis for the environmental consequences of implementing the alternatives. The EA identifies those actions for which NEPA and other compliance requirements are covered through this document as well as those activities for which additional compliance may be required by FWS. The MMP and EA satisfy the FWS' requirements for National Wildlife Refuge System Comprehensive Conservation Planning.

State of Hawaii
The State of Hawai‘i worked cooperatively with our Federal partners to prepare this EA for activities resulting from the implementation of the MMP. This joint Federal and State EA for the MMP satisfies the State's statutory requirements under HRS 343. However, implementation of future activities within the Monument may trigger further environmental review and will be evaluated on a case-by-case basis to determine if additional environmental analysis is needed.

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APPENDICES

Appendix

A Cultural Impact Analysis

LIST OF ACRONYMS/ABBREVIATIONS

ACRONYMS/ABBREVIATIONS

Acronym	Full Phrase
AC	Agency Coordination
APPS	Act to Prevent Pollution from Ships
ARPA	Archaeological Resources Protection Act
AS	Alien Species
BMP	Best Management Practices
CBO	Constituency Building and Outreach
CCP	Comprehensive Conservation Plan
CD	Compatibility Determination
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFO	Coordinated Field Operations
CFR	Code of Federal Register
CO	Central Operations
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenydichloroethylene
DDT	Dichlrodephenyltrichloroethane
DLNR	Department of Land and Natural Resources (State of Hawaii)
DOCARE	Division of Conservation and Resources Enforcement
DOD	Department of Defense
DOT	Department of Transportation (State of Hawaii)
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EN	Enforcement
EPA	Environmental Protection Agency
ER	Ecological Reserve
ERAT	Emergency Response and Assessment Team
ESA	Endangered Species Act
ETOPS	Extended Twin Engine aircraft operations
EV	Evaluation
FAA	Federal Aviation Administration
FFS	French Frigate Shoals
FWS	U.S. Fisheries and Wildlife Services
GIS	Geographic Information Systems
HABS	Historic American Buildings Survey
HCZMP	Hawai`i Coastal Zone Management Program
HMC	Habitat Management and Conservation
HR	Historic Resources

ACRONYMS/ABBREVIATIONS *(continued)*

Acronym	Full Phrase
HRS	Hawaii Revised Statutes
ICC	International Code Council
ICOADS	International Comprehensive Ocean-Atmosphere Data Set
ICS	Incident Command System
IMaST	Information Management and Spatial Technology
IMO	International Maritime Organization
LME	Large Marine Ecosystem
LORAN	Long Range Aid to Navigation
LUCs	Land Use Controls
MARPOL	International Convention for the Prevention of Pollution from Ships 1973
MB	Migratory Bird
MCS	Marine and Conservation Science
MD	Marine Debris
MH	Maritime Heritage
MMB	Monument Management Board
MMP	Monument Management Plan
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
MPRSA	Marine Protection, Research and Sanctuaries Act
MSD	Marine Sanitation Device
MTA	Marine and Transportation Action Plan
MVSP	Midway Visitor Services Plan
NEPA	National Environmental Protection Act
NHCH	Native Hawaiian Culture and History
NHCI	Native Hawaiian Community Involvement
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Services
NOAA	National Oceanic and Atmospheric Administration
NOWRAMP	Northwestern Hawaiian Islands Reef Assessment and Monitoring Program
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NRSP	Natural Resources Science Plan
NWHI	North Western Hawaiian Islands
NWR	National Wildlife Refuge
NWRSAA	National Wildlife Refuge System Administration Act

ACRONYMS/ABBREVIATIONS *(continued)*

Acronym	Full Phrase
OEL	Ocean Ecosystems Literacy
OHA	Office of Hawaiian Affairs (State of Hawaii)
OSHA	Occupational Health and Safety Administration
PAHs	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PDO	Pacific Decadal Oscillation
PHRI	Public Health Research Institute
PIMS	Papahānaumokuākea Information Management System
PSSA	Particularly Sensitive Sea Area
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
ROV	Remotely Operated Vehicle
SAFE	Secure Around Flotation Equipped
SARA	Superfund Amendments and Reauthorization Act
SCUBA	Self-Contained Underwater Breathing Apparatus
SHIELDS	Sanctuaries Hazardous Incident Emergency Logistics Database System
SHPD	Hawaii State Historic Preservation Division
SHPO	State Historic Preservation Officer
SMA	Special Management Area
SPA	Special Preservation Area
TCP	Traditional Cultural Properties
TES	Threatened and Endangered Species
TSCA	Toxic Substances Control Act
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USCG	United States Coast Guard
USDA	U.S. Department of Agriculture
VMS	Vessel Monitoring System
VOIP	Voice Over Internet Protocol
VOS	Volunteer Observing Ship
VS	Visitor Services

CHAPTER 1:

INTRODUCTION

CHAPTER 1
INTRODUCTION

This environmental assessment (EA) evaluates the activities proposed in Papahānaumokuākea Marine National Monument (Monument) Management Plan. The proposed Monument Management Plan is the Monument Co-Trustee agencies' overall guiding framework for their mission of well-coordinated management for strong long-term protection and perpetuation of the Northwestern Hawaiian Islands (NWHI) ecosystems. Management of the Monument is the responsibility of three Co-Trustees: the State of Hawai‘i, through the Department of Land and Natural Resources; the U.S. Department of the Interior, through the Fish and Wildlife Service (FWS), and the Department of Commerce, through the National Oceanic and Atmospheric Administration (NOAA). The Monument Management Plan was developed to carry out Presidential Proclamation 8031 (Establishment of the Northwestern Hawaiian Islands Marine National Monument, June 15, 2006) to develop a joint management plan for the Monument, an effort that the State of Hawaii joined through a Memorandum of Agreement (MOA) signed by the Governor and the Secretary of Commerce and the Secretary of the Interior in December 2006. This EA has been developed in accordance with the National Environmental Policy Act of 1969 (NEPA) and Hawaii Revised Statues (HRS) Chapter 343 Environmental Impact Statement Law. The purpose of the EA is to inform the relevant state and federal agencies and the public of the likely environmental consequences of the activities contained in the Monument Management Plan. It focuses on site-specific issues within the boundaries of the Monument and the socioeconomic effects on the State of Hawai‘i.

1.1 OVERVIEW AND BACKGROUND

The NWHI make up the northern three-quarters of the Hawaiian archipelago, beginning in the northwest at Kure atoll, the most northerly coral reef atoll in the world, and extending approximately 1,200 miles (1,043 nautical miles[nm], 1,931 kilometers [km]) southeast to Nihoa Island, 165 miles northwest of Kaua‘i. The President issued Presidential Proclamation 8031, which created the Monument under the authority of the Antiquities Act of 1906, as amended (16 United States Code [USC] 431-433).

The Proclamation and the December 2006 MOA between the Governor and the Secretaries of Commerce and the Interior (see Volume III, Appendix H) describes the principal entities

responsible for managing the Monument, NOAA, FWS, and the State of Hawai‘i (collectively, the Co-Trustees), the primary responsibility of each, and the institutional arrangements for management among the Co-Trustees. The MOA created a Monument Management Board (MMB) and described institutional arrangements and responsibilities to fulfill the vision, mission, and guiding principles of the Monument including representation of Native Hawaiian interests by the Office of Hawaiian Affairs on the MMB. The MMB implements policy guidance from the Co-Trustees and is responsible for on-site planning and program implementation.

The federal managers—NOAA and FWS—promulgated joint implementing regulations on August 19, 2006 (Northwestern Hawaiian Islands Marine National Monument, 50 CFR Part 404; see Appendix G). Specifically, these regulations codify the scope and purpose, boundary, definitions, prohibitions, and regulated activities of the Monument. Proclamation 8031 was amended on March 6, 2007, to declare the Hawaiian name for the Monument, Papahānaumokuākea and clarify some definitions (Presidential Proclamation 8112, Establishment of the Papahānaumokuākea Marine National Monument, March 6, 2007).

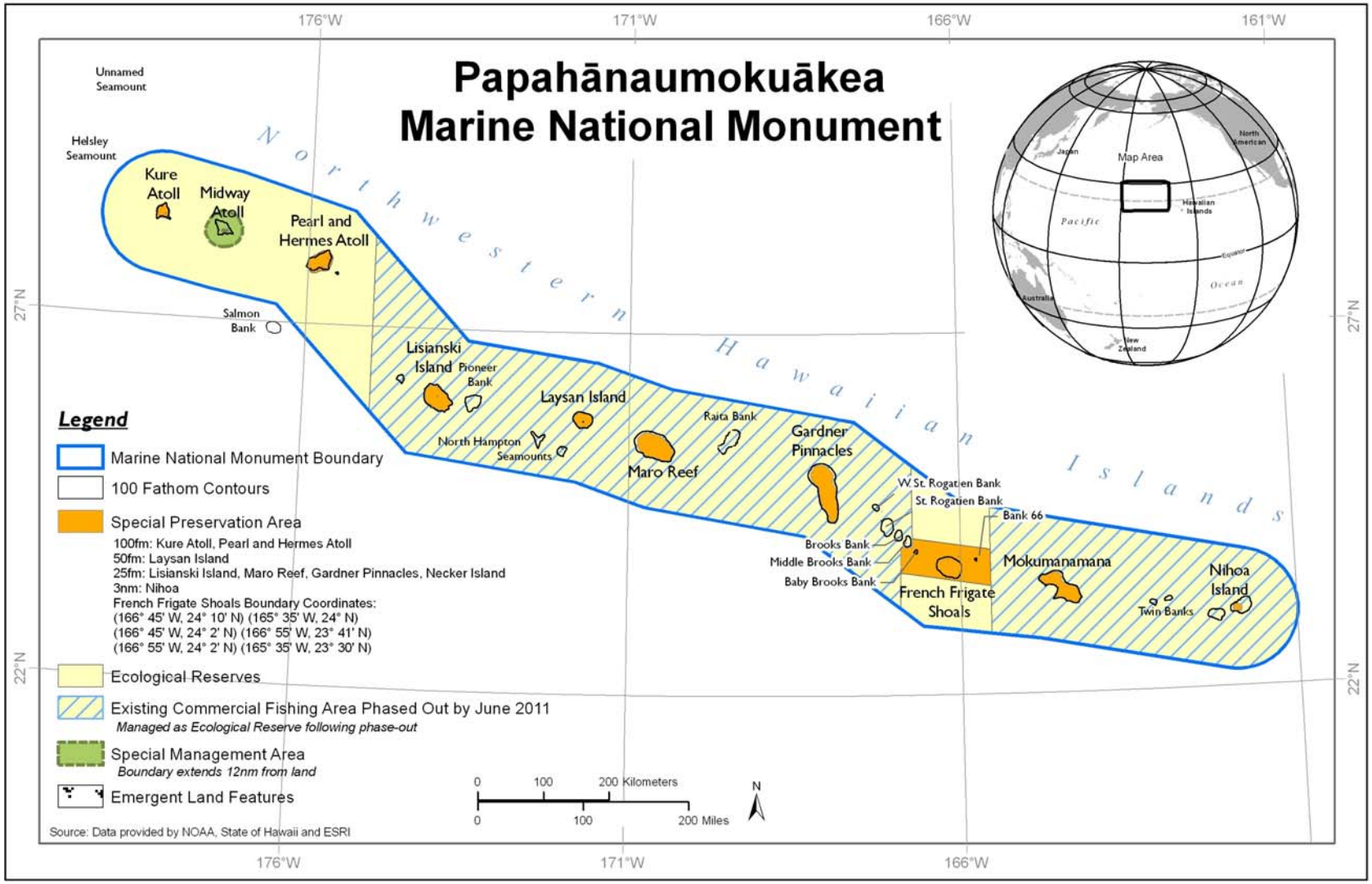
The Monument is the largest fully protected marine conservation area in the world (Figure 1.1). It encompasses 137,792 square miles (356,881 square km) of the Pacific Ocean, an area larger than all U.S. national parks combined. The Monument includes the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, State of Hawai‘i Northwestern Hawaiian Islands Marine Refuge, Kure Atoll Wildlife Sanctuary, the Midway National Wildlife Refuge, the Hawaiian Islands National Wildlife Refuge, and the Battle of Midway National Memorial. This region supports a dynamic reef ecosystem, with more than 7,000 marine species, half of which are unique to the Hawaiian Island chain. This diverse ecosystem is host to many species of coral, fish, birds, marine mammals, and other flora and fauna, including the endangered Hawaiian monk seal, the threatened green sea turtle, and the endangered leatherback and hawksbill sea turtles. In addition, this area has great cultural significance to Native Hawaiians and a connection to early Polynesian culture worthy of protection and understanding as noted in the Proclamation.

The boundaries of the Monument, Special Preservation Areas (SPAs), ecological reserves (ERs), and the Special Management Area at Midway Atoll are illustrated in Figure 1.1 and Appendix A to 50 CFR 404. In addition to activities that are prohibited throughout the Monument, those prohibited within the SPAs are swimming, snorkeling, or scuba diving and discharging or depositing any material or other matter except vessel engine cooling water, weather deck runoff, and vessel engine exhaust. In addition to the overarching regulations that govern activities in the Monument, the regulations governing activities in the reserve and wildlife refuges and State of Hawai‘i jurisdiction also apply.

1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION

The Monument is important both nationally and globally, as it contains one of the world’s most significant marine and terrestrial ecosystems and areas of cultural significance. In accordance with Presidential Proclamation 8031, the Monument Management Plan is built on the foundation of the draft Sanctuary Management Plan, the Reserve Operations Plan, and input obtained through many hours of public consultation. In addition, the National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 688dd-688ee) instructs FWS to develop

Figure 1.1 Papahānaumokuākea Marine National Monument



Comprehensive Conservation Plans (CCPs) with National Environmental Policy Act compliance for all National Wildlife Refuges by October 2012. So that there would be a single management plan for the Monument, FWS moved its planning effort forward to have the MonumentManagement Plan also serve as, and meet the requirements of, the CCPs for the two refuges within the Monument. The proposed Monument Management Plan would serve as a collective guiding framework to enable the Co-Trustees to effectively and efficiently achieve the overall vision of the Monument to ensure the health, diversity, and resources of the NWHI are protected. The ecosystems would be managed over the long term to achieve agency and Monument missions and purposes.

The need for the Monument Management Plan is defined both by legal mandates set forth in the designation of the Monument and priority management identified by the Co-Trustee agencies, with input from scientists, Native Hawaiian practitioners, and other stakeholders through numerous public scoping meetings and workshops. Priority management needs address multiple Monument goals and define areas for focused action, including improving our understanding of the NWHI, conserving wildlife and habitats, reducing threats to the ecosystem, managing human uses, coordinating conservation and management efforts, and achieving effective Monument operations. These priority management needs are described below and form the overall framework of action for the proposed Monument Management Plan.

Understanding and Interpreting the NWHI. The NWHI represents a unique opportunity to advance our understanding of ecosystem science through research, monitoring, and the incorporation of traditional knowledge. Coordinated research and continued development of long-term monitoring is needed to deepen our understanding of the composition, structure, and function of the NWHI ecosystems. The information from these activities would generate vital data and information necessary to document changes in ecosystem function over time. This would provide the needed predictive tools to make informed decisions and evaluate the effectiveness of management measures in protecting and restoring environmental integrity to the NWHI.

Incorporating traditional ecological knowledge into management practices would enrich and inform the MMB's approach to long-term planning. The further characterization of Native Hawaiian cultural relationships to the NWHI, through the study of oral histories, place names, and practices associated with the region, would enhance the physical record of activities in the NWHI. The unique aspects of island and Pacific maritime history, as well as historical and archaeological resources, collectively can provide a basis for developing effective management of resources.

Conserving Wildlife and Habitats. The preservation of the NWHI through active conservation and management of wildlife and their habitats is in the public interest. The NWHI is a large ecosystem home to many diverse terrestrial and marine flora and fauna, including many endemic species and 23 federally listed threatened or endangered species. This priority management need is concerned with maintaining biological integrity, diversity, and environmental health of the Monument and with assisting in the recovery of threatened and endangered species; managing migratory bird populations; and conserving, managing, and where appropriate, restoring the habitats of the Monument's native flora and fauna.

Reducing Threats to the Ecosystem. Despite their remote location, marine and terrestrial ecosystems of the NWHI are at risk from a range of threats from human activities within and outside the Monument. Natural and anthropogenic threats to the Monument include habitat alteration or damage from marine debris, the changing climate, including increased storm intensity and frequency, introduction of alien species, potential vessel and aircraft effects, release of hazardous materials from former landfills, vessel grounding, and past human effects. Development and implementation of threat reduction protocols and monitoring are needed to protect, preserve, maintain and, where appropriate, restore natural communities, including habitats, populations, native species, and ecological processes as a public trust for current and future generations. In addition to threat reduction, emergency response in the Monument would be coordinated through building an internal and interagency capacity to contribute to emergency response efforts.

Managing Human Activities. The NWHI has experienced a long history of human use, with periods of overexploitation, that have contributed to the current endangered status of some species, including land birds, several plants, sea turtles, and the Hawaiian monk seal. Although the extent of resource exploitation has been limited in recent years, human activities and the use of Monument resources must be carefully managed through permitting, enforcement, and managing uses, including Native Hawaiians engaging in cultural practices and people visiting Midway Atoll National Wildlife Refuge (NWR).

Coordinating Conservation and Management Efforts. The Monument can only be comprehensively conserved and monitored through effective interagency coordination and partnerships with a broad range of stakeholders. Coordination among the Co-Trustees, MMB members, and other stakeholders is needed to maintain existing resource protection measures, to increase the efficiency and effectiveness of management and enforcement, and to reduce conflicts and duplication of Monument management activities. Education and outreach efforts require coordination among government agencies, nongovernmental organizations, and other stakeholder groups. Coordination with stakeholders and the public is needed to provide a forum for advice and input on Monument management and to improve awareness and understanding of the ecological, Native Hawaiian cultural significance, and historic significance of the NWHI. Coordination with international initiatives is needed to address Pacific regional and global management issues affecting the Monument.

Achieving Effective Monument Operations. Monument operations include central and field operations, information management, and overall program evaluation. Central and field operations are essential to support action plans to address all other priority management needs. Central operations are located in the main Hawaiian Islands and include support offices, interpretive facilities, and information management facilities. Field operations include, but are not limited to, shipboard and research diving operations, operation of power generation facilities and maintenance of buildings and other infrastructures at field stations and camps. Operational effectiveness must be evaluated and improved through an adaptive management process that captures lessons learned and transforms them into action.

1.3 SCOPE OF ANALYSIS

This EA has been developed in accordance with the National Environmental Policy Act and Hawaii Revised Statutes Chapter 343. Its purpose is to inform decision makers and the public of the likely environmental consequences of the Proposed Action and No Action Alternatives. This EA identifies, documents, and evaluates the effects of the Proposed Action, to implement new and expanded activities described in the Monument Management Plan and No Action , if no new activities were to be conducted beyond the current activities.

The Monument Management Plan is composed of 22 action plans, organized under six priority management needs. Each action plan describes strategies and activities to achieve a desired outcome under each priority management need. Many activities described in the Monument Management Plan are ongoing and are mandated by federal and state laws and existing agency policies and programs. These ongoing activities serve as the baseline for analyzing environmental and socioeconomic consequences. Current activities are described as the No Action alternative and would continue regardless of the development of the Monument Management Plan. Other activities in the Monument Management Plan represent expanded or new activities proposed to achieve the desired outcome for each action plan. Collectively, these activities are the Proposed Action alternative, and their environmental and socioeconomic effects are analyzed in comparison to the No Action alternative. Activities in the Monument Management Plan are also categorized as planning and administrative, field activity, or infrastructure and development to distinguish between those activities that focus primarily on coordination among Co-Trustee agencies and those activities that occur primarily in the Monument.

An interdisciplinary team of environmental scientists and other specialists has analyzed the Proposed Action in light of existing conditions and has identified relevant effects associated with implementing the Proposed Action compared to the No Action alternative. This EA is an analysis of NOAA activities at a programmatic level. The focus is on the scope of the actions proposed by NOAA. Activities either have already been analyzed (No Action) or new and expanded activities will have additional project-specific analysis. FWS activities may be both general or specific and thus require either a programmatic or more detailed analysis. State activities will be evaluated on a case-by-case basis to determine if additional analysis is needed. This analysis covers the biological, cultural, and historic resources of the Monument, as well as the terrestrial and marine environments of the NWHI and the main Hawaiian Islands, as appropriate.

1.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED

In the development of the Monument Management Plan, the MMB also considered other alternatives for managing the Monument. Some comments received from the public have been to close the area that is now the Monument entirely. However, the Proclamation establishes parameters and provides for certain access and activities in the Monument administration, and as such, this is not an option for the Co-Trustees. Providing public use opportunities, education and interpretation at Midway Atoll NWR facilitates a broader understanding and appreciation of the unique NWHI ecosystem.

The Midway Conceptual Plan describes three alternatives to support field activities and visitor services at Midway Atoll: Alternatives A (No Action), B (Integrated Action), and C (Enhanced Action). The enhanced Alternative C was considered but not carried forward for analysis. The enhanced alternative would focus on staff and resources on restoring Midway Atoll habitat and species, cleaning up contaminated sites, and preserving historic resources and limiting visitor services. This alternative would require additional staff and housing to support larger and more focused efforts. Short-term overnight visitation would be as much as 50 volunteer-visitors, while seasonal or long-term contractors, researchers, and habitat specialists would be up to 130 people, thus totaling approximately 180 people on any given night. The increased island population from the current regular capacity of 120 people would require increased utility systems infrastructure. Increased staffing for accelerated restoration and preservation would limit public visitation, and on-site interpretive and educational facilities would be minimal. Visitation would be restricted to those who would carry out approved refuge management activities, essentially closing the Monument to a large interested constituency, including many WWII veterans. A more integrated approach, which balances restoration, preservation, and visitor services, was preferred, and thus this alternative (Alternative C) was not carried forward.

1.5 DESCRIPTION OF NO ACTION ALTERNATIVE

Under the No Action alternative, the Co-Trustees would continue to implement activities to address priority management needs of the Monument based on agency-specific plans. These current activities fall under 22 action areas, as summarized below and described in detail in the Monument Management Plan. Efforts that would result in direct actions are identified and described in the paragraphs and tables below as planning and administrative, field, or infrastructure and development activities.

1.5.1 Marine Conservation Science

Current marine conservation science activities in the Monument are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan, sections 1.1, 1.2, and 1.4 and section 3.1.1, Marine Conservation Science Action Plan). A summary of current activities in the Monument is provided below with references to specific activities in Marine Conservation Science (MCS) Action Plan.

1.5.1.1 Current planning and administrative activities

Current planning and administrative activities would continue to be focused on coordinating research efforts, managing data, and incorporating research results into school curricula. Research update meetings are coordinated among research partners (MCS-2.5). Regularly scheduled meetings are coordinated among managers, staff, and researchers to facilitate information exchange and to provide updates on research efforts in the Monument. These ongoing activities engage scientists conducting research in the NWHI to share their results with each other and with the MMB to assist identify research priorities to improve management decision making. Annual meetings are conducted to present research in the NWHI (MCS-3.1). These meetings provide a forum for the multidisciplinary research community, managers, and interested public to present current research initiatives and recent findings from research, including studies of the ecosystem, Native Hawaiians, maritime heritage, and economics.

Research, monitoring, and bathymetric data are being collected, analyzed, and input to appropriate databases to better inform management decisions (MCS-1.5). Current protocols allow for consistency in data collection protocols over time, which is of primary importance in any monitoring program in order to enable statistically valid comparisons among time periods (MCS-2.2).

Efforts are underway to translate NWHI research findings to the public and to incorporate them into the classroom curricula (MCS-3.2). Many of the materials developed during previous marine research expeditions have been incorporated into other outreach products, specifically displays at the Mokupāpapa Discovery Center, slideshows, and educational curricula. Similarly, educational materials have been associated with satellite tracking of albatross and migration of Golden Plovers (MCS-3.4).

1.5.1.2 Current field activities

Current field activities would continue to be focused on characterizing shallow- and deepwater marine habitats and on integrating education components on some research expeditions. The MMB and its partners would continue to conduct fieldwork to characterize shallow-water marine habitats and their spatial distributions in the NWHI, using a combination of methods, including remote sensing and underwater surveys (MCS-1.1). The shallow-water coral reef ecosystems would continue to be monitored, using sampling protocols developed through an interagency collaborative effort (MCS-1.2).

The MMB and its partners would continue to conduct deepwater mapping and characterization using submersibles, remotely operated vehicles, remote underwater cameras, and multibeam and sidescan sonar (MCS-1.3). Some current scientific expeditions include educational components that have been highly successful for education and outreach. Components include live Web sites with updates from the research vessel, imagery, and video (MCS-3.3).

Current activities described above that would be expanded under the Proposed Action alternative include MCS-1.3, MCS-1.5, MCS-2.2, MCS-3.2, MSC-3.3, and MSC-3.4.

1.5.2 Native Hawaiian Culture and History

Current Native Hawaiian culture and history activities in the Monument are described in the Monument Management Plan and include planning and administrative and field activities (see section 1.3 on resource condition and status and section 3.1.2, Native Hawaiian Culture and History Action Plan, which describes current status and background). A summary of activities in the Monument is provided below with references to specific activities in the Native Hawaiian Cultural and History (NHCH) Action Plan.

1.5.2.1 Current planning and administrative activities

Current planning and administrative activities would continue to be focused on identifying research needs and priorities, assessing cultural resource capacity, and integrating Native Hawaiian traditional ecological knowledge and management into Monument management. Scientific and Native Hawaiian cultural research needs would continue to be identified and prioritized through consultation with the Native Hawaiian Cultural Working Group and other

Native Hawaiian institutions and organizations (NHCH-1.1). Ongoing efforts to develop cultural research priorities would continue alongside associated management challenges and opportunities (NHCH-1.2). Limited cultural and historical research about the NWHI has already been directly conducted by NOAA and FWS, in conjunction with partner organizations such as the Office of Hawaiian Affairs and the Bishop Museum (NHCH-2.1). Current agreements with the University of Hawai‘i are limited to curriculum development (NHCH-2.7). The MMB would continue to assess capacity to support cultural resource management activities (NHCH-3.1). Monument resource managers have varying backgrounds and experiences of Native Hawaiian cultural significance in the Monument, and efforts would continue to inform them about these issues (NHCH-3.3). Native Hawaiian traditional ecological knowledge and management concepts would continue to inform management decisions in the Monument (NHCH-3.4). Native Hawaiian values and cultural information have been used in certain outreach and education programs targeted at both Native Hawaiians and the general public (NHCH-5.1). The development of a culturally based strategy for education and outreach makes information relevant, attractive, and accessible to Native Hawaiians (NHCH-5.2). Currently anyone granted a permit to access the Monument receives a cultural briefing to help foster a deeper respect for the NWHI through better understanding of, and respect for, Hawaiian values and cultural significance of the place (NHCH-5.3).

1.5.2.2 Current field activities

Current field activities would continue to focus on cultural field research and education. Limited cultural field research and education has been facilitated by the Monument. (NHCH-2.3). Two cultural access trip has occurred since the Monument was established (NHCH-2.6). Native Hawaiian practitioners and cultural experts, along with the Native Hawaiian Cultural Working Group, have been advising the OHA on Monument management activities; OHA provides information and recommendations based on this advice to the MMB (NHCH-3.2). Both Nihoa and Mokumanamana are recognized as culturally significant. They are listed on the National Register of Historic Places and protected by FWS in accordance with the National Wildlife Refuge System Administration Act (NWRSAA) of 1966, as amended, and the National Historic Preservation Act of 1966 (NHCH-4.2).

Current activities described above that would be expanded under the Proposed Action alternative include NHCH-2.1, NHCH-2.3, NHCH-2.6, NHCH-2.7, NHCH-3.2, NHCH-3.3, NHCH-4.2, NHCH-5.1, NHCH-5.2, and NHCH-5.3.

1.5.3 Historic Resources

Current historic resources activities in the Monument are described in the Monument Management Plan and include planning and administrative and infrastructure and development activities (see Monument Management Plan, section 3.1.3, Historic Resources Action Plan). A summary of current activities in the Monument is provided below.

1.5.3.1 Current planning and administrative activities

Current planning and administrative activities would continue to be guided by the Midway Atoll NWR Historic Preservation Plan for long-term management and treatment for each of the

63 historic properties eligible for inclusion in the National Register of Historic Places. The procedures in the plan would continue to be used for treating new discoveries. Updates to the Midway Atoll Historic Preservation Plan would continue by reconciling it with the Midway Visitor Service Plan, lead paint abatement plan, and other facilities maintenance and use plans (HR-1.1). Approval of the updated Historic Preservation Plan from Monument partners and the Advisory Council on Historic Preservation would be executed in an agreement document (HR-1.2). Historic preservation responsibilities and procedures would continue to be addressed in annual training of Monument staff and Midway contractors (HR-2.2). Plan and conduct a field survey and documentation of selected National Historic Landmark sites and features within 2 years (HR-3.2). Updating and maintaining the Battle of Midway National Historic Landmark would continue, and interested parties would be included in this planning activity (HR-3.3).

FWS manages the historic properties at Midway Atoll according to a Programmatic Agreement and Historic Preservation Plan. This plan prescribes six different treatment categories for each of the 63 historic properties, based on qualitative measures recommended by interest groups, specialists, and the Advisory Council on Historic Preservation.

1.5.3.2 Current infrastructure and development activities

Current infrastructure and development activities would continue to be guided by the Midway Atoll NWR Historic Preservation Plan for long-term management and treatment for each of the 63 historic properties eligible for inclusion in the National Register of Historic Places. The procedures in the plan would continue to be used for treating new discoveries. Repair and maintenance treatments at National Historic Landmark features would continue to be implemented, with volunteers and unskilled laborers performing maintenance activities and specially trained historic preservation architects and engineers performing repair work (HR-3.4).

Current activities described above that would be expanded under the Proposed Action alternative include HR-1.1, HR-1.2, HR-2.2, HR-3.2, HR-3.3, HR-3.4.

1.5.4 Maritime Heritage

Current maritime heritage activities in the Monument are described in the Monument Management Plan and include planning and administrative, and field activities (see Monument Management Plan, section 3.1.4, Maritime Heritage Action Plan) A summary of current activities in the Monument is provided below with references to specific activities in the Maritime Heritage (MH) Action Plan.

1.5.4.1 Current planning and administrative activities

Current planning and administrative activities would continue to be focused on basic documentary research. Current maritime heritage resource documentation and inventory plans and practices would continue to include annual collection and review of appropriate documentation (MH-1.1). Artifact recovery operation status reports would be developed (MH-1.4), along with an internal maritime heritage resource database (MH-1.5). Maritime heritage information would continue to be incorporated into public education and outreach (MH-2.1). Presentations on maritime heritage resources would continue to be developed and delivered at professional conferences and public events (MH-2.2).

Coordination of interagency maritime heritage resource management would continue to be conducted annually (MH-3.1). Protective measures would be enhanced for selected sites within the NWHI through the National Register of Historic Places nomination process (MH-3.2). A Monument Maritime Heritage Research Plan is being developed for implementation within two years (MH-3.3).

1.5.4.2 Current field activities

Current field activities would continue to focus on coordinated field mapping surveys (MH-1.2). These field surveys include shoreline terrestrial surveys and inventory and marine remote sensing using a magnetometer and side-scan sonar.

1.5.5 Threatened and Endangered Species

Current threatened and endangered species activities in the Monument are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan sections 1.1, 1.2, and 1.4 (Monument setting, resource status and conditions, and stressors) and 3.2.1 (Threatened and Endangered Species Action Plan, Current Status, and Background). A summary of current activities in the Monument is provided below with references to specific activities in the Threatened and Endangered Species (TES) Action Plan.

1.5.5.1 Current planning and administrative activities

Current planning and administrative activities would continue to focus on evaluating potential threats and management needs for threatened and endangered species. NOAA Fisheries has conducted initial habitat loss projections due to sea level rise to evaluate potential threats to Hawaiian monk seals (TES-1.3). Monument staff would continue to reduce any effects of human interactions with monk seals through a variety of methods, including consultations, permitting, and promoting watchable wildlife guidelines. Increased outreach and education activities focused on the Hawaiian monk seal are now being conducted (TES-1.5). Materials have been created for public outreach and attendance at domestic and international meetings to carry out government-to-government communication on fisheries measures that can reduce by-catch of birds that may nest in the Monument during commercial fishing operations that are taking place outside the Monument (TES-4.3).

Ongoing efforts to cooperate with the Japanese government continue to establish one or more breeding populations of short-tailed albatrosses on islands free from threats, such as active volcanoes and introduced mammals (TES-4.1). FWS would continue to evaluate the potential to establish one to three colonies of three endangered plants, *Amaranthus brownii*, *Schiedea verticillata*, and *Pritchardia remota* outside of their historic ranges (TES-7.5). In addition, the MMB would continue to conduct Endangered Species Act (ESA) consultations for all authorized actions (TES-8.1, TES-8.3).

1.5.5.2 Current field activities

Current field activities would continue to focus on conserving, protecting, and managing habitat specifically for the Hawaiian monk seal, green turtle, cetaceans, short-tailed albatross, Laysan

duck, passerines (perching birds), and a variety of listed plant species, One aspect of habitat management is the ongoing efforts to reduce marine debris, particularly in key monk seal habitat; this action is intended to reduce the number of injuries and mortality due to entanglement (TES-1.1). Current emergency response efforts related to Hawaiian monk seals are handled on a case-by-case basis in monk seal camps (TES-1.2).

Cetacean (whales, dolphins, and porpoises) population census research is ongoing (TES-2.1). Spinner dolphin mark and recapture photo identification surveys would continue yearly (TES-2.2), and Monument staff would continue monitoring, characterizing, and addressing the effects of marine debris on cetaceans (TES-2.3). To date, no cases of a cetacean with an infectious disease have been documented in the NWHI, but the appropriate response to any suspected infectious disease incidents would be completed in a timely manner, and contingency response plans would be developed, if required (TES-2.4) . However, controls are being used to prevent negative human-cetacean interactions that may occur as a result of visitor programs or research activities (TES-2.5).

Research has been conducted on the green turtle nesting population in the NWHI since 1973 and is one of the longest series of nesting abundance data for any sea turtle population around the globe (TES-3.1). Green turtle nesting and basking habitat is protected by prohibiting undesirable habitat alteration and controlling access to nesting and basking beaches (TES-3.2). People are prevented from driving and in some cases walking on nesting beaches. Turtle best management practices are being implemented to avoid and to minimize any potential to disturb sea turtle foraging areas (TES-3.3).

Initial studies have been conducted to evaluate the correlation between reproductive success of albatross and contaminant body burdens (TES-4.2). The population of the Laysan duck would continue to be monitored (TES-5.2). The feasibility of translocating Laysan finch, Nihoa finch, and the Nihoa millerbird to other areas of the Monument is being evaluated to buffer against catastrophic declines of current natural populations (TES-6.2).

Efforts to protect all endangered plant species from extinction would continue by collecting their seeds from Nihoa and Laysan Islands and sending them to seed banks, such as the Lyon Arboretum and National Tropical Botanical Garden (TES-7.1).

MMB does not stop at monitoring existing population but seeks to increase numbers and locations of *Amaranthus brownii* and *Schiedea verticillata* on Nihoa by 2018 (TES-7.2) and to establish a self-sustaining Nihoa fan palm (*Pritchardia remota*) population on Laysan Island by 2012 (TES-7.3).These efforts are supported through continued greenhouse operations on Laysan Island to propagate and outplant these and other rare plant species (TES-7.4).

The MMB continues to monitor populations of threatened and endangered species by conducting annual spinner dolphin mark and recapture photo identification surveys (TES-2.2), population monitoring of Laysan ducks on Laysan Island and Midway Atoll (TES-5.1), and annual censuses of populations of each passerine species, along with monitoring their food and habitat requirements (TES-6.1). In addition, ecological baselines of listed species and critical habitat, description of sensitive areas, and other information currently and is being periodically updated (TES-8.2).

Current activities described above that would be expanded under the Proposed Action alternative include TES-1.2, TES-1.3, TES-1.5, TES-2.1, TES-2.3, TES-2.4, TES-2.5, TES-3.1, TES-3.3, TES-4.1, TES-4.2, TES-4.3, TES-5.2, TES-6.2, TES-7.1, and TES-8.2.

1.5.6 Migratory Birds

Current Migratory bird activities in the Monument are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan, section 3.2.2). A summary of current activities in the Monument is provided below, with references to specific activities in the Migratory Bird (MB) Action Plan.

1.5.6.1 Current planning and administrative activities

Current planning and administrative activities would continue to focus on reducing the effect of fisheries outside the Monument on migratory bird populations and ensuring that spill response plans are aimed at minimizing mortality to migratory birds. The Monument staff work with partners to reduce the effect of commercial and sport fisheries on migratory bird populations (MB-2.5). They provide data on seabird population and status and biological expertise regarding migratory bird bycatch and other fishing effects on bird species, particularly the Laysan albatrosses and black-footed albatrosses. Monument staff's biological expertise is tapped to teach seabird identification skills to fishers and fisheries observers and assisting with the development of mitigation techniques should significant effects occur. The MMB would ensure that all spill response plans have adequate coverage of actions necessary to minimize mortality to migratory birds (MB-2.3).

1.5.6.2 Current field activities

Current field activities would continue to focus on controlling or eradicating nonnative species, conducting surveillance of avian diseases, monitoring contaminant levels in birds and the environment, monitoring populations of seabirds, and restoring seabird populations. Nonnative species would continue to be controlled at all sites where they have a negative effect on the survivorship or reproductive performance of migratory birds (MB-1.1). Native vegetation communities would continue to be restored that are important to seabird nesting (MB-1.2). In addition, species-specific social attraction techniques, such as automated playback of calls and providing nesting boxes to encourage recolonization of Bulwer's petrels and Tristram's storm-petrels are ongoing at Midway Atoll (MB-4.1).

The MMB and participating agencies would continue to conduct surveillance for evidence of avian disease outbreaks (including Asian H5N1 Avian Influenza), reporting all instances of unusual mortality, collecting samples, and following response plans if disease is detected (MB-2.1). Contaminant levels in birds and their habitats would continue to be evaluated to determine if the potential exists to cause lethal or slightly below lethal effects (MB-2.2). Furthermore, rigorous quarantine protocols would be maintained to prevent the introduction of alien species that may prove hazardous, specifically to migratory birds (MB-2.4).

Using standard methods devised for tropical seabirds, monitoring a suite of 15 focal seabird species would continue at specific sites in the Monument to track changes in population size and help researchers understand the underlying causes of that change (MB-3.1). Changes in habitat

quality would continue to be monitored by measuring reproductive performance and diet composition in selected seabird species (MB-3.2). Standardized methods would continue to be used to accurately assess the population size and trends of overwintering and migrating Pacific golden plovers, bristle-thighed curlews, wandering tattlers, and ruddy turnstones (MB-3.3).

Current activities described above that would be expanded under the Proposed Action alternative include MB-1.1, MB-1.2, MB-2.2, MB-2.3, MB-3.1, MB-3.2, MB-3.3.

1.5.7 Habitat Management and Conservation

Current habitat management and conservation activities in the Monument are described in the Monument Management Plan and include field activities (see Monument Management Plan, sections 3.2.3). A summary of current activities in the Monument is provided below with references to specific activities in the Habitat Management and Conservation (HMC) Action Plan.

1.5.7.1 Current field activities

Current field activities would continue to focus on habitat restoration and monitoring to document contamination that is degrading habitats within the Monument. Locations of shoreline dumps and other discarded material are documented when found at Kure Atoll (HMC-2.1). Locations of documented landfills would continue to be sought (HMC-2.3). Monument staff would continue to collect and fingerprint washed up oil from mystery spills and its effect on wildlife (HMC-2.5). Studies also would continue on an area of Laysan Island that was contaminated by the insecticide carbofuran (HMC-2.6) to document contamination that degrades habitats within the Monument. Oil fingerprinting is used to determine its origin and to build an oil sample archive for possible use as evidence in liability assignment.

Propagation and outplanting of extant native species identified in the pollen record and historical documents from Laysan Island would continue to occur in 250 acres of vegetated area at Midway Atoll (HMC-4.1). Alien and invasive species would continue to be replaced with native species on Midway and Laysan Islands (HMC-4.3). Habitat restoration activities are part of the routine field season on Kure Atoll (HMC-4.6).

Currently, MMB is monitoring changes in species composition and structure of the coastal shrub and mixed grass communities on all the coralline islands and atolls of the Monument (HMC-4.7) and on basalt islands (HMC-5.2). Water levels, salinity, and other water quality parameters of Laysan Lake continue to be monitored (HMC-6.1). When needed, activities such as installing drift fences are undertaken to slow the movement of sand and the drift of dunes into the lake (HMC-6.2).

Activities described above that would be expanded under the Proposed Action alternative include HMC-2.1, HMC-2.3, and HMC-4.7.

1.5.8 Marine Debris

Current marine debris activities in the Monument are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management

Plan, section 1.4 and section 3.3.1, Marine Debris Action Plan). A summary of current activities in the Monument is provided below, with references to specific activities in the Marine Debris (MD) Action Plan.

1.5.8.1 Current planning and administrative activities

Current planning and administrative activities are focused on collating marine debris data from various entities. Information and data are collected from these entities that use a variety of data collection methods (MD-2.2).

1.5.8.2 Current field activities

Current field activities focus on multiagency marine debris cleanup. Current multiagency marine debris cleanup efforts have been highly effective in removing marine debris from shallow water areas and beaches of the Monument (MD-1.1). These efforts have also included documenting, securing, and removing hazardous materials that wash ashore (MD-1.2). The MMB also works with governmental, nongovernmental, and industry partners to support studies on marine debris issues. One study underway is to assess net scar recovery over time at Midway Atoll (MD-2.1).

Current activities described above that would be expanded under the Proposed Action alternative include MD-1.1, MD-1.2, MD-2.1, and MD-2.2.

1.5.9 Alien Species

Current alien species management activities in the Monument are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan section 3.3.2, Alien Species Action Plan). A summary of current activities in the Monument is provided below, with references to specific activities in the Alien Species (AS) Action Plan.

1.5.9.1 Current planning and administrative activities

Current planning and administrative activities would continue to focus on developing outreach materials and working with various groups to address invasive species issues. As part of the outreach to all Monument permittees, Monument staff would continue to develop best management practices to prevent, control, and eradicate alien species (AS-1.2) and to develop outreach informational materials that include information on regulations, permit requirements, and best management practices related to alien species (AS-9.1). The spread of invasive species and the success of control measures would be tracked in a GIS database of marine and terrestrial alien species (AS-2.2). Some alien species information has been integrated into general Monument outreach materials. For example, the “Navigating Change” curriculum and video series developed in 2004 contained information on the threat of invasive species to native ecosystems (AS-9.2). The MMB is currently working with a number of groups addressing invasive species in Hawai‘i, including the Hawai‘i Invasive Species Council, the Alien Aquatic Organism Task Force, and the Coordinating Group on Alien Pest Species, among several others. The Pacific Invasives Network is addressing invasive species issues in Pacific islands (AS-10.1).

1.5.9.2 Current field activities

Current field activities would continue to focus on alien species prevention, detection, control, and eradication methods. The control of alien species would continue to be addressed through the continued strict enforcement of existing quarantine protocols (AS-3.1) and mandatory hull inspections of all permitted vessels entering the Monument (AS-3.2) to keep the incidence of new invasive species in the NWHI low. Aggressive control of nonnative species is occurring at Tern, Laysan, and Midway Atoll (AS-6.1). For example the grass, sandbur, was eradicated at Laysan (AS-6.2), and work is occurring to control *Pluchea, Sporobolus*, and swine cress at Laysan (AS-6.3). Also, alien species have begun to be surveyed and mapped on Kure (AS-6.4).

Research is conducted on alien species detection and effects of invasive species on native ecosystems (AS-8.1). Terrestrial research is conducted on alien species prevention and control methods for native ecosystems (AS-8.2). Existing invasions of alien species are periodically monitored to determine rate of speed and distribution relative to sensitive species (AS-2.1).

Current activities described above that would be expanded under the Proposed Action alternative include AS-1.2, AS-2.1, AS-2.2, AS-6.1, AS-6.2, AS-6.3, AS-6.4, AS-8.1, AS-8.2, AS-9.1, AS-9.2, AS-10.1.

1.5.10 Maritime Transportation and Aviation

Current maritime transportation and aviation activities in the Monument are described in the Monument Management Plan and include planning and administrative, field, and infrastructure and development activities (see Monument Management Plan, section 3.3.3, Maritime Transportation and Aviation Action Plan). A summary of current activities in the Monument is provided below, with references to specific activities in the Marine Transportation and Aviation (MTA) Action Plan.

1.5.10.1 Current planning and administrative activities

Current planning and administrative activities conducted to manage maritime transportation within the NWHI include coordinating implementation of domestic and international shipping designations with appropriate entities (MTA-1.1). The International Maritime Organization (IMO) has designated the Monument as a Particularly Sensitive Sea Area. This augments protective measures by alerting international mariners to exercise extreme caution when navigating through the area. The IMO adopted associated protective measures for the area that include expanded areas to be avoided and a ship reporting system. Protocols exist for safe aircraft and vessel operations within the Monument (MTA-2.2). Information on alien species introductions, cultural protocols, anchoring, discharge, and Monument regulations are incorporated into training for Monument users and vessel operators before they can access the area (MTA-2.3).

1.5.10.2 Current infrastructure and development activities

Current infrastructure and development activities would continue to focus on encouraging energy and water conservation on all vessels operating with the Monument. Water and energy conservation measures would be continually improved on all vessels operating within the

Monument, upgrading to new practices and technologies as they become available (MTA-2.4). The NOAA vessel *Hi'ialakai* is increasing shipboard conservation measures by recycling, installing water-saving devices, and testing alternative fuels and hydraulic fluids. The MMB would continue to work with various ship managers to encourage similar practices for all vessels operating within the Monument.

Activities described above that would be expanded under the Proposed Action alternative include MTA-2.2 and MTA-2.3.

1.5.11 Emergency Response and Natural Resource Damage Assessment

Current emergency response and natural resource damage assessment activities in the Monument are described in the Monument Management Plan and include planning and administrative activities (see Monument Management Plan, section 3.3.4, Emergency Response and Natural Resource Damage Assessment Action Plan). A summary of activities in the Monument is provided below, with references to specific activities in the Emergency Response and Natural Resource Damage Assessment (ERDA) Action Plan.

1.5.11.1 Current planning and administrative activities

Current planning and administrative activities include incident response and contingency planning. Emergency response in the NWHI is coordinated under a series of plans and systems, including the National Response Plan and the National Incident Management System. The National Response Plan establishes a comprehensive all-hazards approach to enhance the ability of the United States to manage domestic incidents, including oil and hazardous chemical spills. This plan incorporates the National Contingency Plan and its regulations governing how response is conducted by various parties. The NWHI is also covered by a more specific Area Contingency Plan for the Hawaiian Islands.

Appropriate Monument staff would receive training and certifications, including Incident Command System (ICS), hazardous waste Operations and emergency response, boat safety, flight safety, first responder, and first aid, as needed (ERDA-1.2). Monument staff attend Regional Response Team meetings, as appropriate, to keep abreast of current communication and training and to build working relationships with agency staff that make up both the Regional Response Team and the Coast Guard agency staff. Participation in emergency response drills and other events would help with preparedness and better integration into the response process (ERDA-1.3). Appropriate Monument staff have been trained and work closely with a variety of damage assessment programs, to ensure that appropriate response, injury assessment, and restoration activities take place for any given case (ERDA-1.4). There is an area contingency plan and environmental sensitivity indices for the Monument, which damage assessment personnel follow (ERDA-3.1). Monument staff respond to non-ICS events within the Monument (ERDA-3.2). The MMB uses technical experts to consult on permit applications.

Activities described above that would be expanded under the Proposed Action alternative include ERDA-1.2, ERDA-1.3, ERDA-1.4, ERDA-3.1, ERDA-3.2.

1.5.12 Permitting

Current Permitting responsibilities and activities in the Monument are described in the Monument Management Plan and include planning and administrative activities (see Monument Management Plan section 2, Management Framework and section 3.4.1, Permitting Action Plan). A summary of current activities in the Monument is provided below, with references to specific activities in the Permitting (P) Action Plan.

1.5.12.1 Current planning and administrative activities

Current planning and administrative activities include reviewing and tracking permit applications and reports. The Monument staff serve as the central portal through which all permit inquiries and applications are received and processed (P-1.1). Each year, the permit application, instructions, and template are evaluated and updated based on lessons learned from the previous year (P-1.2). Monument staff regularly bring all permits and permit-related issues before the MMB for discussion and decision making. In addition, individual permit applications are reviewed for environmental, cultural, and historic effects, and a case-by-case environmental analysis under NEPA may be conducted as necessary (P-1.3). The MMB uses technical experts to consult on permit applications (P-1.4). Monument staff have begun to develop a geographic information system (GIS)-based permit tracking system, consisting of historical permit data (P-2.1).

Permits are issued based on regulatory requirements and proclamation findings and other criteria established by the MMB to assist with permit reviews. Currently, reports from permittees are received in an unstandardized format (P-2.4). Many of the action plans include educational or outreach activities related to permitting or regulations (P-3.1). Permit applicants are required to meet the findings detailed in Proclamation 8031 and receive a cultural briefing before they are allowed access to the Monument (P-3.2). Information on the permitting process has been placed on the Monument website, including application forms and instructions (P-3.3). Training in advance of a visit to the Monument is an important component of all permitted activities and is required for all those planning to enter the Monument for the first time. Several MMB agencies have formal and informal training mechanisms already in place (P-3.4).

Previously, the State of Hawai‘i Land Board was the primary public forum for being notified of Monument permit applications under consideration by Co-Trustees in Hawaiian waters. To ensure that the general public has access to and is informed of all permit applications under review, a policy on public posting was developed and finalized in November 2007 to regularly update the public on proposed and permitted activities (P-3.5). In addition, the permit application, instructions, and template are evaluated and updated yearly based on lessons learned from the previous year. In addition, feedback from permittees and applicants are gathered yearly to maintain the most efficient and comprehensible permit program possible.

Activities described above that would be expanded under the Proposed Action alternative include P-1.4, P-2.1, P-2.4, P-3.1, P-3.2, P-3.3, P-3.4.

1.5.13 Enforcement

Current enforcement responsibilities and activities in the Monument are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan, section 2, and section 3.4.2, Enforcement Action Plan). A summary of current activities in the Monument is provided below with references to specific activities in the Enforcement (EN) Action Plan.

1.5.13.1 Current planning and administrative activities

Current planning and administrative activities would continue to focus on enforcement of Monument and other applicable regulations, assessment of threats, and operation of a vessel monitoring system, Enforcement activities in the Monument are conducted by the individual Co-Trustee agencies, NOAA Office of Law Enforcement, FWS Law Enforcement, Hawai‘i State Department of Land and Natural Resources (DLNR) Division of Conservation and Resource Enforcement, and the United States Coast Guard (USCG). At the national level, NOAA and FWS have agreements on enforcement (EN-1.2). Collaboration between agencies is conducted on an informal basis as needed to address enforcement issues. Enforcement training is conducted individually by each enforcement entity. A comprehensive threat assessment and enforcement plan is being developed to ensure surveillance resources can be effectively deployed Monument wide and law enforcement agencies can accurately assess threats (EN-2.1).

Currently the Monument relies on USCG platforms for enforcement operations (EN2-4). A Vessel Monitoring System is required by Monument regulations (50 CFR 404), and all permitted vessels must have this system to operate in the Monument (EN-2.2). Current briefings for permittees include information on Monument regulations, permit requirements, and best management practices (EN-3.1). No enforcement personnel are currently stationed in the Monument.

1.5.13.2 Current field activities

Current field activities would continue to focus on enforcement of Monument and other applicable regulations, assessment of threats, and operation of a vessel monitoring system. Enforcement activities in the Monument are conducted by the individual Co-Trustee agencies, NOAA Office of Law Enforcement, FWS Law Enforcement, DLNR Division of Conservation and Resource Enforcement, and the USCG. Midway Atoll is predicted to be a hub of activities for the Monument, and a continued increase in law enforcement capacity is necessary to ensure visitor and staff safety, regulatory compliance, and enforcement (EN-1.5).

Current activities described above that would be expanded under the Proposed Action alternative are EN-1.2, EN-1.5, EN-2.4, EN-3.1.

1.5.14 Midway Atoll Visitors Services

Current Midway Atoll visitor services are described in the Monument Management Plan and include field activities (see Monument Management Plan, 3.4.3, Midway Atoll Visitor Services Action Plan). A summary of current activities in the Monument is provided below with references to specific activities in the Midway Atoll Visitor Services (VS) Action Plan.

1.5.14.1 Current field activities

Current field activities would continue to focus on tours and educational opportunities to visitors consistent with the May 2007 Interim Midway Atoll National Wildlife Refuge Visitor Services Plan. In January 2008, the new program began offering limited opportunities for visitors to experience Midway and the Monument's natural, cultural, and historic resources. The interim visitor services plan, in accordance with the Refuge System Administration Act, has determined that certain recreational uses are compatible. Educational opportunities, which include diving, kayaking, and photography, are consistent with the interim visitors services plan (VS-1.1). Currently, walking tours and snorkeling are offered up to 40 people at a time, consistent with the interim visitors services plan (VS-1.2). Visitor effects and compatibility, as required by FWS policies, would continue to be monitored (VS-1.3). A voluntary visitor satisfaction survey is provided to each guest, with information provided to the refuge manager for appropriate action (VS-2.1).

Current activities described above that would be expanded under the Proposed Action alternative are VS-1.1, VS-1.2, VS-1.3, VS-2.1.

1.5.15 Agency Coordination

Current agency coordination activities in the Monument are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan, section 2, Management Framework, and section 3.5.1, Agency Coordination Action Plan). A summary of current activities in the Monument is provided below, with references to specific activities in the Agency Coordination (AC) Action Plan.

1.5.15.1 Current planning and administrative activities

Current planning and administrative activities are focused on agency coordination among government partners responsible for Monument management activities and other government entities. The MMB currently employs agreed on standard operating procedures for meetings and other events (AC-1.1). A Memorandum of Agreement among the Department of Commerce, the Department of the Interior, and the State of Hawai‘i was signed in 2006 and outlines the coordinated management of the Monument (AC-2.1). Efforts exist to coordinate with agencies outside of the MMB through the Interagency Coordinating Committee (AC-2.2). The collaboration of agencies provides a means to improve management effectiveness in order to assess, prioritize, and plan activities at the Monument. An interagency strategic planning workshop is conducted with the Interagency Coordination Committee to discuss previous year activities, to plan and prioritize new activities, and to identify gaps or additional needs (AC-2.3).

The MMB maintains open communication with the Department of Defense (DOD) and the U.S. Navy on potential areas of cooperation (AC-3.1). The MMB collaborates with managers of marine protected areas and constituents in Hawai‘i and the Pacific to share information on the management challenges common to coral reef ecosystems and the importance of those ecosystems to the world (AC-3.2). The State of Hawai‘i would continue to take the lead within the MMB and would collaborate with agencies to develop a World Heritage application as the

U.S. considers obtaining World Heritage Site status from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) World Heritage Center (AC-3.3).

Current activities described above that would be expanded under the Proposed Action alternative are AC-1.1, AC-2.1, AC-2.2, AC-3.1

1.5.16 Constituency Building and Outreach

Current constituency building and outreach activities are described in the Monument Management Plan and include planning and administrative activities (see Monument Management Plan, section 3.5.2, Constituency Building and Outreach Action Plan). A summary of current activities in the Monument is provided below with references to specific activities in the Constituency Building and Outreach (CBO) Action Plan.

1.5.16.1 Current planning and administrative activities

Current planning and administrative activities would continue to focus on building a constituency of informed stakeholders. Monument staff would continue to refine and implement the Monument Media Communications Protocol to engage news media in informing the public about the Monument's resources and activities (CBO-1.2). The Monument serves as a powerful focal point for engaging a broad and diverse base of constituents and increasing ocean ecosystem literacy (CBO-1.4).

Monument staff will continue to produce a variety of materials to aid Monument constituencies in understanding key aspects of the Monument. The overall site brochure is the primary informational mechanism to help the public, and update letters have been provided to the public regularly during development of the Monument Management Plan (CBO-2.2).

Establishment of the Monument has created great interest from documentary filmmakers, writers, photographers, and others. The MMB supports those endeavors that provide significant benefit to Monument resources and management, and our constituents without affecting Monument resources (CBO-2.3).

Because most people are not able to visit the Monument due to its remoteness and fragility, it is important to bring the place to the people. Through discovery centers, Web sites, public outreach activities and materials, and the Monument media communications protocol, Monument information is dispersed in an accurate, consistent, and timely manner in order to reach a broader audience (CBO-3.1). Public forums have been held regarding specific aspects of the Monument (CBO-3.2). As the Hawaiian Archipelago is most closely related to other sites across Oceania, it is important for the MMB to continue to collaborate with a network of marine managed areas in this region (CBO-3.3). These partnerships would allow for a greater exchange of knowledge and expertise. They would also provide opportunities to build awareness about the important connection between cultural and conservation practices. A volunteer program would continue to be conducted in support of the Monument (Tern, Laysan, Midway, and Kure) (CBO-3.4). Guidance and support relative to Native Hawaiian cultural issues would continue to be provided to the Monument through OHA (CBO-3.6). Nonprofit friends groups would continue to be partners in contributing to the interpretation or recreation and educational programs of Midway (CBO-3.7). The NWHI Coral Reef Ecosystem Reserve Advisory Council, formed in 2001 for the

Reserve, would continue to be convened until the Monument Alliance is established (CBO-3.8). The Reserve Advisory Council has served as a mechanism for public input and a venue for public comment on management activities.

Initial discussions of Monument-wide interpretive themes have been held among the Co-Trustee agencies (CBO-4.1). Two existing interpretive facilities at Hilo and on Midway Atoll NWR would continue to provide interpretive information (CBO-4.2). Monument staff would continue to be engaged in a variety of interpretive efforts to better inform Monument constituencies (CBO-4.3).

1.5.16.2 Current field activities

Because most people are not able to visit the Monument due to its remoteness, current field activities are focused on investigating new technologies to bring the place to the people. To accomplish this goal, Monument staff are investigating a variety of technologies, including underwater video cameras, real-time video transmission, virtual field trips, Web site interfaces, and exhibits in discovery centers (CBO-1.5).

1.5.17 Native Hawaiian Community Involvement

Current Native Hawaiian community involvement activities are described in the Monument Management Plan and include planning and administrative activities (Monument Management Plan, section 3.5.3, Native Hawaiian Community Involvement Action Plan). A summary of current activities in the Monument is provided below, with references to specific activities in the Native Hawaiian Community Involvement (NHCI) Action Plan.

1.5.17.1 Current planning and administrative activities

Current planning and administrative activities would continue to focus on partnerships with existing Native Hawaiian groups and identifying how traditional ecological knowledge can be integrated into Monument management and research activities. A working group consisting of kūpuna, cultural practitioners, Native Hawaiian resource managers, and others established under the NWHI Coral Reef Ecosystem Reserve would continue through OHA to provide advice regarding management of the Monument and ensure the continuance of Native Hawaiian practices (NHCI-1.1). Cultural research and consultation related to the NWHI under the established partnership with the Kamakakūokalani Center for Hawaiian Studies would continue (NHCI-2.1).

Current activities described above that would be expanded under the Proposed Action alternative are NHCI-1.1 and NHCI-2.1.

1.5.18 Ocean Ecosystems Literacy

Current environmental literacy activities in the Monument are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan, section 3.5.4, Ocean Ecosystems Literacy Action Plan). A summary of activities in the Monument is provided below, with references to specific activities in the Ocean Ecosystems Literacy (OEL) Action Plan.

1.5.18.1 Current planning and administrative activities

Current planning and administrative activities focus on education in elementary, middle, and high school. "A Teacher's Guide to Navigating Change" is an integral part of the NWHI-based curricula developed under the Navigating Change partnership and the new Hawai'i Marine Curriculum (OEL-1.1). The Navigating Change partnership would continue to work closely with the Native Hawaiian community to ensure appropriate cultural information is included in curricula (OEL-1.2). Multi-agency educational partnerships would continue to conduct teacher workshops in the main Hawaiian Islands in support of middle/high school environmental education programs, including the "Navigating Change" curriculum (OEL-1.4). The Mokupāpapa Discovery Center for Hawaii's Remote Coral Reefs hosts an average of six school groups per month (OEL-1.6). Education programs would continue to be evaluated to ensure desired goals are being met and target audiences are being reached (OEL-1.9). Monument staff have begun to identify new and innovative projects that could help to increase ocean ecosystems literacy (OEL-2.1).

1.5.18.2 Current field activities

Current field activities would continue to focus on teacher development both in the main Hawaiian Islands and NWHI and on exploring technologies to help those who cannot visit the NWHI experience it remotely. Over the past five years, more than 15 workshops have been conducted on the main Hawaiian Islands to introduce the standards-based Navigating Change curriculum to local teachers. Agency planning for Midway Atoll teacher workshops began in 2007, and a focus group of teachers, curriculum developers, educational leaders, and Navigating Change Educational Partnership members held a planning workshop on Midway Atoll in January 2008 (OEL-1.7). Each year, teachers active in learning about the NWHI and using Monument educational materials are provided with opportunities to participate in teacher and class-at-sea expeditions in conjunction with NOAA research cruises (OEL-1.5). Two opportunities per year are provided for accredited colleges, universities, or private/nonprofit environmental or historical organizations to conduct wildlife-dependent or historical college-level courses or to administer informal educational camps (OEL-1.8). The MMB would continue to use new technologies for educational and outreach activities (OEL-2.2)

Activities described above that would be expanded under the Proposed Action alternative are OEL-1.1, OEL-1.2, OEL-1.6, OEL-1.7, OEL-1.9, OEL-2.1, and OEL-2.2.

1.5.19 Central Operations

Current Central Operations activities in the Monument are described in the Monument Management Plan and include planning and administrative and infrastructure and development activities (see Monument Management Plan section 2 and section 3.6.1, Central Operations Action Plan). A summary of current activities in the Monument is provided below with references to specific activities in the Central Operations (CO) Action Plan.

1.5.19.1 Current planning and administrative activities

Current planning and administrative activities would continue to focus on coordination among the MMB. The MMB has had varying levels of human resources and facility infrastructure in

place before the Monument was established. Although research and management activities are conducted in the Monument, most staff and administrative support is conducted in Honolulu and at other locations within the main Hawaiian Islands. To better coordinate among management agencies and to increase the effectiveness of site operations, annual operating plans would be developed and coordinated in accordance with the Monument management agencies' guiding policies and procedures (CO-1.1). Human resource and organizational capacity needs are regularly assessed to organize and better utilize staff, and identify technical and administrative human resource overlaps and gaps (CO-2.1). Human resource development, including staff recruitment, retention, recognition, training, communication, regular meetings, time and attendance, and staff safety, would continue (CO-2.2). Although some Monument staff are collocated, individual agencies primarily assess the status and future needs of their infrastructure independently (CO-3.1).

1.5.19.2 Current infrastructure and development activities

Current infrastructure and development activities would continue to focus on maintaining physical assets. Maintaining and retaining current physical assets and procuring or leasing additional assets would continue to be driven by individual agency need and available funding (CO-3.2). Appropriate computer equipment would continue to be acquired, upgraded, and maintained to meet management needs (CO-3.3).

Current activities described above that would be expanded under the Proposed Action alternative are CO-2.1, CO-2.2, CO-3.1, CO-3.2, and CO-3.3.

1.5.20 Information Management

Current information management activities in the Monument are described in the Monument Management Plan and include planning and administrative activities (see Monument Management Plan, section 3.6.2, Current Status and Background). A summary of activities in the Monument is provided below.

1.5.20.1 Current planning and administrative activities

Planning and administrative activities are focused on compiling a broad spectrum of information and data into an information management system. Multiagency Reef Assessment and Monitoring Program expeditions in the NWHI, which began in 2000, represent an initial attempt to establish a multiagency data clearinghouse for management purposes. This effort would continue because only a portion of the many years of NWHI data have been processed and made available. An annotated bibliography of cultural resources for the NWHI incorporates past cultural, geological, and biological studies in the NWHI and would continue to be updated. The MMB would continue to participate in the National Marine Sanctuary Program's Information Management and Spatial Technology (IMaST) plan for all field sites. The IMaST plan organizes the many spatial resources within the National Marine Sanctuary System and makes them available to all sites and partner staff needing geospatial information, data, training, software, hardware, and hands-on experience.

Additionally, the MMB would continue developing a field-based tool to help collect research and vessel activity data from scientific expeditions conducted aboard research vessels active in

the NWHI. This system would help to meet permit criteria for data management and reporting and would assist in data entry, metadata recording, and data integrity. This system is one component of the larger Information Management System that would continue to be developed based on a set of priority management questions. A GIS spatial bibliography database for the NWHI is under development and will continue to be updated. This GIS incorporates geographical positions of past habitat characterization and field research into spatially referenced electronic documents.

1.5.21 Coordinated Field Operations

Current coordinated field operations activities in the Monument are described in the Monument Management Plan and include planning and administrative, field activities, and infrastructure and development (see Monument Management Plan, section 3.6.3). A summary of current activities in the Monument is provided below with references to specific activities in the Coordinated Field Operations (CFO) Action Plan.

1.5.21.1 Current planning and administrative activities

Current planning and administrative activities are focused on coordinating field operations and supporting dive operations. Continuing activities include implementing infrastructure rehabilitation, reconstructing and developing facilities on Midway Atoll (CFO-1.1), and applying "greening" methods and technologies for facilities and assets (CFO-1.4). An overarching MOA defines the working relationship among MMB agencies and provides a foundation for future specific field oriented agreements (CFO-2.1).

1.5.21.2 Current field activities

Current field activities would continue to focus on each agency operating under their own field operations procedures (CFO-2.2). Field operations in the Monument rely on ships, aircraft, seasonal field camps, and field stations. Permitted activities are monitored through field activity reports to assess the threats they may pose to the resources. Reporting requirements are being developed with partners that would draw on existing databases when available (CFO-2.3). To enhance interagency planning and coordination for field operations, field operations are coordinated annually to efficiently deploy personnel and share resources among agency partners and ensure that priority management needs are met (CFO-2.4).

Individual MMB agencies inventory, maintain, and coordinate the use of their own small boats and related field resources (CFO-6.1). Interagency dive operations would continue to focus on maintaining reciprocity agreements, communication between dive masters and chief scientists, and ensuring certifications and training (CFO-8.4).

1.5.21.3 Current infrastructure and development activities

Current infrastructure and development activities include routine maintenance activities at Tern and Laysan Islands and Kure and Midway Atolls. Houses would continue to be routinely maintained at Midway Atoll, and lead-based paint removal efforts would continue or be planned for all buildings (CFO-3.4). Routine maintenance of housing and facilities at Kure Atoll are part of the day-to-day operation during the field season (CFO-3.5). Buildings and equipment would

continue to receive routine maintenance and solar power and water would continue to be produced at French Frigate Shoals (CFO-3.6), along with seasonal tent camp operations at Pearl and Hermes Atoll (CFO-3.7) and routine maintenance of tent camps at Laysan Island (CFO-3.8).

Regular maintenance of a recently replaced fuel farm at Midway would continue to be conducted to meet fuel requirements for vessel, aircraft, and utility and equipments needs (CFO-4.1). The present water catchment area, storage tank, and distribution pipeline would be maintained (CFO-5.1). The recently rehabilitated septic and wastewater system would continue operation (CFO-5.2). Termites would be treated in all historic wooden structures at Midway Atoll if funding is available (CFO-5.3). The Clipper House would continue to have limited food service capacity for approximately 70 (CFO-5.4). The seaplane hangar is a historic structure that would be maintained as is, without needed repairs (CFO-5.5). The inner harbor seawall would continue to deteriorate creating safety issues (CFO-5.6).

FWS maintains several small boats at Midway for work in and around the atoll (CFO-6.1). FWS currently charters a twin engine aircraft (Gulf Stream 1 or G-1) to transport people and supplies to Midway. The G-1 would continue to provide service through fiscal year 2008 (CFO-7.1). Marine field research would be limited to Midway Atoll and its surrounding area with the existing small boats (CFO-6.2), and research/enforcement would continue to be limited by the availability of small research/enforcement vessels (CFO-6.3).

The Navy installed a dive recompression chamber at Midway, which was refurbished in the late 1990s in support of commercial dive tour operations and research (CFO-8.1). This diving chamber is no longer functional. Scientists would continue scuba-based research in the remote NWHI, but their research capacity would be limited by the availability of a portable dive recompression chamber (CFO-8.2). The current boathouse at Midway would continue to be in a state of disrepair; it is subject to flooding and limits dive operations support capability (CFO-6.5 and 8.3).

Limited transportation is arranged on a case-by-case basis to assist in moving threatened and endangered species as issues arise (CFO-9.3). Rehabilitation of the Midway Mall and commissary building would be minimal (CFO-9.4).

Current activities described above that would be expanded under the Proposed Action alternative are CFO-1.1, CFO-1.4, CFO-2.1, CFO-2.2, CFO-2.3, CFO-3.5, CFO-3.6, CFO-3.7, CFO-3.8, CFO-5.1, CFO-5.2, CFO-5.3, CFO-5.4, CFO-5.5, CFO-5.6, CFO-6.1, CFO-6.2, CFO-6.3, CFO-6.5, CFO-7.1, CFO-8.1, CFO-8.2, CFO-8.3, CFO-9.3, CFO-9.4.

1.5.22 Evaluation

Evaluation activities in the Monument are described in the Monument Management Plan and include planning and administrative activities (Monument Management Plan, section 3.6.4, Evaluation Action Plan). A summary of current activities in the Monument is provided below with references to specific activities in the Evaluation (EV) Action Plan.

1.5.22.1 Current planning and administrative activities

Planning and administrative activities would focus on agency-specific annual program reviews (EV-1.2). Agency leads are responsible for describing the status of activity implementation and making recommendations for adjusting activities if considered necessary.

1.6 DESCRIPTION OF PROPOSED ACTION ALTERNATIVE

Under the Proposed Action alternative, the Co-Trustees would continue to implement activities described in the No Action Alternatives to address priority management needs of the Monument. These activities are described above and are not repeated here. In addition, some of the No Action alternative activities would be expanded. This section describes new and expanded activities proposed for the Monument. Some of the proposed activities would require additional compliance actions as additional plans are completed, including NEPA, section 7 of ESA, section 106 of the NHPA, and MMPA.

1.6.1 Marine Conservation Science

Proposed marine conservation science activities are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan sections 1.1, 1.2, and 1.4 and section 3.1.1, Marine Conservation Science Action Plan, which describes current status and background and activities). All activities described in the No Action alternative would continue, but several current activities would be expanded under the Proposed Action. In addition, new activities are proposed to increase understanding of the distributions, abundances, and functional links of marine organisms and their habitats in space and time to improve ecosystem-based management decisions in the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Marine Conservation Science	Status	Activity Type
Activity MCS-1.3: Map and characterize deepwater habitats	Expanded	Field activity
Activity MCS-1.4: Establish and implement monitoring program for deep-water ecosystems	New	Field activity
Activity MCS-1.5: Collect, analyze and input research, monitoring, and bathymetric data into appropriate databases to inform management decisions	Expanded	Planning/administrative
Activity MCS-2.1: Develop a prioritized Natural Resources Science Plan within 1 year	New	Planning/administrative
Activity MCS-2.2: Assess monitoring program protocols	Expanded	Planning/administrative
Activity MCS-2.3: Formalize collaborative regional monitoring programs for the NWHI	New	Planning/administrative
Activity MCS-2.4: Implement research priorities identified in the Monument Natural Resources Science Plan	New	field activity
Activity MCS-3.2: Identify and prioritize research, monitoring, and modeling projects for education and outreach	Expanded	Planning/administrative
Activity MCS-3.3: Include an educational component in marine research expeditions	Expanded	Field activity
Activity MCS-3.4: Use materials gathered and created during	Expanded	Planning/administrative

Proposed Action Alternative: Marine Conservation Science	Status	Activity Type
research expeditions to develop or enhance education and outreach products		

Note: This table only includes proposed expanded and new activities; however, there are other activities in this action area, which are described under the No Action alternative.

1.6.1.1 Expanded planning and administrative activities

Expanded planning and administrative activities include efforts to regularly update information management systems, to evaluate the effectiveness of monitoring and sampling protocols, and to identify research projects dissemination of results for education and outreach. While efforts to collect research and monitoring data would continue, the Monument Information Management System would be updated regularly to manage, analyze, summarize, and interpret research data collected in the NWHI (MCS-1.5). As management needs evolve and our understanding of ecosystem variability improves, monitoring protocols, sampling design, and sampling intervals would be evaluated for their effectiveness in meeting management needs and accurately reflecting change in the environment (MCS-2.2). These evaluations would be conducted on a cycle consistent with five-year management plan reviews with the interagency technical group on research. Working with partner agencies, research, monitoring, and modeling projects would be identified and prioritized for dissemination for education and outreach (MCS-3.2).

1.6.1.2 New planning and administrative activities

New planning and administrative activities include the development of a Natural Resources Science Plan (NRSP) and formalization of collaborative regional monitoring programs for the NWHI. The NRSP would identify and prioritize marine and terrestrial research; and monitoring activities conducted in the NWHI would serve as a more detailed implementation plan that supports the management and research strategies, as well as specific management-related surveys, research, and monitoring priorities found in other action plans (MCS-2.1). The NRSP would align management priorities among agencies to facilitate resource and information sharing and would address both baseline information needs and management-driven needs. Several independent monitoring initiatives are being conducted in the NWHI, and new initiatives are being planned, such as monitoring for invasive species, seabird colonies, Monument management zone's effectiveness, and water quality (MCS-2.3). Regional monitoring programs would provide essential information to track long-term ecosystem integrity in the Monument.

1.6.1.3 Expanded field activities

Expanded field activities would include use of new technologies to map and characterize deepwater habitats and new ideas to integrate education and outreach components on all research expeditions. In addition to the current use of submersibles, ROVs, sidescan sonar, and other methods, technical diving would be used to collect data needed to continue mapping and characterizing deepwater habitats in the Monument (MCS-1.3). While education and outreach components have been previously integrated on research expeditions, innovative ideas would be explored to incorporate education and outreach components on all marine research and monitoring expeditions aboard NOAA research vessels (MCS-3.3).

1.6.1.4 New field activities

New field activities include establishing a monitoring program for deepwater ecosystems and implementing research priorities identified in the NRSP. Monitoring deepwater ecosystems would provide essential information and data for ecosystem-based management of the Monument (MCS-1.4). The implementation of research priorities identified in the NRSP would ensure that research activities are focused on addressing critical questions of managing Monument resources, especially endangered and threatened species (MCS-2.4).

1.6.2 Native Hawaiian Culture and History

Proposed Native Hawaiian culture and history activities are described in the Monument Management Plan and include planning and administrative and field activities (see section 1.3 on resource condition and status and section 3.1.2, Native Hawaiian Culture and History Action Plan). All activities described in the No Action alternative would continue, several of which would be expanded. In addition, new activities are proposed to increase the understanding and appreciation of Native Hawaiian histories and cultural practices related to the Monument and to effectively manage cultural resources for their cultural, educational, and scientific values. New and expanded cultural activities are described in the Monument Management Plan (section 3.1.2, Native Hawaiian Culture and History AP). These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Native Hawaiian Culture and History	Status	Activity Type
Activity NHCH-2.1: Continue to compile information and conduct new cultural and historical research about the NWHI.	Expanded	Planning/administrative
Activity NHCH-2.2: Continue to provide direct financial and logistical support.	Expanded	Planning/administrative
Activity NHCH-2.3: Facilitate field research and cultural education opportunities annually during the field season.	Expanded	Field activity
Activity NHCH-2.4: Convene a Native Hawaiian nomenclature working group.	New	Planning/administrative
Activity NHCH-2.5: Incorporate cultural resources information into the Monument Information Management System.	New	Planning/administrative
Activity NHCH-2.6: Support Native Hawaiian cultural access to assure cultural research needs are met.	Expanded	Field activity
Activity NHCH-2.7: Establish agreements with local universities and museums to address possible curation, research, use, return, and repatriation of collections.	Expanded	Planning/administrative
Activity NHCH-3.2: Engage Native Hawaiian practitioners and cultural experts and the Native Hawaiian Cultural Working Group in the development and implementation of the Monument's management activities.	Expanded	Field activity

Proposed Action Alternative: Native Hawaiian Culture and History	Status	Activity Type
Activity NHCH-3.3: Increase knowledge base of Native Hawaiian values and cultural information through "in reach" programs for resource managers.	Expanded	Planning/Administrative
Activity NHCH-4.1: Prepare a cultural resources program plan.	New	Planning/ administrative
Activity NHCH-4.2: Develop and implement specific preservation plans, as appropriate, to protect cultural sites and collections at Nihoa and Mokumanamana.	Expanded	Field activity
Activity NHCH-4.3: Implement the Monument Cultural Resources Program.	New	Field activity
Activity NHCH-5.1: Integrate Native Hawaiian values and cultural information into general outreach and education program.	Expanded	Planning/administrative
Activity NHCH-5.2: Develop a culturally based strategy for education and outreach to the Native Hawaiian community.	New	Planning/administrative
Activity NHCH-5.3: Integrate Native Hawaiian values and cultural information into Monument permittee education and outreach program.	Expanded	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.2.1 Expanded planning and administrative activities

Expanded planning and administrative activities include efforts to increase knowledge and appreciation of MMB, resource management, and the public regarding Native Hawaiian culture and history. Efforts would increase to compile existing information about the region and to initiate new research based on the priorities developed (NHCH-2.1). As management needs evolve and our understanding of ecosystem variability improves, monitoring protocols, sampling design, and sampling intervals would be evaluated for their effectiveness in meeting management needs and accurately reflecting change in the environment. These evaluations would be conducted on a cycle consistent with five-year management plan reviews with the interagency technical group on research (NHCH-2.2). The scope of future agreements would be expanded to provide proper stewardship of cultural resources and artifacts. Agreements would be developed as the need arises and would be established in concert with the Cultural Resources Program Plan (NHCH-2.7). Efforts would be made to increase the knowledge base of Native Hawaiian cultural significance by Monument resource managers. This would be accomplished by having Monument resource managers and staff and MMB members, as appropriate, participate in informal and formal briefings, cultural workshops, and cultural exchanges in cooperation with other marine protected area sites that integrate traditional ecological knowledge into their management (NHCH-3.3). Cultural information and traditional Native Hawaiian values would be infused into education and outreach materials aimed at the general public through the "Navigating Change" program, school curricula, promotion of Hawaiian place names in Monument materials, videos, articles, and the lecture series at Mokupāpapa Discovery Center (NHCH-5.1). Integration of Native Hawaiian values and cultural information into Monument

permittee education and outreach programs would be increased to include numerous other approaches (NHCH-5.3).

1.6.2.2 New planning and administrative activities

New planning and administrative activities include efforts to convene a nomenclature working group, to incorporate research into the Monument Information Management System, and to develop a Cultural Resources Program and education and outreach programs. The MMB would convene a working group for nomenclature for yet-to-be discovered regions, islands, geographical and oceanic features, sites, and plant and animals species. Partnerships would be made through agreements with local universities and museums to facilitate research (NHCH-2.4). New knowledge learned through additional research would be incorporated into the Monument Information management System (NHCH-2.5). A Cultural Resources Program Plan would be developed to identify cultural resources, sites, and other locations and procedures for collections, curation, and disposition of archaeological materials, other artifacts, and human remains (NHCH-4.1). Native Hawaiian values and cultural information has been used in certain outreach and education programs targeted to both Native Hawaiians and the general public (NHCH-5.2).

1.6.2.3 Expanded field activities

Expanded field activities would provide additional opportunities to conduct cultural research and education activities in the Monument. Cultural research and education activities in the field would be expanded to provide logistical support and berthing space aboard research vessels and to put researchers and educators in touch with others doing similar work (NHCH-2.3). Increased cultural access would be facilitated and would include consistent access to Mokumanamana for Hawaiian religious practices and regular access for Polynesian voyaging canoes for wayfinding, navigational, and cultural protocol training (NHCH-2.6). The Native Hawaiian Cultural Working Group and other Native Hawaiian cultural practitioners and experts would be consistently consulted and integrated into the creation and implementation of programs. Examples of their participation may include providing cultural briefings; where feasible, accompanying permittees accessing the Monument to experience, practice, and learn from the Monument resources while educating others; and including Native Hawaiians, particularly the younger generations, as part of cultural and scientific research teams, when feasible (NHCH-3.2). To further protect cultural sites and collections at Nihoa and Mokumanamana, preservation plans for both islands would be developed and implemented, as would plans for other cultural elements and yet-to-be discovered sites within the Monument. These preservation plans would address the monitoring and stabilization of cultural sites and curatorship or return/repatriation agreement with museums and institutions that house the artifact collections (NHCH-4.2).

1.6.2.4 New field activities

New field activities would be based on the Cultural Resources Plan. The MMB would initiate strategies and activities contained in the Cultural Resources Plan (NHCH-4.3).

1.6.3 Historic Resources

Proposed historic resources activities are described in the Monument Management Plan and include planning and administrative, field, and infrastructure and development activities (see Monument Management Plan, section 3.1.3, Historic Resources Action Plan). All activities would continue as described in the No Action alternative, but several activities would be expanded. Recognizing their statutory responsibilities to inventory, evaluate, and interpret historic resources throughout the NWHI, the Co-Trustees propose new activities to identify, document, preserve, protect, stabilize, and, where appropriate, reuse, recover, and interpret historic resources associated with Midway Atoll and other historic resources within the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Historic Resources	Status	Activity Type
Activity HR-1.1: Reconcile the Historic Preservation Plan with the Midway Visitor Service Plan, lead paint abatement plan, and other facilities maintenance and use plans.	Expanded	Planning/administrative
Activity HR-1.2: Submit the updated Historic Preservation Plan for approval to the Advisory Council on Historic Preservation and Monument partners	Expanded	Planning/administrative
Activity HR-2.1: Within 3 years, create dedicated capacity to implement the updated Historic Preservation Plan	New	Planning/administrative
Activity HR-2.2: Annually train Monument staff and the Midway contractors on the content of the Historic Preservation Plan and implementation of appropriate treatments	Expanded	Planning/administrative
Activity HR-2.3: Incorporate into the Midway Atoll visitor services program semiannual opportunities and events for visitors or volunteers to implement historic preservation treatments	New	Field activity
Activity HR-3.1: Identify, collect, and review publications, data sets, and documents on the National Historic Landmark within 2 years of Monument Management Plan adoption	New	Planning/administrative
Activity HR-3.2: Plan and conduct a field survey and documentation of selected National Historic Landmark sites and features within 2 years	Expanded	Field activity
Activity HR-3.3: Consult with interested parties and update the National Historic Landmark nomination within 4 years	Expanded	Planning/administrative
Activity HR-3.4: Implement repair and maintenance treatments at National Historic Landmark features within 6 years	Expanded	Infrastructure and development
Activity HR-4.1: Prepare a Scope of Collections Statement within 5 years	New	Planning/Administrative
Activity HR-4.2: Remodel the Midway museum space within 7 years	New	Infrastructure and development
Activity HR-4.3: Organize and curate collections within 8 years	New	Planning/administrative
Activity HR-5.1: Identify, collect, and review publications, data sets, and documents within 12 years	New	Planning/administrative
Activity HR-5.2: Plan, conduct, and report on field surveys and documentation of selected sites within 15 years.	New	Infrastructure and development

Proposed Action Alternative: Historic Resources	Status	Activity Type
Activity HR-6.1: Begin a long-term annual program to compile, collect, curate, and publish oral histories of life on Midway Atoll within 3 years	New	Planning/administrative
Activity HR-6.2: Conduct archaeological investigation of the Commercial Pacific Cable Station site within 10 years.	New	Field activity
Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.		

1.6.3.1 Expanded planning and administrative activities

Expanded planning and administrative activities involve updating the Midway Historic Preservation Plan and National Historic Landmark nomination, training staff on plan contents and implementation, and consulting interested parties on updates. To better identify, interpret, and protect historic resources in the NWHI, the Historic Preservation Plan would be reconciled with the Midway Visitor Service Plan, lead paint abatement plan, and other facilities maintenance and use plans (HR-1.1). The updated plan would be submitted for approval to the Advisory Council on Historic Preservation and MMB (HR-1.2). Annual training programs for Monument staff and Midway contractors would be conducted to ensure that the content of the updated plan and implementation of appropriate treatments are communicated and understood by all (HR-2.2). Interested parties would be consulted to prepare an updated National Historic Landmark nomination within four years (HR-3.3).

1.6.3.2 New planning and administrative activities

New planning and administrative activities involve increasing capacity to implement the updated Historic Preservation Plan, organization collections, conducting archival research and recording oral histories. A dedicated capacity to implement the updated plan would be developed within three years (HR-2.1). Within two years of the Monument Management Plan adoption, data would be gathered on the National Historic Landmark (HR-3.1). For the purpose of improving the function and capacity of the Midway museum, a Scope of Collections Statement would be prepared within five years (HR-4.1). Collections would be organized within eight years (HR-4.3). Additionally, archival research on historic resources would be conducted beyond Midway Atoll NWR within 12 years (HR-5.1). A long-term program to record oral histories of life on Midway Atoll would begin within three years (HR-6.1).

1.6.3.3 Expanded field activities

Expanded field activities include field surveys on selected National Historic Landmark sites (HR-3.2). Standard historical archaeological practices would be exercised.

1.6.3.4 New field activities

New field activities include semiannual opportunities and events for visitor participation in historic preservation treatments, which would be incorporated into the visitor services program as well (HR-2.3). The Refuge visitor services program would be refined to recruit volunteers to help maintain historic properties, including painting, window restoration, and landscape

maintenance. An archaeological investigation of the Commercial Pacific Cable Station site would be conducted within 10 years (HR-6.2). Archaeological and historical research, including excavation, would be conducted to shed light on Midway's earliest permanent residents.

1.6.3.5 Expanded infrastructure and development activities

Expanded infrastructure and development activities include the appropriate maintenance and repair treatments on the National landmark within six years (HR-3.4). Depending on the treatment, some repair and maintenance activities may be accomplished by volunteers.

1.6.3.6 New infrastructure and development activities

New infrastructure and development activities include remodeling the Midway museum space (HR-4.2). The Scope of Collection Statement would help define the types of artifacts and other historic materials that Monument staff would acquire for proper curation. Archaeological field surveys would be conducted on selected sites in the Monument within 15 years (HR-5.2). Standard historical archaeological practices would be exercised.

1.6.4 Maritime Heritage

Proposed maritime heritage activities are described in the Monument Management Plan and include planning and administrative activities (Monument Management Plan, section 3.1.4, Maritime Heritage Action Plan). All activities described in the No Action alternative would continue under the Proposed Action. One new activity is proposed to identify, interpret, and protect maritime heritage resources in the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Maritime Heritage Resources	Status	Activity Type
Activity MH-1.3: Complete a status report on potential environmental hazards within 1 year, and update it annually	New	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.4.1 New planning and administrative activities

New planning and administrative activities would aim to document environmental hazards from maritime heritage resources to natural resources and water quality. A status report would be completed on potential environmental hazards posed by wreck sites and other debris. This report would be updated annually as new sites are identified (MH-1.3).

1.6.5 Threatened and Endangered Species

Proposed threatened and endangered species activities are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan, section 3.2.1). All activities described in the No Action alternative would continue; however several activities would be expanded under the Proposed Action. In addition, new activities are proposed to protect marine mammals and aid in the recovery of threatened and

endangered species populations within the Monument. These activities are listed in the table below and summarized in this section.

Proposed Action Alternative: Threatened and Endangered Species	Status	Activity Type
Activity TES-1.2: Support and facilitate emergency response for Hawaiian monk seals.	Expanded	Field activity
Activity TES-1.3: Conserve Hawaiian monk seal habitat.	Expanded	Planning/ administrative
Activity TES-1.4: Reduce the likelihood and impact of human interactions.	Expanded	Planning/administrative
Activity TES-1.5: Support outreach and education on Hawaiian monk seals.	Expanded	Planning/administrative
Activity TES-2.1: Census cetacean populations.	Expanded	Field activity
Activity TES-2.3: Monitor, characterize, and address the effects of marine debris on cetaceans in the Monument.	Expanded	Field activity
Activity TES-2.4: Respond to any suspected disease and unusual mortality incidents affecting cetaceans.	Expanded	Field activity
Activity TES-2.5 Prevent human interactions with cetaceans.	Expanded	Field activity
Activity TES-3.1: Collect biological information on nesting turtle populations.	Expanded	Field activity
Activity TES-3.3: Protect and manage marine habitat, including foraging areas and migration routes.	Expanded	Field activity
Activity TES-4.1: Work cooperatively with the Japanese government to establish one or more breeding populations on islands free from threats, such as active volcanoes and introduced mammals.	Expanded	Planning/administrative
Activity TES-4.2: Conduct studies to examine the correlation between reproductive success and contaminant loads.	Expanded	Field activity
Activity TES-4.3: Create and disseminate information on fisheries bycatch and bycatch reduction to all fisheries occurring outside the Monument.	Expanded	Planning/administrative
Activity TES-5.2: Carry out translocations to other sites in the Monument.	Expanded	Field activity
Activity TES-6.2: Implement translocations of each species and site restoration as needed by developing appropriate techniques for capture, translocation, and release	Expanded	Field activity
Activity TES-7.1: Ensure all endangered plant species from Nihoa and Laysan Islands are fully represented in an ex situ collections, such as a nursery or arboretum.	Expanded	Field activity
Activity TES-8.2: Develop baseline assessments for listed species and critical habitat and streamline the Monument consultation process to facilitate ESA consultations.	Expanded	Field activity

Note: Activities TES-6.2 and TES-7.1 would require Hawaii State Cultural Impact Assessment Evaluation. This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.5.1 Expanded planning and administrative activities

Expanded planning and administrative activities include conducting feasibility studies for habitat restoration, scrutinizing permit applications for an expanded range of factors that may affect endangered and threatened species, and enhancing education and outreach for human effects on Hawaiian monk seals. The MMB would investigate the feasibility of restoring and enhancing habitat essential for endangered and threatened species. Restoring or rebuilding habitat may be essential for the reproduction of monk seals and other protected species, such as turtles and sea birds, at several alternative sites that could lead to rebuilding preferred, stable pupping habitat (for example, accessibility, long shoreline, and stable beach) (TES-1.3). To reduce the likelihood and effect of human interactions, Monument staff would scrutinize all permit applications that may involve increased nearshore ship traffic, beach use, noise, and unnecessary research, among others. MMB would expand its support of outreach and education on Hawaiian monk seals to provide the public and interest groups with information to understand the critical status of the Hawaiian monk seal population and the urgent action that is needed to prevent extinction (TES-1.5).

The Monument staff would expand cooperation with the Japanese government by working directly with Japanese biologists on satellite tagging projects and other studies. These efforts are needed to identify sites for one or more breeding populations of short-tailed albatross on islands, free from threats in Japanese breeding colonies, such as active volcanoes and introduced mammals (TES-4.1).

Materials would be created for public outreach and attendance at domestic and international meetings for government-to-government communication on fisheries measures that can reduce bycatch during commercial fishing operations that could affect Monument resources, such as albatross (TES-4.3).

1.6.5.2 Expanded field activities

Expanded field activities include expanding efforts to conserve threatened and endangered species habitat and to protect individual plants and animals, including Hawaiian monk seal, green turtle, cetaceans, short-tailed albatross, Laysan duck, passerines, and a variety of listed plant species.

Agreed-on and standardized protocols would be put into place to ensure that a rapid and well-organized response, including assessment, proper collection of evidence, and continued monitoring, occurs during and after an emergency response. The Monument would facilitate these types of responses through coordination, permitting, transportation, and logistical support (TES-1.2).

In order to best develop management strategies for cetaceans in the Monument, surveys and observations would be pursued to gain information on species presence and abundance estimates (TES-2.1). Annual population census monitoring activities, in addition to other ongoing monitoring would support characterizing and addressing the effects of marine debris on cetaceans in the Monument (TES-2.3). Planning and pre-stage equipment would be established, Should an affected cetacean be sighted, it would be examined and sampled for a spectrum of

possible diseases, and it would be treated appropriately and monitored for recovery (TES-2.4). Cetacean conservation would be further enhanced by preventing human interactions. This would be accomplished by eliminating disturbances to resting cetaceans in Monument lagoons or nearshore and by preventing geological research using sound levels known to be dangerous to marine mammals (TES-2.5). (Note: Under the terms of Proclamation 8031, activities and exercises of the Armed Forces are exempt from Monument prohibitions or permitting requirements. However, activities that may impact cetaceans or other marine mammals remain subject to laws of general applicability, such as the Marine Mammal Protection Act and the Endangered Species Act, which apply within the Monument to the same extent they do elsewhere.)

In addition to maintaining current green turtle nesting abundance monitoring at East Island, distribution of nesting activity throughout the Monument would be periodically reassessed. As the population increases, new sites may be used for nesting (TES-3.1).

Monument staff would identify turtle foraging habitat in the Monument to better manage these areas and minimize vessel hazards to turtles (TES-3.3).

The short-tailed albatross is endangered in the U.S. Most of the world's population breeds on two small Japanese islands (TES-4.1). MMB and partnering agencies would cooperate with the Japanese government to establish one or more breeding populations of short-tailed albatross on islands free of threats, such as active volcanoes and introduced mammals. These efforts include attracting birds to Midway Atoll using decoys and recorded colony sounds. Once a breeding colony is established, it would be monitored. Data collected from studies of contaminant levels in black-footed albatrosses would be used as surrogate data to estimate contaminant body-burdens in short-tail albatrosses (TES-4.2). Finally, because of the hazards to seabirds, the MMB would create and disseminate information on fisheries bycatch and bycatch reduction techniques to all fisheries outside the Monument that may effect seabirds (TES-4.3).

To supplement conservation efforts targeting the Laysan duck, MMB would restore and create habitat necessary to support Laysan duck populations, translocate juveniles, and implement post-release monitoring (TES-5.2). Further efforts to establish additional bird populations include implementing translocations of Laysan finch, Nihoa finch and Nihoa millerbird and site restoration by developing appropriate techniques for capture, translocation, and release (TES-6.2).

Lastly, all endangered plant species from Nihoa and Laysan would be fully represented in an ex situ collections, such as nurseries or arboretums. This would ensure the endangered plants' genetic material would be preserved in perpetuity (TES-7.1).

Information regarding ecological baselines of listed species and critical habitat and description of sensitive areas would be made available to agencies to determine whether or not their activities may affect listed species and, if so, to improve their biological assessments for consultations. Also, ESA and other consultation procedures would be reviewed and streamlined to benefit from the preparation of current baseline descriptions (TES-8.2).

1.6.6 Migratory Birds

Proposed migratory bird conservation activities are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan, section 3.2.2). All activities described in the No Action alternative would continue, but several activities would be expanded under the Proposed Action alternative. In addition, new activities are proposed to conserve migratory populations and habitats within the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Migratory Birds	Status	Activity Type
Activity MB-1.1: Control or eradicate nonnative species at all sites where they have a negative impact on the survivorship or reproductive performance of migratory birds	Expanded	Field activity
Activity MB-1.2: Restore components of the native vegetation communities that are important to seabird nesting	Expanded	Field activity
Activity MB-2.2: Monitor contaminant levels in birds and their habitats, and respond if the potential exists to cause immediately lethal or sublethal effects	Expanded	Field activity
Activity MB-2.3: Ensure that all spill response plans have adequate coverage of actions necessary to minimize mortality to migratory birds	Expanded	Planning/administrative
Activity MB-2.6: Research mite impacts on black-footed albatross chicks on Kure Atoll	New	Field activity
Activity MB-3.1: Using standard methods devised for tropical seabirds, monitor a suite of 15 focal seabird species at specific sites in the Monument to track changes in population size and understand underlying causes of that change	Expanded	Field activity
Activity MB-3.2: Monitor changes in habitat quality by measuring reproductive performance and diet composition in selected seabird species.	Expanded	Field activity
Activity MB-3.3: Develop and use standardized methods to accurately assess the population size and trends of overwintering and migrating Pacific golden plovers, bristle-thighed curlews, wandering tattlers, and ruddy turnstones.	Expanded	Field activity
Activity MB-4.1: Use social attraction techniques to encourage recolonization at Midway and Kure Atolls by Bulwer's petrels and Tristram's storm-petrels.	Expanded	Field activity

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.6.1 Expanded planning and administrative activities

Expanded planning and administrative activities would expand existing oil spill response plans to include actual response plans and natural resource damage assessments through multiagency collaboration. These plans would be evaluated, revised, and followed to minimize morality to migratory birds (MB-2.3).

1.6.6.2 Expanded field activities

Expanded field activities would expand habitat restoration efforts and establish standardized methods for monitoring the health and status of seabirds. To protect and enhance terrestrial and marine migratory birds' habitats, MMB and its staff would control and eradicate nonnative species at all sites where they have a negative effect on the survivorship or reproductive performance of migratory birds (MB-1.1). Alien species eradication would be followed by restoring native coastal mixed grass and shrub communities (MB-1.2). Each of these activities minimizes the effect of alien species and habitat destruction on migratory birds. Monument staff, using standard methods devised for tropical seabirds, would monitor a suite of 15 focal seabird species at specific sites in the Monument to track changes in population size and to understand underlying causes of that change (MB-3.1). Specifically, they would monitor contaminant levels in birds and their habitats and would respond if the potential exists to cause immediately lethal or sublethal effects (MB-2.2). In addition, MBB staff would monitor changes in habitat quality by measuring reproductive performance and diet composition in selected focal species (MB-3.2). These efforts would not be limited to seabirds, but staff would develop and use standardized methods to accurately assess the population size and trends of overwintering and migrating Pacific golden plovers, bristle-thighed curlews, wandering tattlers, and ruddy turnstones (MB-3.3).

1.6.6.3 New field activities

New field activities would target the design and conduct of research on the effect of mites on black-footed albatross chicks on Kure Atoll (MB-2.6). In addition, species specific social attraction techniques, such as automated playback of calls and provision of nesting boxes to encourage recolonization of Bulwer's petrels and Tristram's storm-petrels, are proposed at Kure Atoll (MB-4.1).

1.6.7 Habitat Management and Conservation

Proposed habitat management and conservation activities are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan, section 3.2.3). All activities described in the No Action alternative would continue, several activities would be expanded under the Proposed Action. In addition, new activities are proposed to protect and maintain the native ecosystems and biological diversity of resources in the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Habitat Management and Conservation	Status	Activity Type
Activity HMC-1.1: Identify and prioritize restoration needs in shallow-water reef habitats impacted by anthropogenic disturbances within 5 years.	New	Planning/administrative
Activity HMC-1.2: Analyze historic and present impacts on reef growth at Midway Atoll and determine factors limiting nearshore patch reef growth to facilitate restoration of natural reef building	New	Field activity

Proposed Action Alternative: Habitat Management and Conservation	Status	Activity Type
Activity HMC-1.3: Where feasible, implement appropriate restoration activities	New	Field activity
Activity HMC-2.1: Evaluate effects of contamination in terrestrial and nearshore areas from shoreline dumps at French Frigate Shoals and at Kure, Midway, and Pearl and Hermes atolls and prioritize cleanup action based on risk assessments	Expanded	Field activity
Activity HMC-2.2: Work with partners and responsible parties to verify the integrity of known landfills and dumps and to conduct additional remediation if necessary	Expanded	Field activity
Activity HMC-2.3: Locate historic disposal sites at Tern Island (French Frigate Shoals) and at Kure, Midway, and Pearl and Hermes atolls, and investigate them for contamination	Expanded	Field activity
Activity HMC-2.4: Evaluate costs to ecosystem function and benefits of removing anthropogenic iron sources such as metal from shipwrecks and discarded debris from reefs throughout the Monument	New	Planning/administrative
Activity HMC-2.7: Conduct ecological risk assessment to determine allowable lead levels in soils at Midway and remove lead from buildings and soils to nonrisk levels	New	Planning/administrative
Activity HMC-3.1: Evaluate loss of beach strand and crest due to erosion and sea level rise to aid in formulating a restoration plan that would stop as much net loss of beach strand and beach crest habitat as is possible	New	Field activity
Activity HMC-3.2: Inventory manmade structures and changes in natural beach and reef state that may influence erosion and depositional processes at all of the beach strand units of the Monument	Expanded	Field activity
Activity HMC-4.4: Formulate and implement a restoration plan for Lisianski Island using guidelines established for neighboring Laysan Island	New	Planning/administrative
Activity HMC-4.5: Propagate and outplant native vegetation on 34-acre Southeast Island at Pearl and Hermes Atoll to replace native plant community extirpated by invasion of the alien plant golden crownbeard.	New	Field activity
Activity HMC- 4.6: Implement the coordinated ecosystem restoration activities on Kure Atoll.	Expanded	Field activity
Activity HMC-4.7: Monitor changes in the species composition and structure of mixed grass and shrub communities at each site.	Expanded	Field activity
Activity HMC-5.1: Inventory and document life histories of endemic terrestrial invertebrates at Nihoa and Mokumanamana.	Expanded	Field activity
Activity HMC-7.1: Monitor salinity, parasites, contaminants, and native arthropods associated with freshwater seeps, ponds, and streams.	Expanded	Field activity
Activity HMC-7.2: Evaluate potential for development, and create as needed, additional freshwater sources at potential translocation sites of the Laysan duck, Nihoa finch, and Nihoa millerbird.	Expanded	Planning/administrative

Proposed Action Alternative: Habitat Management and Conservation	Status	Activity Type
Activity HMC-8.1: Remove ironwood on Sand Island from 50 acres outside designated woodland and control young ironwood in areas managed for grass and shrubs.	Expanded	Field activity
Activity HMC-8.2: Devise and implement methods for monitoring population size and reproductive success in tree-nesting seabird species.	New	Field activity
Activity HMC-9.1: Educate other federal agencies about overflight rules and promote compliance regarding overflights and close approaches	Expanded	Planning/administrative
Activity HMC-9.2: Develop and implement techniques for monitoring plant and animal populations on cliff habitats in the Monument within 10 years.	New	Planning/administrative
Activity HMC-10.1: Conduct a wilderness review of the Hawaiian Islands and Midway Atoll NWRs within 5 years.	New	Planning/administrative

Notes: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.7.1 Expanded planning and administrative activities

Expanded planning and administrative activities include evaluating potential translocation sites for endangered endemic birds and education activities regarding overflight to sensitive habitats in the Monument. The potential for developing additional freshwater sources would be evaluated at potential translocation sites of the Laysan duck, Nihoa finch, Laysan finch, and Nihoa millerbird (HMC-7.2). Personnel at other federal and state agencies would be educated about rules for overflights and close approaches to Nihoa and Mokumanamana cliff habitats to promote compliance with rules and regulations (HMC-9.1).

1.6.7.2 New planning and administrative activities

New planning and administrative activities include developing habitat- and species-specific restoration plans, risk-based approach for prioritizing cleanup and remediation actions, and techniques to monitor cliff-dwelling plant and animal populations. Habitat- and species-specific restoration plans would also be developed and implemented. Restoration needs would be developed and implemented for shallow-water reef habitats modified by humans (HMC-1.1); a plan would include restoring original population levels of black-lipped pearl oysters at Pearl and Hermes Atolls. Ecological risk assessments would be conducted to determine allowable lead levels in soils at Midway and to remove lead from buildings and soils to nonrisk levels (HMC-2.7). The costs to ecosystem function and benefits of removing man-made iron sources, such as metal from shipwrecks and discarded debris from reefs throughout the Monument, would be evaluated (HMC-2.4). Cleanup and remediation actions would be prioritized, based on risk assessments. MMB would also formulate restoration and management plans or would implement administrative plans for various islands including Kure Atoll and Lisianski Island (HMC-4.4). This activity would undergo additional NEPA analysis, as described in section 1.8. Techniques for monitoring plant and animal populations on cliff habitats in the Monument would be developed and implemented (HMC-9.2). A wilderness review of the Hawaiian Islands and Midway Atoll NWRs will be conducted within five years (HMC-10.1).

1.6.7.3 Expanded field activities

Expanded field activities include increased investment in identifying, containing, and removing contaminated sites, in determining the feasibility of creating water sources or wetlands for translocating endangered species, in conducting comprehensive monitoring and inventorying all terrestrial habitats, and in restoring native terrestrial vegetation. The effects of contamination due to shoreline dumps on birds nesting on the dumps and marine organisms in adjacent waters would be investigated at Kure Atoll, French Frigate Shoals, Midway Atoll, and Pearl and Hermes Atolls (HMC-2.1). Efforts to ameliorate the effects of contamination would focus on locating, evaluating, monitoring, containing, and removing contamination from shoreline dumps and landfills (HMC-2.2). The Coast Guard created a new unlined landfill on Green Island, Kure Atoll, during remediation of the LORAN (Long-Range Aid to Navigation) station. The landfill would be investigated to confirm that PCBs placed in it are not leaching to groundwater and that the documented surface hotspots have been removed. Cleanup levels of PCBs need to be evaluated to ensure that these levels protect wildlife (HMC-2.3).

FWS would conduct an inventory of man-made structures and changes in natural beach and reef condition that may influence erosion and depositional processes at all the beach strand units of the Monument (HMC-3.2). Feasibility studies would determine if Kure is appropriate as a translocation site for Laysan ducks. If feasible, appropriate wetland habitats, such as a pond, would be developed for this purpose (HMC-4.6). Changes in the species composition and structure of mixed grass and shrub communities would be monitored on all coralline islands and atolls (HMC-4.7).

MMB intends to implement, and if necessary, develop methods to inventory and monitor a range of habitats and a variety of organisms. Endemic terrestrial invertebrates at Nihoa Island and Mokumanamana would be inventoried and their life histories would be documented (HMC-5.1). The salinity, parasites, contaminants, and native arthropods associated with freshwater seeps, ponds, and streams would be monitored to evaluate the potential for development. Additional freshwater sources would be created, with particular emphasis on potential translocation sites of the Laysan duck, Nihoa finch, and Nihoa millerbird (HMC-7.1). Examples of these restoration goals are to remove ironwood on Sand Island from 50 acres outside designated woodland and to control young ironwood in areas managed for grass and shrubs (HMC-8.1).

1.6.7.4 New field activities

New field activities would focus on evaluating historic and present effects on reef growth, evaluating the loss of beach habitats, outplanting new areas, and employing new methods to monitor tree-nesting seabird populations. New field research would be conducted to analyze historic and present effects on reef growth at Midway Atoll and to determine limiting factors of reef growth (HMC-1.2); then restoration would be conducted to facilitate natural reef building (HMC-1.3). Research would be designed to evaluate loss of beach strand and crest due to erosion and sea level rise (HMC-3.1); this would help formulate a restoration plan that would stop as much net loss of beach strand and beach crest habitat as is possible. Propagating and outplanting native vegetation on 34-acre Southeast Island at Pearl and Hermes Atolls would be conducted to replace the native plant community extirpated by the invasive golden crownbeard

(HMC-4.5). Methods for monitoring population size and reproductive success in tree-nesting seabird species would be devised and implemented (HMC-8.2).

1.6.8 Marine Debris

Marine debris cleanup activities would continue, as described in the Monument Management Plan, and include planning and administrative and field activities (see Monument Management Plan, section 3.3.1, Marine Debris Action Plan). All activities described in the No Action alternative would continue, but several activities would be expanded under the Proposed Action. In addition, new activities are proposed to reduce the negative effects of marine debris to Monument resources and to reduce the amount of debris entering the North Pacific Ocean. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Marine Debris	Status	Activity Type
Activity MD-1.1: Continue working with partners to remove marine debris in the Monument and reduce additional debris entering the Monument.	Expanded	Field activity
Activity MD-1.2: Catalog, secure, contain, and properly remove hazardous materials that wash ashore in the NWHI.	Expanded	Field activity
Activity MD-1.3: Develop and implement a 5-year marine debris removal and prevention strategy for the Monument.	Expanded	Planning/administrative
Activity MD-1.4: Work with the U.S. Department of State to gain international cooperation and involvement for marine debris issues.	New	Planning/administrative
Activity MD-1.5: Work with the fishery management councils to address marine debris prevention with U.S. fishing fleets.	Expanded	Field activity
Activity MD-2.1: Work with partners on marine debris studies.	Expanded	Field activity
Activity MD-2.2: Develop and standardize monitoring protocols for marine and terrestrial habitats.	Expanded	Planning/administrative
Activity MD-3.1: Work with partners to continue to develop and implement an outreach strategy for marine debris.	New	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.8.1 Expanded planning and administrative activities

Expanded planning and administrative activities include developing standardized protocols for marine debris removal and developing a multiagency outreach strategy for marine debris. The MMB would work with all federal and state partners to standardize protocols to maximize the use and utility of data collected by the various programs (MD-2.2). To better explain the scope and effects of marine debris in the NWHI, an outreach strategy would be developed with the multiagency partnership to reach a broad audience and specific fishing communities (MD-3.1).

1.6.8.2 New planning and administrative activities

New planning and administrative activities include highlighting marine debris prevention internationally. The MMB would work through the Interagency Marine Debris Coordinating Committee, the U.S. Department of State, and other appropriate U.S. agencies to call

international attention to marine debris problems in the NWHI and to identify approaches to reducing foreign debris sources (MD-1.4).

1.6.8.3 Expanded field activities

Expanded field activities include increased efforts to intercept marine debris at sea before it enters the Monument. Efforts to remove marine debris in the Monument would be increased, and efforts to reduce additional debris entering the Monument would be undertaken. New technology, such as unmanned aerial vehicles, would be tested to detect marine debris at sea (MD-1.1). Efforts to document, secure, and remove hazardous materials that wash ashore would increase (MD-1.2). Marine debris removal in the Monument would be expanded through the efforts of multiagency partnerships and working with the fishery management councils to address marine debris prevention with U.S. fishing fleets (MD-1.5). The MMB would continue current research efforts with the Marine Debris Program and would expand them to determine marine debris accumulation rates, biological and habitat effects, efforts to track sources and types of debris, and documentation of the cost estimates of damage (MD-2.1).

1.6.9 Alien Species

Proposed alien species management activities are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan, section 3.3.2, Alien Species Action Plan). All activities described in the No Action alternative would continue, but several activities would be expanded under the Proposed Action. In addition, new activities are proposed to detect, control, eradicate where possible, and prevent the introduction of alien species into the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Alien Species	Status	Activity Type
Activity AS-1.1: Complete an Integrated Alien Species Management Plan.	New	Planning/administrative
Activity AS-1.2: Develop best management practices to prevent, control, and eradicate alien species.	Expanded	Planning/administrative
Activity AS-2.1: Survey distributions and populations of known alien species at regular intervals.	Expanded	Field activity
Activity AS-2.2: Maintain a GIS database of marine and terrestrial alien species.	New	Planning/administrative
Activity AS-2.3: Develop and implement monitoring protocols for early detection and characterization of new infestations.	New	Field activity
Activity AS-4.1: Produce a house mouse eradication plan within 5 years and procure appropriate permits for chosen eradication techniques.	New	Planning/administrative
Activity AS-4.2: Implement and complete house mouse eradication.	New	Field activity
Activity AS-5.1: Within 5 years, formulate a priority list of locations and species and a treatment plan to control and eventually eradicate all social Hymenopterans, such as ants and wasps, at all islands in the Monument.	New	Planning/administrative

Proposed Action Alternative: Alien Species	Status	Activity Type
Activity AS-5.2: Conduct toxicant trials to evaluate their efficacy and document ecological effects at selected islands on highest-priority invasive species of ants and wasps.	New	Field activity
Activity AS-5.3: Control and if possible eradicate the two introduced mosquito species at Midway Atoll within 10 years using methods prescribed in the Integrated Pest Management Plan.	New	Field activity
Activity AS-5.4: Develop and implement a plan to control and if possible eradicate the invasive gray bird locust wherever it occurs.	New	Field activity
Activity AS-5.5: Protect endangered plants threatened by gray bird locust outbreaks at Nihoa Island by developing appropriate baits for localized application of toxicants to protect specific high-priority plant sites.	New	Field activity
Activity AS-6.1: Control and eventually eradicate golden crownbeard and co-occurring weedy shrubs in all areas where they occur.	Expanded	Field activity
Activity AS 6.2: Control and eventually eradicate the invasive grass sandbur from all areas of the Monument where it currently occurs.	Expanded	Field activity
Activity AS-6.3: Control and eventually eradicate Indian pluchea, Sporobolus pyramidatus, and swine cress from Laysan Island.	Expanded	Field activity
Activity AS-6.4. Control and eventually eradicate prioritized alien plant species from Kure Atoll.	Expanded	Field activity
Activity AS-7.1: Map, control and eventually eradicate invasive red algae where it occurs.	New	Field activity
Activity AS-7.2: Conduct surveillance at appropriate sites for snowflake coral and other incipient marine invasives.	New	Field activity
Activity AS-8.1: Support and conduct research on alien species detection and the effects of invasive species on native ecosystems.	Expanded	Field activity
Activity AS-8.2: Support and conduct research on invasive species prevention, control methods, and eradication techniques.	Expanded	Field activity
Activity AS-9.1: Integrate alien species information into the overall outreach program for Monument permittees.	Expanded	Planning/administrative
Activity AS-9.2: Integrate alien species information into general Monument outreach materials.	Expanded	Planning/administrative
Activity AS-10.1: Build relationships with other resource managers and invasive species experts in the state, nation, and other countries based on shared challenges concerning invasive species.	Expanded	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.9.1 Expanded planning and administrative activities

Expanded planning and administrative activities include developing enhanced outreach materials and working with new groups involved with alien species control. Specific protocols and requirements for preventing, controlling the spread of, and eradicating alien species, such as hull inspections and island quarantine protocols, a description of each partner's role in alien species control, best management practices to prevent the spread of species within the NWHI, and priority areas would be expanded to address threats from alien species on Monument resources. Monument staff would expand activities for responding to alien species through further development of best management practices for preventing, controlling and eradicating alien species (AS-1.2). Outreach activities would be expanded through the integration of alien species information in outreach materials for both general education and to provide Monument permittees with information on regulations, permit requirements and best management practices for preventing alien species introductions. A guide to marine and terrestrial alien species with photographs, modes of transport, reporting protocols, and best management practices would be used as part of the outreach program. Outreach may consist of printed materials, as well as presentations that are part of the permit application process and as taxonomy training for staff and volunteers (AS-9.1). Monument staff would increase integration of messages on alien species into general education and outreach materials when appropriate opportunities arise (AS-9.2). Monument staff would participate in public and professional conferences, working group meetings, and activities focused on reducing the effects of alien species statewide and in the Pacific region. Increased information exchange would maximize the effectiveness of collective resources and keep the MMB current on invasive species research, management, and outreach efforts throughout Hawai‘i and the Pacific (AS-10.1).

1.6.9.2 New planning and administrative activities

New planning and administrative activities include developing an integrated plan to control and eradicate alien species, implementing new monitoring protocols for early detection, and prioritizing control efforts for ants and wasps.

An Integrated Alien Species Management Plan would be developed to prioritize alien species management actions for the Monument (AS-1.1). Data collected during alien species monitoring would be added to the Monument's GIS database for tracking and analysis (AS-2.2). This data would help track the spread of invasive species and the success of control measures instituted by Monument managers. Through the development and implementation of monitoring protocols, new infestations of alien species can be detected and characterized early. An eradication plan would be developed for the house mouse at Midway Atoll (AS-4.1). A priority list of locations and species would be formulated and a treatment plan would be developed to control and eventually eradicate all social Hymenopterans, such as ants and wasps, at all islands in the Monument (AS-5.1).

1.6.9.3 Expanded field activities

Expanded field activities include additional monitoring and standardization of data collection protocols. Monitoring would be expanded and standardized and new data collection would be incorporated into existing annual monitoring (AS-2.1). The distributions and populations of

known alien species would be surveyed annually to facilitate early detection. The highest priority terrestrial alien plant species would be controlled using hand pull, mow where appropriate, and treat with glyphosate at 1,098 acres at Midway, 75 acres at Kure, and 34 acres at Pearl and Hermes (AS-6.1). Sandbur would be controlled and eradicated at all other locations in the Monument. A year-round program of hand-pulling and limited glyphosate spraying would be used (AS-6.2). Further removal efforts of invasive species would treat and prevent seed set to eventually eradicate at Laysan (AS-6.3). The eradication of alien species would be prioritized according to the management plan (AS-6.4).

Research would be expanded beyond terrestrial areas to include the marine ecosystem. Monument staff, working with experts, would determine which methods for alien species detection and control would be appropriate for use in the NWHI (AS-8.1). Successful invasive species control and eradication programs require systematic investigations into the efficacy of techniques chosen and the ecological effects of any methods used. Terrestrial and marine research to document the effectiveness of these measures would aid those managing other wildlands in choosing quarantine methods (AS-8.2).

1.6.9.4 New field activities

New field activities would control and eradication of the house mouse, mosquitoes, and gray bird locust and mapping and surveillance of two marine invasive species. The house mouse eradication plan would be implemented using the methods proven successful for eradicating black rats (AS-4.2). Toxicant trials would be conducted on highest-priority invasive species of ants and wasps to evaluate their efficacy and document the ecological effects (AS-5.2). Monument staff would control and if possible eradicate two introduced mosquito species at Midway Atoll through using the methods prescribed in the Integrated Pest Management Plan (AS-5.3). Monument staff would continue efforts to address the gray bird locust invasion by developing and implementing a plan to control and possibly eradicate the gray bird locust (AS5-4). Gray locust outbreaks that threatened endangered plants at Nihoa Island would be controlled by developing appropriate baits for localized application (AS-5.5). Early detection and characterization of new infestations of alien species would be possible through monitoring (AS-2.3). The Monument staff would map the extent of red algae infestation through the use of scuba or remotely operated vehicles to control and eventually eradicate invasive red algae (AS-7.1). The MMB would devise a plan to conduct surveillance activities at appropriate sites where snowflake coral and other incipient marine invasive species have been identified (AS-7.2).

1.6.10 Maritime Transportation and Aviation

Proposed maritime transportation and aviation activities are described in the Monument Management Plan and include planning and administrative and field activities (see Monument Management Plan, section 3.3.3, Maritime Transportation and Aviation Action Plan). All activities described in the No Action alternative would continue, but several activities would be expanded under the Proposed Action. In addition, new activities are proposed to investigate, identify, and reduce potential threats to the Monument from maritime and aviation traffic. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Maritime Transportation and Aviation	Status	Activity Type
Activity MTA-1.2: Develop boundary and zoning informational tools.	New	Planning/administrative
Activity MTA-1.3: Provide necessary updates to nautical charts and Notice to Mariners	New	Planning/administrative
Activity MTA-2.1: Conduct studies on potential aircraft and vessel hazards and impacts	New	Field activity
Activity MTA-2.2: Develop protocols and practices as needed and integrate with existing protocols for safe aircraft and vessel operations.	Expanded	Planning/administrative
Activity MTA-2.3: Improve existing pre-access information for inclusion on the Monument website and in permit application instructions.	Expanded	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.10.1 Expanded planning and administrative activities

Expanded planning and administrative include developing new protocols and practices to reduce risk from maritime transportation and aviation. Existing protocols would be evaluated and other recommendations sought to reduce risks to personnel and the environment through pre-access training and standard procedures. New protocols and practices would be developed as needed (MTA-2.2). Existing and additional pre-access information would be incorporated into the Monument website and in permit application instructions. Additional information may include navigational hazards, zoning designations, including waste discharge location and types, and preventing the introduction of alien species (MTA-2.3).

1.6.10.2 New planning and administrative activities

New planning and administrative include the development of boundary and zoning information tools (MTA-1.2). In addition, existing nautical charts and mariner notices would be updated with boundary and zoning information (MTA-1.3). Overall, protocols and practices would be expanded to ensure safe aircraft and vessel operations, and improvements would be made to make pre-access information available on the Monument website and in permit application instructions.

1.6.10.3 New field activities

New field activities include various studies on potential aircraft and vessel hazards, which would be conducted based on priority threats identified in a comprehensive threat assessment conducted by the MMB (MTA-2.1). A range of studies may be conducted, such as feasibility studies on anchoring and mooring locations, effects of discharge, long-term study of hull inspections, alien species introductions via aircraft and other studies that would aid the MMB in making informed management decisions to protect Monument resources.

1.6.11 Emergency Response and Natural Resource Damage Assessment

Proposed emergency response and natural resource damage assessment activities are described in the Monument Management Plan and include planning and administrative activities (see Monument Management Plan, section 3.3.4, Emergency Response and Natural Resource

Damage Assessment). All activities described in the No Action alternative would continue, but several activities would be expanded. In addition, new activities are proposed to minimize damage to Monument resources through coordinated emergency response and assessment. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Emergency Response and Damage Assessment	Status	Activity Type
Activity ERDA-1.1: Create a Monument Emergency Response and Assessment Team for ICS responses.	New	Planning/administrative
Activity ERDA-1.2: Acquire and maintain training and certification to complement and support the Regional Response Team.	Expanded	Planning/administrative
Activity ERDA-1.3: Participate in emergency response and preparedness drills and meetings throughout the life of the plan.	Expanded	Planning/administrative
Activity ERDA-1.4: Participate in damage assessment programs and training throughout the life of the plan.	Expanded	Planning/administrative
Activity ERDA-2.1: In the second year, determine the non-ICS emergencies and the necessary type and scope of responses.	New	Planning/administrative
Activity ERDA-2.2: Designate appropriate Monument personnel for each non-ICS response team.	New	Planning/administrative
Activity ERDA-2.3: Throughout the life of this plan, ensure that appointed personnel acquire and maintain training and certifications.	New	Planning/administrative
Activity ERDA-3.1: Update and improve upon the Area Contingency Plan and the Environmental Sensitivity Indices	Expanded	Planning/administrative
Activity ERDA-3.2: Within 3 years, create damage assessment criteria and protocols	Expanded	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.11.1 Expanded planning and administrative activities

Expanded planning and administrative activities include additional training, drills, and contingency plan updates and protocols development. Additional Monument staff receive training and certifications, ICS, hazardous waste operations and emergency response, boat safety, flight safety, first responder, and first aid, as needed (ERDA-1.2). Additional Monument staff would be added to the emergency response and assessment team and would participate in team meetings and drills, along with current staff (ERDA-1.3). Additional staff would be trained to work closely with a variety of damage assessment programs to ensure that appropriate response, injury assessment, and restoration activities take place for any given case (ERDA-1.4). Monument staff would update and improve on the area contingency plan and environmental sensitivity indices for the Monument (ERDA-3.1) Monument staff would develop non-ICS damage assessment criteria and protocols for the natural, cultural, and historic resources in the Monument (ERDA-3.2). The MMB would formalize the permit review process further by identifying and engaging a pool of experts trained in Monument-related subject matter, including policy, purpose, and proclamation findings.

1.6.11.2 New planning and administrative activities

New planning and administrative activities include creating a Monument Emergency Response and Assessment Team (ERAT) for ICS responses (ERDA-1.1)

With the creation of an ERAT, the regional response team's training and certification would be enhanced and continual emergency response and preparedness drills would be conducted to increase emergency preparedness. This team would also continually participate in damage assessment programs and training to improve response capabilities. The MMB would also determine the type and scope of non-ICS emergencies (ERDA-2.1) and would designate appropriate Monument personnel for each non-ICS response team (ERDA-2.2).

All personnel involved in the emergency response and natural resource damage assessment activities would be required to acquire and maintain the necessary training and certifications throughout the life of the plan (ERDA-2.3).

1.6.12 Permitting

Permitting activities would continue, as described in the No Action alternative, but several activities would be expanded. In addition, new activities are proposed to implement an effective and integrated permit program for the Monument. This program would manage, minimize, or prevent negative human effects by allowing access only for those activities consistent with Presidential Proclamation 8031 and the implementing regulations of the Monument. In addition, individual permit applications would continue to be reviewed for environmental effects. Also, the MMB would conduct a case-by-case environmental analysis under NEPA or HRS Chapter 343 for each permit issued. New and expanded permitting activities are described in the Monument Management Plan (section 3.4.1, Permitting Action Plan). These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Permitting	Status	Activity Type
Activity P-1.4: Engage outside experts in review of permit applications.	Expand	Planning/administrative
Activity P-1.5: Investigate individual and vessel insurance and other avenues to fund mitigation of any damages associated with permitted activities.	New	Planning/administrative
Activity P-2.1: Develop a Geographic Information System (GIS)-based permit tracking system.	Expand	Planning/administrative
Activity P-2.2: Analyze permit data to inform management decision making.	New	Planning/administrative
Activity P-2.3: Analyze permit data for patterns of compliance.	New	Planning/administrative
Activity P-2.4: Develop and implement a Monument reporting process.	Expand	Planning/administrative
Activity P-3.1: Develop and implement a permit and regulatory education program.	Expand	Planning/administrative
Activity P-3.2: Develop and implement a Native Hawaiian cultural education program for all permit applicants.	Expand	Planning/administrative
Activity P-3.3: Coordinate permitting outreach.	Expand	Planning/administrative
Activity P-3.4: Develop a pre-access training and briefing program.	Expand	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative

1.6.12.1 Expanded planning and administrative activities

Expanded permitting and administrative activities include enhancing the permit review and tracking process and information outreach to permittees and the public. Expanded permitting activities also include emphasizing the cultural significance of the Monument to Native Hawaiians and the environmental and cultural conduct necessary for access to the Monument. An integrated MMB review of reports generated from the vast array of permit data collected would be established to ensure that reports are completed and submitted on time. One aspect of the report review process would ensure that data is logged and research results were made available. The MMB would formalize the permit review process further by identifying and engaging a pool of experts trained in Monument-related subject matter, including policy, purpose, and proclamation findings (P-1.4). Current and future permit data would be integrated into the GIS-based permit tracking system to ensure a comprehensive portrayal of activities in the region (P-2.1). The permit reporting process as a follow-up to field activities would be standardized (P-2.4).

Monument staff would work together to ensure that the educational activities proposed in these action plans are integrated to provide a consistent and effective message (P-3.1).

The MMB would develop and implement an educational program that could be provided online from the Monument Web site, which would educate prospective applicants about the Native Hawaiian culture (P-3.2).

Multiple information, outreach, and education programs would be developed to communicate permitting processes and regulatory information to the public, with particular attention given to interagency permitting efforts. Additional information and outreach, including presentations, publications, and DVDs, would aid interagency permitting efforts and better inform the public about Monument permitting (P-3.3). The MMB would develop and maintain a single Web site address committed to keeping the public engaged and regularly informed on all proposed and permitted activities that would be conducted in the Monument. This Web site would be the location for the public to access information regarding the Monument, including information on the Monument permit program (3.5).

In addition to the current pre-access training, new information on the Proclamation regulations, permit terms and conditions, reporting requirements, the significance of the NWHI to Native Hawaiians, and ways to best conduct activities to reduce human effects on the natural environment and cultural resources would be incorporated into the training (P-3.4).

1.6.12.2 New planning and administrative activities

New planning and administrative activities include defining insurance requirements for permittees and developing a data analysis system to identify potential environmental effects and patterns of compliance. The MMB would develop joint criteria for insurance that may be required before a permit authorizes activities in the Monument. Insurance requirements are intended to mitigate the potential risks of medical evacuations, vessel groundings, alien species introductions, and hazardous materials spills (P-1.5).

To assist in ecosystem based management decision making, permit data generated from each permit application and report would be analyzed to provide the insight needed to make informed management choices about appropriate levels and locations of permitted activities (P-2.2). Data generated from permit applications and reports would be analyzed to modify reporting requirements and make them more relevant. In addition, this data would be used to evaluate patterns of compliance and to aid in enforcement and other program area planning efforts (P-2.3).

1.6.13 Enforcement

Enforcement activities would continue, as described in the No Action alternative, but several activities would be expanded. In addition, new activities are proposed to achieve compliance with all regulations within the Monument. New and expanded enforcement activities are described in detail the Monument Management Plan (section 3.4.2, Enforcement Action Plan). These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Enforcement	Status	Activity Type
Activity EN-1.1: Charter a Monument law enforcement working group.	New	Planning/administrative
Activity EN-1.2: Develop necessary interagency agreements.	Expand	Planning/administrative
Activity EN-1.3: Develop an integrated law enforcement training program.	New	Planning/administrative
Activity EN-1.4: Assess Monument law enforcement capacity and program effectiveness	New	Planning/administrative
Activity EN-1.5: Increase law enforcement capacity on Midway Atoll within 2 years	Expand	Field activity
Activity EN-2.3: Integrate additional automated monitoring systems and ship reporting systems for all vessels transiting the Monument	New	Planning/administrative
Activity EN-2.4: Increase available platforms to support law enforcement.	Expand	Infrastructure and development
Activity EN-3.1: Integrate regulations briefings into pre-access training required for all Monument users.	Expand	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.13.1 Expanded planning and administrative activities

Expanded planning and administrative activities would include efforts to enhance interagency agreements, increase law enforcement capacity and assets, and refine pre-access briefings. Additional cooperative agreements at a regional level would allow law enforcement officers of partner agencies to enforce the variety of federal and state statutes that apply within the entire Monument, as well as future collaborations (EN-1.2). Current pre-access briefings would be standardized using videos, printed materials, and presentations (EN-3.1).

1.6.13.2 New planning and administrative activities

New planning and administrative activities include developing a Monument law enforcement working group, which would enhance communication and collaboration on law enforcement issues and needs (EN-1.1). The working group would also regularly assess the effectiveness of law enforcement activities and would identify hot spots that require additional focus (EN-1.4). New training programs would be developed to provide officers with the most current information, including environmental education and Native Hawaiian cultural practices (EN-1.3).

1.6.13.3 Expanded field activities

Expanded field activities include on-site enforcement presence at Midway Atoll NWR. Credentialed officers would be stationed there to ensure visitor and staff safety and regulatory compliance (EN-1.5) providing on-site enforcement capacity at the refuge and Monument-wide to respond to increased operations and recreational activities. Additional automated monitoring systems and ship reporting systems would be integrated in the Vessel Monitoring System to track vessels transiting the Monument (EN-2.3).

1.6.13.4 Expanded infrastructure and development activities

Expanded infrastructure and development activities would be used to evaluate aerial and ship-based surveillance systems. Due to the remoteness of this area, increased aerial and ship-based resources would be evaluated both for surveillance and for response and would be added as needed (EN-2.4).

1.6.14 Midway Atoll NWR Visitor Services

Proposed Midway Atoll visitor services activities are described in the Monument Management Plan. They include planning and administrative, field, and infrastructure and development activities (see Monument Management Plan, section 3.4.3, Midway Atoll Visitor Services Action Plan and Appendix B). All activities described in the No Action alternative would continue, but several activities would be expanded. In addition, new activities are proposed to offer visitors opportunities to discover, enjoy, appreciate, protect, and honor the unique natural, cultural, and historic resources of the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Midway Atoll Visitor Services	Status	Activity Type
Activity VS-1.1: Provide visitors with opportunities for wildlife-dependent recreation to enhance their knowledge and appreciation of the Monument's natural resources.	Expand	Field activity
Activity VS-1.2: Provide visitors with opportunities to learn about and appreciate the Monument's cultural and historic resources.	Expand	Field activity
Activity VS-1.3: Continuously monitor the impacts of visitors and other users on wildlife and historic resources to ensure their protection.	Expand	Field activity

Proposed Action Alternative: Midway Atoll Visitor Services	Status	Activity Type
Activity VS-2.1: Monitor visitor satisfaction surveys completed by outgoing visitors, adjusting activities, facilities, and maintenance schedules as appropriate on a monthly basis.	Expand	Field activity
Activity VS-2.2: Convene a team of visitor services specialists and Midway Atoll staff to review the visitor program on a biennial basis.	New	Planning/administrative
Activity VS-2.3: Based on the assessment above, seek funding, authority, or other needs to implement the recommendations for improvement.	New	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.14.1 New planning and administrative activities

New planning and administrative activities would include engaging specialists to review the visitor services program every two years. A team of visitor services specialists and Midway Atoll staff would assess whether the visitor program is meeting the standards outlined in the Visitor Services Plan (VS-2.2). The team would also evaluate the need to adjust visitor fees and make recommendations on the program's financial stability, including staffing and facility needs (VS-2.2). FWS would seek funding authority or other needs to implement any recommendations to improve the visitor program (VS-2.3).

1.6.14.2 Expanded field activities

Expanded field activities include efforts to provide visitors with opportunities to come to Midway Atoll and to continuously improve visitor services, based on monitoring effects and visitor satisfaction. As outlined in the Draft Midway Atoll Visitor Services Plan (Volume III, Appendix C), up to 50 visitors would be offered educational opportunities through tours, diving, kayaking, and photography (VS-1.1). In addition, tours and exhibits would be offered focusing on Midway's and the Monument's cultural and historic resources. One of the historic buildings on Sand Island would be restored to a visitor center and educational facility, offices and a permanent museum/library, which would include Monument-wide information.

An expanded snorkel and new dive program would be developed (VS-1.2). The Midway Atoll Visitor Services Plan would extend the interim plan and would include most of the same restrictions that would be carried over into a longer-term plan. To ensure resource protection, visitor effects and compatibility with conservation management would be monitored, as required by FWS policies (VS-1.3). A higher level of evaluation would be conducted with formal recommendations for improvements (VS-2.1).

1.6.15 Agency Coordination

Proposed agency coordination activities are described in the Monument Management Plan and include planning and administrative activities (see Monument Management Plan, section 2.0; Management Framework; and section 3.5.1, Agency Coordination Action Plan). All activities described in the No Action alternative would continue, but several activities would be expanded under the Proposed Action. In addition, new activities are proposed to continue the successful collaboration with government partners to achieve publicly supported, coordinated management

in the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Agency Coordination	Status	Activity Type
Activity AC-1.1: Establish standard operating procedures, as needed, to provide direction and improve communication within the MMB.	Expanded	Planning/administrative
Activity AC-2.1: Establish agreements for coordinated management and conduct cooperative management operations.	Expanded	Planning/administrative
Activity AC-2.2: Develop interagency agreements, grants, and memoranda of agreement as needed to carry out specific program priorities.	Expanded	Planning/administrative
Activity AC-3.1: Enhance communication and cooperation with the Department of Defense and the U.S. Navy Pacific Fleet.	Expanded	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.15.1 Expanded planning and administrative activities

Expanded planning and administrative activities include enhanced coordination among Co-Trustee agencies and expanded collaborative agreements with other agencies, as appropriate. In order to ensure that unwritten knowledge and skills do not disappear when positions are filled with new staff, standard operating procedures for the MMB would be recorded, updated as necessary, and properly maintained (AC-1.1).

Building on the MOA signed in 2006, new agreements would be developed among the MMB to help coordinate management. Such agreements would specify roles, responsibilities, and periodic reviews (AC-2.1). Cooperative projects that may benefit from formal and other informal agreements would be pursued with agencies outside of the MMB. This would allow for ease in sharing resources and in-kind assistance and support, as appropriate (AC-2.2).

Formal and informal agreements may be developed for specific program priorities that require cooperative assistance from agencies outside the MMB. Through the ICC (International Code Council) and other forums, the MMB would enhance communications with the DOD and the U.S. Navy on potential areas of cooperation, including enforcement; minimizing the effects of military activities in the Monument; supporting zoning, permitting, and tracking programs; and restoring and protecting regional and local wildlife (AC-3.1).

1.6.16 Constituency Building and Outreach

Constituency building and outreach activities would continue, as described in the No Action alternative, but several activities would be expanded. In addition, new activities are proposed to cultivate an informed involved constituency that supports and enhances conservation of the natural, cultural, and historical resources of the Monument. New and expanded constituency building and outreach activities are described in the Monument Management Plan (section 3.5.2, Constituency Building and Outreach Action Plan). These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Constituency Building and Outreach	Status	Activity Type
Activity CBO-1.1: Develop an integrated communications strategy based on an assessment of ongoing activities and future needs.	New	Planning/administrative
Activity CBO-1.3: Develop a consistent Monument identity to be used in all communications strategies that reflects its co-management within 1 year.	New	Planning/administrative
Activity CBO-1.4: Incorporate new perspectives for understanding the value of NWHI ecosystems, including socioeconomic studies, to increase ocean ecosystem literacy and conservation in the Monument within 5 years.	Expanded	Planning/administrative
Activity CBO-1.5: Research and implement new technologies and tools to increase public understanding of the NWHI ecosystems within 5 years.	Expanded	Field activity
Activity CBO-2.1: Establish a new Monument website that would allow constituents to visit a single site for all Monument-related information within 1 year.	New	Planning/administrative
Activity CBO-3.2: As needed, hold focused forums on various Monument-related issues or topics to inform and engage a broader range of constituents.	Expanded	Planning/administrative
Activity CBO-3.4: Continue to build and nurture volunteer programs that develop knowledge of, involvement in, and support for Monument programs and resources.	Expanded	Planning/administrative
Activity CBO-3.5: Establish and support a Papahānaumokuākea Marine National Monument Alliance to engage a broad range of constituents, who would provide us with recommendations and information on specific management issues on a regular basis, within 1 year.	New	Planning/administrative
Activity CBO-3.6: Continue to support the Native Hawaiian Cultural Working Group through the Office of Hawaiian Affairs.	Expanded	Planning/administrative
Activity CBO-3.7: Continue working with the Friends of Midway Atoll National Wildlife Refuge through FWS and support the establishment of a Monument-related “friends” group.	Expanded	Planning/administrative
Activity CBO-4.1: Develop interagency Monument interpretive themes to guide all interpretive products and activities.	Expanded	Planning/administrative
Activity CBO-4.2: Review existing interpretive sites and activities to determine their current relevance to the Monument and how they could better represent Monument themes.	Expanded	Planning/administrative
Activity CBO-4.3: Seek additional opportunities to expand Monument interpretive efforts to new sites and through new technologies, creating a network of coordinated interpretive sites.	Expanded	Planning/administrative
Activity CBO-4.4: Working with the National Park Service, U.S. Navy, and other key entities, develop off-site exhibits on the Battle of Midway and the associated National Memorial to be integrated into World War II memorial sites of the Pearl Harbor Historic District.	New	Infrastructure and development

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.16.1 Expanded planning and administrative activities

Expanded planning and administrative activities include new products, messages, and modes of communication. The MMB would support and seek out traditional ecological knowledge, as well as new perspectives that contribute different ways of valuing the ecosystems of the NWHI. New and novel ways to look at the value of marine ecosystems, such as socioeconomic analysis of the nonmarket value of coral reefs, would also be supported (CBO-1.4). Additional materials would be developed to aid in the understanding of more specific aspects of the entire region and on the ways in which the public can participate. These printed materials may also include multimedia components or may be developed as a suite of materials (CBO-2.2).

The MMB would offer public forums on specific topics or issues, both to exchange information with our constituencies and to build awareness and support. These forums would be offered at various locations to facilitate participation by a broad range of constituents (CBO-3.2). The volunteer program would continue to be nurtured and grown in support of the Monument (CBO-3.4). Guidance and support provided to the Monument by the Native Hawaiian Cultural Working Group through OHA would be further considered (CBO-3.6). In addition to continuing to work with the Friends of Midway Atoll National Wildlife Refuge, the MMB would evaluate the possibility of establishing a Monument-wide friends group to provide similar support. (CBO-3.7).

A more focused study would be conducted to develop Monument-wide interpretive themes to guide the development and presentation of interpretive sites and products (CBO-4.1); existing interpretative facilities would be reviewed and updated. The Midway Atoll visitor center would be upgraded to include Monument-wide information (CBO-4.2). In addition, the inclusion of an interpretative facility at the proposed NOAA facility on Ford Island would be reviewed. The MMB would identify new sites and technologies to better reach our audiences and to include Monument messages in broader arenas (CBO-4.3).

1.6.16.2 New planning and administrative activities

New planning and administrative activities include a unified approach and identity for constituency building and outreach. To better reflect the shared management of the Monument, the MMB would work toward a unified strategy for constituency building and outreach (CBO-1.1). A new identity would be developed for the Monument, and a consolidated website for information would be created (CBO-1.3 and CBO-2.1). A range of constituent participation would be encouraged through holding public forums, expanding volunteer activities, and establishing a Monument Friends Group and a Monument Alliance group (CBO-3.5).

1.6.16.3 Expanded field activities

Expanded field activities would incorporate new technologies to increase public understanding of the Monument and its resources. The MMB would increase support for projects such as documentaries, photography, and writing, which would bring the place to the people (CBO 2.3). Telepresence technologies would play an important role in educating the public about the NWHI. Significant obstacles to implementing these technologies do exist, such as cost,

feasibility, and ecological sensitivities, but Monument staff would continue to use and expand these new technologies for providing this virtual experience (CBO-1.5).

1.6.16.4 New infrastructure and development activities

New infrastructure and development activities include possible additional interpretative centers. Additional opportunities to expand interpretive sites would be examined through working with the National Park Service, the U.S. Navy, and other key entities to develop off-site exhibits (CBO-4.4).

1.6.17 Native Hawaiian Community Involvement

Proposed Native Hawaiian community involvement activities are described in the Monument Management Plan and include planning and administrative activities (Monument Management Plan, section 3.5.3 Native Hawaiian Community Involvement Action Plan). All activities described in the No Action alternative would continue, but several activities would be expanded under the Proposed Action. In addition, new activities are proposed to engage the Native Hawaiian community in active and meaningful involvement in the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Native Hawaiian Community Involvement	Status	Activity Type
Activity NHCI-1.1: Formalize, expand, and convene the Native Hawaiian Cultural Working Group.	Expanded	Planning/administrative
Activity NHCI-1.2: Engage the Native Hawaiian Cultural Working Group in the development of a Monument Cultural Resources Program.	New	Planning/administrative
Activity NHCI-1.3: Establish an annual cultural resources exchange.	New	Planning/administrative
Activity NHCI-2.1: Continue to expand and explore opportunities to partner with institutions serving Native Hawaiians.	Expanded	Planning/administrative
Activity NHCI-3.2: Use and integrate Native Hawaiian traditional ecological knowledge in Monument management activities.	New	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.17.1 Expanded planning and administrative activities

Expanded planning and administrative activities include formally establishing the Native Hawaiian Working Group and establishing additional partnerships with other Native Hawaiian groups. The MMB, through OHA, would formally establish the Native Hawaiian Cultural Working Group, expanding the previously established working group, to ensure regular involvement of the Native Hawaiian community and a strong cultural link in planning and managing the Monument (NHCI-1.1). In addition to the partnership with the Kamakakūokalani Center for Hawaiian Studies, the MMB would also seek other opportunities to formally consult with and engage other Native Hawaiian groups and would develop outreach programs for the Native Hawaiian community (NHCI-2.1). Additional partnerships, contracts, grants, or formal agreements with Native Hawaiian organizations would be considered and established as opportunities arise.

1.6.17.2 New planning and administrative activities

New planning and administrative activities include developing a Monument Cultural Resource Program and integrating Native Hawaiian traditional ecological knowledge into Monument management activities. A Monument Cultural Resource Program and corresponding cultural resource management activities would be established and based on the recommendations of the Native Hawaiian Cultural Working Group and other Native Hawaiian organizations (NHCI-1.2). The MMB would annually convene groups of Native Hawaiians to discuss the knowledge, experiences, and new questions gained during the past research season (NHCI-1.3). This conference would update the Native Hawaiian community and would engage that community in determining the priorities and proposed methods of forthcoming research queries, theories, and needs. The Monument's cultural resources staff would work with the Native Hawaiian community and cultural experts to identify how traditional ecological knowledge and associated practices may be woven into Monument management and research activities (NHCH-3.1). Based on traditional Hawaiian resource management strategies and traditional ecological knowledge, the MMB would integrate traditional perspectives, knowledge, and approaches in the management of Monument resources (NHCI-3.2).

1.6.18 Ocean Ecosystems Literacy

Ocean ecosystem literacy activities would continue, as described in the No Action alternative, but several activities would be expanded. In addition, new activities are proposed that would cultivate an ocean ecosystems stewardship ethic, strengthen the Nation's science and cultural literacy, and create a new generation of conservation leaders through formal environmental education. New and expanded enforcement activities are described in the Monument Management Plan (section 3.5.4 Ocean Ecosystems Literacy Action Plan). These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Ocean Ecosystem Literacy	Status	Activity Type
Activity OEL-1.1: Expand and improve the NWHI educational partnership's Navigating Change curriculum for elementary and middle school students, with increased focus on ocean ecosystems literacy within 3 years.	Expanded	Planning/administrative
Activity OEL-1.2: As curricula are developed, work with Hawaiian language immersion schools and the Office of Hawaiian Affairs to ensure the curricula meet their needs, including translation into the Hawaiian language/	Expanded	Planning/administrative
Activity OEL-1.3: Develop an ocean stewardship program for middle school and high school students within 5 years.	New	Planning/administrative
Activity OEL-1.6: Expand educational programs for school groups at Mokupāpapa: Discovery Center for Hawai'i's Remote Coral Reefs to host at least 10 groups per month.	Expanded	Planning/administrative
Activity OEL-1.7: Provide biennial wildlife-dependent educator workshops at Midway Atoll, targeting a mix of science teachers and those from other fields of education and using the Navigating Change curricula, within 2 years	Expanded	Field activity
Activity OEL-1.9: Build formal evaluations into all education programs within 2 years.	Expanded	Planning/administrative

Proposed Action Alternative: Ocean Ecosystem Literacy	Status	Activity Type
Activity OEL-2.1: Identify and prioritize research and development projects to increase ocean ecosystems literacy and conservation in NWHI.	Expanded	Planning/administrative
Activity OEL-2.2: Use telepresence technology for educational and outreach activities within 5 years.	Expanded	Field activity

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.18.1 Expanded planning and administrative activities

Expanded planning and administrative activities include developing new curricula, ensuring appropriate cultural information is included, increasing the capacity of the Discovery Center for education and outreach, evaluating the outcomes of educational programs developed for the Monument, and identifying priority research needs on new educational technologies. Additional study units would be added for the current guide targeted at fourth and fifth grade students, and units focusing on other grade levels would be developed. Education partners would work with the Department of Education and private and charter schools as curricula are being developed to ensure that the Department's and schools' needs are incorporated into the work and to help incorporate the new curricula into educational programming (OEL-1.1). The Navigating Change partnership would work closely with the Native Hawaiian community to ensure appropriate cultural information is included within all curricula and that the units meet the needs of Hawaiian-language immersion and culture-based charter schools (OEL-1.2). Educational programming at the Monument's education and outreach venue, Mokupāpapa: Discovery Center for Hawai'i's Remote Coral Reefs, would be expanded. Discovery Center staff would create 40 educational partnerships to promote Mokupāpapa as an educational facility and field trip venue. Volunteer docent capacity would be developed to meet the increasing needs of school and community groups (OEL-1.6) Evaluating education and outreach programs and activities is critical to ensuring that the MMB is achieving its desired goals and reaching target audiences. Formal evaluations would be integrated into all Monument education programs (OEL-1.9). The MMB, working together with educational partnerships and other relevant groups, including the private sector, would identify and prioritize research and development projects for new products and innovative technologies that could be used to increase ocean ecosystem literacy and support for conservation of the NWHI (OEL-2.1).

1.6.18.2 New planning and administrative activities

New planning and administrative activities include working with educational partners to develop an ocean stewardship program for middle and high school students that provides real-world, hands-on experiences with issues of ocean management (OEL-1.3).

1.6.18.3 Expanded field activities

Expanded field activities include providing additional opportunities to engage teachers in experiencing Midway Atoll and use telepresence technologies to support broader public education. The teacher workshop program would be expanded to include workshops every other year on Midway Atoll. Offering more educators the opportunity to experience Midway Atoll and

bring the Monument back to their students would be an important role for Midway in the coming years (OEL-1.7). Because most people would not be able to visit the NWHI, the MMB would use such technologies as underwater video cameras, real-time video transmission, virtual field trips, formal distance learning programs, websites, and exhibits in discovery centers to educate the public about the NWHI. Significant obstacles to implementing these technologies do exist, such as cost, feasibility, and ecological sensitivities, but Monument staff would continue to use and expand these new technologies for providing this virtual experience (OEL-2.2).

1.6.19 Central Operations

Proposed central operations are described in the Monument Management Plan and include planning and administrative and infrastructure and development (see Monument Management Plan, section 2.0 and 3.6.1, Central Operations Action Plan). All activities described in the No Action alternative would continue, but several activities would be expanded under the Proposed Action. In addition, new activities are proposed to conduct effective and well-planned operations with appropriate human resources and adequate physical infrastructure in the main Hawaiian Islands to support management of the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Central Operations	Status	Activity Type
Activity CO-2.1: Regularly assess current status and future needs for human resources.	Expanded	Planning/administrative
Activity CO-2.2: Improve human resources and organizational capacity.	Expanded	Planning/administrative
Activity CO-3.1: Regularly assess current status and future needs for infrastructure and facilities.	Expanded	Planning/administrative
Activity CO-3.2: Maintain and improve infrastructure and facilities.	Expanded	Infrastructure and development
Activity CO-3.3: Improve information technology infrastructure.	Expanded	Infrastructure and development

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.19.1 Expanded planning and administrative activities

Expanded planning and administrative activities include human resource and infrastructure needs assessments and capacity building. Monument staff would continue to regularly assess human resource needs for individual agencies. They would continue to identify and prioritize capacity building opportunities and regional capacities and opportunities to coordinate and share resources with partners (CO-2.1). As Monument staff grows, so would the human resource development capacity, including staff recruitment, retention, recognition, training, communication, regular meetings, time and attendance, and staff safety (CO-2.2). In conjunction with assessments of human resource needs, infrastructure and facilities needs would also be reviewed to optimize facilities utilization. These assessments would aim to organize and better use existing facilities and infrastructure, to identify physical resource overlaps and gaps, and to identify needs to support projected future growth and collocation (CO-3.1).

1.6.19.2 Expanded infrastructure and development activities

Expanded infrastructure and development activities include resource sharing among the MMB agencies and acquiring new computer technology to support Monument activities.

Use of assets among MMB agencies would be assessed to determine more efficient use of available resources and to plan for cooperative growth (CO-3.2). Appropriate computer equipment would be acquired, upgraded, and maintained to meet management needs, and new technologies would be integrated as warranted (CO-3.3).

1.6.20 Information Management

Proposed information management activities are described in the Monument Management Plan and include planning and administrative activities (see Monument Management Plan, section 3.6.2, Information Management Action Plan). All activities described in the No Action alternative would continue, but several activities would be expanded. In addition, new activities are proposed to consolidate and make accessible relevant information to meet educational, management, and research needs for the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action: Information Management	Status	Activity Type
Activity IM-1.1: Develop and implement a data discovery, inventory, and acquisition strategy.	New	Planning/administrative
Activity IM-1.2: Develop appropriate data management protocols, procedures, and agreements with partner agencies.	New	Planning/administrative
Activity IM-1.3: Continue to design, build, and maintain the Papahānaumokuākea Information Management System (PIMS).	Expanded	Planning/administrative
Activity IM-1.4: Begin incorporating information into PIMS.	New	Planning/administrative
Activity IM-2.1: Design tools for accessing the PIMS.	New	Planning/administrative
Activity IM-2.2: Assess data access needs and provide training for PIMS users.	New	Planning/administrative
Activity IM-2.3: Develop interfaces to feed data to repositories, such as National Biological Information Infrastructure, Pacific Basin Information Node, Coral Reef Information System, and Integrated Ocean Observing System.	New	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.20.1 Expanded planning and administrative activities

Expanded planning and administrative activities include the continued development of the Papahānaumokuākea Information Management System (PIMS), which would be refined, configured, and maintained to meet a spectrum of needs of the MMB (IM-1.3).

1.6.20.2 New planning and administrative activities

New planning and administrative activities include the development of a data acquisition strategy, data management protocols, tools and training on accessing PIMS, and interfaces to major data repositories. A data discovery, inventory, and acquisition strategy would be developed and implemented to identify the types, format, and sources of new and existing information and data sets (IM-1.1). Once the data sources have been identified, protocols for how data would be collected, documented, stored, and shared would be developed and implemented (IM-1.2). A shipboard data collection tool, under development, would facilitate data capture, standardization, and chain-of-custody. While PIMS stores some data that is not already maintained by other partner agencies, it is primarily intended to be a portal to a decentralized data storage and management system. Data entry, formatting, and review would be formulated in conjunction with data providers as data and information is incorporated into PIMS (IM-1.4). The MMB would develop tools and training for accessing, updating, analyzing and receiving PIMS data (IM-2.1 and IM-2.2). Interfaces would be developed to feed data to other data repositories, such as the National Biological Information Infrastructure and the Integrated Ocean Observing Systems (IM-2.3).

1.6.21 Coordinated Field Operations

Proposed coordinated field operations activities are described in the Monument Management Plan and include planning and administrative, field, and infrastructure and development activities (see Monument Management Plan, section 3.6.3). All activities described in the No Action alternative would continue, but several activities would be expanded. In addition, new activities are proposed to coordinate field activities and to provide adequate infrastructure to ensure safe and efficient operations while avoiding effects on the ecosystems in the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Coordinated Field Operations	Status	Activity Type
Activity CFO-1.1: Initiate and complete necessary planning to implement the draft Midway Atoll Conceptual Site Plan.	Expanded	Planning/administrative
Activity CFO-1.2: Develop conceptual site plans for Hawaiian Islands National Wildlife Refuge and Seabird Sanctuary at Kure Atoll.	New	Planning/administrative
Activity CFO-1.3: Develop a strategy for long-term sustainability for operations throughout the Monument using alternative energy systems and waste reduction with 2 years.	Expanded	Planning/administrative
Activity CFO-1.4: Plan for use of sustainable construction and landscape architecture for facilities and assets throughout the Monument.	Expanded	Planning/administrative
Activity CFO-2.1: Develop interagency agreements to facilitate effective field coordination throughout the Monument.	Expanded	Planning/administrative
Activity CFO-2.2: Develop and implement standardized field operation protocols.	Expanded	Field activity
Activity CFO-2.3: Assess threats that field activities pose to Monument resources.	Expanded	Planning/administrative

Proposed Action Alternative: Coordinated Field Operations	Status	Activity Type
Activity CFO-2.5: Develop a staff coordination agreement between Midway Atoll NWR and the State Seabird Sanctuary at Kure Atoll.	New	Planning/administrative
Activity CFO-3.1: Construct low-impact structure pilot project at Midway Atoll.	New	Infrastructure and development
Activity CFO-3.2: Replace Bravo Barracks at Midway Atoll.	New	Infrastructure and development
Activity CFO-3.3: Replace Charlie Barracks at Midway Atoll.	New	Infrastructure and development
Activity CFO-3.4: Rehabilitate "Officers Row" Housing at Midway Atoll.	Expanded	Infrastructure and development
Activity CFO-3.5: Maintain and enhance, where appropriate, the infrastructure at Kure Atoll.	Expanded	Infrastructure and development
Activity CFO-3.6: Maintain and enhance, where appropriate, the infrastructure at French Frigate Shoals.	Expanded	Infrastructure and development
Activity CFO-3.7: Evaluate, maintain, and enhance the small tent field camp at Pearl and Hermes Atolls on Southeast Island.	Expanded	Infrastructure and development
Activity CFO-3.8: Maintain and enhance the existing tent field camp at Laysan Island.	Expanded	Infrastructure and development
Activity CFO-4.2: Develop biodiesel fuel capacity or other sustainable fuel types at Midway Atoll within 2 years.	New	Infrastructure and development
Activity CFO-5.1: Rehabilitate water catchment and distribution systems.	Expanded	Infrastructure and development
Activity CFO-5.2: Rehabilitate septic and wastewater systems.	Expanded	Infrastructure and development
Activity CFO-5.3: Treat all wooden historic structures at Midway Atoll for termites.	Expanded	Infrastructure and development
Activity CFO-5.4: Evaluate and expand food services as necessary.	Expanded	Infrastructure and development
Activity CFO-5.5: Rehabilitate seaplane hangar.	Expanded	Infrastructure and development
Activity CFO-5.6: Repair inner harbor seawall.	Expanded	Infrastructure and development
Activity CFO-6.1: Inventory, maintain, and coordinate the use of small boats and related field resources.	Expanded	Planning/administrative
Activity CFO-6.2: Within 2 years, station additional vessels at Midway for use during the summer marine research field season.	Expanded	Infrastructure and development
Activity CFO-6.3: Within 5-10 years. station a small research/enforcement vessel at Midway Atoll.	New	Infrastructure and development
Activity CFO-6.4: Construct new finger piers along the north wall of Midway's inner harbor.	New	Infrastructure and development
Activity CFO-6.5: Redevelop existing boathouse at Midway into a multi-use facility.	New	Infrastructure and development
Activity CFO-6.6: Evaluate needed improvements to Pier No. 1 in the ship basin and the Tug Pier at Midway Atoll.	New	Planning/administrative

Proposed Action Alternative: Coordinated Field Operations	Status	Activity Type
Activity CFO-6.7: Make needed improvements to or replace the pier at Eastern Island.	New	Infrastructure and development
Activity CFO-7.1: Identify a reliable, efficient, cost-effective aircraft service to double the delivery capacity of personnel and cargo between Honolulu and Midway.	Expanded	Planning/administrative
Activity CFO-7.2: Within 5-10 years, evaluate the need for a dedicated aircraft for transportation, research, evacuation, education, surveillance, management, and enforcement in the Pacific region.	New	Planning/administrative
Activity CFO-7.3: Within 15 years, acquire appropriate aircraft to service the Monument and the Pacific region.	New	Infrastructure and development
Activity CFO-8.1: Refurbish or replace the dive recompression chamber at Midway.	Expanded	Infrastructure and development
Activity CFO-8.2: Investigate acquisition of portable dive recompression chamber for use on a small research vessel.	Expanded	Infrastructure and development
Activity CFO-8.3: Incorporate a dive operations center into refurbished boathouse facility at Midway.	Expanded	Infrastructure and development
Activity CFO-9.1: Design a marine laboratory at Midway and develop in phases.	New	Infrastructure and development
Activity CFO-9.2: Complete planning for and construct captive care monk seal facility on Sand Island.	New	Infrastructure and development
Activity CFO-9.3: Provide logistical, infrastructure, and transportation support for threatened and endangered species recovery actions.	Expanded	Infrastructure and development
Activity CFO-9.4: Complete Phase I rehabilitation of Midway Mall and the commissary building.	Expanded	Infrastructure and development
Activity CFO-9.5: Construct airport welcome center on Sand Island within 2 years.	New	Infrastructure and development

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.21.1 Expanded planning and administrative activities

Expanded planning and administrative activities include necessary site planning to ensure coordinated field operations to achieve the purpose of the Monument, the Midway and Hawaiian Islands National Wildlife Refuges, NWHI Coral Reef Ecosystem Reserve, the Kure Atoll Wildlife Sanctuary, and the State of Hawai‘i Marine Refuge. Other activities are to incorporate “green” methods and technologies into future Monument operations and infrastructure. The completion and implementation of conceptual site plans for the Midway Atoll National Wildlife Refuge, the Kure Atoll Wildlife Sanctuary, and the Hawaiian Islands National Wildlife Refuge is fundamental to fulfilling the purpose and needs of these various needs. Co-trustees would coordinate on Midway Site Plan priorities, would conduct detailed planning, would initiate budget requests, and would implement actions as planning and compliance is completed and funding is available (CFO-1.1). Co-trustees also would work together to develop sustainable management and operations priorities (CFO-1.3) and to develop sustainable programs for construction, landscape architecture, and facilities (CFO-1.4).

Interagency agreements to coordinate field operations, share resources, and commit to joint implementation of field priorities would be developed, as appropriate (CFO-2.1). Permitted activities would continue to be monitored through field activity reports. In addition, data from these reports would be managed in a geographic information system to provide adaptive management for the MMB in conducting or authorizing future field activities (CFO-2.3). Small boats and support equipment would be inventoried Monument-wide to determine whether the Co-Trustees could use these resources more effectively and reduce duplicative efforts (CFO-6.1). The development of biodiesel fuel capacity or sustainable fuel types would be evaluated within two years to meet future fuel requirements for aircraft, vessel, utility, and equipment needs at Midway as part of a long-term sustainability strategy (CFO-1.3). Furthermore, in support of the "Greening of America," sustainable construction and landscape architecture for facilities and assets would be incorporated into Monument infrastructure planning (CFO-1.4).

1.6.21.2 New planning and administrative activities

New planning and administrative activities include conceptual site plan development for other parts of the Monument and evaluation of transportation needs. Similar to Midway, conceptual site plans need to be developed for the Seabird Sanctuary at Kure Atoll and at various locations within the Hawaiian Islands National Wildlife Refuge to identify long-term infrastructure requirements and priorities (CFO-1.2). A staff coordination agreement would be developed between Midway Atoll National Wildlife Refuge and the State Seabird Sanctuary at Kure Atoll to ensure coordination of habitat restoration and management activities and wildlife monitoring activities between the state and FWS (CFO-2.5).

Pier 1 in the ship basin and the tug pier in the inner harbor at Midway would both be evaluated for needed improvements (CFO-6.6). Within five to ten years, the need for a dedicated aircraft for transportation, research, evaluation, education, surveillance, management, and enforcement in the Pacific region would be evaluated (CFO-7.2).

1.6.21.3 Expanded field activities

Expanded field activities include standardized protocols for field operations. Standardized environmental, safety, and preparedness protocols for field operations would be developed consistent with partner agency standards to provide resource protection and safe field operations (CFO-2.2). Principal investigators and managers working in the NWHI would receive a copy of the Field Operations Manual and would implement these protocols.

1.6.21.4 Expanded infrastructure and development activities

Expanded infrastructure and development activities include maintaining or rehabilitating additional facilities. Housing and facilities would be replaced as needed on a case-by-case basis, with any construction occurring within the existing development footprint, so there would be no loss of wildlife habitat. The ten houses in Officers Row would be rehabilitated at Midway Atoll (CFO-3.4). Infrastructure at French Frigate Shoals, Kure Atoll, Pearl and Hermes Atoll, and Laysan Island would be maintained and enhanced, where appropriate (CFO-3.5, CFO-3.6, CFO-3.7, CFO-3.8).

At Midway, critical utility systems and ailing structures and facilities would be rehabilitated within five to fifteen years. Specific projects include rehabilitating the water catchment and distribution system (CFO-5.1), septic and wastewater systems (CFO-5.2), food services (FCO-5.4), the seaplane hangar (CFO-5.5), and the inner harbor seawall (CFO-5.6). Wooden historic structures at Midway would be treated for termites (CFO-5.3). Food service facilities would be evaluated and expanded, as necessary (CFO-5.4).

NOAA would add additional small boats as needed to facilitate research, management, and education conducted by the MMB (CFO-6.2). Within five years, inter-island aircraft transportation options would be identified (CFO-7.1).

The dive chamber at Midway Atoll has not been serviced in over five years and needs to be assessed and refurbished or replaced. This chamber would be maintained by an on-site chamber operator/dive technician (CFO-8.1). Advanced recovery efforts, particularly efforts to address juvenile survival, would be met by developing logistical, infrastructure, and transportation capability to transport threatened and endangered species, equipment, and personnel among the various atolls more reliably (CFO-9.3). Phase 1 Rehabilitation of Midway Mall and the Commissary building would be completed as well (CFO-9.4).

1.6.21.5 New infrastructure and development activities

New infrastructure and development would increase housing, field camp, and transportation capacity. Housing and field camp capacity would be maintained and enhanced through various infrastructure projects, such as at Midway, the construction a low-impact pilot project for housing, replacement of Bravo Barracks (CFO-3.2), replacement of Charlie Barracks (CFO-3.3).

A small research/enforcement vessel would expand research, enforcement, education, response, and restoration capabilities from French Frigate Shoals to Kure Atoll. Repair and maintenance facilities would be established at Midway, and full-time support personnel would be identified to properly manage this asset (CFO-6.3). The boathouse, dive center, seaplane ramp and pier, and storage facility would be redeveloped. The facility would have maintenance bays for servicing small boats and a dive locker, including a compressor, recompression chamber, appropriate storage, and work area. The building would be resited and potentially raised to address concerns over flooding on the seaplane pad (CFO-6.5). Improving or replacing the pier at Eastern Island is proposed to ensure continued access for researchers and field workers (CFO-6.7). Aircraft to serve the Monument and the Pacific region would be acquired within 15 years (CFO-7.3).

A small, portable recompression chamber would be evaluated for use aboard the small research vessel referenced in CFO-6.3 to extend research capacity (CFO-8.2). A dive center would be incorporated into a newly refurbished boathouse, complete with storage, maintenance facility, compressor, recompression chamber, dive locker, and tool shed (CFO-8.3).

A marine laboratory at Midway would be designed and developed in phases to serve as a hub for coordinated research (CFO-9.1). A captive care monk seal facility is planned for Sand Island (CFO-9.2), and an airport welcome center would be constructed to handle visitor arrival and departures from Midway (CFO-9.5). This facility would provide a welcome and briefing area for visitors and would contain restrooms, baggage handling, and a waiting area out of the weather.

1.6.22 Evaluation

Proposed evaluation would continue, as described in the Monument Management Plan, and include planning and administrative activities. All activities described in the No Action alternative would continue, but several new activities are proposed to determine the degree to which management actions are achieving the goals of the Monument. These activities are listed in the table below and are summarized in this section.

Proposed Action Alternative: Evaluation	Status	Activity Type
Activity EV-1.1: Prepare a comprehensive Monument evaluation strategy.	New	Planning/administrative
Activity EV-1.3: Conduct comprehensive evaluation and prepare a State of the Monument Report.	New	Planning/administrative
Activity EV-1.4: Conduct a management plan review.	New	Planning/administrative

Note: This table includes only proposed expanded and new activities. Activities in this action area that are not included in this table are described under the No Action alternative.

1.6.22.1 New planning and administrative activities

New planning and administrative activities include conducting a comprehensive evaluation. The successful management of the Monument by multi-agency partners is measured by implementing a comprehensive evaluation process. New evaluation activities include preparing the Monument evaluation strategy (EV-1.1), conducting a comprehensive evaluation in the fifth year of plan implementation and preparing a State of the Monument Report (EV-1.3), and conducting a review of the Monument Management Plan (EV-1.4). The review of recommended changes identified during the comprehensive evaluation would be reflected in a revised Monument Management Plan and revised Monument regulations (if needed).

1.7 COMPARISON OF ALTERNATIVES

The Monument Management Plan includes a range of activities to achieve the vision of the Monument. This section highlights new and expanded field and infrastructure and development activities described in the Proposed Action alternative; activities are highlighted in tables by action area (see section 1.6). This section also includes a comparison of these activities to current activities described in the No Action alternative (see section 1.8). Overall, new and expanded activities described in the Proposed Action alternative are designed to address priority management needs in all action areas. A comparison of key features of the No Action and Proposed Action alternatives is provided in Table 1.1.

Table 1.1 Comparison of Key Elements of No Action and Proposed Action Alternatives		
	No Action	**Proposed Action**
PMN 1 - Understanding and Interpreting the NWHI		
Marine Conservation Science		
Planning	Continue to conduct research according to agency-specific priorities.	Develop and implement a Monument natural resources science plan to prioritize marine and terrestrial research needed for Monument management.
Research	Continue to characterize shallow-water and deepwater marine habitats using scuba diving, submersibles, remotely operated vehicles, underwater cameras, and multibeam and side scan sonar.	Same as No Action plus use technical diving in mapping and monitoring deepwater habitats.
Information Management	Continue to integrate data and information in the Monument information management system.	Same as No Action plus regular update of information management systems and protocols.
Education and Outreach	Coordinate research update and annual meetings to present current research.	Same as No Action plus integrate education component in research expeditions.
Native Hawaiian Culture and History		
Research	Continue to identify cultural research priorities.	Same as No Action plus provide berthing space on research vessels and logistical support.
Cultural access	Continue to support Native Hawaiian cultural access.	Same as No Action plus provide Native Hawaiian cultural access to ensure cultural lessons can be learned at specific sites.
Monument management	Continue OHA support informational meetings of the Native Hawaiian Cultural Working Group and cultural experts.	Same as No Action plus integrate consultations and traditional ecological knowledge and practices into Monument management and Native Hawaiian cultural information into education and outreach for Monument permittees.
Cultural resource management for Nihoa and Mokumanamana	National Register of Historic Places listing for Nihoa and Mokumanamana.	Same as No Action plus implement preservation plans for Nihoa and Mokumanamana.
Monument Cultural Resources Program	No Monument cultural resources program.	Develop and implement a Monument cultural resources program.
Historic resources		
Historic Preservation Plan for Midway	Continue to implement Midway Preservation Plan and maintain volunteer program at current levels.	Same as No Action plus reconcile Midway Preservation Plan with Midway Visitor Services Plan, lead paint abatement plan, and other facilities maintenance; recruit additional volunteers for work at Midway Atoll, seek private funding to restore and preserve a representative number of historic items at Midway Atoll. Complete

Table 1.1 Comparison of Key Elements of No Action and Proposed Action Alternatives		
	No Action	**Proposed Action**
		surveys and restoration efforts within 15 years.
Field survey and documentation	Plan and conduct field survey and documentation as funding permits.	Midway Atoll Historic Preservation Plan, survey and documentation completed within two years.
Repair and maintenance treatments	Promote through volunteer programs and trained specialists at present levels and funding.	Repair and maintenance treatments complete within six years.
Remodel museum	Remodeling dependent on sufficient funding.	Complete remodel within seven years.
Archaeological site surveys	Complete surveys at existing levels, as budgets permit.	Complete archaeological surveys within 15 years.
Commercial Pacific Cable Station Survey and Restoration	Complete surveys and restoration at existing levels, as budgets permit.	Complete surveys and restoration within 10 years.
Maritime Heritage		
Field mapping and surveys	Continue field work and complete progress reports annually.	Same as No Action.
PMN 2- Conserving Wildlife and Habitats		
Threatened and Endangered Species		
General	Continue threatened and endangered species research and management with current funding levels.	Dedicate more resources to threatened and endangered species management and subsequently increase the numbers and locations of threatened and endangered species throughout Monument.
Marine debris	Continue to support marine debris removal activities.	Same as No Action plus target marine debris prevention, characterize and address the effects of marine debris; develop proactive methods to remove marine debris at sea in areas where it is concentrated; and expand educational and outreach programs domestically and internationally to prevent debris from entering the ocean.
Endangered species consultations	Conduct adequate endangered species consultations.	Add additional Monument staff as needed to thoroughly conduct endangered species consultations.
Hawaiian monk seal	Maintain current level of protection for seals and their pupping and habitat.	Evaluate the loss of habitat from erosion and other factors; Restore nesting, breeding, and pupping habitat for seals; develop standardized interagency protocols for emergency response for Hawaiian monk seal; increase juvenile survivorship through appropriate management tools, such as supplemental feeding through NOAA monk seal

Table 1.1
Comparison of Key Elements of No Action and Proposed Action Alternatives

	No Action	Proposed Action
		captive care programs.
Cetaceans	Continue to monitor spinner dolphin populations by photo-identification surveys and DNA sampling.	Same as No Action plus conduct annual censuses of cetacean populations and minimize human interactions with cetaceans; respond to any suspected infectious disease incidents affecting citations; and explore the use of remote sensing to survey cetaceans.
Green turtles	Protect and manage green turtle nesting and basking habitat; monitor nest nesting or breeding female abundance using standardized and consistent protocols; and maintain current level of protection for turtles and their nesting habitat.	Same as No Action plus identify areas of high turtle foraging activity in benthic habitats; map high use corridors used by turtles migrating between their breeding and foraging sites outside the Monument; ensure that nesting populations of green turtles at source beaches are stable or increasing; assess distribution of nesting activity throughout the Monument; and take action to reduce night lighting effects on nesting turtles.
Birds	Mark and recapture surveys of Laysan duck; monitor Laysan duck reproductive success and survival for population modeling, disease screening, and prevention; avoid translocating unhealthy individuals and genetic research to prevent loss of genetic diversity; and conduct annual censuses of populations of Laysan finch, Nihoa finch, and Nihoa millerbird and monitor their food and habitat. Maintain quarantine protocols and standard operating procedures for those permitted entry onto the islands and for the supplies shipped into islands within the Monument. Conduct annual censuses of passerine species and monitor their food and habitat requirements; continue monitoring reproductive success and productivity of albatrosses, tropicbirds, boobies, frigates, and other breeding seabird species, as funding permits, at French Frigate Shoals, Laysan Island, and Midway Atoll and continue to monitor all other species of nonbreeding migratory birds through surveys as funding permits.	Same as No Action plus restore breeding populations of short-tailed albatross; restore or create habitat for the Laysan duck; transport juvenile Laysan ducks from established populations to additional islands, and conduct post-release monitoring; maintain stable or increasing populations of Laysan finch on Laysan Island. Maintain stable populations of Nihoa finch and Nihoa millerbird. Conduct annual censuses of passerine species and monitor their food and habitat requirements; identify habitat suitability, prioritize sites for establishing new populations, and restore habitat if necessary; develop techniques for capture, translocation, and release; continue monitoring reproductive success and productivity of albatrosses, tropicbirds, boobies, frigates, and other breeding seabird species, as funding permits, at French Frigate Shoals, Laysan Island, and Midway Atoll and continue to monitor all other species of nonbreeding migratory birds through resite surveys, as funding permits. Encapsulate lead-based paint on structures to reduce likelihood of ingestion by birds.

Table 1.1
Comparison of Key Elements of No Action and Proposed Action Alternatives

	No Action	Proposed Action
Plants	Continue efforts to increase the numbers and locations of *Amaranthus brownie* and *Schiedea verticillata* on Nihoa and establish a self-sustaining *Pritchardia remota* population on Laysan Island.	Same as No Action plus establish populations of each listed plant species on one to three additional Monument islands and ensure the genetic material of all endangered plant species from Nihoa and Laysan Islands are preserved in perpetuity. Hire additional two to four additional biological technicians to eradicate 90 percent of *Verbesina enceliodes* and other invasive plants at Midway Atoll in the next 15 years.
Migratory Birds		
Alien species	Maintain rigorous quarantine protocols to prevent the introduction of alien species	Same as No Action plus eradicate nonnative species at all sites where they have a negative effect on the survivorship or reproductive performance of migratory birds.
Avian diseases	Conduct surveillance for evidence of avian disease outbreaks.	Same as No Action.
Effects from commercial and sport fisheries	Continue efforts to reduce the effect of commercial and sport fisheries occurring outside Monument on migratory bird populations; teach seabird identification skills to fishers and fisheries observers; and assist with the development of techniques to minimize bycatch.	Same as No Action.
Conservation	Continue efforts to monitor migratory bird populations.	Same as No Action plus assess the population size and trends of overwintering and migrating Pacific golden plovers, bristle-thighed curlews, wandering tattlers, and ruddy turnstones; monitor a suite of 15 focal seabird species; and restore native coastal mixed grass and shrub communities.
Habitat Management and Conservation		
General	Continue to monitor and restore habitats of the Monument	Same as No Action plus expand restoration efforts to shallow-water marine areas, cleanup of contaminated sites, and feasibility studies for restoring beach and crest habitats.
Contamination	Monitor oil and other anthropogenic contamination.	Same as No Action plus within 10 years, investigate and inventory sources of known contamination from post-contact historic human use of the NWHI; and coordinate with responsible parties to develop plans and complete cleanup actions, conduct risk assessment to determine acceptable levels of lead (from

Table 1.1
Comparison of Key Elements of No Action and Proposed Action Alternatives

	No Action	Proposed Action
		lead-based paint) in soils; conduct risk assessment to determine acceptable levels of contaminants, such as PCBs and dioxin, for Laysan ducks; investigate contamination levels in both terrestrial and marine species, especially threatened and endangered species; investigate contaminant effects on wildlife.
Alien species	Continue to remove alien and invasive species.	Same as No Action plus within 10 years investigate and inventory sources of known contamination from post contact historic human use of the NWHI; coordinate with responsible parties to develop plans and complete cleanup actions; conduct risk assessment to determine acceptable levels of lead (from lead-based paint) in soils; conduct risk assessment to determine acceptable levels of contaminants, such as PCBs and dioxin, for Laysan ducks; investigate contamination levels in both terrestrial and marine species, especially threatened and endangered species; investigate contaminant effects on wildlife.
Restoration	Propagate and out-plant extant native species.	Same as No Action plus within 10 years, develop and implement a plan for restoring shallow reefs and shoals; protect and restore beach and crest habitats at French Frigate Shoals, Laysan Island, Lisianski Island, and Pearl, Hermes, Midway, and Kure Atolls for 15 years; and within 10 years restore and maintain coastal mixed grasses and shrublands on basalt islands in the Monument (Nihoa, Mokumanamana, La Perouse and Gardner Pinnacles).
Conservation	Monitor changes in species composition and habitat structure.	Same as No Action plus inventory and monitor all Monument habitats, evaluate potential for development of additional freshwater sources for translocation sites for Laysan duck, Nihoa finch, and Nihoa millerbird; remove ironwood on Sand Island and Midway Atoll to provide nesting and roosting habitat for migratory birds; and protect and maintain areas of vertical rocky cliff face habitat at Nihoa and Mokumanamana Islands for nesting terns, black noddies, brown boobies, and white-tailed and red-tailed tropicbirds.

Table 1.1 Comparison of Key Elements of No Action and Proposed Action Alternatives		
	No Action	**Proposed Action**
PMN 3- Reducing Threats to Monument Resources		
Marine Debris		
Research activities	Research marine debris sources, types and accumulation rates.	Same as No Action plus complete within five years.
Debris removal activities	Continue to remove hazardous materials on beaches and marine debris onshore and in shallow waters.	Same as No Action plus catalog and remove hazardous materials on beaches and expand marine debris removal activities to offshore waters.
Alien Species		
Monitoring and surveillance	Continue to monitor alien species annually, using existing protocols; identify existing snowflake coral infestation.	Same as No Action plus refine or develop new protocols for monitoring alien species and survey new infestations of snowflake coral and incipient marine invasive species.
Species prevention, control and eradication	Continue programs to prevent and control alien species introductions into the Monument; collect climate data and measure gray bird locust abundance on Nihoa Island, Mokumanamana, French Frigate Shoals, and Lisianski Island.	Same as No Action plus implement eradication plans for the house mouse on all of Sand Island, Midway, within 15 years, two species of mosquitoes at Midway Atoll within 10 years, gray bird locust on Nihoa Island, Mokumanamana, French Frigate Shoals, and Lisianski Island, invasive red algae from waters near Mokumanamana.
Research	Continue research on alien species.	Conduct toxicant trials on high priority invasive species within five years and develop appropriate baits for gray bird locust.
Maritime Transportation and Aviation		
Aircraft and vessel hazards studies	Continue studies on aircraft hazards.	Same as No Action plus conduct comprehensive assessment of threats posed by aircraft and vessels on Monument resources.
Boundaries and zoning	Continue to work with the IMO on designations and protocols for domestic and international shipping.	Develop boundary and zoning information materials and updates to nautical charts to enhance notice to mariners of Monument boundaries and zoning.
Aircraft and vessel conservation measures	Use water recycling and reducing program and biofuels or nonpetroleum-based hydraulic fluid on NOAA ship.	Same as No Action.
Emergency Response and Natural Resource Damage Assessment		
Contingency planning	Continue implementing contingency plan and protocols.	Update and improve the Area Contingency Plan.
Incident command systems (ICS)	Continue incident response.	Establish Monument Emergency Response Team for ICS responses and a

Table 1.1 Comparison of Key Elements of No Action and Proposed Action Alternatives		
	No Action	**Proposed Action**
		non-ICS response team.
Certification, training and drills	Continue training.	Provide additional training for incident Command System and Hazards Waste Operations and Emergency Response, boat safety, first responder, and drills for emergency response in the Monument and ensure Emergency Response Team maintains appropriate certifications.
PMN 4 - Managing Human Uses		
Permitting		
Permit review and tracking	Continue to review and track permit applications and reports.	Same as No Action plus engage additional outside experts in permit application review; develop GIS-based permit tracking systems.
Pre-access training and briefing	Continue multiple agency-specific pre-access training and briefing programs.	Develop and conduct a unified pre-access training and briefing programs that incorporates a Native Hawaiian cultural education program.
Enforcement		
Midway Atoll	No on-site enforcement presence.	Establish on-site enforcement presence at Midway Atoll to address increase in operational and recreational activities.
Monument	Continue informal collaboration among enforcement entities and operation of Vessel Monitoring System for vessels conducting permitted activities.	Establish a chartered Monument law enforcement working group to enhance communication and collaboration among law enforcement entities; integrate additional automated monitoring systems for vessels transiting the Monument.
Enforcement platforms	Continue enforcement using nondedicated platforms.	Increase number of platforms dedicated to enforcement; and research and development of remote surveillance technologies and deployment in 10 years.
Midway Atoll Visitors Services		
Wildlife-dependant recreation opportunities	Continue to offer limited visitor opportunities.	Expanded educational opportunities through tours and other recreational activities.
Opportunity for cultural and historic resources information and interpretation	Continue focus in on the human history in Midway and the Monument.	Expand focus to include information on the importance of the NWHI in the Native Hawaiian culture.
Monitoring visitor effects and satisfaction	Continue limited monitoring of the effects of visitors and surveys on visitor experience.	Expand monitoring visitor effects and visitor satisfaction surveys.
Visitor satisfaction surveys	Survey information is compiled on a monthly basis.	Activities would be adjusted on a monthly basis based on feedback

Table 1.1 Comparison of Key Elements of No Action and Proposed Action Alternatives		
	No Action	**Proposed Action**
		received in surveys.
PMN 5 - Coordinating Conservation and Management Activities		
Agency Coordination	No field activities anticipated.	Same a No Action.
Constituency Building and Outreach		
Materials and exhibits	Continue to use multiple agency-specific Web sites and prepare informational materials to provide the public with information on the Monument.	Establish a unified Monument Web site, identity, integrated communications strategy, and education and outreach themes; develop new exhibits on the Battle of Midway and other historic events and a network of interpretative sites in partnership with existing and new sites.
Volunteer programs	Continue to support limited volunteer opportunities.	Enhance support for volunteer programs and Monument Alliance to engage a broad range of constituents in Monument activities
Native Hawaiian Community Involvement	Continue to foster partnerships with existing Native Hawaiian groups.	Same as No Action plus formalize and expand the Native Hawaiian Working Group, use and integrate Native Hawaiian traditional ecological knowledge in Monument management.
Ocean Ecosystems Literacy		
Formal education	Continue to conduct teacher workshops on main Hawaiian Islands on navigating change curriculum four times a year.	Same as No Action plus develop new curriculum and conduct educator workshops at Midway Atoll biennially.
Interpretative facilities	Continue educational opportunities for school groups per month at the Mokupāpapa Discovery Center.	Same as No Action plus expand educational opportunities for school groups to 10 groups per month.
Research and Technology	Continue education and outreach through video and teleconferencing.	Same as No Action plus identify and prioritize research and development projects to increase ocean literacy and expand education with innovative technologies, such as telepresence, to bring the place to the people.
PMN 6 - Achieving Effective Monument Operations		
Central Operations	Continue to coordinate annual site operations planning and implementation.	Same as No Action plus assessment and enhancement of human resource and organizational capacity and physical infrastructure and facilities.
Information Management	Continue to update and maintain a Monument Information Management System; GIS-based database of past habitat characterization and field research; participate in National Marine	Same as No Action plus conduct workshops to facilitate data sharing, access, security, and use; develop protocols for data collection, documented, stored and shared; and

Table 1.1 Comparison of Key Elements of No Action and Proposed Action Alternatives		
	No Action	**Proposed Action**
	Sanctuary's IMAST program; and develop a field-based data collection tool.	develop educational materials that interpret data and make the information accessible and understandable.
Coordinated Field Operations		
Planning	Continue to conduct multiple agency-specific field operations planning, field activities, and infrastructure and development.	Same as No Action plus develop interagency agreements to facilitate effective field coordination throughout the Monument and develop a comprehensive dive operations program and research, education, visitor, and administrative facilities Monument-wide.
Midway Atoll	Continue to maintain infrastructure in suboptimal operating condition.	Same as No Action plus transform Midway into the operational hub for the Monument; implement Midway Conceptual Site Plan; replace and maintain rehabilitating critical utility systems and ailing structures and facilities at Midway Atoll; strategy for long-term sustainability using alternative energy, waste reduction, and low impact construction; meet fuel requirements for aircraft, vessel, utility and equipment needs at Midway Atoll; improve the small boat operational capacity; develop a monk seal captive care facility.
Other field camps	Continue to maintain field camps in suboptimal condition.	Enhance and maintain field camps at Kure Atolls, French Frigate Shoals, Pearl and Hermes Atolls, and Laysan Island.
Evaluation	Continue to evaluate program activities by conducting agency-specific annual program review.	Develop and implement a comprehensive Monument evaluation strategy and Monument Management Plan review.

1.8 ACTIONS DESCRIBED REQUIRING FUTURE NEPA/HRS CHAPTER 343 ANALYSIS

A number of activities described in the Monument Management Plan are at a conceptual stage of development. If these activities are developed beyond the conceptual stage, additional NEPA and potentially HRS Chapter 343 analysis would be required and conducted. These activities include some of the proposed infrastructure and development to expand Midway as an operational hub for the Monument. Proposed infrastructure needs include increasing boat storage, constructing new piers, and building a marine laboratory at Midway Atoll. In addition, infrastructure improvements are proposed to support visitors, volunteers, researchers, and managers at Midway. Proposed restoration activities related to habitat, such as Hawaiian monk seal haul out

areas at French Frigate Shoals, and to species, such as the black-lipped oyster, would require assessment and feasibility studies before specific activities could be defined.

1.9 REGULATORY FRAMEWORK

The following federal laws, proclamations, and state constitutional provisions and statutes or regulations are the most relevant to coordinated management of the Monument:

- Antiquities Act, 16 U.S.C. § 431, et seq., provides statutory authority for the establishment of national monuments;
- Proclamations 8031, June 15, 2006 (71 FR 36443) and 8112, March 6, 2007 (72 FR 10031), establishing the NWHI as a marine national Monument;
- Papahānaumokuākea Marine National Monument, codifying regulations, 50 CFR 404;
- State of Hawai‘i Organic Act of April 30, 1900, c339, 31 Stat.141 § 2, and Hawai‘i Admission Act of March 18, 1959, Pub. L. 86-3, 73 Stat. 4 § 2;
- Constitution of the State of Hawai‘i, Article XI, §§ 1,2,6,9 and Article XII § 7, including Hawai‘i Administrative Rules Title 13, Chapter 60.5 Northwestern Hawaiian Islands Marine Refuge. Hawai‘i Administrative Rules Title 13 Rules Regulating Wildlife Sanctuaries;
- Title 1, Chapter 10, §§ 10-1, 10-3, 10-4, Title 12, Ch. 171, § 171-3, Ch. 183D, § 183D-8, Ch 187A, § 187A-8, Ch. 188, §§ 188-37, 188-53, Ch. 195D, §195D-5, and Ch. 199, § 199-3, Hawai‘i Revised Statutes; and Title 13, Ch. 60.5 and Ch. 125 Hawai‘i Administrative Rules;
- National Marine Sanctuaries Amendments Act of 2000, Pub. L. 106-513 § 6(g) (2000);
- Endangered Species Act of 1973, as amended, 16 USC. § 1531 et seq.;
- Marine Mammal Protection Act of 1972, 16 USC. § 1361 et seq.;
- National Historic Preservation Act of 1966, as amended through 2000, 16 U.S.C. § 470 et seq.;
- Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1801 et seq.;
- National Wildlife Refuge System Administration Act of 1966, as amended, 16 USC. §§ 668dd-ee;
- Refuge Recreation Act, 16 U.S.C. § 460k-3;
- Fish and Wildlife Act of 1956, 16 U.S.C. § 742f; and
- Fish and Wildlife Improvement Act of 1978, 16 U.S.C. § 742l.

CHAPTER 2:

AFFECTED ENVIRONMENT

CHAPTER 2
AFFECTED ENVIRONMENT

2.1 INTRODUCTION

This chapter describes the physical, biological, social, and economic conditions that occur within the region of influence (ROI) of the Proposed Action alternative. Only those conditions relevant to the Proposed Action alternative are presented. Resource areas discussed include natural resources, cultural and historic resources, human uses and activities, human health, safety, and hazardous materials, land use economic and social conditions, water quality, transportation and communications infrastructure, and utilities.

Chapter 2 is organized by resource area. Each resource area discussion includes an overview of the resource area with background on how the resource is related to the Proposed Action alternative, a general overview of relevant legislative requirements governing the resource, where applicable, and a discussion of the conditions of the resource within the ROI.

2.2 NATURAL RESOURCES

2.2.1 Introduction/Region of Influence

The NWHI, together with the main Hawaiian Islands, are classified as the Insular-Pacific Hawaiian Large Marine Ecosystem (LME), one of 64 LMEs in the world (NOAA 2003a). Due to the interconnectivity between land and sea throughout the Hawaiian archipelago, the ROI for biological resources is the Insular-Pacific Hawaiian LME, which includes the Monument. The waters surrounding the NWHI support a diversity of marine life inhabiting a complex array of shallow- and deepwater marine environments. Emergent lands include the many small islands and islets of the NWHI; these lands, the surrounding shallow reef, deepwater benthic, and pelagic habitats form an integrated ecosystem that supports abundant endemic, threatened, and endangered wildlife.

2.2.2 Regulatory Environment

The biological resources within the Monument are protected under numerous federal and state laws and regulations. The following is a list of the most pertinent ones:

- Antiquities Act (16 USC 431-433);
- Proclamations 8031, June 15, 2006 (71 FR 36443), and 8112, March 6, 2007 (72 FR 10031);
- Papahanaumokuakea Marine National Monument codifying regulations (50 CFR 404);
- National Marine Sanctuaries Act of 1972, as amended (16 USC 1431-1445c);
- Endangered Species Act of 1973, as amended (16 USC 1531-1544);
- Marine Mammal Protection Act of 1972, as amended (16 USC 1361-1421h);
- Migratory Bird Treaty Act of 1918, as amended (16 USC 703-712);
- Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended (16 USC 1801-1882);
- National Wildlife Refuge System Administration Act of 1966, as amended (16 USC 668dd-668ee);
- Refuge Recreation Act of 1966, as amended (16 USC 460k-460k-4);
- Fish and Wildlife Act of 1956, as amended (16 USC 742a-742m);
- Fish and Wildlife Improvement Act of 1978, as amended (16 USC 742l);
- Coastal Zone Management Act of 1972, as amended (16 USC 1451-1465);
- Executive Order 13022—Administration of the Midway Islands, October 31, 1996 (61 FR 56875);
- Executive Order 13112—Invasive Species, February 3, 1999 (64 FR 6183);
- Executive Order 13089—Coral Reef Protection, June 11, 1998 (63 FR 32701);
- Executive Order 13158—Marine Protected Areas, May 26, 2000 (65 FR 34909);

- Executive Order 1019 - Hawaiian Islands Reservation, February 3, 1909;
- Executive Orders 13178 and 13196 – Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, December 4, 2000 (65 FR 76903) and January 18, 2001 (66 FR 7395);
- State of Hawaii Organic Act of April 30, 1900 (c339, 31 Stat.141 § 2); and Hawaii Admission Act of March 18, 1959 (Pub. L. 86-3, 73 Stat. 4 § 2);
- Constitution of the State of Hawaii, Article XI, §§ 1, 2, 6, and 9 and Article XII § 7;
- Hawaii Revised Statues, Title 12, Ch. 171-3, Ch. 183D-4 and 183D-8, Ch. 187A-6 and 187A-8, Ch. 188-37 and 188-53, Ch. 195D-5, and Ch. 199-3;
- Hawai‘i Administrative Rules, Title 13, Ch. 60.5, Ch. 107, Ch. 124, and Ch. 125;
- Hawai‘i Revised Statues Title 1, Ch. 6E, Sections 1,7,11,12, 43, 43.5, & 46.5 - Hawai‘i Historic Preservation Program; and
- (Hawai‘i Administration Rules, Title 13, Ch. 275 - 284, & 300) - Hawai‘i Historic Preservation Assessment Guidelines.

2.2.3 Resource Overview

Natural resources of the Monument are described in detail in the Monument Management Plan. This section provides an overview of the terrestrial and marine resources and special status species in the region of influence.

2.2.3.1 Terrestrial Resources

There are ten main islands and atolls in the NWHI. The two southernmost (Nihoa and Mokumanamana) are basaltic islands. Four of the five middle landmasses are open atolls (French Frigate Shoals [FFS] and Maro Reef) and sandy islands (Laysan and Lisianski). La Perouse Pinnacle (at FFS) and Gardner Pinnacles are small basaltic outcrops, remnants of islands similar to Nihoa and Mokumanamana. The three northernmost landmasses are classical atolls (Pearl and Hermes, Midway, and Kure). This emergent land is vital habitat to the 14 million resident and migratory seabirds, which rely on these islands for roosting and breeding habitat and on the surrounding waters for food. Included in the 5.5 million seabirds that nest on these islands annually are more than 95 percent of the world’s Laysan (*Phoebastria immutabilis*) and black-footed (*Phoebastria nigripes*) albatross (Naughton and Flint 2004). Four endangered endemic bird species that are not seabirds (Laysan duck, Laysan finch, Nihoa finch, and Nihoa millerbird) also breed on the islands (Table 2.2-2).

Nihoa’s seabird colony boasts one of the largest populations of Tristam’s storm-petrel (*Oceanodroma tristrami*), Bulwer’s petrel (*Bulweria bulwerii*), and blue noddies (*Procelsterna cerulea*) in the Hawaiian Islands, and very possibly the world. The island is a unique example of a lowland native community, resembling those lowland communities that once occurred on the main Hawaiian Islands but are now almost completely gone (Wagner et al. 1999). The island’s vegetation can be classified as part coastal mixed community (*Sida* mixed shrub and grassland) and coastal dry shrubland dominated by ‘ilima (*Sida fallax*), ‘aweoweo (*Chenopodium oahuense*), and ‘ohai (*Sesbania tomentosa*). The island supports 21 native plant species,

including 3 endemics: a palm or loulu (*Pritchardia remota*), an amaranth (*Amaranthus brownii*), and an herb (*Scheidea verticillata*) (Wagner et al. 1999). The avifauna of the island includes two endemic passerine birds, the Nihoa finch (*Telespiza ultima*) and the Nihoa millerbird (*Acrocephalus familiarus kingii*), both listed as endangered under the federal Endangered Species Act. The arthropod fauna of the island includes 33 species of mites, 3 species of spiders, and 182 species of insects, 17 of which are endemic, including a katydid (*Banza nihoa*), a giant tree cricket (*Thaumatogryllus conantae*), 2 species of endemic seed bugs (*Nysius nihoae* and *Nysius suffusus*), and an endemic trapdoor spider (*Nihoa mahina*) (Evenhuis and Eldredge 2004). Nihoa also has a rich cultural heritage, with at least 88 known wahi kupuna (ancestral sites) constructed by the pre-contact Hawaiians who inhabited the island for 700 years (until 1700 AD), and is listed on the National Register of Historic Places (NRHP) (DMMP 2008). In Nihoa's Loulu Coastal Forest Community, *Pritchardia remota* assumes complete dominance with a closed canopy and thick layers of fallen fronds in the understory. Native plants growing nearby include *Chenopodium oahuense*, *Sesbania tomentosa*, *Solanum nelsonii*, and *Sida fallax.* Lichens grow on the trunks of the trees (U.S. Fish and Wildlife Service 1998). In this system, *P. remota* provides nesting habitat for red-footed boobies (*Sula sula*) and perching space for brown noddies (*Anous stolidus*), two resident seabirds at Nihoa (U.S. Fish and Wildlife Service 1998).

Because of its limited size, Mokumanamana supports only 5 indigenous plant species and no land birds but does harbor 3 species of mites, 2 species of spiders, and 70 species of insects, of which 11 are endemic, including a large weevil (*Rhycogonus biformis*), 2 species of seed bugs (*Nysius neckerensis* and *N. chenopodii*), and a trapdoor spider (*Nihoa hawaiiensis*) (Evenhuis and Eldredge 2004). Sixteen species of seabirds breed here, including the black noddy (*Anous minutus*), which historically was called the Necker Island tern (DMMP 2008).

The islets of the NWHI provide highly important habitat for the world's largest breeding colony of the endangered Hawaiian monk seal (*Monachus schauinslandi*), which is listed as endangered under the Endangered Species Act and is also internationally recognized as endangered by the World Conservation Union. The sandy islets of FFS provide nesting sites for 90 percent of the threatened green turtle (*Chelonia mydas*) population breeding in the Hawaiian Archipelago. In addition, 19 of Hawai'i's 22 seabird species are found on the island, giving it the highest species richness of breeding seabirds within the Monument. The dry coastal shrublands of the larger islets within the atoll also support an endemic seed bug (*Nysius frigatensis*), moth (*Agrotis kerri*), and mite (*Phauloppia bryani*) (Usinger 1942; Nishida 2002, DMMP 2008).

Due to the limited size of the Gardner Pinnacles, they support only a single species of land plant (*Portulaca lutea*) and a few terrestrial arthropod species, but they are by contrast excellent habitat for seabirds (Clapp 1972). Guano from such seabirds gives the peaks a "frosted" appearance, indicating their importance as roosting and breeding sites for at least 12 subtropical species. Landings and terrestrial surveys rarely take place due to the difficulty of getting ashore under all but the calmest ocean conditions (DMMP 2008).

Maro Reef is a largely submerged open atoll with less than 1 acre (4,046.8 square meters) of periodically emergent land. At very low tide, only a small coral rubble outcrop of a former island is believed to break above the surface; as a result, Maro supports no terrestrial biota (DMMP 2008).

Laysan Island's ring of sandy dunes surrounds a 173-acre (70-hectare) hypersaline interior lake, a feature unique within the Hawaiian Archipelago and rare within the Pacific as a whole. Because of its elevation of about 40 feet (12 meters), Laysan is well vegetated, supporting at least 30 species of flowering plants, including 5 endemic subspecies prior to human contact (Athens et al. 2007), many of which were driven to extinction by the misguided introduction of rabbits in 1902 during the guano mining era (Ely and Clapp 1973). The plant community is divided into five different associations arrayed in concentric rings around the interior hypersaline lake: 1) coastal shrubs, 2) interior bunchgrass, 3) vines, 4) interior shrubs, and 5) wetland vegetation (Newman 1988). The island also previously harbored five endemic birds, of which two, the Laysan finch (*Telespiza cantans*) and the Laysan duck (*Anas laysanensis*), still survive (Pratt et al. 1987). In addition, approximately 2 million seabirds nest here, including boobies, frigatebirds, terns, shearwaters, noddies, and the world's second-largest black-footed and Laysan albatross colonies. The island also supports a relatively rich arthropod fauna, including a large endemic weevil (*Rhyncogonus bryani*), four endemic moths, an endemic wasp, and three endemic mites. A successful 12-year eradication project to remove the sandbur *Cenchrus echinatus,* a plant that had displaced native vegetation over 30 percent of the island, has been completed, and an active ecological restoration project is under way to bring back a number of other plants and animals that were lost after the introduction of rabbits (Morin and Conant 1998, DMMP 2008).

Lisianski supports no endemic land plant or bird species, although it does harbor an endemic seed bug (*Nysius fullawayi flavus*) and an endemic moth (*Helicoverpa minuta*) (Usinger 1942; Nishida 2002). The island also hosts large Bonin petrel (*Pterodroma hypoleuca*) and sooty tern (*Onychoprion fuscata*) colonies, as well as a variety of other seabirds. Lisianski also has the only grove of *Pisonia grandis* trees in the entire Hawaiian Archipelago; this tree is dispersed by seabirds and favored as a nesting site for many tree-nesting seabird species (MMP).

Pearl and Hermes Atoll is a true atoll, fringed with shoals, permanent emergent islands, and ephemeral sandy islets. These features provide vital dry land for monk seals, green sea turtles, and a multitude of seabirds, with 16 species breeding here. The permanent islands with higher dunes support an endemic subspecies of native seed bug (*Nysius fullawayi infuscatus*) (Usinger 1942). Pearl and Hermes also hosts a small population of endangered Laysan finches that were translocated here in the 1960s (MMP).

Although Midway's native vegetation and entomofauna have been greatly altered by more than a century of human occupation, the island boasts the largest nesting colonies of Laysan and black-footed albatrosses in the world, forming the largest colony of albatrosses in the world. The Navy, FWS, and U.S. Department of Agriculture-Wildlife Services (USDA Wildlife Services) successfully eradicated black rats (*Rattus rattus*), accidentally introduced during World War II, from Midway, and invasive ironwood trees have been entirely removed from Eastern Island. Currently the cover on all of the islands at Midway is approximately 30 percent paved or structures, 23 percent grass and forbs, 18 percent woodland, 7 percent sand and bare ground, 22 percent shrublands, and <0.23 percent wetland. A translocated population of Laysan ducks is thriving on the introduced insect community at Midway, and a large program of invasive weed eradication and native plant propagation is ongoing. Introduced canaries (*Serinus canaria*) breed

among historic buildings that mark the beginning of cable communication across the Pacific near the beginning of the 20th century (MMP).

Kure Atoll is an important breeding habitat for Christmas shearwaters, Laysan and black-footed albatross. Kure has at least 11 terrestrial arthropods endemic to Hawai‘i and one that is apparently endemic to Kure.

2.2.3.2 Current Status of the Resources

A number of these islands have been significantly altered from their natural state. Tern Island, in FFS, was transformed from an 11-acre (4.5-hectare) sandy island into a 42-acre (17-hectare) naval airstrip by building a steel retaining wall, blasting and dredging a channel around the island, and using the blasted coral to fill in the wall (Amerson 1971). Barracks, a fuel depot, and a LORAN station were constructed over the years, with the barracks still housing five to ten people, including FWS managers, volunteers, researchers, and monk seal field teams. Laysan Island, at 1,015 acres (411 hectares), is the second largest landmass in the NWHI. In the middle of the island lies a 173-acre (70-hectare) hypersaline lake. During the late 1800s, Laysan experienced great ecological changes from guano miners and feather harvesters. Introduced rabbits and guinea pigs quickly devastated the island’s vegetation. FWS has undertaken an ecological restoration project that includes eradication of invasive plants and insects and return of native plant, insect, and bird species extirpated previously (Flint and Rehkemper 2002). A short-lived black-lipped pearl oyster (*Pinctada margaritifera*) industry at Pearl and Hermes Atoll led to the construction of several buildings and the harvest of at least 150,000 oysters (Keenan et al. 2006). Today, 70 years after cessation of commercial harvest, only a few more than 1,000 individual pearl oysters have been documented in the lagoon. Midway Atoll, the largest landmass in the NWHI at 1,535 acres (621 hectares), has been significantly altered from its natural state. In 1871, efforts began to clear a channel into the lagoon. In 1903, workers for the Commercial Pacific Cable Company added 9,000 tons of soil from Honolulu and Guam and introduced hundreds of new species of flora and fauna. Infrastructure was built, including fuel depots, an airstrip, and housing for as many as 5,000 military personnel. The base was closed in 1993, and the atoll was put under Department of the Interior jurisdiction in 1996 (U.S. Fish and Wildlife Service 2005a). Today, approximately 60 people are stationed at Midway. Kure Atoll, a state wildlife refuge with no permanent population, is the northernmost coral atoll in the world. The United States Coast Guard (USCG) built a runway and LORAN station on Green Island in 1960 and 1961. The USCG controlled the runway until 1993 and had a peak of 24 personnel. After 1993, the runway began deteriorating and is no longer useable. Biologists conduct wildlife surveys, restore habitat, and remove marine debris.

At Midway and Tern, aircraft pose a risk to wildlife from collisions. At Midway, the greatest risk of bird/aircraft collision is from the two resident albatross species. Nearly two million migratory seabirds, representing 18 species, nest on Midway’s three islands each year. The most abundant species is the Laysan albatross, with a population in excess of one million. Because of its size, its distribution on Sand Island, and its flight activity over the 7,900-foot ETOPS runway, the Laysan albatross represents the greatest bird/aircraft collision hazard. Other species that are involved in bird/aircraft strikes, albeit less frequently, are the black-footed albatross, Bonin petrel, black noddy, brown noddy, and white tern. Very few seals have ever been observed on

the active runway, so the frequency of this hazard is low. A barrier of the native vegetation Scaevola and Aerograstis helps to prevent seals from reaching the runway.

For more than 50 years, the Navy attempted to mitigate the bird/aircraft collision problem by discouraging nesting and bird flight activity near the Sand Island runways. Since Midway became a National Wildlife Refuge in 1988, other steps have been taken to mitigate the collision hazard. Reducing the number of landings and takeoffs during the most hazardous times of day and year has proven to be the most successful mitigation strategy. Albatross are found at Midway in large numbers from November through July, but the peak of activity appears to be in February through May, when both juvenile and adult birds are in abundance.

In March of 2004 FWS completed a wildlife assessment for the airport operations (American Airports Corporation 2003; Klavitter 2004), as an FAA certification requirement. The objectives of the assessment were as follows:

- Analyze past bird strike data at Midway Atoll;
- Identify the species, numbers, locations, local movements, and daily and seasonal occurrences of wildlife;
- Identify and locate features on and near the airport that attract wildlife;
- Describe the wildlife hazard to air carrier operations; and
- Discuss additional wildlife concerns associated with the airfield.

The primary management implications from this assessment were as follows:

- Runway sweeps are conducted before aircraft departures and arrivals to ensure that all birds are carefully removed from the active runway;
- Flights occur during nighttime from late November to mid-July each year;
- All unnecessary lights are turned off at the airport operations building at night immediately following flight operations; and
- All unnecessary poles, signs, and antennas over three feet (one meter) tall around the airfield are removed.

At Tern Island, FFS, the species most commonly killed during aircraft operations is the sooty tern, but occasionally wedge-tailed shearwaters, great frigatebirds, and albatrosses of both species are also hit. Tern Island does not have runway lights, so all operations are done during daylight. Just before landings and takeoffs, all the staff on the island make a sweep to drive the birds from the runway. Flight activities have a slight negative effect on migratory birds, but they have a beneficial effect on all natural resources by facilitating management actions that benefit wildlife and habitats.

Because these island ecosystems have evolved with little contact with the rest of the world, they are particularly vulnerable to the introduction of invasive species. Invasive plants and introduced mammals are a primary threat to nesting seabirds, indirectly through alteration of the ecosystem and directly by eating eggs and chicks. The number of alien land plants in the NWHI varies from

only 3 introduced at Nihoa to 249 introduced at Midway Atoll. The level of threat from introduced plants also varies between species. For example, the invasive plant golden crownbeard (*Verbesina encelioides*) displaces all native vegetation in nesting areas at Kure, Midway, and Pearl and Hermes Atolls, causing entanglement and heat prostration and killing hundreds of albatross each year.

A variety of alien plants, animals, and most likely fungi and bacteria have made it to the Northwestern Hawaiian Islands. Some of them have proven to be particularly invasive and dangerous to native species. These include plants such as Sandbur (*Cenchrus echinatus*), *Verbesina*, ironwood (*Casuarina equisetifolia*), and animals such as the black rat (*Rattus rattus*), rabbit (*Oryctolagus cuniculus*), gray bird locust (*Schistocerca nitens*), and several ant species. Much of the routine management of this area revolves around eradicating or controlling existing invasives and preventing the introduction of new ones.

Marine alien species can be defined as nonnative aquatic organisms that have been intentionally or unintentionally introduced into new ecosystems, resulting in negative ecological, economic, or human health effects. Twelve marine alien invertebrate, fish, and algal species have been recorded in the NWHI. Alien species may be introduced unintentionally by vessels, marine debris, or aquaculture, or intentionally, as in the case of some species of groupers and snappers and algal species (Table 2.2-1). Eleven species of shallow-water snappers (*Lutjanidae*) and groupers (*Serranidae*) were purposely introduced to one or more of the main islands of the Hawaiian Archipelago in the late 1950s and early 1960s. Two snappers, the bluestripe snapper (taape, *Lutjanus kasmira*) and the blacktail snapper (*L. fulvus*), and one grouper, the peacock grouper (*Cephalopholis argus*), are well established and have histories of colonization along the island chain that are reasonably well documented (Randall 1987). Bluestripe snappers have been by far the most successful fish introduction to the Hawaiian coral reef ecosystem. Approximately 3,200 individuals were introduced on the island of O‘ahu in the 1950s. The population has expanded its range by 1,491 miles (2,400 kilometers), until it has now been reported as far north as Midway in the NWHI. These records suggest a dispersal rate of about 18-70 nautical miles (33-130 kilometers) per year. The other two species have only been recorded as far north as FFS and are present in much lower numbers than bluestripe snappers.

Table 2.2-1
Probable Mechanisms of Introduction of Marine Invertebrates to Hawai‘i

Mechanism	Species	Percent Established
Hull fouling	212	90%
Solid ballast	21	90%
Ballast water	18	89%
Intentional release	18	28%
Parasites on nonindigenous species	8	88%
Associated with commercial oysters: unintentional	7	100%
Aquarium release	3	67%

Source: Eldredge and Carlton 2002

It is often difficult to determine the specific vector of accidental introduction in the marine environment because there is generally a pronounced lag time between introduction and first observation as an invasive species.

According to the Bishop Museum Hawai‘i Biological Survey, the total observed alien marine species in Hawai‘i is 343, including 287 invertebrates, 24 algae, 12 flowering marine plants, and 20 fish. The presence of any of these or other potentially invasive species, even in their current benign state, illustrates the fact that these pristine reefs can be invaded.

A 2002 survey documented the first example of an invasive species attached to marine debris in the NWHI. The Asian anemone *Diadumene lineata* was identified from a derelict fishing net at the reefs of Pearl and Hermes Atoll (Zabin et al. 2003). To date, only a few of the 582 metric tons of debris collected have been analyzed for attached species. In addition, an estimated 1,000 tons (907 metric tons) of debris have accumulated in the NWHI over the past 20 years, with an estimated accumulation rate of 40 to 60 tons per year (36 to 54 metric tons per year) (Asher 2006).

In addition to the current threats posed by alien plant and animal species, several historic buildings on Sand Island contain hazardous materials such as lead-based paint or asbestos. These toxic materials pose health and safety concerns for humans and wildlife. Lead paint flakes are ingested by albatross chicks, causing growth deformities and mortality. Currently, the Old Bulky Waste Landfill on the south shore of Sand Island, Midway Atoll National Wildlife Refuge (NWR) is eroding, and the soil placed on top is sifting into the debris, causing large holes to open up around the edge and in the center of the landfill. As a result, burrowing birds are bringing up buried and potentially contaminated soil and are nesting in that contaminated soil. Over 500 bird burrows have been counted in the landfill.

Marine debris, especially derelict fishing nets and gear, plastics, and hazardous materials, is a severe chronic threat to shallow ecosystems such as Midway Atoll, and negatively affects albatrosses, monk seals, marine turtles, and other species that become entangled in or ingest these materials.

2.2.3.3 Marine Resources

Shallow Reef

As with the definition of ecosystem, depending on the nature of the argument, the depth to which the shallow reef is defined is subjective. For this EA, this ecosystem is defined as all waters to a depth of 30 meters (98 feet). Because reef-building corals have a symbiotic relationship with microalgae that allows them to grow and thrive in the nutrient-poor waters of the tropics, these reefs have a depth limit based on the penetration of sunlight into the water column. Generally, coral reefs grow in water less than 30 meters (Grigg and Epp 1989), although non-reef-building corals are able to grow in much deeper waters (Maragos and Jokiel 1986; Veron 1986). In addition, there is a much better understanding of the shallow reef, as most coral reef assessment and monitoring is done in waters shallower than 30 meters (Maragos et al. 2004).

Coral reef ecosystems consist of much more than the reef-building corals for which they are named, including sand and unconsolidated sediments, colonized hardbottom, non-reef-building corals, and macroalgae. Reefs comprise approximately 50 percent of the biomass, providing habitat structure, refuge, and food to the diverse group of organisms (Garrison 1999). Even in this relatively pristine coral reef habitat, the percentage of coral cover varies widely. A recent assessment of this habitat determined that coral cover for individual islands ranges from 4.4 percent to 64.1 percent across the chain, and less than 1 percent to close to 100 percent within the various habitats of the islands (Friedlander et al. 2005). The highest diversity and highest percent coral cover occurs in the middle of the Monument, at the large open atolls of FFS and Maro Reef. Reef, hardbottom and sediment habitat are interspersed to create a variety of environmental niches and resources for the diverse array of species.

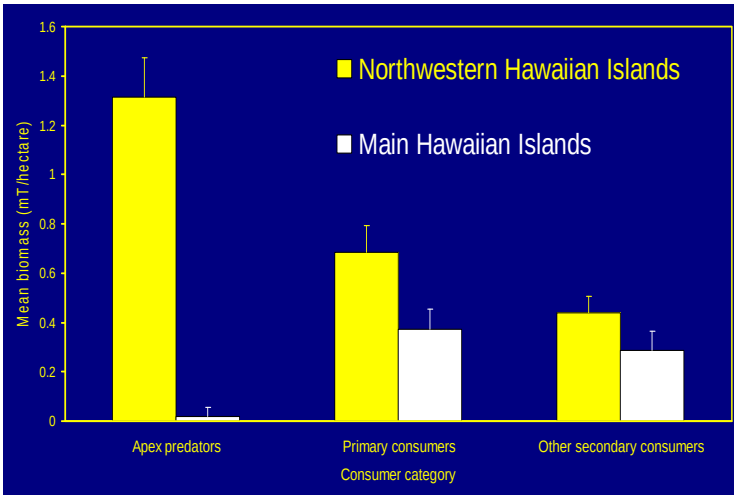
The shallow reef is a dynamic environment, experiencing constant wave surges and powerful winter storms. Tropical storms and hurricanes can generate extreme wave energy events that can damage shallow coral reef habitat. These events are the primary natural force in altering and shaping coral reef community structure (Dollar 1982; Dollar and Grigg 2004). They represent potential, but infrequent, threats to the shallow coral reef ecosystems of the NWHI. There is a growing concern that global warming, and the concurrent acidification of the ocean, may cause drastic changes to corals in the coming century (Hoegh-Guldberg 1999). While the northern extent of the NWHI, from Kure to Pearl and Hermes Atolls, experiences sea surface temperatures from less than 18°C in winter to summer highs exceeding 28°C, a temperature anomaly of only 1ºC in the summer of 2002 resulted in widespread mass coral bleaching (Hoeke et al. 2006). Acidification, caused by increased levels of CO_2 in the ocean, inhibits the deposition of calcium carbonate, the primary component of the coral skeleton (Kleypas et al. 2006). Events such as these may be more devastating in the NWHI, as these reefs grow more slowly than most other reefs (Friedlander et al. 2005).

Fifty-seven species of coral have been identified in the NWHI, with 30 percent endemic. To date, 355 species of algae and 838 species of invertebrates have been documented in a thorough assessment of the Monument's living resources (Friedlander et al. 2005). Characteristics of the shallow water coral reef habitat change with both island geology and reef orientation to the island. Due to strong wave action and currents, the basalt islands in the southern portion of the Monument have no fringing reef. The underwater habitat is composed primarily of vertical walls and wave-cut benches (Friedlander et al. 2005). Caves, overhangs, and trenches provide small-scale habitat for corals, although basalt blocks, boulders, and pavement are the principal bottom cover. Species diversity is low relative to the middle and northern atolls. The shallow reef habitat in the middle of the Monument – FFS, Maro Reef, and Lisianski Island – is a series of open atolls that exhibit the highest levels of coral abundance and diversity (Friedlander et al. 2005). The largest pod of spinner dolphins *(Stenella longirostris)* occurs at FFS (Andrews et al. 2006). The northernmost atolls – Pearl and Hermes, Midway, and Kure – are formed by a continuous barrier reef, where the lagoon is connected to the outside ocean through a series of channels and grooves.

Structurally, apex predators such as sharks and jacks dominate fish communities on the reefs in the NWHI. In addition, abundance and biomass estimates indicate that the reef community is characterized by fewer herbivores, such as surgeonfish, and more carnivores, such as damselfish,

goatfish, and scorpionfish. A comparison of both biomass and trophic structure between reef fish communities in the NWHI and main Hawaiian Islands (Figure 2.2-1) was conducted in 2000. Across similar habitats, biomass was 260 percent greater in the NWHI (Friedlander and DeMartini 2002). Additionally, 54 percent of the biomass in the NWHI was composed of apex predators, compared to 3 percent in the main Hawaiian Islands.

Figure 2.2-1 Comparison of Biomass in Major Trophic Guilds between NWHI and Main Hawaiian Islands



Source: Friedlander and DeMartini 2002

Deep Reef - Banks, Shoals and Slopes

Approximately 30 submerged banks are within the Monument (Miller et al. 2004). Deepwater banks and seamounts are one of the least studied environments of the NWHI.

Submersible surveys on South Pioneer Ridge (Pioneer Bank) and two unnamed seamounts, one east of Laysan Island and the other east of Mokumanamana, have revealed the presence of various substrate types, deposited when these geologic features were at sea level (Smith et al. 2004). In some areas, dense communities of corals (ahermatypic) and sponges at depths approaching 1,000 fathoms (1,830 meters) obscured the underlying substratum. The deepwater marine plants of the area are a mixture of tropical species, species with cold-temperature affinities, and species with disjunctive distributions, suggesting alternative biogeographical patterns and dispersal routes from the main Hawaiian Islands (McDermid and Abbott 2004).

Mega- to macro-scale descriptions of bottomfish habitats made on Raita Bank, West St. Rogatien Bank, Brooks Bank, and Bank 66 indicate the distribution and abundance of bottomfish are patchy and appear to be associated with high relief and topographic features, including crevices and caves (Kelley et al 2004). Telemetry studies of Hawaiian monk seals unexpectedly have revealed that these animals spend considerable foraging time at subphotic depths on these banks, particularly in areas that have high levels of relief, such as pinnacles and walls (Parrish and Abernathy 2006).

All of these banks provide prime habitats for bottomfish-associated fish species that are important food sources for Hawaiian monk seals. Such banks also support populations of spiny and slipper lobsters, and colonies of precious gold, pink, and black corals. These deep-living corals, below the depth where enough light penetrates for photosynthesis, rely on the capture of plankton from the water column with their tentacles rather than deriving energy from symbiotic dinoflagellate algae, known as zooxanthellae, that virtually all shallow-water reef-building corals harbor in their cells. Submersible surveys conducted at depths of 656 to 1,148 feet (199.9 to 349.9 meters) on Raita, West St. Rogatien, and Brooks Banks found little evidence of physical disturbances by bottomfishing from anchors and fishing gear (Kelly, Moffit, and Ikehara 2006).

Pelagic

Most of the Monument's area can be considered pelagic habitat. The estimated area of all parts of the Monument with depths greater than 1,000 fathoms (6,000 feet or 1.8 kilometers) is 117,375 square miles (304,000 square kilometers) (Miller et al. 2006).

Pelagic species are closely associated with their physical and chemical environments. Suitable physical environment for these species depends on gradients in temperature, oxygen, or salinity, all of which are influenced by oceanic conditions on various scales. In the pelagic environment, physical conditions such as isotherm and isohaline boundaries often determine whether the surrounding water mass is suitable for pelagic fish, and many of the species are associated with specific isothermic regions. Additionally, fronts and eddies which become areas of congregation for different trophic levels are important habitat for foraging, migration, and reproduction for many species (Bakun 1996). Oceanic pelagic fish including skipjack, yellowfin tuna, and blue marlin prefer warm surface layers, where the water is well mixed by surface winds and is relatively uniform in temperature and salinity. Other pelagic species—albacore, bigeye tuna, striped marlin, and swordfish—prefer cooler, more temperate waters, often meaning higher latitudes or greater depths.

The oceanic Scombroid fish (billfish, tuna, wahoo) have zoogeographies much more like that of plankton than benthic fish. Most are cosmopolitan and occur in all oceans within the tropical and subtropical zones but may have very specific water temperature preferences (Longhurst and Pauly 1987). The yellowfin tuna, for instance, prefers water no cooler than 18 to 21 ºC, which coincides with the northern boundary of the Monument. All species undertake seasonal and age-related migrations, traveling between spawning grounds and feeding grounds appropriate for their sizes. They prey upon medium-sized pelagic fish, crustaceans, and cephalopods. Tagging studies of yellowfin tuna and bigeye tuna have demonstrated that while these species have enormous capacity to travel huge distances, they show very specific attraction to fish aggregating devices, island reef ledges, seamounts, and other elements of structure (Itano and Holland 2000). Lowe et al. (2006) similarly found that while two species of large sharks, tiger sharks (*Galeocerdo cuvier*) and Galapagos sharks (*Carcharhinus galapagensis*), are capable of long-distance travel, they showed more site fidelity than expected throughout the year, with 70 percent of tiger sharks exhibiting year-round residence at FFS. Some of the study subjects did make long-distance movements, with sharks marked at FFS showing up at Midway and on the Kona coast of the Island of Hawai'i. The tremendous economic value of these fishes has resulted in serious declines of most populations due to industrialized fishing. Myers and Worm (2003)

calculated that large predatory fish biomass today is only about 10 percent of pre-industrial levels worldwide. Large predatory fish populations remain healthy and robust in the Monument (Friedlander et al. 2005).

The estimated 5.5 million seabirds breeding in the Monument are primarily pelagic feeders that obtain the fish and squid they consume by associating with schools of large predatory fish such as tuna and billfish (Fefer et al. 1984; Au and Pitman 1986). These fish—yellowfin tuna (*Thunnus albacares*), skipjack tuna (*Katsuwonus pelamis*), mahimahi (*Coryphaena hippurus*), wahoo (*Acanthocybium solandri*), rainbow runner (*Elagatis bipinnulatus*), broadbilled swordfish (*Xiphias gladius*), and blue marlin (*Makaira indica*)—are apex predators of a food web existing primarily in the epipelagic zone. While both the predatory fish and the birds are capable of foraging throughout their pelagic ranges (which encompass the entire Monument and tropical Pacific Ocean), the birds are most successful at feeding their young when they can find schools of predatory fish within easy commuting range of the breeding colonies (Ashmole 1963; Feare 1976; Flint 1990).

The five species of sea turtles that occur in the NWHI are the loggerhead (*Caretta carretta*), the Hawaiian green (*Chelonia mydas*), the olive ridley (*Lepidochelys olivacea*), the leatherback (*Dermochelys coriacea*), and the hawksbill (*Eretmochelys imbricata*). All of these species are protected by the Endangered Species Act. The Hawaiian population of green turtles has been monitored for 30 years, following the cessation of harvesting in the 1970s, and has shown a steady recovery from its depleted state (Balasz and Chaloupka 2004). The transition zone chlorophyll front, located north of Monument waters most years, occasionally moves southward along with one of the species tightly associated with it, the loggerhead turtle. These turtles breed in Japan but feed on buoyant organisms concentrated at the convergent front in these high-chlorophyll waters, which support a complex food web including cephalopods, fishes, and crustaceans, also fed upon by albacore tuna (*Thunnus alalunga*) and a variety of billfish (Polovina et al. 2001).

The waters of the Monument are also home to 20 cetacean species, 6 of them federally recognized as endangered and recognized as depleted under the Marine Mammal Protection Act (MMPA).

2.2.3.4 Connections Among Ecosystems

The most obvious connection between the above ecosystem classifications is that many primarily marine species need emergent land for reproduction. Approximately 5.5 million seabirds nest annually on nearly every island in the NWHI. FFS is the primary nesting site for the Hawaiian stock of the threatened green sea turtle (*Chelonia mydas*). Females lay an average of two clutches (nests) per season, with a mean inter-nesting interval (time between laying nests) of 13 days. The mean incubation period (days to hatchling emergence) for nests is approximately 65 days (Balazs 1980). These islands are also vital as the primary haul-out, pupping, and weaning habitat for the endangered Hawaiian monk seal. Monk seals give birth on land and begin to teach their pups to swim after about three weeks (NOAA 2003b). For seabirds, a parent's proximity to a reliable food source when raising chicks is directly related to their survival (Polovina et al. 1994). Global atmospheric events (such as El Niño and the Pacific Decadal Oscillation) appear to lower the productivity of the waters around the NWHI and have been correlated to low chick

survival rates and the decline in the monk seal population (Polovina et al. 1994). While the albatross come to the NWHI to breed, departing for the open ocean after their chicks have fledged, resident seabirds (e.g., boobies, frigates) spend a good percentage of their time on land. Monk seals that haul out to rest regularly spend two weeks every year on land to molt. Even the coral claims the islands as they subside under the sea, creating the atolls that support the abundant and unique ecosystem that is the Monument.

The connections between the shallow reef, where light penetration and coral growth dominate the environment, and the deep reef, where algal meadows and bottomfish prevail, are an important area of study. Some species of juvenile bottomfish inhabit much shallower waters than adults (Parrish 1989). The depth range of both spiny and slipper lobsters spans the deep and shallow reef (DiNardo and Marshall 2001). These lobster species are important links between the shallow and deep reef, as they are among the largest mobile invertebrates in the coral reef ecosystem. As such, they may represent a vital link in the trophic food web. Monk seals are known to forage in both shallow and deep reef environments and have been documented at 500 meters depth, presumably foraging, for a significant duration (Parrish et al. 2000). These are only a few of the known connections that exist between the habitats defined as deep and shallow reef; many more may exist and are yet to be discovered.

The pelagic habitat is the realm of the highly migratory species, including tunas, sharks, billfish, and hatchling green sea turtles. The deep waters are also important insofar as they support an offshore mesopelagic boundary community (Benoit-Bird et al. 2002), a thick layer of pelagic organisms that rest in the deep ocean (1,300 to 2,300 feet [400 to 700 meters]) during the day, then migrate up to shallower depths (from near zero to 1,300 feet [400 meters]) at night, providing a critical source of nutrition for open-ocean fishes, seabirds, and marine mammals. This community is composed of small fishes, shrimps, and squids, which serve as an important food resource for many animals, including spinner dolphins, bottomfish, tunas, and billfish. Future research will provide more details and interconnections between pelagic and shallow water ecosystems.

2.2.3.5 Special Status Species

Table 2.2-2 provides a list of all of the endangered plant species and resident and occasional visitors protected under the ESA and MMPA. Only species protected under the ESA that are considered regular visitors to the Monument are listed. Some species protected under the MMPA that are known to occur in the western Pacific and could occur within the Monument are not listed for brevity and because no management action would specifically affect these species.

Plants

Six endangered plant species found in the Hawaiian Islands have populations in the Northwestern Hawaiian Islands (Table 2.2-2), and three of these are endemic species on Nihoa Island. *Amaranthus brownii*, *Pritchardia remota*, and *Schiedea verticillata* were listed as endangered under the ESA in 1996. Critical habitat was designated for five plant species in the Monument in 2003.

Table 2.2-2
Special Status Species in the NWHI

Common Name	Taxonomic Name	Protection	Occurrence
Land plants			
Loulu/fan palm	*Pritchardia remota*	ESA	Resident
Kamanomano	*Cenchrus agrimoniodes*	ESA	Resident
‘Ohai	*Sesbania tomentosa*	ESA	Resident
	Amaranthus brownii	ESA	Resident
	Mariscus pennatiformis	ESA	Resident
	Schiedea verticillata	ESA	Resident
Land Birds			
Laysan duck	*Anas laysanensis*	ESA	Resident
Laysan finch	*Telespyza cantans*	ESA	Resident
Nihoa finch	*T. ultima*	ESA	Resident
Nihoa millerbird	*Acrocephalus familiaris kingi*	ESA	Resident
Seabirds			
Short-tailed albatross	*Phoebastria albatrus*	ESA/MBTA	Rare
Sea Turtles			
Olive Ridley	*Lepidochelys olivacea*	ESA	Occasional
Leatherback	*Dermochelys coriacea*	ESA	Occasional
Loggerhead	*Caretta caretta*	ESA	Occasional
Hawksbill	*Eretmochelys imbricata*	ESA	Rare
Green	*Chelonia mydas*	ESA	Resident
Marine mammals			
Hawaiian monk seal	*Monachus schauinslandi*	ESA/MMPA	Resident
Humpback whale	*Megaptera novaeangliae*	ESA/MMPA	Seasonal
Sperm whale	*Physeter macrocephalus*	ESA/MMPA	Occasional
Blue whale	*Balaenoptera musculus*	ESA/MMPA	Rare
Fin whale	*B. physalus*	ESA/MMPA	Rare
Sei whale	*B. borealis*	ESA/MMPA	Rare
North Pacific right whale	*Eubalaena japonica*	ESA/MMPA	Rare
Spinner dolphin	*Stenella longirostris*	MMPA	Resident
Bottlenose dolphin	*Tursiops truncatus*	MMPA	Resident

Source: NOAA 2004b

A. brownii is currently the rarest native plant on Nihoa (FWS 1998); its populations are scattered in two valleys, and a few individuals grow at the bases of basaltic cliffs on the steep outer slopes of the two valleys. *P. remota* grows on valley floors and at the bases of basaltic cliffs, areas that are subject to flash floods. *P. remota* is known from approximately 680 plants scattered in four colonies in each of two valleys that are on opposite sides of Nihoa (FWS 1998). *S. verticillata* typically grows in soil pockets and cracks on coastal cliff faces between 30 and 242 meters. All historically known colonies of *S. verticillata* are known to be extant and have remained relatively stable.

Threats to *A. brownii* on Nihoa include competition with the nonnative plant *Portuluca oleracea (*pigweed*)*, herbivory by introduced grasshoppers (*Schistocerca nitens*), alteration of substrate, fire, potential introduction of rats and mice, human disturbances, a risk of extinction from naturally occurring events (such as hurricanes), and reduced reproductive vigor due to the small number of extant individuals (U.S. Fish and Wildlife Service 1998). Although the current population of *P. remota* appears to be stable, this species may have experienced declines resulting from Polynesian settlement of Nihoa. Contemporary threats may include alien plant,

insect, and mammal species. Flash floods, fire, and human disturbances may also pose potential threats. As a consequence of small population sizes, many of these species are at risk to stochastic events and face reduced reproductive vigor (U.S. Fish and Wildlife Service 1998).

Three additional endangered plants that are found in the main Hawaiian Islands are also found in the Northwestern Hawaiian Islands—*Cenchrus agrimonioides* var. *laysensis*, *Mariscus pennatiformis* ssp. *bryannii*, and *Sesbania tomentosa* (U.S. Fish and Wildlife Service 1999). *C. agrimonioides* var. *laysensis* was historically known from Laysan, Kure, and Midway but has not been seen since 1973 (U.S. Fish and Wildlife Service 1999). *M. pennatiformis* ssp. *bryannii* is known only from Laysan Island where the population has fluctuated between 1 and 200 since 1980. *S. tomentosa,* the only endemic Hawaiian species in this genus, occurs on Nihoa Island and Mokumanamana; the largest population occurs on Nihoa and consists of several thousand individuals (U.S. Fish and Wildlife Service 1999). Threats to these species include competition with alien plants, herbivory by introduced grasshoppers (*Schistocerca nitens*) and other invasive animals, risk of extinction from natural events, and reduced reproductive vigor due to the small number of existing individuals.

Birds

Both the Nihoa finch and the Nihoa millerbird reside year-round on the steep-sided, rocky, and shrub-covered island of Nihoa. Laysan finches are restricted to the low-elevation vegetated area of Laysan Island, although translocated populations have occupied the vegetated areas of Southeast Island and Grass Island at Pearl and Hermes Atoll. The Nihoa millerbird is the least abundant of the endangered passerines, with an average population of 367 ± 218 (SD) that was derived from data surveyed most years beginning in 1967 (Mitchell et al. 2005). The Laysan and Nihoa finch populations have been surveyed most years since 1966, and their mean populations are 11,217 ± 3748 (SD) and 3,196 ± 925 (SD), respectively (Mitchell et al. 2005). No clear population trends have been observed (Mitchell et al. 2005) Factors limiting Nihoa finch and millerbird populations are primarily weather, variations in food supply, and availability of appropriate nest sites. Additional threats include invasive alien arthropod and plant species, arthropod irruptions, introduced mammals, small population size, and associated demographic, stochastic, and genetic risks. Landmass loss accompanying sea-level rise also poses a potential risk to the Laysan finch population.

The Laysan duck was an additional endangered species found exclusively on Laysan Island until 2004, when 20 ducks were successfully translocated to Midway Atoll. Fossil and subfossil records reveal that Laysan ducks were widespread in the Northwestern Hawaiian Islands and the main Hawaiian Islands prior to the arrival of Polynesians. The Laysan duck population on Laysan Island generally does not exceed 500 individuals. The population in 2005 was 459, having recovered from a recent low of 100 in early 1994. Vegetated uplands and wetlands are critical to the survival of the Laysan duck. Vegetated uplands provide shelter and nesting habitat, while wetlands provide foraging habitat. Historic threats to the survival of the Laysan duck include introduction of invasive mammals (e.g., rabbits), sport hunting, and guano mining. Filling of the hypersaline lake by sand is a current threat since the lake provides important foraging habitat.

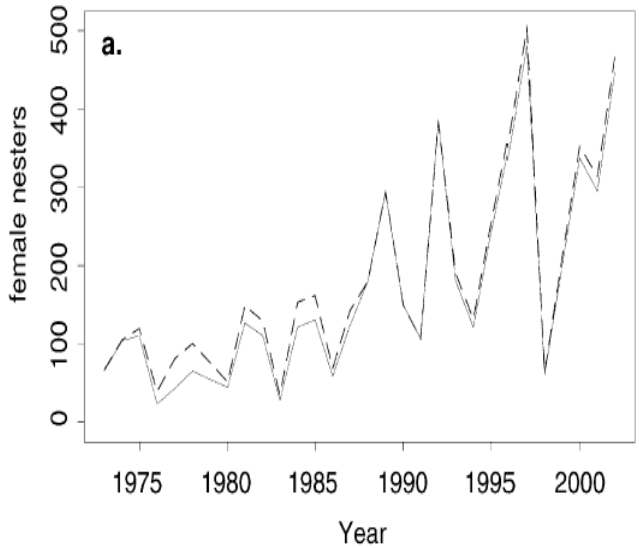
The short-tailed albatross is listed as endangered under the ESA and is the smallest population of any albatross species in the North Pacific. Short-tailed albatrosses once ranged throughout most of the North Pacific Ocean and Bering Sea, but were harvested to near extinction at their breeding colonies in Japan. The current worldwide population is approximately 1,700 individuals, and due to habitat management and stringent protection, the population has increased by approximately six percent per year (U.S. Fish and Wildlife Service 2000). The primary range of this species is along the coasts, traveling between its breeding colonies in Japan, along Russia, the Aleutian Islands, and down the coast of North America. Land-based sighting records indicate that at least 15 short-tailed albatrosses have visited the NWHI over the past 60 years. Most of these sightings have been at Midway Atoll (U.S. Fish and Wildlife Service 2000), where two individuals are present every breeding season.

Sea Turtles

There are five listed sea turtles that could occur in the waters of the Monument. The Hawaiian population of the green turtle is listed as threatened under the ESA. The leatherback, olive ridley, loggerhead, and hawksbill turtles are listed as endangered under the ESA. The green turtle is common in the NWHI. The other turtles are rarely sighted in the Monument and therefore are not listed in Table 2.2-2 or considered in this analysis because of their infrequent incidence.

The NWHI are the primary nesting grounds for the Hawaiian green turtle, while the main Hawaiian Islands are the primary foraging grounds. Although scattered low-level nesting occurs throughout the Hawaiian archipelago, over 90 percent of the nesting is at a few sandy islets within FFS (NMFS and U.S. Fish and Wildlife Service 1998). Nearshore waters contain adults that migrate to breed at these key sites. Mating occurs in the water, yet both males and females arrive on land to bask. Approximately 200 to 700 adult green turtle females nest on FFS annually. Since protection by state law in 1974 and by the ESA in 1978, the nesting population of the Hawaiian green turtle has increased dramatically, as shown in Figure 2.2-2.

Figure 2.2-2 Trends in French Frigate Shoals Green Turtle Nester Abundance



Source: Balazs and Chaloupka 2004

Hawaiian Monk Seal

The Hawaiian monk seal is listed as endangered under the ESA and depleted under the MMPA. It is the most endangered pinniped in U.S. waters, and the second most endangered marine mammal (after the northern right whale). The Hawaiian monk seal is so named for its solitary nature, preferring to be alone, with the closest social bond between mother and pup (Reeves et al. 1992).

Little is known about the Hawaiian monk seal population before the 1950s, although the species is thought to never have numbered more than a few thousand (Ragen and Lavigne 1999). The arrival of the first Polynesians to Hawai‘i probably began the reduction of the seals' range to the NWHI. Two activities in historic times are believed to have caused major declines in population: a short-lived sealing venture of the 1800s, and military activities on Kure, Midway, and FFS in the second half of the twentieth century. Population surveys conducted since 1959 indicate that non-pup populations have declined by 60 percent (NOAA 2003d). Today, the total population is estimated at 1,200 individuals (NOAA 2004g). A wide variety of management actions have been implemented to improve the population trends, including removing aggressive males, relocating males to equalize the sex ratio, and rehabilitating undersized pups to improve survival.

Other Marine Mammals

The great whales occur throughout the Pacific. Five baleen whales—blue whale, fin whale, humpback whale, sei whale, and Pacific right whale — and one toothed whale, the sperm whale, are listed under the ESA. Four of the five baleen whales are known to occur in this area of the north Pacific, but with the exception of the humpback whale, they are rare in Hawaiian waters. Humpback whales occur consistently in the winter but are found mainly in waters surrounding the seven main Hawaiian Islands. Recent research by Johnston et al. (2007) reveals that the Monument hosts many more humpback whales than originally thought. Sperm whales have been sighted around several of the NWHI, and their sounds have been recorded throughout the year in Hawaiian waters. A summer/fall 2002 shipboard survey of waters within the U.S. Exclusive Economic Zone (EEZ) of the Hawaiian Islands resulted in 43 sperm whale sightings throughout the study area (NOAA 2004).

Spinner and bottlenose dolphins are year-round residents of the Hawaiian Islands. They are not considered threatened or endangered under the ESA or depleted under the MMPA. While both species are widely distributed throughout the world in tropical and warm temperate waters, they are considered separate stocks from other populations due to their isolation in the Hawaiian archipelago (NOAA 2000). Both species occur from Hawai‘i Island to Kure Atoll. There are an estimated 743 bottlenose dolphins and 3,184 spinner dolphins within 28.7 mi (25 nm, 46.3 km) of the main Hawaiian Islands. As waters beyond 28.7 mi (25 nm, 46.3 km) of the coast or the waters of the NWHI were not surveyed, this number is considered an underestimate of the population size (NOAA 2000). The largest pod of spinner dolphins within the Monument occurs at FFS, with approximately 500 individuals (Andrews et al. 2006). Smaller pods occur at Pearl and Hermes Atoll, Midway Atoll, and Kure Atoll. While spinner dolphins have a capacity for high mobility, it appears that movements between islands are relatively infrequent, with each pod having a high affinity to a specific atoll (Karczmarski et al. 2005).

2.3 CULTURAL AND HISTORICAL

2.3.1 Introduction/Region of Influence

The ROI or area of potential effect for cultural and historic resources includes all lands and waters within and adjacent to the Monument. Historic and current maps, cultural resources reports, public meetings, and archival records were reviewed to identify cultural resources in the ROI. The NRHP and state and local inventories of historic places were reviewed for prehistoric and historic resources within the ROI. Native Hawaiian groups were consulted, and public meetings were held to identify and locate traditional Hawaiian resources. In addition to formally evaluated cultural properties, and from a broad cultural perspective, the NWHI contain resources that have meaning and significance to Native Hawaiian groups and other members of the general public.

2.3.2 Regulatory Environment

Cultural resources are defined as historic properties, landscapes, cultural items, archaeological resources, sacred sites, or collections subject to protection under the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act (ARPA), and the guidelines on Curation of Federally Owned and Administered Collections (36 CFR Part 79).

Cultural and historical resources are regulated through a number of laws, beginning with the NHPA, which is the basis for a process that considers the effects of federal undertakings on cultural and historic resources. The procedure an agency takes to comply with this legislation is commonly called the Section 106 process. Although the NHPA was created primarily in response to numerous federally funded urban renewal projects in which old neighborhoods and historic homes were demolished, it applies to any actions an agency may take that would affect historic or cultural resources, as they are defined in the law. The intent of the process is to require the federal agency, in consultation with other affected parties, to make an informed decision as to the effect its actions would have on something that may be important to our heritage. In addition to the federal regulations, there are also state regulations protecting cultural resources. These regulations, administered under the Hawai‘i Department of Land and Natural Resources Historic Preservation Division, not only protect the cultural resources but more importantly also provide a process for reinternment of *iwi*, or bones of Native Hawaiians. Included in this process is consultation with the islands burial councils. Depending on the resources identified, the following legislation could apply within the Monument:

- Abandoned Shipwreck Act of 1987 (PL 100-298; 43 USC 2101-2106);
- Sunken Military Craft Act (HR 4200, Title XIV, Sec. 1401-1408);
- Preserve America Executive Order (2003);
- National Marine Sanctuary Act (16 USC 1431 et seq.);
- American Antiquities Act of 1906 (16 USC 431-433);
- Archaeological and Historic Preservation Act of 1974 (16 USC 469-469c);
- Archaeological Resources Protection Act of 1979, as amended (16 USC 470aa-mm);

- Historic Sites, Buildings, Objects, and Antiquities Act of 1935 (16 USC 461-467);
- Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001-3013);
- Department of the Interior Secretary's Order 3217 – Battle of Midway National Memorial, September 13, 2000;
- Protection and Enhancement of the Cultural Environment Executive Order 11593;
- National Wildlife Refuge System Administration Act of 1966, as amended (16 USC 668dd-ee);
- Hawai‘i Historic Preservation Program (HRS Title 1, Ch. 6E, Sections 1, 7, 11, 12, 43, 43.5, and 46.5); and
- Hawaii Historic Preservation Assessment Guidelines (HAR, Title 13, Ch. 275-284, and 300).

Monument regulations define Native Hawaiian practices as cultural activities conducted for the purposes of perpetuating traditional knowledge, caring for and protecting the environment, and strengthening cultural and spiritual connections to the NWHI that have demonstrable benefits to the Native Hawaiian community. In addition to the findings that must be made for any category of Monument permit (see 404.11[d]), permits for conducting Native Hawaiian cultural practices may be issued (50 CFR 404.11 [c][4] and [e]; Proclamation 8112), provided that activities are noncommercial and do not involve the sale of any organism or material collected. The purpose and intent of a Native Hawaiian practice or activity must be appropriate and deemed necessary by traditional standards in the Native Hawaiian culture, benefit the resources of the NWHI and Native Hawaiian community, and support traditional knowledge and ancestral connections of Native Hawaiians to the NWHI. Finally, any living Monument resource harvested from the Monument must be consumed or utilized in the Monument.

2.3.3 Resource Overview

Cultural and historical resources of the Monument are described in detail in the Monument Management Plan. This section provides an overview of these resources in the ROI.

2.3.3.1 Native Hawaiian History in the NWHI

Native Hawaiians' ancestors were the first discoverers of the Hawaiian archipelago. They inhabited these islands for thousands of years prior to Western contact. The NWHI are considered a sacred place, a region of primordial darkness from which life springs and spirits return after death (Kikiloi 2006). Much of the information about the NWHI has been passed down from generation to generation through oral and written histories, genealogies, songs, dance, and archaeological resources.

In the past, Nihoa played an important role in a larger subsistence network between Ni‘ihau and Kaua‘i. The traditions of Ni‘ihau tell of how the people would frequent Nihoa to collect loulu palm wood for spears and mākiukiu grass, which could be used for cordage and stuffing (Tava and Keale 1989). A reciprocal and interdependent relationship developed between these three islands (Tava and Keale 1989; Maly 2003). Annual visits from Ni‘ihau and Kaua‘i to Nihoa

were made during the spring and summer trade wind season. Niʻihau traditions suggest that "the Niʻihauans sailed to Nihoa in the spring, returning to Niʻihau in the fall on the Kona winds" (Tava and Keale 1989; Maly 2003). Other documented accounts tell of how fishermen in the late 1800s from Oʻahu and Hawaiʻi island would make special trips to the NWHI for four months at a time – from May to August, which was the special sailing season. They fished for ʻōpelu (mackerel scad; *Decapterus macarellus*) and aku (skipjack tuna; *Katsuwonus pelamis*) (Johnson and Mahelona 1975). These accounts highlight the importance that the waters of the NWHI played in the lives of Native Hawaiians who regularly sailed to and from this region.

During the post-contact historical period of Hawaiʻi, the Kingdom of Hawaiʻi exhibited strong interest in the NWHI as title to the islands and waters were acquired throughout the 1800s through the doctrine of discovery (Mackenzie and Kaiama 2003). During this time, there were a number of written records of visits to the NWHI made by monarchs of the Hawaiian Kingdom. In 1822, Queen Kaʻahumanu organized and participated in an expedition to locate and claim Nihoa Island under the Kamehameha Monarchy. Later on March 16, 1856, Nihoa was reaffirmed as part of the existing territory of Hawaiʻi in a circular by authority of Alexander Liholiho, Kamehameha IV (March 16, 1856 Circular of the Kingdom of Hawaiʻi). In April of 1857, Kamehameha IV voyaged to Nihoa and instructed Captain John Paty on the Manuokawai to explore the rest of the northwest region to verify the existence of land. Kamehameha IV instructed him to annex any lands he discovered on his expedition. Captain Paty traveled to Nihoa, Necker, Gardner, Laysan, Lisianski, and Pearl and Hermes. Later that year, the Privy Council passed a resolution declaring the islands of Laysan and Lisianski as new lands to be included into the domain of the Kingdom (Kingdom of Hawaiʻi 1857). By authority of Kamehameha IV, a notification of annexation ran for a period of three months announcing possession of the islands. In 1885, the most famous visit by any Hawaiian royalty was made by Lydia Liliʻuokalani (princess at the time) and her two-hundred-person party that visited Nihoa on the ship Iwalani. Finally in 1886, King David Kalākaua, through Special Commissioner Colonel James Harbottel, annexed Kure Atoll (Ocean Island) and announced formal possession of the island (Boyd 1886). While Nihoa and Mokumanamana are thought to have been frequented until about 700 years ago, voyages to these islands and others in the NHWI for the gathering of turtles, fish, bird feathers, and eggs continued into the 20th century, particularly from Kaua'i and Ni'ihau (Tava and Keale 1989; Maly 2003).

Today, Native Hawaiians maintain their strong cultural and spiritual ties to the Northwestern Hawaiians Islands. In recent years, Native Hawaiian cultural practitioners voyaged to the Northwestern Hawaiian Islands to honor their ancestors and to perpetuate traditional practices. In 1997, Hui Mālama I Nā Kūpuna O Hawaiʻi Nei repatriated sets of human remains to Nihoa and Mokumanana that were collected by archaeologists in the 1924-25 Bishop Museum Tanager Expeditions (Ayau and Tengan 2002). In 2003, a cultural protocol group, Nā Kupuʻeu Paemoku, traveled to Nihoa on the voyaging canoe Hōkūleʻa to conduct traditional ceremonies. In 2004, Hōkūleʻa sailed over 1,200 mi (1,043 nm; 1,931 km) to the most distant end of the island chain to visit Kure Atoll as part of a statewide educational initiative called "Navigating Change." In 2005, Nā Kupuʻeu Paemoku sailed to Mokumanamana to conduct protocol ceremonies on the longest day of the year, June 21, the summer solstice. Cultural practitioners (Kamakakūokalani Center for Hawaiian Studies and the Edith Kanakaʻole Foundation) continued this in 2006 and in 2007.

2.3.3.2 Recent History

In more recent history, the NWHI were used for their natural resources, and commercial fishing began in the 1800s. Whaling ships and sampans had fishing ranges that included the NWHI. Midway Atoll was discovered by Westerners in 1859 and was claimed for the US based on the Guano Act of 1856, which authorized Americans to temporarily occupy uninhabited islands to obtain guano. The US took formal possession of the atoll in 1867. Transformation began almost immediately, with projects to blast the reef and create a port on Sand Island. Other islands and atolls were discovered and rediscovered by crews of various sailing ships.

Due to a lack of quality charts for the area, the NWHI and its low-lying reefs and atolls were a navigational hazard for ships and navigators and shipwrecks were common. Maritime activities by the American, British, French, and Japanese during the nineteenth and twentieth centuries are marked by submerged historic resources and wreck sites found throughout the archipelago (VanTilburg 2002). There are 52 known shipwreck sites throughout the NWHI, the earliest dating back to 1822 (NOAA 2005).

In 1867 the US took possession of Midway, and in 1940 it constructed a naval air facility. From 1939 to 1943, Midway functioned as a naval air base, but by 1943 it had been converted to a major submarine base. During World War II, NWHI played an important role as a strategic location. Following the Battle of Midway, the US Navy established a Naval Air Facility at FFS and created a 3,300-foot landing strip at Tern Island. The Naval Facility operated until 1946. Between 1952 and 1979, the USCG operated a LORAN station on Tern Island, FFS.

The naval air facility at Midway was closed down in 1992 under the Base Realignment and Closure Act of 1990. As part of the base closure process, the Navy was obligated to consider the effects of the closure process on historic sites and structures. The Navy determined that 78 structures, buildings, or objects were eligible for inclusion in the NRHP, including the structures associated with the Battle of Midway National Historic Landmark, designated in 1986 (U.S. Fish and Wildlife Service 2005a) under the World War II in the Pacific theme. In 2000, the entire National Wildlife Refuge, including the territorial seas, was designated as the Battle of Midway National Memorial.

2.3.3.3 Other Areas of Importance

There are areas within the Monument that are of cultural importance to native, aboriginal, or local groups that might not otherwise be recognized as significant under the NHPA. These areas have been identified through initial research or are associated with other cultural or natural sites and features. These areas are not historic or cultural properties, which are defined as sites that have undergone formal analysis, evaluation, and consultation in accordance with Sections 106 and 110 of the NHPA, but may be of cultural significance and they may or may not qualify as historic or cultural properties once they undergo formal evaluation and consultation.

Other areas of importance in the Monument may include the following:

- Cultural landscapes (defined below);

- Areas of traditional religious, spiritual, or ceremonial importance to a Native Hawaiian group that are used for maintaining connections to ancestors, nature, cosmology, and creation;
- Areas meant to be kapu (prohibited), which are often times wild areas that are meant to be off limits through consecration and are valued for their restrictions;
- Areas of cultural importance for the perpetuation of existing traditional practices and use or for reviving old practices that are used for subsistence, access for gathering resources, taking care of resources for arts, crafts, and hoʻokupu (offerings), conducting ceremonies, inspiration and meditation, and ʻike (insight and traditional knowledge); and
- Areas of archaeological importance and prehistoric and historic sites, which may include dwellings and burials, that contribute to western knowledge about the indigenous people of the past.

It is important to point out that some natural features and resources may have cultural significance, although they can be difficult to specify and to describe in terms of location and physical place. Thus, they may be specific landforms and places that cannot be physically identified, yet clearly have significance as mentioned in oral traditions. Some areas can derive traditional importance from oral histories that describe ancestral or mythical events, many of which explain how places or landscapes were named or created. These affiliations also illustrate how Native Hawaiian spirituality and worldview intertwines Hawaiian ancestry with life history of islands, landforms, plants, waters, oceans, skies, mountains, and all things natural and supernatural. Many of these intangible elements or connections may not be readily apparent by people unfamiliar with the native worldview or traditional cultural practices.

These areas also may be associated with flora and fauna. For example, Native Hawaiians recognize a spiritual and even genealogical connection to plants, specifically kalo (*Colocasia esculata*), or taro, because it plays a large role in their creation stories (concerning the sky and earth). One version of this story describes how Wākea, the sky father, coupled with his daughter, resulting in a stillborn and misshapen male fetus named Hāloanakalaukapalili (the quivering leaf of Hāloa) that was buried in the earth on the east side of their house (Enos 1998). From out of the ground where the baby was buried the kalo grew, nourished by the tears of his mother. When Wākea's daughter became pregnant again, she bore another child that was human and was named Hāloa in honor of his older brother. All future Hawaiians descended from Hāloa, highlighting Native Hawaiians' familial relationship with the kalo as their older brother, and also teaching the responsibility of mālama ʻāina (Enos 1998; Kameeleihiwa 1992).

More appropriately, in regard to the NWHI, the Kumulipō also highlights man's relationship and responsibility to nature (Beckwith 1951). This creation chant begins in a time of darkness, and born first is the coral polyp, which became the eldest sibling in a long line of evolution of biological species. While the Kumulipō chant has largely been interpreted as a lineal account for the evolution of biological species through time, this chant also highlights biogeographically the migration and distribution of these species spatially throughout the Hawaiian archipelago, moving eastward. The western half of the archipelago holds a position of prominence in Hawaiian traditions because it represents the ancestral beginnings of Native Hawaiians and the source of origin for all life (Kikiloi 2006).

Native Hawaiian oral traditions often refer to the islands beyond the main Hawaiian Islands and recall the travels of seafaring ancestors on their way to and from the Hawaiian archipelago. In one significant journey, Pele, the Hawaiian goddess of fire and volcanoes, migrates with her family from their distant homeland to Ni‘ihau in the main Hawaiian Islands. They travel by way of Mokumanamana (Emerson 1915). Other oral traditions recall migrations of Native Hawaiians passing through the Northwestern shoals. Therefore, these areas may include more than specific areas where identifiable activities occurred. Because of the interconnected nature of Native Hawaiian beliefs, they may represent links in a chain of places, such as the entire NWHI.

2.3.3.4 Native Hawaiian Cultural Landscapes

Federal guidelines recognize four cultural landscape categories; the following three are most relevant to this discussion (Stoffle et al. 1997):

- Historic vernacular landscapes that illustrate peoples’ values and attitudes toward the land and that reflect patterns of settlement, use, and development over time;
- Historic sites that are significant for their association with important events; and
- Ethnographic landscapes associated with contemporary groups that are typically used or valued in traditional ways.

National Park Service (NPS) Cultural Resource Management Guidelines describe cultural landscapes as complex resources that range from rural tracts to formal gardens, further defined by the way the land is organized and divided, settled, and used, including the types of structures that are built on it (Stoffle et al. 1997). Natural features, such as landforms, soils, and vegetation, provide the framework within which the cultural landscape evolves. In its broadest sense, a cultural landscape is a reflection of human adaptation to and use of natural resources (Stoffle et al. 1997).

In Western cultures, it is difficult to define what cultural landscapes mean to Native Hawaiians, and it has become evident that labeling and evaluating geographic units that are usually loosely defined and based on interdependent and intermingled cultural traditions presents only a part of the overall picture. Although a number of different terms may be used to describe these cultural areas, the term cultural landscape is used here because it is widely understood and has official standing in federal cultural resources law and regulation.

Applying federal guidelines to Native Hawaiian cultural landscapes, a culturally specific set of components reflecting Native Hawaiian spiritual, religious, and cultural values has been identified. In *Kalo Kanu o Ka ‘Āina*, a report on the cultural landscape for Ke‘anae and Wailua Nui, five somewhat overlapping types of sites were identified (McGregor 1998). These categories necessarily reflect the importance of culturally significant natural resources, in addition to human-made archaeological sites (McGregor 1998), and include the following:

- Areas of naturally occurring or cultivated resources used for food, shelter, or medicine;
- Areas that contain resources used for expression and perpetuation of Hawaiian culture, religion, and language;

- Places where known historical and contemporary religious beliefs or customs are practiced;
- Areas where natural or cultivated endangered terrestrial or marine flora and fauna used in Native Hawaiian ceremonies are located or where materials for ceremonial art and crafts are found; and
- Areas that provide natural and cultural community resources for the perpetuation of language and culture, including place names and natural, cultural, and community resources for art, crafts, music, and dance.

Prior to Western contact, Native Hawaiians developed a complex system of resource management and a specialized set of skills to survive on remote islands. Resource management revolved around a native worldview that guided the actions and practices of the people. Lands were divided into resource management parcels known as ahupuaʻa, primarily on the main Hawaiian Islands. These land parcels were land divisions that divided the land vertically from mountain to ocean and typically included the ridges on both sides of a valley as well as the offshore area to hundreds of miles from shore. The inclusion of both mountain and ocean lands in a typical ahupuaʻa assured residents access to resources from the mountains and the sea and provided a balance between the two regimes (Abbott 1992). Certain areas were designated to be left alone and wild in their naturally occurring state and were called wao akua (realm of the gods), a pristine region of the mountains, which contained a greater variety of trees and biodiversity. The wao akua regions were seldom accessed by people because of the priority of promoting new growth by not disturbing seed-producing forest areas (Kanahele 2003). On a larger macroscale of resource management, the NWHI may have functioned in much the same way traditionally, as it too was designated as wao akua, or divine islands (or realm of gods). In essence, this remote region was left wild and pristine because it was viewed as a place which has an important role in the continual cycle of life (creation) and death (afterlife) (Kikiloi 2006).

2.3.3.5 Traditional Cultural Places

The NPS defines TCPs as properties of traditional religious and cultural significance that at a minimum are "eligible for their inclusion in the [NRHP] because of [their] association with cultural practices or beliefs of a living community that (a) are rooted in the community's history and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1990).

Remnants of human presence can be found on the islands of Nihoa and Mokumanamana, all of which are listed on the NRHP. Nihoa has 88 and Mokumanamana has 52 archaeological sites, which include residential features, ceremonial sites, shelters, agricultural terraces, and cairns.

Cultural research involving archival searches, ethnographic interviews, cultural practices, and archaeological studies are ongoing and have identified a number of areas of importance, as discussed above that may be eligible as TCPs. The process for determining if these areas are eligible as formal TCPs includes consultation among FWS, NOAA, the Hawaiʻi State Historic Preservation Officer (SHPO), and other interested groups. Special consideration is given to those properties designated as having national significance.

2.3.3.6 Archaeological Sites

The Monument contains a significant number of archaeological sites. Nihoa and Mokumanamana are recognized as culturally and historically significant and are listed on the National and State Registers of Historic Places and are protected by the US Fish and Wildlife Service in accordance with the National Wildlife Refuge System Administration Act of 1966, as amended. Archaeological surveys on Nihoa and Mokumanamana have documented numerous archaeological sites and cultural material (Emory 1928; Cleghorn 1988; Ziegler 1990; Graves and Kikiloi, in prep).

Nihoa Island, the closest of the islands from the main Hawaiian chain, contains over 88 archaeological sites (including residential features, shelters, ceremonial features, agricultural terraces, and cairns) (Emory 1928; Cleghorn 1988; Kawaharada 2001, Kikiloi and Graves 2005). The island has significant soil development, and the number of constructed terraces suggests some expenditure for agricultural production. The diversity in site types has led archaeologists to conclude that a wide range of cultural activities took place on Nihoa. Previous surveys also uncovered two burials containing the remains of adults and children (Emory 1928). This has led to the conclusion that Nihoa once had a resident population that was either permanent or semi-permanent, spanning a period of AD 1000 to 1700 (Emory 1928; Cleghorn 1988).

Mokumanamana (Necker Island), the second closest island to the main Hawaiian chain, has very limited soil development. There are 52 archaeological sites (33 of which are ceremonial structures*)* that have been recorded; there are no substantial habitation sites or agricultural sites on the island. Mokumanamana has the highest concentration of ceremonial sites anywhere in the Hawaiian archipelago. Researchers have hypothesized that this island plays a significant role in the Native Hawaiian tradition regarding the process of creation and afterlife, as it lies directly on the Tropic of Cancer and on an axis between two Hawaiian spiritual realms (Liller 2000; Kikiloi 2006).

A number of artifacts have been collected from both islands, including fishhooks, sinkers, cowry shell lures, hammerstones, grindstones, adzes, coral rubbing stone, and unique stone images (Emory 1928; Cleghorn 1988; Kikiloi and Graves 2005). These artifact collections are stored at the Bernice Pauahi Bishop Museum and at the University of Hawai‘i Archaeology Laboratory. More recent paleo-botanical research by Athens (2007) on Laysan Island has revealed the possibility that coconuts (*Cocos nucifera*) may have been brought to the island by Native Hawaiians who ventured up the archipelago. The presence of coconut pollen from deep within a salt lake in the middle of the island has led to two possible alternatives: (1) This plant was brought purposefully by humans; or (2) it arrived on Laysan by itself accidentally. This would be the first and earliest documented case of either accidental or purposeful introduction of the coconut in the Hawaiian Islands (TenBruggencate 2005b).

At present, evaluations are continuing for archaeological sites throughout the Monument. According to NPS regulations (36 CFR § 60.4), a property could be eligible for listing on the NRHP if it meets the following criteria:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

A. that are associated with events that have made a significant contribution to the broad patterns of our history;
B. that are associated with the lives of persons significant in our past;
C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. that have yielded, or may be likely to yield, information important in prehistory or history.

Iidentified archaeological sites can have additional cultural importance as locations where Hawaiian ancestors lived, worked, worshipped, or engaged in other activities. It has been clearly documented through archival research and ethnographic studies that Native Hawaiians were consistently going to the Northwestern Hawaiian Islands in pre-contact times and into the post-contact historic period (NOAA 2004b; Tava and Keale 1989; Maly 2003; Kikiloi 2006). Archaeological features on the landscape, as well as the numerous artifacts collected, are also indications of maritime seafaring and resource gathering throughout the region. Furthermore, historic western-made anchors and fishing implements can be found throughout the ROI (Van Tilburg 2002). The islands of Lisianski, Nihoa, and Mokumanamana have been formally surveyed for pre-contact Hawaiian archaeological sites (Emory, 1928; Cleghorn 1988; Zeigler 1990; Graves and Kikiloi, in prep.), and paleo-botanical studies were conducted on Laysan Island (Athens 2007).

Cultural resources in the Monument are being studied through a historical landscape study, in contrast to site-specific individual and unrelated projects, in which a high priority is placed on the interaction between these resources and the immediate environment. Wrecks can provide artificial reef environments but can also have the potential for leaching metals, cargo, and fuel into the ecosystem. A broader historical approach is more compatible with an ecosystem approach to management that examines human impacts on the ecosystem rather than just the individual events. Ongoing work emphasizes a low-impact approach.

2.3.3.7 Paleontological Resources

Paleontological resources in the form of flora remnants can be expected to be present in the Monument. In paleo-botanical studies conducted at Laysan Lake, coconut pollen was found in sediment cores. Core results contained potentially datable remains older than the historic period, showing a deposit of artifacts that suggest previous human settlement (Athens 2005).

2.3.3.8 Submerged Cultural and Historic Resources

Hawai‘i has approximately 1,500 years of continuous and intensive maritime activities, and hundreds of wreck sites from the nineteenth and twentieth century are scattered throughout the whole Hawaiian archipelago (NOAA 2004b).

Submerged cultural resources can be defined loosely as submerged archaeological or culturally significant sites over fifty years old. These sites may include shipwrecks, downed airplanes, or submerged structures within the more recent historic period, or may include harder-to-identify prehistoric sites, consisting of campsites with stone tools or stones used for grinding. Because of their low and uncharted nature, the NWHI have numerous historic shipwrecks (Van Tilburg 2002). Field surveys and management for historic shipwreck and aircraft sites are ongoing. Because of the vast expanse of the NWHI, plans for the maritime heritage survey and management are projected to five and ten years. Shipwrecks are treated as potentially eligible for the NRHP (Van Tilburg 2002).

2.3.3.9 Buildings and Historic Sites

Midway Atoll NWR’s lands and water were designated as a National Memorial in 2000 because of their significance in American history. Study of Midway’s heritage resources was initiated in 1986 by the NPS when it conducted a survey of World War II-era properties eligible for designation as a National Historic Landmark (NHL). Nine structures, all defensive positions, were identified on Midway that convey a close association with the pivotal Battle of Midway (June 4-6, 1942), including ammunition magazines (ARMCO huts), a pillbox, and gun emplacements (Thompson 1986). All of the resources are on the west side of Sand Island, on relatively undisturbed terrain. A buffer zone around the individual structures was included in the NHL. No resources were identified on Eastern Island for inclusion in the NHL.

Between 1992 and 1994, the US Navy sponsored studies of the Naval Air Facility on Midway carried out in conjunction with the Department of Defense Legacy Resources Management Program. These investigations, which comprised archival research, interviews, and field surveys, are presented in several documents, including *Cultural Resources Overview Survey at Naval Air Facility, Midway Island* (Yoklavich 1993), a *Supplemental Cultural Resources Overview Survey* (Yoklavich et al. 1994), and the *Cultural Resources Management Plan* (Helber, Hastert, & Fee 1995). The following is a brief synopsis of the results as reported in these documents.

Architectural Studies

The initial field effort consisted of an architectural history survey of the structures, buildings, and objects located on Sand and Eastern Islands. A military historian specializing in Cold War history performed archival research and surveyed resources on Eastern and Sand Islands that were constructed after 1945. The historian concluded that none of the Cold War facilities at Midway were eligible for the National Register of Historic Places because they lacked the exceptional importance necessary for resources less than 50 years old (Yoklavich et al. 1994). Severe weather conditions prohibited the study of Eastern Island during the fieldwork phase in 1992. Therefore, a supplemental survey was conducted in 1994 to complete work on Eastern Island. The 1994 fieldwork included large-format photography of historic properties following

standards of the Historic American Buildings Survey (HABS). In addition to the nine NHL structures, 69 buildings, structures, and objects associated with the 1903-1945 historic period on Sand and Eastern Islands were determined eligible according to criteria established by the NRHP. The properties evaluated as significant are associated with three major themes—colonization, initial years of base construction and the Battle of Midway, and 1942-1945 base construction.

Colonization: The first evidence of habitation on Midway is the buildings associated with the Commercial Pacific Cable Company, constructed in 1903-1904. San Francisco-based architect Henry H. Meyers designed these unique two-story buildings. The innovative design advanced the use of concrete with an embedded steel frame and steel posts. The main four buildings are arranged around a courtyard plan. The buildings are reminders of technological innovations in communication, colonial expansion, and early steel and concrete architecture.

Initial Years of Base Construction and Battle of Midway: Defensive construction prior to World War II includes more than just the NHL structures. An example is the Power Station building that was hit during the December 7, 1941 attack, which stands as a reminder of that pivotal moment when the United States entered World War II. Approximately half of the historic properties inventoried on Midway are related to this period between 1940 and 1942. Eastern Island sustained heavy damage during the Battle of Midway; historic resources from this period are limited to the runways, a couple of defensive positions, and revetments. Construction of Midway Naval Air base began in earnest in 1940, with construction battalions and civilian contract workers. Plans for many of the buildings were developed by Detroit architect Albert Kahn, including barracks, Senior Officer's Quarters, Shops, the Motor Pool, the Seaplane Hangar, and the Theater. Kahn was well known for his steel and concrete factories. His use of natural light to create buildings with comfortable interior spaces is reflected in the shop buildings on Midway. The Officer's housing reflects Kahn's design versatility; the houses are functional and stylish with covered patios, fireplaces, large sliding doors and windows, servant's quarters, and portal window porch details. Most of the buildings designed by Kahn are still in use.

1942-1945 Base Construction: Between 1942 and 1945, after the Battle of Midway, emphasis shifted to creating a Naval Air Station on Sand Island. Eastern Island was heavily damaged during the battle and was left in rather rough condition, although it continued to be the base of operation for marine air squadrons. Only a few buildings remain on Sand Island that were constructed during this period; these include an electric switch station, public works storehouse, radar buildings and radar tower base, diesel power plant, brackish water reservoirs, and command post. Properties that transcend a particular theme or period include the three Japanese grave markers, the cemetery, and the Midway Mall Memorial. The Japanese markers date from about 1911 to 1916. Translations of the markers indicate that they are memorials to fishermen who died and were buried at sea. The location of the markers is not original; they were moved in the early 1970s. The small cemetery is an anomaly because all military personnel killed in battle or during duty were either buried at sea or transported back to Pearl Harbor. The dates on the gravestones range from 1906 to 1950. Four of the five individuals buried there were medical doctors. The Midway Memorial Mall encompasses several plaques, a large gooney bird statue,

and two five-inch guns. One of the plaques was erected in 1941, just a few months after the battle. The guns were probably used during the battle, and later moved to this location.

Archaeological Studies

An archaeological survey of Sand Island was conducted by Dr. Fred Reinman in 1992 as part of the *Cultural Resources Overview Survey* (Yoklavich 1993). The field investigations consisted of a pedestrian survey of Sand Island augmented by 20 subsurface core samples. The surface inspections and core samples produced no indication of prehistoric settlement on Sand Island. A literature review of Hawaiian legends was conducted to determine if Midway was included in any travel accounts. While references to distant low-lying islands with abundant birds and turtles were found, no clear tie to Midway was detected (Maly 1994 in Yoklavich et al. 1994:A-1-A-4). The poor field conditions that hindered study of Eastern Island in 1992 prompted an additional study in 1994 by Paul H. Rosendahl, PhD, Inc., on both Sand and Eastern Islands for the *Supplemental Cultural Resources Overview Survey* (Yoklavich et al. 1994). The intent of this supplemental survey was to achieve uniform coverage of Eastern Island. The sample included 45 auger cores and two contiguous 1.0-meter by 1.0-meter shovel-test units excavated on Eastern Island and three auger cores and three 1.0-meter by 2.0-meter shovel-test units excavated on Sand Island (Yoklavich et al.1994:7). No evidence of Polynesian/Hawaiian or pre-A.D. 1900 historic period cultural remains was found.

The studies concluded that no evidence of prehistoric Polynesian/Hawaiian occupations or historic period occupations is present on either island. The subsurface archaeological investigations observed very disturbed deposits, with as much as two meters of fill or redeposited sediment over a thin layer of undisturbed sand. Polynesians/Hawaiians may have utilized Midway in their extended travels, but the atoll has experienced such pervasive ground-disturbing activities that finding evidence of prehistoric use is problematic. Even prior to the mid-twentieth century construction, the low-profile islands were periodically scoured by storms and high winds that may have removed or buried evidence of use.

Tern Island of the FFS was developed as a naval air facility. The USCG operated LORAN stations there between 1949 and 1970. Many of these structures remain in use for refuge and partner operations.

With the past activities at many sites in the Monument, combined with known shipwrecks and sunken naval aircraft, many can be defined by state and federal preservation law as historical and nationally significant (NOAA 2004b).

2.4 SOCIOECONOMICS

2.4.1 Human Uses

2.4.1.1 Introduction/Region of Influence

This section describes human uses and activities in the Monument. The ROI for human uses and activities includes all lands and waters within and adjacent to the Monument. This section of the DEA also fulfills the resource assessment requirements of 16 USC 1434 (a)(2)(B) by documenting present and potential uses of the area.

The waters of NWHI are used for a variety of activities, such as research and management, cultural practices, fishing, recreation, ecotourism, and education.

2.4.1.2 Regulatory Environment

While the following description of the regulatory environment describes the separate and often overlapping responsibilities of the Co-Trustees, the No Action alternative includes the MOA, which has a primary purpose of facilitating coordinated management. This coordination includes developing a single overarching set of regulations for the Monument, a single permitting system for Monument users, and sharing resources to enforce regulations and carry out management activities. The Co-Trustees are currently addressing these issues. This coordinated management is considered part of the No Action alternative.

Federal Regulations

Monument regulations promulgated in 50 CFR 404 primarily relate to prohibiting or regulating human uses within the Monument to ensure the protection of Monument resources. Section 404.4 addresses how access will be granted into the Monument and requires notification prior to entering and after departing. All U.S. vessels passing through the Monument without interruption will be required to provide notification at least 72 hours before entering and within 12 hours of leaving the Monument and must include intended and actual route through the Monument and general categories of any hazardous cargo on board. Section 404.5 describes the Vessel Monitoring System (VMS) requirements for all vessels operating in or transiting through the Monument. Section 404.6 lists all prohibited activities within the Monument. Prohibited activities include exploring for oil, gas, or minerals or using poison or explosives. Section 404.7 describes all regulated activities that are prohibited unless specifically allowed by one of the Monument-issued permits. Sections 404.8 and 404.9 provide exemptions from prohibited activities for emergency response and law enforcement activities (404.8) and armed forces actions (404.9). Section 404.10 describes Monument-specific regulations for commercial fishing activities, essentially prohibiting all commercial fishing immediately, except for bottomfishing, which will be prohibited as of June 15, 2011. Section 404.11 describes the six permit types issued to access and conduct activities otherwise prohibited by Monument regulations. These permit types are 1) research, 2) education, 3) conservation, 4) Native Hawaiian practices, 5) special ocean uses, and 6) recreational activities. Specific requirements for issuance of Native Hawaiian practices, special ocean uses, and recreational activities are included in the regulations.

Section 404.12 ensures that these regulations will be carried out in accordance with international law.

In addition to Monument-specific regulations, FWS has regulations specific to Midway Atoll NWR (50 CFR 38), special conditions for cruise ship visits to Midway, and permitting requirements for both Midway Atoll and Hawaiian Islands NWRs under 50 CFR 13, 18, and 25 (general permitting procedures, marine mammal permitting, and administrative provisions, respectively).

NOAA, in association with the Western Pacific Fisheries Management Council, has jurisdiction over the ongoing bottomfish fishery through 50 CFR 665. As this permitted activity will be prohibited as of June 15, 2011, as discussed above, prohibition of bottomfishing is considered part of the No Action alternative and effects from fishing will not be analyzed.

State Regulations, Policies, and Programs

The DLNR has stewardship responsibility for managing, administering, and exercising control over the coastal and submerged lands, ocean waters, and marine resources under state jurisdiction around each of the NWHI, except Midway Atoll, under Title 12, Chapter 171.3 Hawai‘i Revised Statutes. The state is the lead agency for management of the emergent lands at Kure Atoll, a State Wildlife Sanctuary. DLNR’s Division of Conservation and Resources Enforcement (DOCARE) maintains full police powers, including the power of arrest, within all lands and waters within the state’s jurisdiction. In 2005, the DLNR’s Division of Aquatic Resources established the Northwestern Hawaiian Islands Marine Refuge (0-3 nm [3.5 mi, 5.5 km] around all emergent lands, except Midway Atoll) through Hawai‘i Administrative Rule, Chapter 13-60.5. Unless otherwise authorized by law, it is unlawful for any person to enter the refuge without a permit except for freedom of navigation, passage without interruption, interstate commerce, and activities related to national defense, enforcement, or foreign affairs and in response to emergencies.

The state currently holds the submerged and ceded lands of the NWHI in trust. Established by a 1978 amendment of the Constitution of the State of Hawai‘i, the Office of Hawaiian Affairs (OHA) serves as the principal agency working for Native Hawaiians. OHA was created to satisfy the public land trust purpose of bettering the conditions of Native Hawaiians. To this end, OHA manages a property and monetary trust, creating a fiduciary duty to Native Hawaiians. The OHA trust is funded in part by a pro rata share of proceeds from the ceded lands portion of the public land trust.

2.4.1.3 Resources Overview

The area the Monument encompasses has a long history of use. Native Hawaiians explored these waters, established settlements, and conducted religious ceremonies for hundreds of years prior to the arrival of the first Europeans. Most extractive uses, including guano mining, egg and feather collection, rabbit farming, whaling, and a variety of fishing ventures, ended by the early 1900s. The U.S. military used FFS and Midway Atoll, which are equipped with runways, as permanent bases during and after World War II. The USCG built a LORAN station with a 4,000-foot runway at Kure Atoll in 1960. The military still conducts limited operations and missile

tracking in the general area around the Monument. The earliest intensive scientific expedition in the Northwestern Hawaiian Islands was the Rothschild Expedition in 1891 (Ely and Clapp 1973). Research continues to be one of the primary activities occurring within the Monument. Management activities conducted by the State of Hawai‘i, FWS, and NOAA have been ongoing for decades. Human activities and use of the Monument resources are carefully managed, considering historical uses and new threats through permitting, enforcement, and managing specific human uses, including Native Hawaiian cultural practices and visitors at Midway Atoll.

Historical Uses

The waters and islands of the Monument have been visited and inhabited by Native Hawaiian since at least 1000 AD Other documented accounts tell of how fishermen in the late 1800s from O‘ahu and Hawai‘i islands would make special trips to the NWHI for four months at a time – from May to August, which was the special sailing season. These accounts highlight the importance that the waters of the NWHI played in the lives of pre-contact Native Hawaiians who regularly sailed to and from this region. Further details on Native Hawaiian uses of the Monument are available in section 2.3, Cultural and Historic Resources.

The impacts of guano mining, egg and feather collection, rabbit farming, dredge and fill, importation of soil to Midway, and invasive species that occurred in a few of the islands in the late 1800s and 1900s caused serious environmental damage to these fragile places (NOAA 2005). In the 1800s and 1900s, western sailing ships exploited the area for seals, whales, reef fish, turtles, sharks, birds, pearl oysters, and sea cucumbers (WPFMC undated). The pearl oyster population (*Pinctada margaritifera*) on Pearl and Hermes Atoll was nearly extirpated in a few short years and has yet to recover to pre-exploitation levels (Keenan et al. 2006). Japanese vessels harvested bird skins, eggs, and feathers until 1909, when the area was designated the Hawaiian Island Reservation by President Theodore Roosevelt. Fishing continued largely unregulated until the late 1970s, when the Magnuson-Stevens Act established U.S. sovereignty over fishery resources in the Exclusive Economic Zone, out to 200 nm, leading to the development of four federally administered fishery management plans for precious corals, crustaceans, pelagic species, and bottomfish. Today, only eight bottomfish vessels are grandfathered in and allowed to continue fishing until June 15, 2011, after which all commercial extraction of Monument resources will be prohibited. Additional regulations limiting the total allowable catch, areas open to the fishery, and general vessel conditions are aspects of the baseline conditions.

The first military presence occurred at Midway Atoll, which President Theodore Roosevelt put under the control of the U.S. Navy in 1903. Midway was subsequently managed by the Commercial Pacific Cable Company, which laid the first trans-Pacific communications cable. Prior to World War II, Pan American World Airways flew weekly Clipper plane flights to Midway. On August 1, 1941, U.S. Naval Air Station Midway was commissioned. Midway was the site of two major battles, the attack on December 7, 1941, and the Battle of Midway on June 4 to 7, 1942. On July 15, 1942, the submarine base at Midway was commissioned, providing a strategic outpost in the Pacific during World War II and the Cold War. After World War II, Midway was an active navy base supporting a population of up to 4,000 people. The naval air

facility was closed in 1992, and in 1997 the last U.S. Navy personnel departed, following the completion of environmental cleanup and mitigation measures (NOAA 2003a).

In 1942, the Navy transformed the 11-acre (4.5-hectare) Tern Island in FFS into a 42-acre (17-hectare) airstrip and fuel depot, housing 118 servicemen. It served as an emergency landing strip and refueling stop and provided surveillance of the surrounding area. The atoll was swept clean by a tidal wave in 1946, after which the Navy closed its base there. In 1952, the USCG built a LORAN beacon tower on Tern, along with a 20-person support facility. Several cold war operations were conducted at FFS such as the recently declassified 'Corona Project,' the first operational space photo reconnaissance satellite system. FFS served as a tracking and recovery station for this project in the early 1960s. An additional 100 people were stationed at FFS to monitor the aboveground nuclear testing at Johnston Atoll. During the Cold War, FFS housed up to 300 personnel at a time in support of the different classified and unclassified missions (Wood 2001). The USCG continued to operate the installation until 1979, when it was turned over to FWS (Amerson 1971). In 1960, the USCG built and operated a LORAN C station with a single 625-foot-high (190.5-meter-high) transmitter tower. In addition to the transmitter tower, the USCG built a 4,000-foot runway, a pump house, a pier, seven aboveground storage tanks, and living and working quarters for 24 personnel. The station was decommissioned in 1992 and was abandoned in 1993. Today, all but two buildings and a cistern have been demolished and buried on the island.

Current Human Uses and Activities

Compared to the past, there is little human activity in the Monument today. With the departure of the military and the prohibition on commercial fishing, the main marine-related activities are research, wildlife management, and transiting ships (for a discussion of transiting ships please refer to section 2.8). Regulations in 50 CFR 404 provide access to the Monument under six types of permitted activities: 1) research, 2) education, 3) conservation, 4) Native Hawaiian practices, 5) special ocean uses, and 6) recreational activities. In addition, access by the armed forces for emergency response, enforcement, and passage without interruption are allowed without permit by regulation. Commercial bottomfishing by eight federally permitted vessels will be allowed to continue through June 15, 2011, after which it will be prohibited.

Understanding and Interpreting the NWHI

In order to best protect the NWHI, the need for understanding and documenting the historical significance of the area has been growing. Research efforts in ethnographic studies, archaeology, and archived information have provided a wealth of cultural information pertaining to the practices and traditions of the Native Hawaiians in the NWHI. In order to allow access to this historical information, steps have been taken by NOAA, FWS, the State of Hawai'i, and other partnerships through the program "Navigating Change" to provide students with engaging materials that convey the importance of these traditions and cultural values. In addition to the cultural research conducted on the NWHI, research has been done on historic resources (nonmarine sites, structures, artifacts, culture, and places) within the Monument associated with the period after 1778 when Western contact was made with Native Hawaiians. The Midway Atoll Historic Preservation Plan, implemented in 1999, focuses on long-term management and treatment of historic sites and identifies procedures for new historic finds. This plan also offers

ways of interpreting historic data and releasing it through public outreach. With the exception of Midway Atoll, the current historical record of the NWHI is minimal, as there have not been many research efforts in this area.

Reducing Threats to Monument Resources

A variety of management practices to reduce threats to Monument resources have been implemented. This includes alien species control conducted by FWS and a multi-agency effort to remove marine debris led by NOAA. Between 1996 and 2006, 563 tons of marine debris was removed from the NWHI. Areas considered "High Entanglement Risk Zones" for Hawaiian Monk Seals are cleaned and have been designated accumulation rate zones. The Marine Debris Program, established in 2005 under NOAA's Office of Response and Restoration, was made permanent in 2006 by the Marine Debris Research, Prevention, and Reduction Act. NOAA is to work in conjunction with other agencies such as the EPA and the USCG to find sources of marine debris pollution and act in removing this debris. Awareness of this threat to the NWHI, in particular to the coral reef ecosystem, is fostered through publications and public outreach displays in NOAA's Mokupapa Discovery Center, as well as in the "Navigating Change" program Teacher's Guide.

FWS has an ongoing program to eradicate invasive terrestrial species and restore native ecosystems. This effort focuses on the most invasive and harmful pest species of plants such as sandbur, golden crownbeard, and ironwood; insects such as various ant species and the gray bird locust; and introduced mammals such as black rats.

Research and monitoring conducted by federal and state agencies, academic institutions, and other organizations over the last 30 years have increased our understanding of the structure and function of ecosystems of the NWHI and the interconnectedness between the NWHI and the main Hawaiian Islands. Early research efforts include the Tanager expedition in 1923, the Smithsonian's Atoll Research Bulletin publications of the mid 1960s, and the Tripartite expeditions of the late 1970s and early 1980s. The integrated research by the Tripartite Cooperative Program, led by NOAA Fisheries, FWS, Hawai'i Division of Fish and Game (now Division of Aquatic Resources), and the University of Hawai'i Sea Grant College Program, encompassed all resources on land, in the air, and in the sea. The research that resulted from this multi-agency effort provided a seminal understanding of the NWHI ecosystem and continues to inform research efforts.

Monitoring select stocks of commercially fished species, such as bottomfish and lobsters, and of protected species, such as monk seals and green sea turtles, has been conducted by NOAA Fisheries Pacific Islands Fishery Science Center for several decades. Ecosystem-level characterization and monitoring has been a more recent endeavor. The Northwestern Hawaiian Islands Reef Assessment and Monitoring Program (NOWRAMP) was a multi-agency program initiated in 2000 to characterize and monitor the coral reefs of the NWHI using a consistent set of sampling protocols and to establish a baseline for future data gathering and for monitoring change over time. Similar annual multi-agency efforts have been supported by a variety of agencies and institutions in the ensuing years. Mapping efforts, led by NOAA, have provided detailed maps of the NWHI seafloor and are consolidated into two documents, *The Draft Atlas of the Shallow-Water Benthic Habitats of the NWHI* and *The Bathymetric Atlas of the NWHI*. These

documents begin to describe the marine habitats and bathymetry of the NWHI and establish important baseline information for resource managers. This high interest in research and mapping activities in the NWHI, concurrent with the availability of more funds for coral reef ecosystem research, has increased the activity level in the Monument.

In May 2003, a multi-agency partnership workshop was convened to identify information and science needs and resources for effective conservation and management of the NWHI. The results were analyzed and summarized in the report *Information Needs for Conservation Science and Management of the Northwestern Hawaiian Islands* (Gittings et Al. 2004). In November 2004, the *Third Scientific Symposium on Resource Investigations in the NWHI* was convened to provide a forum for the review and synthesis of recent research and to identify knowledge gaps and delineate future research needs. This symposium highlighted the need for agencies to develop more cooperative research programs. Most participants recognized the need to develop a more coordinated research plan in the NWHI that will address the management needs of the Monument Co-Trustees. These efforts have provided a foundation for the development of a coordinated Monument Natural Resources Science Plan, which is being drafted.

Managing Human Uses

NOAA, FWS, and the State of Hawai‘i have played a major role in organizing research expeditions that serve dual purposes of collecting necessary baseline data and information for management combined with media coverage to introduce the region’s resources to the general public. Multi-agency educational programs include outreach for the 2002 and 2004 NOWRAMPs, the “Navigating Change” program, and “Hawai‘i’s Living Reef” program. A five-part video, educational curriculum, and teleconferences with the traditional Polynesian voyaging canoe Hōkūle‘a during its 2004 expedition to the NWHI were completed in partnership with several agencies and organizations. Teacher workshops on the “Navigating Change” program have been held since 2003 across Hawai‘i, and an outreach coordinator has been hired to launch the curriculum in schools statewide. The Co-Trustees and other partners also created and facilitated a number of education-at-sea initiatives and developed new standard-based curriculum on the NWHI now being introduced to Hawai‘i’s fourth and fifth grade teachers. In addition to educational programs, the MMB currently develops informational materials such as fact sheets and brochures for educational purposes that are able to reach those that are not participating in these programs.

NOAA also built a visitor center collocated with its Hilo office to spur greater public awareness of the region and ocean conservation issues. Mokupāpapa: Discovery Center for Hawaii’s Remote Coral Reefs was conceived and built in 2003 to interpret the natural science, culture, and history of the NWHI and surrounding marine environment. The 4,000-square-foot (372-square-meter) center brings the region to people by proxy, since most will never have the opportunity to visit it. The center has served as a physical hub of learning, regularly hosting well attended educational talks and activities, while drawing a constant stream of field trips co-organized by Monument staff and by school and community groups from around the state and beyond. To date, nearly 100,000 visitors have been exposed to the wonders of the NWHI and have developed an informed appreciation of the region’s resources and the Monument’s ongoing effort to restore and preserve them.

In conjunction with a private contractor, FWS operated Midway Atoll NWR as a combined refuge and ecotourism/historical destination between 1996 and 2002. The contractor provided the infrastructure and visitor services to operate ecological and historic preservation service projects, guided tours, diving and snorkeling trips, and sport fishing operations. In all, 12,262 people visited Midway between 1997 and 2001, with an average visitation around 200 people per month. In 2002, FWS and the contractor ended their cooperative agreement. In May 2007, FWS approved an interim visitor services program to guide a small-scale visitor program. A regularly scheduled visitor program was established in January 2008 that allows limited visitor opportunities for people to experience the wildlife and history of Midway and the Monument. Recreational activities in this interim visitor service plan include wildlife observation, photography, environmental education, and interpretation.

Remote location and hazardous environmental conditions in the NWHI have discouraged recreational activities in the past. Since the departure of the USCG from FFS, ocean recreation has been limited to offshore snorkeling by resident staff and researchers. Anecdotal reports indicate that trans-Pacific yachts may occasionally traverse the NWHI, possibly lingering at various reefs and atolls along the way.

The size, remote location, and hazardous navigational conditions of the Monument present significant enforcement challenges. The USCG has long been the primary enforcement agency conducting surface and aerial patrols in the NWHI. However, with their broad mandates and large enforcement area, the USCG has few resources to allocate to NWHI patrols. In addition to frequent aerial patrols, each year the USCG sends a buoy tender to the NWHI (Havlik 2005). USCG operations in this region cover a broad range, including search and rescue, servicing aids to navigation, response to oil and hazardous chemical spills, inspecting commercial vessels for safety and environmental regulations compliance, interdiction of illegal narcotics and migrants, and enforcement of fisheries management laws (Mathers 2005). In addition to the USCG, NOAA, the State of Hawai‘i, and FWS all have powers to enforce regulations within the Monument. These entities are expected to share resources to fulfill the common goals discussed in the MOA.

2.4.2 Human Health, Safety and Hazardous Materials

2.4.2.1 Introduction/Region of Influence

This section addresses issues related to the Proposed Action alternative that are associated with human health and safety, hazardous material management, hazardous waste management, and environmental contamination. The ROI is the marine waters within the Monument, adjacent open-ocean areas outside of the Monument, and islands within the Monument as they may affect the marine environment.

2.4.2.2 Regulatory Environment

Human safety in the work place and the management of hazardous materials and waste are already highly regulated under a number of federal and state laws. These laws are administered by various federal agencies, including the U.S. Department of Labor Occupational Health and Safety Administration (OSHA), the U.S. Department of Transportation (DOT), the U.S.

Environmental Protection Agency (EPA), the State Department of Labor and Industrial Relations, and the State Department of Health.

Hazardous and toxic substances are defined as those workplace chemicals that are capable of causing harm. In this definition, the term "chemicals" includes dusts, mixtures, and common materials, such as paints, fuels, and solvents. A hazardous chemical, as defined by the Hazard Communication Standard, is any chemical that can cause a health hazard. This determination is made by the chemical manufacturer, as described in 29 CFR 1910.1200(d).

Hazardous material is defined by the DOT as a substance or material that is capable of posing an unreasonable risk to health and safety or property when transported in commerce and has been designated as hazardous under the federal Hazardous Materials Transportation Law (49 USC 5103). The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table, 49 CFR Part 172.101, and materials that meet the defining criteria for hazard classes and divisions in 49 CFR 173. The Resource Conservation and Recovery Act (RCRA) specifically defines a hazardous waste as a solid waste (or combination of wastes) that, due to its quantity, concentration, physical, chemical, or infectious characteristics, can cause or significantly contribute to an increase in mortality. RCRA further defines a hazardous waste as one that can increase serious, irreversible, or incapacitating reversible illness or pose a hazard to human health or the environment when improperly treated, stored, disposed of, or otherwise managed. A solid waste is a hazardous waste if it is listed in 40 CFR 261 as a hazardous waste or if it exhibits any ignitable, corrosive, reactive, or toxic characteristics, as defined in 40 CFR 261.

Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, on December 11, 1980, and the Superfund Amendments and Reauthorization Act (SARA) amended CERCLA on October 17, 1986. Superfund is the federal government's program to clean up the nation's uncontrolled hazardous waste sites.

In addition, Monument regulations specifically prohibit some activities, such as exploration for oil, gas, or minerals and use of poisons or explosives to collect or harvest Monument resources, that could affect human safety or result in the release hazardous materials or wastes into the environment (50 CFR 404.6). Monument regulations require a permit for all access to and activities conducted in the Monument. All vessels operating in the Monument must possess VMS. VMS enables law enforcement to monitor and identify unauthorized entry of vessels to the Monument and to respond quickly to emergencies involving human safety or hazardous material release.

Emergency response in the NWHI is coordinated under a series of plans and systems, including the National Response Plan and the National Incident Management System. The National Response Plan establishes a comprehensive all-hazards approach to enhance the ability of the United States to manage domestic incidents, including oil and hazardous chemical spills. This plan incorporates the National Contingency Plan and its regulations governing how pollution response is conducted by the USCG, EPA, the affected state, and resource trustees, including NOAA and FWS. The NWHI are also covered by a more specific Area Contingency Plan for the Hawaiian Islands.

FWS and NOAA have designated representatives who are federal members of the Regional Response Team, which makes response recommendations to the Federal On-Scene Coordinator. The Hawai‘i Department of Land and Natural Resources and the Hawai‘i Department of Health are the designated state representatives for all marine injury events. The Department of Health is the State On-Scene Coordinator. These representatives work closely with all parts of FWS, NOAA, the state, and the MMB in making recommendations on the use of alternative response technologies, such as dispersants. Unlike the state, NOAA and the Department of the Interior can only make consultative recommendations; they do not have a formal vote in that process.

While the Monument and state regulations regulate access, they also provide a general exemption for activities necessary to respond to emergencies. The general exemption for emergencies allows for individuals responding to emergencies threatening life, property, or the environment to conduct necessary activities without the need for a permit. The general exemption only applies to the emergency response activity itself and does not apply to ancillary activities such as training for emergency response, salvage operations, remediation, or restoration. These ancillary actions also require timely response and would be covered under the appropriate agency’s conservation and management permit.

2.4.2.3 Resources Overview

This section provides an overview of the human health and safety in marine and land areas within the region of influence.

Activities within Marine Areas in and adjacent to the Monument

Diving Safety
Self-Contained Underwater Breathing Apparatus (SCUBA) diving for research and management activities is routinely conducted in the Monument. Co-trustee agencies and other partner organizations have diving requirements specific to that agency; however, these requirements are aligned through reciprocity agreements. The Monument supports coordinated dive operations through such agreements.

Hazardous Material and Hazardous Waste Management
All hazardous material and hazardous waste management activities within the marine areas of the Monument are on marine vessels. With the prohibition of commercial bottomfishing in the Monument, research vessels and vessels used in restoration activities, such as the removal of marine debris, make up the predominant vessel activity. In addition, no more than three cruise ships per year are permitted entry to the Midway Atoll Special Management Area. The controlled environment onboard these vessels allows for proper containment of chemical substances. In a shipboard environment there are numerous engineering and management controls that prevent hazardous chemicals or materials from contaminating crew, passengers, and the environment. Any hazardous waste generated aboard a marine vessel, such as mercury-containing light bulbs, waste paint, dry cleaning and photo-processing operations, batteries, or solvents, is required by RCRA to offload hazardous waste to land-based treatment or disposal facilities (NOAA 2004a). Monument regulations and permit conditions provide additional safeguards on hazardous material and waste management including requirement for VMS and reporting all incidents.

Environmental Contamination

Maritime accidents are the only known major source of environmental contamination within the waters of the Monument. The first known Western shipwrecks in the NWHI occurred in 1822. Since then, many more known and unidentified marine vessels have been lost in the NWHI. A maritime cultural survey conducted by NOAA in 2002 lists over 50 shipwreck sites (NOAA 2002). At least five of these ships were lost within the past 25 years.

The three most notable recent wrecks in the NWHI are the Swordman I, the Paradise Queen II, and the Casitas. The 85-foot-long (26-meter-long) line fishing vessel Swordman I, carrying more than 6,000 gallons (22,712 liters) of diesel fuel and hydraulic oil, ran aground at Pearl and Hermes Atoll in 2000. In October 1998, the Paradise Queen II ran aground off Kure Atoll after catching 3,000 pounds (1,360 kilograms) of lobster. The boat was carrying about 11,500 gallons (43,530 liters) of diesel fuel and oil, over a thousand plastic lobster traps with lead weights, 11 mi (9.5 nm; 18 km) of fishing line, and an assortment of boating equipment (Parks 2004). The 145-foot ship Casitas ran aground on the northern side of Pearl and Hermes Atoll on July 2, 2005 with more than 33,000 gallons (124,900 liters) of diesel fuel on board (TenBruggencate 2005a). Very little data are available on the extent or effects of contamination from shipwrecks in the NWHI. However, iron that erodes from ships acts as a nutrient in marine waters, causing localized growth of "blue-green algae (cyanobacteria) and invasive soft corals that can smother reefs and surrounding wrecks.

Activities in Land Areas within the Monument

Hazardous Material and Hazardous Waste Management

Most of the hazardous materials and hazardous wastes in the Monument are at FWS facilities within the Midway Atoll Special Management Area. Facilities at Midway are maintained and operated by a FWS contractor, Chugach Industries. Facilities and infrastructure at Midway are similar to any small city or town. A variety of hazardous materials are used to maintain and operate the facilities and infrastructure at Midway Atoll. Material safety data sheets and a hazardous material inventory are kept at each location where hazardous materials are stored, in compliance with OSHA hazardous communication requirements (Christenson 2005). All hazardous waste generated by Chugach Industries at Midway is shipped by an EPA-approved transporter to an EPA-approved disposal or treatment facility. Chugach Industries manages the airfield, wastewater treatment facility, electrical power plant, potable water storage and delivery system, harbor, housing areas, dining facilities, and the fuel farm, with a capacity of 450,000 gallons. Chugach Industries manages spill prevention, control, and countermeasures plan and an aboveground storage tanks monitoring program for the fuel farm, as required by the EPA (Christenson 2005).

The maintenance of the smaller FWS facility at FFS and the DLNR facility at Kure Atoll requires some hazardous material and generates small amounts of hazardous waste. Both FWS and DLNR have an environmental compliance program and properly transport hazardous waste to the main Hawaiian Islands, in compliance with hazardous material and hazardous waste regulations (Horvath 2005; Smith 2005). The other islands have seasonal camps that require very little hazardous materials, and all wastes are shipped back to Honolulu at the end of each season.

Environmental Contamination

Building Materials

Green Island at Kure Atoll and Tern and East Islands at FFS have former USCG stations and associated PCB contamination. Pearl and Hermes Atoll served as a refueling site for seaplanes. Midway Atoll bears the most contamination of any of the NWHI, most of which is associated with previous military activities. Several buildings on Sand Island contain hazardous materials such as lead-based paint, arsenic-treated wood, or asbestos. These toxic materials pose potential health and safety concerns for humans and wildlife. Lead-based paint flakes are ingested by albatross chicks, causing growth deformities and mortality. Some of the other islands had guano mining operations on them during the late 1800s, but no known contamination was left behind.

At Midway Atoll, the Navy excavated and treated 1,390 cubic yards of PCB-contaminated soils were excavated from five sites (U.S. Navy 1998). Long-term monitoring revealed PCB contamination leaking from the landfill and around a beached tug and barge, which have been removed along with the surrounding soil (U.S. Navy 2001a, 2001b).

During Navy base closure, 111 buildings and other structures were demolished. Large amounts of metal debris were removed from shorelines and other wildlife habitats, and deteriorating asbestos materials and lead-based paint were removed from dozens of structures. Hundreds of batteries, compressed gas cylinders, and other metal debris were removed from nearshore waters (U.S. Fish and Wildlife Service 2005b).

A USCG LORAN station operated on East Island, FFS, from 1944 to 1952. LORAN is a terrestrial-based navigation system using low-frequency radio transmitters. Before the popularity of satellite-based global positioning system, LORAN was a widely used marine navigation system. Cleanup activities at the USCG station took place in 1965 and 1973. The USCG initiated a geophysical investigation of the island in 1998, looking for possible landfills. Based on the anomalies recorded, 23 five-foot-deep pits were dug. No contamination requiring cleanup was found (Silberman 2005). A USCG LORAN station operated on Tern Island, FFS, from 1952 until 1979, when it was turned over to FWS. The USCG removed part of the landfill containing high levels of PCB-contaminated soil in October 2001 (Silberman 2005). The remaining portion of the dump contains PCB-contaminated soil that is tidally washed and visited by turtles, seals, and migratory birds.

Storage Tanks

At Midway Atoll, the Navy removed 132 underground and aboveground storage tanks, some as large as 2.2 million gallons (8.327 million liters). Several miles of petroleum pipeline was drained and removed, and 10,657 cubic yards (8,438 cubic meters) of petroleum-contaminated soils were excavated and treated. Ninety thousand gallons (340,650 liters) of petroleum product were extracted from the groundwater (U.S. Fish and Wildlife Service 2005b). In addition, beach erosion exposed two underground storage tanks on Eastern Island, both of which have been removed (USDOD 2003).

In early February 2003, monitoring results from an aboveground storage tank indicated a release of approximately 100,000 gallons (378,500 liters) of JP-5 aviation fuel on Sand Island. This release did not come in contact with the marine environment and caused no effect to wildlife.

The cause of the leak was identified as corrosion failure of fittings on a fuel delivery line. Dozens of test pits were dug to define the limits of the release. Recovery trenches and recovery and monitoring wells were then put in place. An automated product recovery system was installed to automate and enhance recovery. From January 20-27, 2005 the WS and its contractor deactivated the fuel recovery system following recovery of 80,000 gallons of fuel. A Remedial Investigation Report was submitted documenting that additional remediation was not necessary. All but eight wells were removed or abandoned in place. The remaining eight wells were cut off six inches below the surface and fitted with surface-mounted well boxes. These were then designated as monitoring wells. Based on the high costs of off-site disposal of both fuel and recovered product, soils were remediated by aerobic biodegradation in an aboveground soil farm, and recovered fuel was used for cogeneration to burn other wastes at the island in a customized incinerator. All recovered fuels were disposed of in this manner by early 2007 (Ragain 2004; Christenson 2008) (Jan. 25, 2005 Project Close-Out Activities Report, Geo Engineers).

Pesticides

With the exception of an uncontrolled release of insecticide at Laysan Island, the other islands and atolls have not been significantly contaminated by insecticides. In 1988, biologists first detected unexplained mortality of carrion flies and ghost crabs at a beach crest site on Laysan Island. These scavengers were coming in to feed on dead albatross chicks, commonly seen in summer months at Laysan. Upon entering the area later referred to as the "Dead Zone," they would abruptly die. The cause was finally identified by FWS as the pesticide Carbofuran, and the area was cleaned by removing and treating on-site contaminated sand. In 2001, insecticide-contaminated soil was removed from Laysan Island and transported to the mainland for disposal. FWS suspects that the release resulted from an abandoned container, which washed ashore and deteriorated, releasing its contents (Woodward 2005).

During Navy closure at Midway Atoll, 1,578 cubic yards of DDT-, DDE-, and DDD-contaminated soil were excavated from six sites (U.S. Navy 1998).

Landfills

'No Dig' areas are Land Use Controls (LUCs) remaining from the closure of the Navy base. These areas had soil contamination removed to a depth of 4 feet and backfilled with clean soil. The remaining control is that no digging may occur below 4 feet, or the Service assumes all responsibility. Additionally, Midway has several landfills left behind by the Navy. Some of these landfills were created during base closure for the disposal of construction rubble and asbestos. Other landfills were created during Navy occupancy for disposal of materials associated with operations. Two active landfills at Midway Atoll were investigated, capped, and closed (U.S. Fish and Wildlife Service 2005b).

There are 'No Dig' areas on both Sand Island and Eastern Island. One area on Sand Island that needs continued monitoring and potentially further remediation is known as the Old Bulky Waste Landfill. This site is an uncharacterized landfill that was created by the disposal of scrap metal, used equipment, and unconsolidated waste off the south shore of Sand Island to create a peninsula approximately 1,200 feet long by 450 feet (average) wide by 9 feet high (Navy 1995). It is surrounded on the three seaward sides by an approximately 10-foot-thick band of concrete and stone rip-rap. Wastes known to have been deposited in the landfill are metals (lead,

cadmium, chromium, and nickel), gasoline, battery acid, batteries, mercury, lead-based paint, solvents, waste oil (including burning of petroleum, oil, and lubricants), PCBs, dioxins, furans, transmission and brake fluids, vehicles, equipment, tires, and miscellaneous debris (BRAC SI 1996 Volume 1). The landfill was covered in approximately 2 to 2.5 feet of soil in an attempt to contain the waste. The Old Bulky Waste Landfill is eroding, and the soil placed on top is sifting into the debris, causing large holes to open up around the edge and in the center of the landfill. Additionally, burrowing birds are bringing up buried soil and nesting below the cover.

The USCG Kure Atoll LORAN station landfill, on Green Island, was used to dispose of old electrical components and scrap metal during the USCG's 33-year tenure, which ended in 1993. The landfill was cleaned out as part of the station closure process. The USCG remediated the landfill on Kure in 1994. The USCG excavated and put into containers soil from the landfill that exhibited a concentration equal to or greater than 25 mg/kg PCB. A total of 36 cubic yards of soil were removed from the landfill. This soil, along with six 95-gallon overpack drums of corroded capacitors, was transported off-island for disposal at the TSCA-permitted U.S. Ecology Facility at Beatty, Nevada. Scrap metal, cable, non-liquid-containing drums, and the remaining soil in the landfill that contained debris were removed from the landfill and reinterred in a reburial pit (USCG 1994b). The depth of the reburial pit was set 15 feet bgs, which was 2 feet above the groundwater. All metal debris and soils with concentrations below 25 mg/kg PCB were placed in the reburial pit, which was then graded to a minimum depth of 5 feet bgs, covered with a nonwoven puncture-resistant geotextile fabric, then covered with clean soil from 5 feet bgs to original grade (USCG 1994b). The clean up level at Tern Island was 2 mg/kg.

Emergency Medical and Aviation Infrastructure

Monument staff have access to resources-at-risk information that is of interest during contingency planning and spill response through the Sanctuaries Hazardous Incident Emergency Logistics Database System, a web-based decision support tool commonly referred to as "SHIELDS." This tool includes regulatory information, contact lists, geographic information system (GIS) maps, environmental sensitivity indexes, information on resources at risk, and significant terrestrial and submerged historic and cultural resource and hazards data. Environmental Sensitivity Indices were last produced by NOAA for this area in 2001. Environmental Sensitivity Indices identify resources at risk on a seasonal and location basis and facilitate decisions about response options given threats to specific resources at risk.

FWS facilities at Midway Atoll serve as an emergency stop for marine vessels in distress in the mid-Pacific Ocean. The deep draft harbor at Sand Island can handle large vessels, and Henderson Airfield at Midway has the only runway that can handle large aircraft within a large swath of the mid-Pacific Ocean. Marine vessels periodically bring fishers and researchers with medical emergencies to Midway. FWS maintains emergency medical supplies, and an on-island medic can treat patients with emergency problems before the USCG transports them to Honolulu for treatment (Honolulu Advertiser 2003; Associated Press 2004).

Henderson Airfield is an FAA Part139-certified airport and is an important emergency landing site for aircraft en route from the west coast of North America to East Asia. Extended twin-engine aircraft operations (ETOPS) over the mid-Pacific Ocean use routes that keep them close enough to an FAA Part139-certified airport to meet FAA requirements for alternate landing sites.

According to the FAA Advisory Circular 120-42A on ETOPS, "These suitable en route alternates serve a different purpose than the destination alternate airport and would normally be used only in the event of an engine failure or loss of primary airplane systems."

Though the focus of en route alternate airports is primarily for twin-engine aircraft, these airports are important for the safety of all long-range operations regardless of the number of engines. Alternate airports support unscheduled landings from such emergencies as cargo fire, decompression, fuel leak, passenger illness, or severe turbulence. On several occasions, aircraft on non-ETOPS routes have diverted to various islands in the Pacific, namely Adak, Midway, Shemya, and Wake. Reasons for these diversions included passenger or crew medical emergency, an unanticipated headwind requiring additional fuel, and an engine fire warning (Boeing Company 1998). As recently as January 2004, a commercial passenger jet used Henderson Field for an emergency landing after suffering oil pressure drop in one engine (Honolulu Advertiser 2004).

2.4.3 Land Use

2.4.3.1 Introduction/Region of Influence

This section addresses issues related to the Proposed Action alternative that are associated with land use. The ROI for land use includes all lands within the Monument. This section of the DEA also fulfills the resource assessment requirements of 16 USC 1434(a)(2)(B) by documenting present and potential uses of the area.

2.4.3.2 Regulatory Environment

Federal Regulations

Monument regulations promulgated in 50 CFR 404 primarily relate to prohibiting or regulating human uses within the Monument to ensure the protection of Monument resources. Section 404.4 addresses how access will be granted into the Monument and requires notification prior to entering and after departing. All U.S.vessels passing through the Monument without interruption will be required to provide notification at least 72 hours before entering and within 12 hours of leaving the Monument and must include intended and actual routes through the Monument and general categories of any hazardous cargo on board. Section 404.5 describes the VMS requirements for all vessels operating in or transiting through the Monument. Section 404.6 lists all prohibited activities within the Monument. Prohibited activities include exploring for oil, gas, or minerals or using poison or explosives. Section 404.7 describes all regulated activities that are prohibited unless specifically allowed by one of the Monument-issued permits. Sections 404.8 and 404.9 provide exemptions from prohibited activities for emergency response and law enforcement activities (404.8) and armed forces actions (404.9). Section 404.11 describes the six permit types issued to access and conduct activities otherwise prohibited by Monument regulations. These permit types are 1) research, 2) education, 3) conservation, 4) Native Hawaiian practices, 5) special ocean uses, and 6) recreational activities. Specific requirements for issuance of Native Hawaiian practices, special ocean uses, and recreational activities are included in the regulations. Section 404.12 ensures that these regulations will be carried out in accordance with international law.

In addition to Monument-specific regulations, FWS has regulations specific to Midway Atoll NWR (50 CFR 38), special conditions for cruise ship visits to Midway, and permitting requirements for both Midway Atoll and Hawaiian Islands NWRs under 50 CFR 13, 18, and 25.

State Regulations, Policies, and Programs

The DLNR has stewardship responsibility for managing, administering, and exercising control over the coastal and submerged lands, ocean waters, and marine resources under state jurisdiction around each of the NWHI under Title 12, Chapter 171.3 Hawai‘i Revised Statutes. The state is the lead agency for managing the emergent lands at Kure Atoll, a state wildlife sanctuary. DLNR’s Division of Conservation and Resources Enforcement (DOCARE) maintains full police powers, including power of arrest, within all lands and waters within the state’s jurisdiction. In 2005, the DLNR’s Division of Aquatic Resources established the NWHI State Marine Refuge (0-3 nm [3.5 mi, 5.5 km] around all emergent lands, except Midway Atoll) through Hawai‘i Administrative Rule, Chapter 13-60.5. Unless otherwise authorized by law, it is unlawful for any person to enter the refuge without a permit except for freedom of navigation, passage without interruption, interstate commerce, and activities related to national defense, enforcement, or foreign affairs and in response to emergencies.

The state currently holds the submerged and ceded lands of the NWHI in trust. This trust is overseen by the Office of Hawaiian Affairs (OHA), which was established in 1978 as a public trust by an amendment to the Hawai‘i State Constitution, Article XII, Section 5. The amendment further stated that OHA “…shall hold title to all the real and personal property now or hereafter set aside or conveyed to it which shall be held in trust for Native Hawaiians.”

The Hawai‘i Coastal Zone Management Program (HCZMP) was promulgated in 1977 in response to the federal CZMA. The coastal zone area encompasses the entire state, including all marine waters seaward to the extent of the 14-mi (12-nm, 22-km) territorial sea and all archipelagic waters. The HCZMP is charged with protecting waters within the coastal zone and includes a permit system to control development within a coastal zone and a shoreline setback area, which serves as a buffer against coastal hazards and erosion and protects views. The CZMA requires direct federal activities and development projects to be consistent with approved state coastal programs to the maximum extent practicable.

In compliance with the federal Coastal Zone Act Reauthorization Amendments of 1990, the State of Hawai‘i prepared the Hawai‘i Coastal Nonpoint Pollution Control Program in 1996, the year that NOAA and EPA approved the program. In July 2000, the state completed an implementation plan for polluted runoff control, which established long-term and short-term goals and activities to control nonpoint source pollution, as required for implementing the Coastal Nonpoint Pollution Control Program. It also established five-year implementation plans to address polluted runoff in six categories: agriculture, forestry, urban, marinas and recreational boating, hydromodification, and wetlands and riparian areas. The nonpoint source pollution control programs are intended to be consistent with the Native Hawaiian approach to resource management.

The State Department of Health has regulatory oversight for maintaining high standards of water quality throughout the NWHI, which is classified as Class AA waters, via the Clean Water

Branch. In addition, the Department of Health's Hazard Evaluation and Emergency Response Office is the on-scene coordinator for all responses to hazardous material, chemical, and oil spill response.

2.4.3.3 Resources Overview

Current Land Use

Land use in the Monument has been minimal throughout history, although some areas, such as Midway Atoll and the FFS, were used during World War II and after for military training and exercise grounds. Most of the islets and reef formations of the Monument have small land areas and do not offer much area for development or human use. Under the Proposed Action alternative, the ROI would require permits for visiting the islands and reefs.

Kure Atoll
Kure Atoll is an oval-shaped atoll located at the farthest northwestern end of the NWHI chain. Green Island is the only permanent island within the atoll. During World War II, several military bases were built on Green Island, and in 1960 the USCG built and operated a LORAN C Station with two 518-foot-high (158-meter-high) masts and 20 personnel. The station was abandoned in 1989. Today all structures but two have been removed, and the airstrip is closed. Today up to six seasonal staff work on Kure Atoll.

Midway Atoll
In 1996 the remaining Naval base on Midway Atoll was turned over to FWS to be managed as Midway Atoll National Wildlife Refuge. Today, full-time NWR staff administer a small visitors program, care for wildlife, restore native plant life, and protect historic resources. Those historic resources that remain on Midway Atoll are protected under the Midway Atoll Historic Preservation Plan, approved in 1999, that focuses on long-term management and treatment for the 63 historic properties. The airstrip on Midway Atoll is still active and averages about 45 flights per year. The USCG also uses Midway as a refueling stop. Today approximately 65 people reside on Midway year round. Additionally, Midway Atoll accommodates up to 40 overnight visitors at any one time.

Pearl and Hermes Atoll
The low islets of Pearl and Hermes Atoll are exposed to occasional overwashing by high seas. Resource managers occupy a seasonal field camp at the atoll.

Lisianski Island
Lisianski is a small island; its highest point is a sand dune that rises 40 feet above sea level and is relatively undisturbed. Resource managers occupy a seasonal field camp on the island.

Laysan Island
Laysan Island was used by guano traders and feather harvesters in the late 1800s and early 1900s but these activities were stopped after President Theodore Roosevelt declared the Hawaiian Islands Reservation in 1909. A year-round field camp of three to six people supporting ecological restoration work has been maintained at Laysan Island since 1992.

French Frigate Shoals
The FFS is an open atoll with several small, sandy islets. One of the small islands, Tern Island, was formed into a 42-acre airstrip in 1942 to serve as a refueling stop for planes going to Midway Atoll during World War II. Today, the original seawall, runway, and some buildings remain. The FFS average about 27 charter flights per year on the existing runway. FWS maintains a field station that is staffed by two permanent year-round employees and some volunteers.

Mokumanamana (Necker Island)
The Tanager Expedition came to Mokumanamana, also known as Necker Island, in 1923 for biological and cultural research. There is significant evidence of human habitation on Mokumanamana, with 52 archaeological sites. Mokumanamana is visited occasionally on day trips for wildlife monitoring, Native Hawaiian practices, and cultural research.

Nihoa Island
Native Hawaiians are thought to have used Nihoa Island between AD 1000 and AD 1700, as over 88 archaeological sites have been found on the island. The Tanager Expedition stopped at Nihoa, in addition to Mokumanamana, for biological and cultural research. Occasionally, short-term field camps are established for wildlife monitoring and invasive species management.

2.4.4 Economics

2.4.4.1 Introduction/Region of Influence

The state of Hawai‘i forms the economic ROI and defines the geographic area in which the predominant economic and social effects from the Proposed Action alternative are likely to take place. The geographic area of the ROI was defined based on the home location of individuals directly affected by research, management, recreation, education, and cultural activities or other activities in the Monument.

The baseline year for the effects analysis is 2005, except for fishing, which is 2011; however, most of the economic and demographic data for the ROI are available only through 2003. Wherever possible, the most recent data available are presented so that the affected environment descriptions reflect current conditions in the ROI.

2.4.4.2 Regulatory Environment

2.4.5 Resources Overview

Population
The population of Hawai‘i increased by almost nine percent between 1990 and 2000 and by another 5.4 percent between 2000 and 2005 (Table 2.4-1). Among the fifty states and the District of Columbia, Hawai‘i was ranked the forty-first most populous state, as of the 2000 Census (U.S. Census Bureau 2001). By 2030, Hawai‘i’s population is projected to increase to 1.63 million people, an average rate of growth of slightly less than 1.0 percent per year between 2000 and 2030. The natural population growth—the net increase from births over deaths—has previously

Table 2.4-1
Hawai‘i Population

	1990	2000	2005 (estimated)	% Change 1990-2000	% Change 2000-2005
Hawai‘i	1,113,491	1,212,670	1,277,950	8.9	5.4

Sources: DBEDT 2004a

been the more important contributor to total population growth. However, Hawai‘i’s population is aging, and forecasts project that in-migration will provide the larger share of population growth over the next 25 years (DBEDT 2004a).

Employment and Industry

State Overview. Total earnings by industry for Hawai‘i was about $30 billion (BEA 2005). The state has a civilian labor force of almost 626,000 people (Table 2.4-2). The state’s civilian labor force and number of persons employed has increased between 1990 and 2005. The unemployment rate is at a low 2.7 percent, compared to the national unemployment rate of 5.4 percent (BLS 2005). Total civilian employment in Hawai‘i is expected to increase to 725,850 by 2030, an annual growth rate of 0.8 percent (DBEDT 2004a).

Table 2.4-2
Hawai‘i Labor Market Information

Year	Civilian Labor Force	Employment	Unemployment	Unemployment Rate
1990	550,300	534,300	16,000	2.9
2000	604,000	578,200	25,800	4.3
2005	625,950	608,900	17,050	2.7

Source: HIWI 2005
Note: 2005 data as of February 2005.

The State of Hawai‘i calculated employment and industry forecasts by major industry for 2005. Table 2.4-3 presents the distribution of employment among the various industry sectors and the changes projected in these sectors between 2003 and 2005. Education and health services, trade, leisure and hospitality, professional and business services, and the government sector will employ the greatest number of workers in 2005. Between 2003 and 2005, construction and mining, professional and business services, educational and health services, leisure and hospitality, and trade, transportation, and utilities will account for 92 percent of the job growth over the two-year period. Educational and health services and trade, transportation, and utilities will be the major contributors in job expansion, adding nearly half of the employment growth. Construction is projected to have the largest percentage of growth of all industries. Employment losses are expected in information and in agriculture, forestry, and fishing (HIWI 2004).

Table 2.4-3
Hawai‘i Industry Employment and Growth Rates, 2003–2005

Industry	2003	2005	Change in Employment	Average Annual Growth Rate
Agriculture, forestry, and fishing	7,460	7,350	-110	-0.7%
Construction and mining	27,780	29,390	1,610	2.9%
Manufacturing	14,840	14,950	120	0.4%
Trade, transportation, and utilities	109,300	113,200	3,890	1.8%
Trade	79,940	82,830	2,890	1.8%
Wholesale	16,680	17,120	440	1.2%
Retail	63,260	65,710	2,450	1.9%
Transportation	26,660	27,650	990	1.9%
Utilities	2,700	2,720	20	0.4%
Information	11,070	10,630	-450	-2.0%
Financial activities	28,210	28,750	540	1.0%
Professional and business services	69,010	71,700	2,690	1.9%
Educational and health services	109,650	114,070	4,420	2.0%
Leisure and hospitality	98,870	101,250	2,380	1.2%
Other services	23,140	23,490	360	0.8%
Government	67,900	68,730	840	0.6%
Federal	28,700	29,090	390	0.7%
State	22,290	22,690	400	0.9%
Local	16,900	16,960	60	0.2%
Total employment	567,230	583,510	16,290	1.4%

Source: HIWI 2004
Note: Data as of the end of second quarter 2003 and 2005. Totals are rounded to the nearest ten. Totals may not add up to 100 percent due to rounding.

Retail trade will account for nearly two-thirds of the boost in employment in the trade, transportation, and utilities industry sector, with several shopping centers undergoing renovations and upgrades and the opening of big-box retailers (HIWI 2004).

Increasing military presence in Hawai‘i, driven by national counterterrorism efforts, will add to the demand for jobs in the construction industry. In addition, the relocation of the Army’s Stryker Brigade to Hawai‘i has created a need for construction projects such as residential housing, which will bring further economic benefits to the industry (HIWI 2004).

Employment in the agriculture, forestry, and fishing industry is predicted to decline by 0.7 percent. This general trend is a result of the transition from large-scale plantation crops to smaller crops in diversified farming (HIWI 2004).

Hawai‘i industry employment and growth rate projections through 2012 predict that construction, professional and business services, and education and health services sectors will continue to expand and will have the largest percentage increases of the state’s total employment growth. The agriculture, forestry, and fishing industry sector is projected to decline by 0.2 percent between 2002 and 2012, losing 180 jobs (DLIR 2005). The agriculture, forestry, and fishing industry employs the smallest share of the state’s workforce at 1.3 percent.

Research and Management in the Monument. Research and management activities in the Monument include assessment and long-term monitoring of resources, genetic and ecological research, restoration activities such as marine debris removal, endangered species protection, enforcement, and other conservation activities. An estimated $7.5 million is spent annually in research and management of the Monument. All access to the Monument is regulated through permits issued by the Monument Management Board.

Commercial Fishing in the Monument. Commercial bottomfishing in the Monument is prohibited after June 15, 2011. Until that date, Monument regulations establish total landings for the eight permitted fishermen at 350,000 pounds of bottomfish and 180,000 pounds of pelagic species. The NWHI commercial bottomfishing industry has on average landed approximately 300,000 pounds of bottomfish each year, with an ex-vessel value of about $1 million (WPFMC 2004a). Twenty people are directly employed in the NWHI commercial bottomfish fishery. Four of the bottomfish operations are on O‘ahu, two are on Kaua‘i, one is on Maui, and one is on the island of Hawai‘i. No other commercial fishing is allowed in the Monument. Commercial fishing is not considered in the socioeconomic baseline for the Monument, as it has already been prohibited by Monument regulations.

Tourism Industry in Hawai‘i. Ocean tourism and recreation in the Monument are regulated under special ocean use and recreational permits. Due to the remote location of the Monument, few ocean tourism and recreational activities have occurred in the NWHI. FWS permitted a cooperator to operate an ecotourism operation based on Midway Atoll from 1996 to 2002, drawing approximately 250 sportfishers and divers to the refuge each year. FWS has completed a tourism feasibility study and a visitor’s services plan for Midway, which will guide future decisions on these types of activities in the area. Tourist and recreational opportunities on the eight main Hawaiian islands, in particular O‘ahu, Maui, Hawai‘i, and Kaua‘i, are abundant and satisfy the demand for tourism and recreation activity. Almost 6.4 million people visited the main Hawaiian Islands in 2003, spending more than $10 billion (DBEDT 2004b).

Income

Total personal income for the state was about $37 billion in 2002. The average annual personal income growth rate was 7.5 percent from 1969 through 2002, just below the national average growth rate of 7.7 percent. The per capita personal income for Hawai‘i was $29,875 in 2002, slightly below the national per capita personal income of $30,906 (BEA 2004).

Hawai‘i’s median annual family income was $67,564 as of 2002, thirteenth among the fifty states and the District of Columbia. The cost of living in Hawai‘i for a family of four has been estimated to be about 25 percent higher than the United States average for a comparable standard of living (DBEDT 2004b).

2.5 OTHER FACTORS

2.5.1 Water Quality

2.5.1.1 Introduction/Region of Influence

This section addresses issues related to the Proposed Action alternative that are associated with the water quality of marine and terrestrial waters and water resources. Due to the continuous mixing of water masses within the marine environment, the ROI for water quality includes Monument waters. Additionally, the ROI for water quality includes the terrestrial waters and water resources of the NWHI. This section also identifies threats to water quality in the affected environment.

2.5.1.2 Regulatory Environment

Federal Regulations

The regulations promulgated in 50 CFR 404 during the establishment of the Monument include numerous specific regulations aimed at the protection of water quality. In addition to monitoring vessel traffic through the issuance of permits, all U.S. vessels passing through the Monument without interruption will be required to provide notification at least 72 hours before entering and within 12 hours of leaving the Monument and include intended and actual route through the Monument and general categories of any hazardous cargo on board. In addition, prohibited activities, including exploring for oil, gas, or minerals or using poison or explosives, specifically protect the water quality of the Monument. Regulated activities, including discharging or depositing material into Monument waters, are designed to minimize the effect of vessel activity on water quality.

In addition, general federal regulations relevant to marine water quality include the following:

- Federal Water Pollution Control Act, commonly known as the Clean Water Act (CWA), as amended (33 USC 1251-1382);
- Marine Protection, Research, and Sanctuaries Act (MPRSA), also known as the Ocean Dumping Act, as amended (33 USC 1401-1421, 1441-1445, and 2801-2805 and 16 USC 1447-1447f);
- Oil Pollution Control Act (OPA 90), as amended (33 USC 2701-2761);
- Act to Prevent Pollution from Ships (APPS) (33 USC 1901-1912);
- Coastal Zone Management Act of 1972, as amended (16 USC 1451-1465);
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended (42 USC 9601-9675);
- Resource Conservation and Recovery Act (RCRA), as amended (42 USC 6901-6992k);
- Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 USC 4701-4728);

- National Wildlife Refuge System Administration Act of 1966, as amended (16 USC 668dd-668ee); and
- Toxic Substances Control Act of 1976, as amended (15 USC 2601-2692).

Congress passed the Federal Water Pollution Control Act in 1972, and amended it with the Clean Water Act in 1977. Under CWA Section 402, anyone discharging a pollutant from a point source to the navigable waters of the U.S. must obtain a National Pollutant Discharge Elimination System permit, which requires compliance with technology- and water quality-based treatment standards. The State of Hawai‘i has been delegated authority over discharges to state waters (HAR 11-55).

Under CWA Section 403, any discharge to the territorial seas or beyond also must comply with the Ocean Discharge Criteria established under CWA Section 403. CWA Section 312 contains regulations protecting human health and the aquatic environment from disease-causing microorganisms that may be present in sewage discharged from vessels. A marine sanitation device (MSD) on board a vessel is designed to receive, retain, treat, control, or discharge sewage. Pursuant to Section 312 of the CWA, all recreational boats with installed toilet facilities must have an operable MSD on board (33 USC § 1322). Vessels 65 feet (20 meters) and under may use a Type I, II, or III MSD. Operators of vessels over that length must install a Type II or III MSD. The USCG must certify all installed MSDs.

The MPRSA regulates the dumping of wastes into marine waters and is the primary federal environmental statute governing transportation of dredged material for disposal into ocean waters. CWA Section 404 governs the discharge of dredged or fill material into waters of the U.S.. In 1983, a global ban on dumping radioactive wastes was implemented. The MPRSA and the CWA regulate materials that are disposed of in the marine environment, and only sediments determined to be nontoxic by US Environmental Protection Agency (EPA) standards may be disposed of in the marine environment. The EPA and the U.S. Army Corps of Engineers share responsibility for managing the disposal of dredged materials.

The Oil Pollution Control Act of 1990 requires extensive planning for oil spills from tank vessels and onshore and offshore facilities and places strict liability on parties responsible for oil spills.

The discharge of solid wastes is regulated under the CWA and the APPS, as amended by the Marine Plastic Pollution Research and Control Act of 1987. The APPS regulates the disposal of plastics and garbage for the U.S. Annex V of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78). Under these regulations, disposing of plastics is prohibited in all waters.

The CZMA provides incentives for coastal states to develop and implement coastal area management programs. It is significant with regard to water pollution abatement, particularly concerning nonpoint source pollution. In 1990, Congress enacted the Coastal Zone Act Reauthorization Amendments by adding Section 6217, entitled Protecting Coastal Waters. It requires that states with coastal zone management programs develop and implement coastal nonpoint pollution control programs. Section 6217 requires states to submit a coastal nonpoint pollution control management plan and is intended to strengthen links among federal, state, and

county coastal zone management and water quality programs. The purpose of the plan is to describe the programs and actions taken to control polluted runoff and to maintain water quality standards.

CERCLA addresses cleanup of hazardous substances and mandates liability for environmental cleanup on those who release hazardous substances into the environment. In conjunction with the CWA, it requires preparation of a National Contingency Plan for responding to oil or hazardous substances release.

RCRA addresses hazardous waste management, establishing duties and responsibilities for hazardous waste generators, transporters, handlers, and disposers. The NWRSAA and the regulations and policies developed to implement the act address the quality and quantity of water impacting management of fish and wildlife and their habitats on refuges. The TSCA was enacted by Congress to give EPA the ability to track industrial chemicals currently available, produced, or imported into the United States. EPA controls these chemicals for health and human safety.

State Regulations, Policies, and Programs

In Hawai‘i, key state regulations relevant to marine water quality are as follows:

- Water Quality Standards (Hawai‘i Administrative Rules [HAR] Chapter 11-54);
- Water Pollution Control (HAR Chapter 11-55);
- Coastal Zone Management Program;
- Point-Source Discharge Requirements; and
- Ballast Water Management (HAR Chapter 13-76.2).

The regulations governing water quality in Hawai‘i are primarily contained in Title 11, Chapter 54 of the Hawai‘i Administrative Rules (HAR Chapter 11-54), Water Quality Standards. The Clean Water Branch administers and enforces state water pollution laws and regulations that are outlined in Hawai‘i Administrative Rules Chapter 11-55. The State of Hawai‘i also has delegated authority under the CWA for any discharges into state waters through the administration of the National Pollutant Discharge Elimination System (NPDES) permits.

All waters are subject to an anti-degradation policy, which states that “Waters whose quality [is] higher than established water quality standards shall not be lowered in quality unless it has been affirmatively demonstrated to the director [of the Department of Health] that the change is justifiable as a result of important economic or social development and will not interfere with or become injurious to any assigned uses made of, or presently in, those waters” (HAR Section 11-54-01.1).

In general, all waters must be free of substances resulting from domestic, industrial, or other controllable sources of pollution. This includes sediments resulting from erosion caused by construction or agricultural activities, floating or sinkable materials, thermal pollutants, pathogens, biocides, excessive nutrients, toxic compounds, and other pollutants. All discharges

to state waters are subject to laboratory testing to determine if the discharge meets standards for acute or chronic toxicity. These standards are published in HAR Title 11, Chapter 54.

Marine waters are classified as either Class AA or Class A, based on protection of water quality (HAR 11-54). The open coastal waters around the NWHI are classified as Class AA waters (11-54-6[b][2][A][ix] and [x]). The objective of Class AA waters is that they remain as nearly as possible in their natural pristine state, while Class A waters are maintained for multiple uses, with lower water quality standards applied to them.

The water quality standards regulations also contain special classifications and standards for marine bottom ecosystems, and these areas are designated as Class I or Class II areas. All beaches, marine pools and protected coves, and reef flats and reef communities (e.g., Kure Atoll Lagoon, Pearl and Hermes Lagoon, Lisianski Island, Maro Reef, Laysan Island, and French Frigate Shoals Lagoon) in the NWHI are considered Class I areas. The objective of Class I marine bottom ecosystems is to keep them in the most pristine and natural state possible, and only nonconsumptive uses are allowed in these areas. Class II marine bottom ecosystems allow for multiple uses.

The Hawai‘i Coastal Zone Management Program (HCZMP) was promulgated in 1977 in response to the federal CZMA. The coastal zone area encompasses the entire state, including all marine waters seaward to the extent of the 14-mi (12-nm, 22-km) territorial sea and all archipelagic waters. The HCZMP is charged with protecting waters within the coastal zone and includes a permit system to control development within a coastal zone and a shoreline setback area, which serves as a buffer against coastal hazards and erosion and protects views. The CZMA requires direct federal activities and development projects to be consistent with approved state coastal programs to the maximum extent practicable.

In compliance with the federal Coastal Zone Act Reauthorization Amendments of 1990, the State of Hawai‘i prepared the Hawai‘i Coastal Nonpoint Pollution Control Program in 1996, the year that NOAA and EPA approved the program. In July 2000, the state completed an implementation plan for polluted runoff control, which established long-term and short-term goals and activities to control nonpoint source pollution, as required for implementing the Coastal Nonpoint Pollution Control Program. It also established five-year implementation plans to address polluted runoff in six categories: agriculture, forestry, urban, marinas and recreational boating, hydromodification, and wetlands and riparian areas. The nonpoint source pollution control programs are intended to be consistent with the Native Hawaiian approach to resource management (ahupua‘a).

In 2007, Chapter 76.2 Ballast Water Management was added to Hawai‘i Administrative Rules. These rules are intended to work in coordination with and complement federal regulations to prevent the introduction and spread of invasive species in Hawai‘i waters by regulating vessel ballast water. Regulations include the adoption of a ballast water management program, ballast water exchange program, reporting requirements, and compliance monitoring.

2.5.1.3 Resources Overview

Existing Water Quality Conditions

Water quality in the marine and terrestrial environments of the Monument is important to the survival of the various species of biota and the coral reef ecosystems.

Marine

The marine environment in the ROI is generally considered to be relatively pristine. This is due to the remoteness of the NWHI, the fact that most of the islets and shoals remain uninhabited, and the oceanographic conditions of the central Pacific Ocean. While there have been very few studies done on contamination in the ROI, the lack of major pollution sources and the health and productivity of the coral reef ecosystems in the area are strong evidence of the relatively unpolluted marine environment (Friedlander et al. 2005a). However, several localized areas of contamination exist along the shorelines and islands in the NWHI. This contamination includes PCBs, dioxin, PAHs, and metals. Some fish and other biota sampled in these areas have PCB levels that rivaled levels found in fish near major PCB manufacturers on the mainland.

A considerable amount of research has been done on the oceanographic conditions of the NWHI. Characteristics of the marine environment of the ROI include highly variable sea surface temperatures, both nutrient-rich and nutrient-poor waters, and seasonal high-energy waves (Friedlander et al. 2005a). Sea surface temperatures around the NWHI fluctuate greatly, particularly in the northwest end of the island chain, ranging from less than 64 °F (18 °C) in the winter to greater than 82 °F (28 °C) in the summer. Sea surface temperature also varies greatly from year to year over longer periods, including those characterized by ENSO (Friedlander et al. 2005a).

Satellite observations of the ROI indicate a significant chlorophyll front in the area, with seasonal and annual migrations (northward in the summer and southward during the winter). When these nutrient-rich waters cross through the NWHI, productivity in the coral reef ecosystems is expected to become elevated, and trophic changes in the ecosystem may occur (Friedlander et al. 2005a).

There is a pronounced annual cycle of ocean wave energy in the ROI, with over 10-foot (3.3-meter) waves occurring annually, resulting from extratropical winter storms. Most storms approach the NWHI from the northwest, shaping the assemblages of species that exist in the northwest-facing reef areas. There is also evidence of variability in cumulative wave energy and wave energy events between years and over longer periods, including Pacific Decadal Oscillation (PDO) events (Mantua et al. 1997).

However, despite the rare pristine conditions of the ROI, the area has not been completely untouched by human influences. Vessel discharges, spills, shipwrecks, marine debris, and land-based military activities have all contributed to contamination in the ROI. These sources and their effects on water quality are discussed in the Pollution Sources section below.

Terrestrial
The terrestrial environment in the ROI varies among the different islands in the Monument. The only permanent surface water in the NWHI is on Laysan Island. Laysan Island has a 173-acre (0.7square-kilometer) hypersaline interior lake. A small brackish groundwater lens exists below the surface of some of the islands (U.S. Fish and Wildlife Service 2007a [IVSP, Midway Atoll NWR]). Freshwater sources are found at Nihoa, Mokumanamana, and Laysan Islands, and Midway and Kure Atolls. Rainwater percolates through the sand rapidly. Fresh water, being slightly lighter, tends to float on salt water below the ground or is trapped by cap rock of phosphatized coral. The coral cap rock overlays the basaltic volcanic base. Historic records reveal that potable brackish water could be found 5 to 10 feet below the ground surface on several of the sandy NWHI. On the rocky islands, rain water percolates though the porous basalt until it reaches layers of dike material. Groundwater flows along the upper surface of dense materials, and fresh water seeps are found where it reaches the ground surface (U.S. Fish and Wildlife Service 1986).

Water Resources
The potable water is supplied via rainwater catchment and treatment systems on Midway, Tern, and Laysan and is imported or made from sea water using reverse osmosis at camps on other islands. See the Utilities section for further information on potable water systems.

Marine Pollution Sources

Marine Sources
Cargo vessels and research vessels transit the ROI regularly, and cruise ships, USCG ships, and recreational boats pass through the ROI occasionally. Research vessels sometimes anchor in designated areas near the shore of various islands, while recreational boaters and cruise ships occasionally visit Midway. During the course of normal operations, seagoing vessels produce a multitude of wastes, which, when disposed of into the marine environment, can affect the water quality of the Monument. Potential discharges from vessels include sewage, gray water, bilge water, hazardous wastes, and solid materials and toxic compounds. These are discussed below.

Sewage
Sewage includes vessel sewage and other wastewater. Sewage discharge may contain bacteria or viruses that cause disease in humans and in other wildlife. Chemicals and deodorants often used in MSDs include chlorine, ammonia, or formaldehyde and may also affect water quality. The CWA requires the use of MSDs for all offshore vessels 3.5 mi (3 nm, 5.5 km) or closer. Monument regulations prohibit the discharge of MSD effluent within the Special Preservation Areas (SPA) or Midway Atoll Special Management Area (SMA) but allow discharge in the rest of the Monument; dumping of raw sewage is prohibited throughout the Monument and in waters outside the Monument if the sewage would subsequently drift into Monument waters.

Type I MSDs shred and disinfect the waste prior to its discharge into the water. Type II MSDs provide an advanced form of the same type of treatment used by Type I devices and discharge wastes with lower fecal coliform counts and reduced suspended solids. Type III MSDs, commonly called holding tanks, flush sewage into a tank containing deodorizers and other chemicals. The contents of the holding tank are stored until they can be properly disposed of at a shore-side pump-out facility. Type III MSDs can be equipped with a discharge option, usually

called a Y-valve, that allows the boater to direct the sewage either into the holding tank or directly overboard.

Gray water
Gray water from vessels includes wastewater from kitchens, showers, and laundries. Pollutants in gray water include suspended solids, oil, grease, ammonia, nitrogen, phosphates, copper, lead, mercury, nickel, silver and zinc, detergents, cleaners, oil and grease, metals, pesticides, and medical and dental wastes. Monument regulations prohibit the discharge of gray water in all SPAs and the SMA.

Bilge Water
Bilge water includes fuel, oil, wastewater, other chemicals, and materials that collect at the bottom of the ship's hull with fresh water and sea water. Under the Oil Pollution Act and the CWA, vessels are prohibited from releasing any water with an oil content of greater than 15 parts per million (ppm) of oil to water within 14 mi (12 nm, 22 km) of the coastline. Beyond 14 mi, discharges with oil content greater than 100 ppm are prohibited.

Hazardous Materials
Various hazardous materials are generated during the course of vessel operations, including cleaning and photo processing chemicals, paints and solvents, batteries, and fluorescent light bulbs containing mercury. RCRA requires that vessels generating or transporting hazardous wastes offload these wastes at treatment or disposal facilities (NOAA 2003b). Release of any of these materials is prohibited within the Monument and in waters outside the Monument if these materials would subsequently drift into Monument waters.

Spill and Release Incidents
There is a persistent threat to water quality from an accidental oil spill or cargo release from a vessel within or outside of Monument boundaries. Offshore spills have the potential to severely impair water quality and sensitive nearshore ecosystems. Floating debris from vessels is also a significant threat to the resources of the Monument, and there have been a number of such incidents. The most noteworthy example was in 1987, when a container of the pesticide Carbofuran is believed to have washed ashore at Laysan Island. The pesticide killed all invertebrates and the endangered Laysan finches that came into contact with or consumed contaminated sand.

Ship and Aircraft Wrecks
The NWHI region has been a significant center of maritime activity historically and of aircraft activity during World War II. As such, a number of ships and aircraft have been wrecked in the area. There are 52 known shipwrecks, 12 of which have been located. There are also 67 known aircraft wrecks in the area, only two of which have been located. While most of the shipwrecks are sailing vessels and pose little threat to the marine water quality, more modern ship and aircraft wrecks are likely to pose a threat of petroleum contamination (Friedlander et al. 2005a).

One of the more harmful ship groundings occurred in 1998, when the Paradise Queen II, an 80-foot (24-meter) lobster fishing vessel, ran aground on a coral reef at Kure Atoll, spilling approximately 4,000 gallons (15,140 liters) of diesel fuel and other petroleum hydrocarbons into the marine environment. The remaining 7,000 gallons (26,500 liters) of fuel were recovered from

the vessel during salvage operations (Maragos and Gulko 2002). More recently, the 85-foot-long (26-meter-long) line fishing vessel Swordman I, carrying more than 10,000 gallons (37,800 liters) of diesel fuel and hydraulic oil, ran aground at Pearl and Hermes Atoll in 2000 (NOAA 2001). The 145-foot (45-meter) ship Casitas ran aground on the northern side of Pearl and Hermes Atoll on July 2, 2005, with more than 33,000 gallons (124,900 liters) of diesel fuel on board (TenBruggencate 2005a). Additionally, iron that erodes from the ships acts as a nutrient in the marine waters, often causing growths of invasive algae and soft corals that smother the reefs surrounding the wrecks.

Land-Based Sources

Early extractive activities in the NWHI occurred around the turn of the twentieth century, with guano mining at Laysan Island. Later, the islands became strategically important for the U.S., which constructed a naval base at Midway Atoll and FFS during the first half of the twentieth century. During World War II, FFS and Pearl and Hermes Atoll were used for seaplane refueling. After World War II, the USCG constructed LORAN stations at Kure Atoll and FFS. Midway Atoll's U.S. Navy Airfield, which was in operation from 1941 to 1996, is the island's most significant source of land-based marine pollution (Friedlander et al. 2005a).

Land-based pollution sources from these early developments include lead and mercury batteries, transformers, capacitors, barrels, and landfills (uncharacterized and unlined). There is suspected petroleum on FFS and Pearl and Hermes Atoll from the historic refueling operations on those islands. Kure Atoll, Midway Atoll, and FFS are known point sources for PCBs from the former LORAN stations (Friedlander et al. 2005a).

On Midway Atoll, historic contamination includes petroleum in groundwater and coastal waters, pesticides, PCBs, metals, including lead and arsenic, and unknown contaminants that continue to leak and erode from landfills. As part of the base realignment and closure process, the U.S. Navy remediated much of the historic contamination. PCBs, dichloro-diphenyl-trichloroethane/ dichloro-diphenyl-dichloroethylene- (DDT/DDE-), and petroleum-contaminated soils were excavated and treated, and petroleum-contaminated groundwater was remediated. In addition, a large number of underground and aboveground storage tanks and several miles of petroleum pipeline were drained and removed. However, despite extensive remediation efforts, several areas may warrant continued monitoring for potential releases (U.S. Fish and Wildlife Service 2005b; Friedlander et al. 2005a). In 1997, a FWS contractor installed a septic system for Sand Island and closed the Navy's sewage outfall pipe.

Some pollution studies in the NWHI have been performed in areas where conditions and historical use indicate the potential for elevated levels of contaminants (Miao 2000a, Miao 200b, Miao 2001). In addition, the U.S. Navy and USCG conducted investigations to document the scope and extent of contamination at their installations to aid in remediation efforts. Evidence of terrestrial and aquatic contamination is present in wildlife in the NWHI (PCBs, PAHs, lead, and other metals).

There are several point sources of pollution throughout the Monument. It appears that most of the negative effects of these contaminants are localized. Studies are on-going to determine upper trophic level effects of some of the persistent compounds. The remoteness of the NWHI, the low level of development on the islands, and the oceanographic conditions of the region have

ensured that the marine environment remains relatively pristine, as strongly indicated by the health of the coral reef ecosystems in the NWHI. Potentially, the most persistent and significant threat to water quality in the ROI is the vessels that transit the area. Vessel traffic presents the risk of a large oil spill or release of cargo that could greatly impair the marine water quality of the affected environment.

2.5.2 Transportation and Communication Infrastructure

2.5.2.1 Introduction/Region of Influence

The ROI for the marine transportation and communication infrastructure analysis is the area inside the Monument and open ocean areas within the U.S. EEZ, which extends 230 mi (200 nm, 368 km) from land.

2.5.2.2 Regulatory Environment

A number of acts in Congress govern the movements of commercial vessels in specified waterways. These acts include the Ports and Waterways Safety Act (1972), the Port and Tanker Safety Act (1978), and the Oil Pollution Act (1990). However, these acts have little jurisdiction in the open seas. For this reason, the traffic lanes used by commercial vessels transiting the waters surrounding NWHI are the result of vessels following the most direct routes (great circle routes) to and from major ports between the west coast of North America and East Asia (Franklin 2006). The first international law to address submarine cables was the 1884 Convention for the Protection of Submarine Cables. This agreement is still in force today and has provisions to ensure the safety of cable repairs and to prevent interference with and from other ocean uses.

Entering the Monument is prohibited except when responding to emergencies, for law enforcement, and activities and exercises of the armed forces (50 CFR 404.8 and 404.9) or unless permitted under 50 CFR 404.10 or 404.11. All U.S. vessels passing through the Monument without interruption are subject to the prohibitions in 50 CFR 404.5, 404.6, and 404.7 and must provide notification prior to entering and after leaving the Monument (50 CFR 404.4 (b). VMS is required under 50 CFR 404.5 for any vessel that is issued a permit to enter the Monument. Only VMS approved by NOAA's Office of Law Enforcement (OLE) may be used. The USCG may enforce all applicable federal laws within the boundaries of the Monument. The USCG has the authority to enforce Monument regulations and restrictions concerning ship traffic under 14 USC 2 and 14 USC 89. Prohibitions in the Monument regulations do not apply to activities necessary to respond to emergencies threatening life, property, or the environment, or to activities necessary for law enforcement purposes (50 CFR 404.8).

In response to national concern regarding introduction of aquatic nuisance species, the National Invasive Species Act of 1996 was enacted, which reauthorized and amended the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990.

On December 22, 2006, the Marine Debris Research, Prevention, and Reduction Act was signed into law. The act makes the Marine Debris Program permanent and directs NOAA to work in conjunction with federal agencies such as EPA and the USCG to identify the origin, location,

and projected movement of marine debris within navigable waters of the United States and within the U.S. exclusive economic zone.

2.5.2.3 Resources Overview

Vessel Activity

With the exception of a few small boats at Midway Atoll and Tern Island, no vessels have home ports in the NWHI. For this reason, almost all marine traffic in the waters surrounding the NWHI is made up of transiting vessels, research vessels, and fishing vessels, with cruise ships, USCG ships, and recreational boats occasionally visiting. An estimated 50 vessels pass through the EEZ surrounding the NWHI each day (Mathers 2005; Franklin 2006). On average, the range of vessel types include 20- to 60-foot fishing and recreational vessels, 150- to 250-foot research vessels, 500- to 700-foot passenger cruise ships and freighters, 700- to 1,000-foot tankers, and Coast Guard, military, and international ships of all sizes and types.

Research Vessels

Research vessels have been visiting the NWHI in increasing numbers over the past ten years. However, the number of days spent at sea in the Monument has remained fairly constant over the last four years (Table 2.5-1). Several research vessels regularly visit the NWHI, including ships operated by NOAA, FWS, the University of Hawai‘i, and private charter vessels. Three vessels in the NOAA fleet operate in the NWHI, the *Oscar Elton Sette*, *Hi‘ialakai*, and *Ka‘imimoana*. The NOAA fleet spends more time within the boundaries of the Monument than any other research organization. Table 2.5-1 shows the number of sea days each NOAA vessel spent in the Monument from 2003 to 2007. These vessels are most active in the NWHI from April through November. They average 200 feet in length, weigh 2,300 tons, and carry 50 crew, researchers, and other staff.

Table 2.5-1
Number of Days Spent in the Monument from 2003 to 2007

	Number of Days Spent in the Monument				
NOAA Vessel	**FY 2003**	**FY 2004**	**FY 2005**	**FY 2006**	**FY 2007**
Oscar Elton Sette	80	113	154	177	138
Hi‘ialakai	N/A	18	144	97	120
Charter Vessels	120	120	90	2	2

The University of Hawai‘i has two blue-water research vessels on which it occasionally conducts research in the waters surrounding the NWHI, the R/V *Kilo Moana* and R/V *Kaimikai-O-Kanaloa*. The university conducted research in the Monument twice in 2003 and once in 2004, spending about a month in the Monument on each cruise. There were no cruises to the NWHI planned for University of Hawai‘i ships in 2005 (Winslow 2005).

Fishing Vessels

The only commercial fishery occurring in the Monument is the federal bottomfish fishery. This fishery operates according to the management regime specified in the Fishery Management Plan for Bottomfish and Seamount Groundfish Fisheries in the Western Pacific Region. In the NWHI, the bottomfish fishery is a hook and line fishery that targets a range of snappers, jacks, emperors, and groupers that live on the outer reef slopes, seamounts, and banks at depths of approximately 50 to 400 fathoms.[1] The management regime includes several precautionary measures that minimize potential effects of this fishery. For instance, the bottomfishery participants do not operate in the presence of the monk seals so as to avoid any direct or indirect effects of the fishery on the species.[2] Also, it is known that the vessels operations do not negatively effect habitat.[3] Finally, the annual catch limit in the NWHI is set by regulation at 300,000 lbs of bottomfish and 180,000 lbs of pelagic species (50 CFR Part 404). In practice, bottomfish harvest is below catch limits and is thought not to be the contributing factor to the overfishing status of the bottomfish stocks in the archipelago.

The fishery management plan divides the fishery into two zones, the Mau and Hoʻomalu. Four vessels fish the Mau zone, which includes areas east of the 165º longitude, and four vessels fish the Hoʻomalu zone, which includes areas west of the 165º longitude. All vessels offload their catch in Honolulu. A small number of foreign fishing companies use the open seas to the north and south of the EEZ surrounding the NWHI. These companies often fish the open ocean north or south of the EEZ, then transit through the island chain to fish the open ocean on the other side. Foreign fishing vessels in the open ocean also transit the Monument en route to Honolulu (Franklin 2006).

Eight commercial fishing permits are eligible for use in the Monument. The fishermen average 2 to 10 trips per year per vessel, with duration ranging from 3 to 22 days per trip. For the most part, these vessels bottomfish around the atolls and banks at the 100-fathom depth, and troll in deep water and across banks as they transit between islands. Crew size ranges from one to four people. The proclamation allows this fishery to continue operating until June 15, 2011 (50 CFR 404.10 [b][3]), at which time the commercial fishery will cease altogether in the Monument.

Cruise Ships

A small number of cruise ships have started visiting Sand Island in the Midway Atoll National Wildlife Refuge. The Seven Seas Voyager visited Midway once, and the Pacific Princess visited twice in 2004. In 2005, 2006, and 2007, one cruise ship visited the atoll each year (Maxfield 2007 personal communication). Due to their size and the narrow width of the entrance channel at Midway, as well as port security requirements, cruise ships offload passengers 3 to 4 miles outside the lagoon and transport them ashore in small boats. Cruise ship passengers participate in

[1] For a full list of bottomfish management unit species or BMUS, see DEIS Draft Amendment 14 to the Fishery Management Plan for Bottomfish and Seamount Groundfish Fisheries of the Western Pacific Region, June 27, 2007, Table 5.

[2] 50 CFR 665.61(2007) Subpart E – Bottomfish and Seamount Groundfish Fisheries and the Endangered Species Act Consultation on the Fishery Management Plan for the Bottomfish and Seamount Groundfish Fisheries in the Western Pacific Region, March 8, 2002.

[3] See the finding of no significant impact for the environmental assessment, "Issuance of a Conservation and Management Permit to the National Marine Fisheries Service Pacific Islands Regional Office for Anchoring in Non-coral Areas by the Northwestern Hawaiian Islands Bottomfish Fishery," issued July 6, 2007.

a guided tour of the historical section of Sand Island lead by FWS staff or volunteers. Typically, a cruise ship visit begins in mid-morning, and all passengers have returned to the ship by 4:00 pm. The ship departs the SMA before sunset.

Worldwide, cruise ships constitute a large and growing industry, and like other ships, they present a potential environmental threat to the Monument. Large cruise ships can carry thousands of passengers and crew, producing hundreds of thousands of gallons of wastewater and tons of garbage each day. Monument regulations and permit requirements (which are more restrictive than other open ocean sites) appear to have discouraged cruise ship visits, and none are scheduled for 2008.

Marine Debris Removal Vessels

The USCG provides ship support for marine debris activities and sends a buoy tender once a year. This mission also serves as a law enforcement patrol. In addition, the USCG may send other ships to the area as needed (Havlik 2005). Since 1997, regular marine debris removal efforts have been conducted through a multi-agency effort led by NOAA, in collaboration with FWS, the State of Hawai‘i, City and County of Honolulu, Honolulu Waste Disposal, USCG, U.S. Navy, University of Hawai‘i Sea Grant College Fund, Schnitzer Steel Hawai‘i Corporation (formerly Hawai‘i Metals Recycling Company), The Ocean Conservancy, and other local agencies, businesses, and nongovernmental partners. Since then, this effort has resulted in the removal of more than 563 tons (502 metric tons) of derelict fishing gear and other marine debris from the coral reef ecosystems of the NWHI (figure 1.24) and put one ship on the reef. Marine debris survey and collection activities have been conducted at Kure Atoll, Midway Atoll, Pearl and Hermes Atoll, Lisianski Island, Laysan Island, and FFS. Removal operations have targeted areas where marine debris has accumulated over the past several decades. Long-term average accumulation rates are estimated at 45 to 79 tons (40 to 71 metric tons) per year. Until substantial efforts are made to significantly reduce the sources of debris and until debris can be effectively removed at sea, similar amounts are expected to continue accumulating indefinitely in the reef ecosystems of the NWHI.

Native Hawaiian Vessels

Between 2003 and 2007, several trips for Native Hawaiian cultural practices, education, and documentary film and photography projects were conducted on vessels in the Monument. Vessel size varied, as did anchoring and waste discharge practices. Such trips normally include a representative from FWS or NOAA (DMMP 2007).

Support Vessels

FWS maintains permanent facilities on Tern Island at FFS, Sand Island, and Midway Atoll and a field camp at Laysan Island, while NOAA Fisheries maintains seasonal camps at Pearl and Hermes Atoll and Lisianski Island. A fuel barge makes a port call at Midway once a year, and supply barges provision Midway and the other refuge islands at least twice each year.

The DLNR maintains permanent facilities on Green Island at Kure Atoll. The DLNR does not operate or charter vessels to transport people or supplies to or from the NWHI; instead, it uses other agency vessels to access the Kure Atoll station (Smith 2005).

There are deteriorating deep-water piers to accommodate between two and four large visiting ships. Midway Atoll annually authorizes two supply barges, one fuel barge, and two visiting

large ships (NOAA, USCG, university, or charter). There are also deteriorating small boat finger piers and a boat ramp that are exposed to incoming wind chop.

The deep water cargo pier (Pier 1 on charts) is in functional condition and can handle ships up to 450 feet but will need maintenance in the next 3 to 4 years to remain serviceable for the long term. It can safely handle one ship at a time. The fuel pier is in unsafe condition and is no longer operational. Midway Atoll normally has one barge per year associated with ongoing construction projects that brings supplies for those projects and general materials for island operation. With the new fuel farm capacity, FWS expects to have a fuel barge delivery to Midway every 11-14 months, depending on usage. NOAA ships transiting the Monument typically stop at Midway 3 to 5 times per year. FWS maintains a fleet of 11 small boats for routine operational and research needs. These include several 21 to 23 fiberglass skiffs and two aluminum SAFE boats, one 23-foot and one 31-foot with a full cabin. Both SAFE boats have full electronic packages, including RADAR. The existing small boat maintenance facility is in poor condition and needs replacement within the next 5 years.

Vessel Routes

Container ships, bulk carriers, and tankers regularly transit the waters of the Monument. Although it is estimated that 50 vessels transit the EEZ surrounding the Monument each day, most traffic passes to the north of the island chain, following great circle routes to and from ports on the west coast of North America and East Asia. Occasionally vessels will transit farther south, passing within the Monument. Vessels have been observed using the pass between Pearl and Hermes Atoll and Lisianski Island because it allows vessels to maintain an east-west heading while transiting through the island chain (Franklin 2006). Periodically, accidental loss of cargo overboard causes marine debris or hazardous materials to enter sensitive shallow-water ecosystems.

A preliminary analysis of vessel traffic patterns in the NWHI was performed using positional information collected by the Volunteer Observing Ship program (VOS) from March 2004 to November 2005 (Franklin 2006). The VOS program has collected geo-referenced data from a set of selected non-research vessels that make frequent and regular crossings of all major ocean basins and has provided access to these data through the International Comprehensive Ocean-Atmosphere Data Set (ICOADS; NOAA 2006). The vessel names and call signs collected from ICOADS were then used to search for vessel attributes such as service type, length, and tonnage through the USCG Maritime Information Exchange (USCG 2006). During the 21-month study period, there were 132 vessels that reported from within the Monument. The 132 vessels comprised 104 freighters, 8 tankers, 4 research vessels, 2 passenger vessels, 2 school vessels, 1 recreational vessel, 1 towing vessel (with a 666-foot vessel in tow), and 10 vessels with service unidentified. The mean vessel length was 651 feet, and mean gross tonnage was 43,452 tons. The vessels hailed from 23 countries, with Liberia, Panama, and Germany flying the most common foreign flags. There were 17 U.S.-flagged vessels. The study was limited to vessels participating in the VOS program; therefore, these results do not describe the total vessel traffic through the Monument but rather suggest a limited level of vessel activity over a given time period.

Aircraft Activity

A relatively small number of flights are conducted in the Monument. The MMB agencies charter an average of 27 flights to FFS. Henderson Airfield on Sand Island handles approximately 45 chartered flights to Midway Atoll annually. Aircraft transport goods, materials, and passengers. The USCG conducts regular enforcement overflights, often landing at Midway Atoll for refueling. A few research and management activities associated with remote sensing, mapping, wildlife survey, and marine debris detection may be conducted by aircraft each year.

Henderson Field Airport (PMDY), a 7,900-foot runway, is on Sand Island at Midway Atoll. A contractor maintains the infrastructure associated with the airfield under a base operations service contract with FWS. The airport operator and FWS, as the airport owner, jointly hold and maintain the FAA-issued Part 139 Airport Operating Certificate for PMDY (14 CFR Part 139.3337). The airport provides logistical support for the refuge and is an emergency landing strip for commercial extended twin-engine operation jets that traverse the Pacific. Congress provides partial funding for the operation and maintenance of the airfield because of its function as an emergency landing strip. The USCG also uses the airfield to refuel during fisheries enforcement missions and to perform evacuate injured crew members from fishing and cargo vessels traveling in the north Pacific. In a 1996 environmental assessment, completed before the FWS took over its management, the airport and its operations were found to have no effects (US Fish and Wildlife Service 1996). As part of continued maintenance of the airport, a new airport building was constructed during 2007 and 2008, and new runway lighting and runway painting are planned for 2008-2009. Midway's 7,900-foot runway is capable of handling almost any type of aircraft. A new FAA operations center was constructed southwest of the existing hangar in 2007. At least three flights per month bring personnel and supplies to the refuge. The plane seats 19 passengers. A separate charter cargo aircraft is used to bring up to 25,000 lbs of cargo three times per year.

At Pearl and Hermes Atoll, visiting NOAA, USCG, or contract ships are used for cargo and personnel delivery from either Honolulu or Midway. The timing is subject to cruise schedule and berth availability. Ship and field camp small boats are used to shuttle supplies. The field camp has two small boats. The weight of present cargo drop off is 13,000 lbs (12 boat loads); pickup is 5,000 lbs.

FFS accepts eight flights per year for personnel transfers. There is an existing runway and seaplane ramp. The area permits three visiting large ships per year for cargo supplies and personnel transfers. Visiting ships may also deliver limited cargo and personnel depending on schedule and berth availability. Small boats are used to shuttle supplies to the island. The field camp has between two and three small boats.

At Nihoa Island, Laysan Island, and Lisianski Island, visiting NOAA, USCG, or contract ships are used for cargo and personnel delivery from Honolulu or Midway Atoll. The timing is subject to cruise schedule and berth availability. Small boats are used to shuttle supplies to the island. The weight of present cargo drop-off is 3,000 lbs (3 boat loads); pickup is 3,000 lbs.

Communication Infrastructure

Minimum communication infrastructure exists in the Monument. Before satellite communication, ocean cables were used to transmit data across the Pacific Ocean. In July 1903, the first trans-Pacific cable was completed. It was routed along the NWHI, coming ashore at Midway Atoll. The only actively used cable, the Trans-Pacific Cable No. 1, was installed in 1964 and linked Hawai‘i to Guam. The cable runs the length of the island chain from O‘ahu to Midway, where it comes ashore. From Midway it continues to Wake Island before terminating in Guam. The cable continues to be used for scientific purposes (ICPC 2004).

A new fiber optic distribution system was constructed during 2006/2007 in the core area of Sand Island, Midway Atoll. The satellite antenna was relocated and refurbished in October 2007. Satellite service was upgraded to T-1, and work to install a new VOIP phone system was completed in March 2008. These upgrades will markedly improve telecommunications for the current island population but do not add capacity for a large population increase.

Terrestrial Transportation

The Midway Atoll interim visitor services plan designates areas that are both open and closed to the public. Closed areas ensure public safety and maximum protection for wildlife. Most roads are open to the public. Trails are listed as closed, open by guided tour only, or open. Trails generally follow existing paths, roads, or the edges of aircraft runways. Visitors are free to walk on paved and gravel roads, walkways, and marked trails, but areas such as the fuel farm and pier, power plant/utility building complex, construction and rehabilitation sites, and aircraft runways and service areas are off limits to visitors. Bikes and golf carts are also used.

At other islands in the Monument, transportation is almost exclusively on foot.

2.5.3 Utilities

2.5.3.1 Introduction/Region of Influence

This section addresses issues related to the Proposed Action alternative that are associated with utilities. The ROI is the utilities and infrastructure systems on the islands within the Monument.

2.5.3.2 Resources Overview

The ROI for the utilities and infrastructure systems in the NWHI are limited to Midway Atoll (Sand Island). Field stations located on FFS, Kure Atoll, and Laysan Island rely on satellite communications and field camp utilities such as solar power and desalinated and imported water. All trash generated is shipped off-island. The following section describes the existing utilities and infrastructure at these field camp-style locations and on Midway Atoll.

Potable Water Supply and Fire Protection

The drinking water source on Midway Atoll consists of a rainwater collection and distribution system. Rainwater is collected in a pond then pumped to storage tanks following a significant

rainfall event. The storage volume is approximately 12,000,000 gallons. A new drinking water treatment system and distribution main were constructed and became operational in October 2005. The design daily use rate for the new system is 100 gallons per day/person, or 20,000 gallons per day total for a design capability of 200 people. This new water distribution pipeline was connected to existing lateral pipes at selected buildings through the core area of town but need to be extended to serve newly constructed or remodeled facilities located outside of the new water main.

The old system was left in place to provide water for fire-fighting activities and to serve the Inner Harbor and Cargo Pier areas. This water is not treated to drinking water standards. The storage tanks in the R-1 area provide water for both the new and old systems, but the old system leaks approximately 10,000 gallons per day, which reduces the stored volume of water.

Drinking and other fresh water at Tern Island, FFS, and Laysan Island is produced by desalination and rain catchment systems. Tern Island has the capacity to hold up to 58,000 gallons of rain catchment water and up to 14,500 gallons of desalination treated water. Rain water is collected from an abandoned tennis court and from the roofs of two large buildings on the island. Drinking water is drawn from a brackish water well for desalination. Laysan has holding tanks for 1,000 gallons of rain catchment water, which is collected from the roofs of the living and working tents, and 110 gallons of desalination treated water, which is drawn from a well. Desalination at both locations is conducted using reverse osmosis equipment.

Sanitary Wastewater Management

The existing sanitary wastewater system at Midway Atoll is composed of central septic tanks and drainfields. Stormwater intrusion and suspected groundwater infiltration has overloaded the current system. Work has been performed to eliminate stormwater intrusion, and a new sewer system and treatment and disposal system have been designed for certain facilities located in the core area of town. The estimated construction cost for a new wastewater treatment system is approximately $2,000,000. A dispersed septic design is preferred over the existing central septic in sensitive habitat areas and bird nesting sites.

Tern Island has two septic tanks to collect the sewage and wastewater from the barracks. These tanks together hold approximately 3,200 gallons of sewage.

Stormwater System

The Navy designed the existing stormwater system on Sand Island to work in conjunction with the sewage disposal system that simply discharged raw sewage into the ocean. The existing septic/leach field system was installed in 1998 and it connected to the old Navy system. The stormwater component floods the leach field during heavy rainfall events which reduces the long term viability of the system by moving solids into the drainfield. The stormwater system collects runoff from streets and the many buildings on Sand Island that were designed with direct downspout discharge into the drains throughout the island. To minimize the stormwater influx into the leach field, the FWS has been disconnecting building downspouts from the system and reducing the hard surface areas that collect rainfall, allowing for more groundwater percolation.

Energy

Electrical power at Midway Atoll is supplied by a diesel generator power plant. Two generators that operate in automatic duplex mode were installed and began operating in 2005. In most cases, only one generator is needed to meet the island's demand. If one generator exceeds capacity, the second generator automatically comes online and automatically shuts off when electrical demand reduces. The current system for generating electricity is sufficient for the existing population. Midway has two electrical distribution grids. A new electrical distribution grid was constructed and placed into service in 2006. This system serves most of Sand Island. The old grid still provides power to the old airport hangar, the old fuel farm, and the finger pier area. Materials and equipment of the old grid are aging and need replacing. Constructing new developments or renovating existing facilities would require the new grid to be extended.

Tern Island and Laysan Island electrical power systems are primarily supported by photovoltaic systems, and generator power is used in emergencies and to supplement low-sun days, as needed. These systems have been in place for several years and are being upgraded and replaced as funding becomes available.

Communication System

Telecommunication is provided by satellite service. A new fiber optic distribution system was constructed during 2006/2007 in the core area of Sand Island, Midway Atoll. The satellite antenna was relocated and refurbished in October 2007. Satellite service was upgraded to T-1, and work to install a new VOIP telephone system was completed in March 2008. These upgrades will markedly improve telecommunications for the existing island population but will not add capacity for a large population increase.

Primary communications on Tern Island and Laysan are provided by satellite telephone and associated e-mail service. Single-side band radio is used as a secondary means of communicating with the Honolulu office from these field camps. Currently, Tern Island has high speed internet access through a satellite link provided by NOAA's Marine Fisheries Service.

Solid Waste Management

Solid waste disposal practices in Midway Atoll include the temporary storage of waste in open plastic containers with periodic collection via stake bed truck. The solid waste is then burned in an oil-fired incinerator, dependent on the availability of waste fuel, or burned in an unlined open-aired pit and ashes are disposed of in the existing landfill/dump. The existing incinerator has been modified to burn waste oil, but the island does not generate enough waste oil to operate the incinerator on a daily basis. Alternatively, daily waste is burned in an open pit. Aluminum cans are collected, compacted and sent to a recycling facility in Hawai‘i. Glass is collected, crushed, and buried in the landfill/dump. The existing landfill used for solid waste disposal is limited in its capacity and the types of waste it can safely handle. The landfill, which is only used when an item cannot be incinerated, contains general household/food waste or wood materials.

Because of concerns specific to asbestos and lead in many buildings on Sand Island, any major renovations or remodeling must take worker safety and hazmat disposal into consideration in accordance with appropriate OSHA guidelines.

The Bulky Waste Landfill, located on the south shore of Sand Island, is an uncharacterized landfill that was created by the disposal of scrap metal, used equipment, and unconsolidated waste. This landfill is no longer utilized for waste disposal, but continued monitoring and further remediation may be required. Wastes known to have been deposited in the landfill are metals, gasoline, battery acid, batteries, mercury, lead-based paint, solvents, waste oil, PCBs, dioxins, furans, transmission and brake fluids, vehicles, equipment, tires, and miscellaneous debris (BRAC SI 1996 Volume 1). The landfill is eroding, and soil placed on top is sifting through the debris, causing large holes to open up around the edge and in the center of the landfill. Additionally, burrowing birds are bringing up buried soil and nesting below the cover.

Both Tern and Laysan Islands burn all food and paper waste produced on island. Ashes, plastics, glass, metals, and other non-burnable waste is shipped off island to be disposed of or recycled in Honolulu.

Fueling Facilities

A new fuel tank farm was constructed in 2007 with a capacity of 450,000 gallons. The tank farm stores a sufficient amount of fuel to operate electrical generators, vehicles, and aircraft for a year. Of this total capacity, 100,000 gallons were purchased by the USCG for their use in search and rescue or law enforcement flights. The USCG and FWS have an interagency agreement that covers this cooperative effort and outlines shared costs.

While Laysan Island has very little need for fuel storage or use (up to 40 gallons per year), Tern Island requires storage of several hundred gallons of gasoline, diesel fuel, and aviation gasoline. All fuel is transported to Tern Island in 55-gallon drums and stored in spill containment lockers. This provides spill containment, shelter from the elements, and minimizes fuel handling by allowing fuel storage and shipment in the same containers. Both FWS and NMFS conduct small boat operations at FFS, which requires separate fuel reserves for each agency.

CHAPTER 3:

ENVIRONMENTAL CONSEQUENCES

CHAPTER 3
ENVIRONMENTAL EFFECTS

3.1 INTRODUCTION

This section discusses the potential effects of the Proposed Action on the natural and human environment compared to the No Action alternative. A discussion of cumulative projects and effects is presented in Chapter 4.

Each section in this chapter includes the methods used for effects analysis and a discussion of factors used to determine the significance of direct and indirect effects (40 CFR 1508.8). Direct effects are those that are caused by the Proposed Action and occur at the same time and place. Indirect effects are those caused by the Proposed Action but that occur later or are farther removed in distance from the Proposed Action.

3.1.1 Terminology

To determine whether an effect is significant, Council on Environmental Quality (CEQ) regulations require the consideration of context and intensity of potential effects (40 CFR 1508.27). Context normally refers to the setting, whether local or regional, and intensity refers to the severity of the effect. Effects are categorized as follows:

- Significant;
- Significant but mitigable to less than significant;
- Less than significant;
- No effect; and
- Beneficial effect.

The effects analysis assumes that selecting the No Action alternative would maintain the current management regime provided by federal, state, and Monument regulations, and ongoing activities and uses, beneficial or negative, would continue at current levels. It assumes that effects are presently occurring and would continue to occur under the No Action alternative, but that choosing the No Action alternative would not result in additional effects.

In the effects analyses, effects of the Proposed Action alternative are measured against those of the No Action alternative. A beneficial effect determination means that the Proposed Action would reduce detrimental effects on the natural environment or improve socioeconomic conditions compared to the No Action alternative. How the categories are determined is described in the following subsections for each resource area. A brief summary of the effects is listed at the beginning of each resource section (sections 3.2 – 3.5). Summary tables 3.2.1-3.2.5 in each section provide an overview of effects by resource and by alternative. These tables show both the beneficial and negative effects for each resource.

3.1.2 Summary of Effects

This section provides a summary of potential effects of the Proposed Action on the natural and human environment compared to No Action. The Proposed Action to implement the Monument Management Plan would result, overall, in beneficial effects or no effects on most resource areas compared to the No Action alternative. Short-term negative effects are happen when animals or vegetation are being restored, protected, or enhanced. These effects are inherently of short duration and are limited to the site where the activities occur. Affected resources are expected to return to predisturbance conditions shortly after activity ceases, so this does not constitute a significant effect. In addition, these negative effects are minimized through the use of the BMPs described in Volume III, Appendix I. Therefore, while there may be short-term negative effects as a result of some activities, the long-term beneficial effects almost always offset the negative effects.

Beneficial effects of the Proposed Action on the ecosystem would result from improved planning and coordination of research, monitoring, and management actions by the Co-Trustees, compared to the No-Action alternative. Research priorities would be developed to address gaps in managing the Monument based on ecosystem principles. Less than significant effects are noted for marine transportation and communication related to the expansion of Areas to be Avoided (ATBA) in the Monument through the International Maritime Organization. There were no significant negative effects found as a result of any of the activities described for the Proposed Action alternative. A summary of all the effects for the resource areas is in a table at the end of each resource section.

3.2 NATURAL RESOURCES

3.2.1 Effects Analysis Methodology

In the description of the No Action and Proposed Action alternatives (Chapter 1), activities presented in the Monument Management Plan were divided into three categories: (1) Planning and Administrative, (2) Field, and (3) Infrastructure and Development. Planning and administrative activities are not considered to directly affect natural resources, either because they relate to development of the coordination mechanisms described in the Memorandum of Agreement (MOA) and Proclamation, or they are specifically administrative in nature. However, many activities identified as a result of these planning and administrative actions ultimately would have a direct effect and to the extent adequate information is currently available they are analyzed below. For activities proposed within the Monument or intended to improve management of the Monument, the methodology used to determine the effect on natural resources is as follows:

- Review and evaluate existing and past activities to identify their potential effect on natural resources;
- Review and evaluate activities within the Monument Management Plan to identify their potential to beneficially or negatively affect the ecosystem and its component parts within the Monument; and
- Assess the compliance of each activity within the Monument Management Plan with applicable federal, state, or local laws, regulations, and policies.

In addition, all proposed activities that may affect species protected under the Endangered Species Act, Marine Mammal Protection Act, Migratory Bird Treaty Act, or other federal or state law would only proceed after compliance with applicable laws, including as necessary consultation, receipt of permits, and compliance with all permit terms and conditions.

3.2.2 Effects Common to Human Interactions with Natural Resources of the Monument

Possible effects from entry to the Monument include (1) effects on nesting and resting seabirds and other migratory birds, (2) effects on Hawaiian monk seals (*Monachus schauinslandi*) or green turtles (*Chelonia mydas*) swimming and feeding in the nearshore marine environment or resting on beaches, (3) effects on spinner dolphins (*Stenella longirostris*), (4) effects on fish, cetaceans, marine invertebrates, and corals, (5) effects on Laysan ducks (*Anas laysanensis*), Nihoa finches (*Telespiza ultima*), Nihoa millerbirds (*Acrocephalus familiaris kingi*), and Laysan finches (*Telespiza cantans*), (6) trampling of native plants and insects, (7) damage to corals, (8) accidental release of pollution and contaminants, and (9) the accidental introduction and establishment of nonnative species. All activities would be designed and managed using best management practices (BMP), described in Volume III Appendix I of the MMP, to avoid or minimize these effects. However, even with proper management and execution of a well planned project, certain behavioral responses in wildlife may occur that are not easily recognized by the casual observer.

There are a number of consequences, including possible disturbance and mortality, every time a seabird colony is entered in the Monument. These effects can be characterized as mechanical, thermal, or biological in nature. Mechanical effects include accidental crushing of eggs, chicks, or nest burrows and blockage of access to nest sites with gear. Equipment and man-made materials brought into the colony may result in collisions or entanglement. Artificial lights at night increase collision hazards by disorienting flying birds. The eggs and very young chicks of seabirds are vulnerable to thermal stress if attending adults are flushed from the nest and kept away for more than 3 minutes, so activities that require staying in one place are hazardous to birds nesting in the vicinity of the operation. Negative interspecies interactions between birds may be exacerbated by human presence in the colony in cases where an incubating bird is frightened away from its nest and the egg or hatchling is preyed upon by another species. If young ground-nesting terns (<1 week of age) flee their nest-site when humans approach, they may not be able to find their way back and could starve. BMPs to avoid or minimize effects on seabirds (See MMP, Volume III, Appendix I) require that when a person first approaches a seabird colony they look for any nests or for adults flushing from inconspicuous nests. Also, all activities would be planned to avoid displacing adults from their eggs or chicks for more than 3 minutes.

Stress reactions (elevated heart rate, elevated levels of corticosterone, and behavioral responses) have been documented in several species of nesting seabirds at several ecotourism locations as a result of human activities in nesting colonies (Jungius and Mirsch 1979; Fowler 1995; Nimon et al. 1995; Kitaysky et al. 2003). However, no studies have been conducted to document cumulative effects of human disturbance. Participants observing albatrosses, terns, boobies, Laysan ducks, or other species in the less visited areas could have the potential of greatly elevating stress hormone levels if the duration of the disturbance is excessive. Kitaysky et al. (2003) showed that limited-duration disturbance, however, has only minor, short-term effects. For this reason, observation periods for any particular bird or group of birds would be kept to 15 minutes or less. Observations occurring from a blind can continue for up to 1 hour. It is important to note that even wildlife photography by professionals or amateurs can often be disturbing depending on the manner in which it is pursued.

Human activities have played a major role in determining the status and trend of Hawaiian monk seals over the past two centuries (Ragen 1997). From the 1960s to the 1990s, decreases in monk seal populations at several locations (French Frigate Shoals, Midway Atoll, and Kure Atoll) have been associated with human disturbance (Gerrodette 1990). Recreational beach activities caused monk seals to alter their pupping and hauling patterns, and survival of pups in suboptimal habitats was low, leading to gradual population declines (Kenyon 1972). Human activity and disturbance caused substantial declines at Midway Atoll (Kenyon 1972). Beach counts of monk seals at Midway Atoll averaged 56 animals in the late 1950s, but declined severely by the late 1960s, with only a single seal observed during an aerial survey in 1968. It is clear from these examples that monk seals are very sensitive to disturbance, and proposed activities would be carefully reviewed and, as appropriate, restricted so no further effects on seals would occur.

All water and land activities could continue to be conducted in accordance with BMPs (See MMP, Volume III, Appendix I) that avoid the potential for any effects on protected species. For example, should a Hawaiian monk seal or other listed species be observed during a dive, the

standard procedure is to cease all activity until the animal departs the area. These procedures have been implemented for decades, with the result being no effects on listed wildlife, and only minimal disturbance with no lasting effects on other wildlife (such as to fish that may temporarily avoid or aggregate around divers).

Increased use of Monument waters also increases the potential for introductions of nonnative species, and the potential for negative interactions between humans and monk seals, sea turtles, spinner dolphins, cetaceans, and live corals. One accidental introduction of a nonnative species on a boat or dive equipment could have devastating effects. The introduced sea star (*Acanthaster planci*) in Guam killed 1 kilometer (km) of coral in a month in a narrow fringing coral reef, and 90 percent of the coral in a 2.5-year period along 38 km of Guam's coastline (Chesher 1969). Any action of pursuit or annoyance from boats potentially disturbs marine mammals in the wild by causing disruption of their behavioral patterns or displacement from essential habitat areas, especially if the cetaceans or seals are in a resting phase (Bejder et al. 1999). Snorkel or dive operations also include the added risk of damaging living coral (Hawkins et al. 1999). Improper boat operation could result in localized effects on the coral reef from repeated anchoring, touching, standing, or other avoidable physical disturbance to the coral.

Maintenance and repair for management operations at all sites where seasonal or year-round personnel reside may sometimes temporarily disturb or displace nesting seabirds or native plants. Examples of these activities are painting, maintaining septic and wastewater systems, keeping runways, roads, and trails clear, and repairing structures and real property assets. These effects are reduced by using standard best management practices, such as timing maintenance work for periods when the fewest birds are nesting in the area. Another method to reduce the effects of operations is, in advance of the planned work, to exclude that season’s nesting birds by laying down geotextile fabric that prevents seabirds from burrowing or nest-building.

Best management practices used to reduce the risk of bird air strike vary between Midway and French Frigate Shoals because of different species compositions of seabird colonies next to the runways, different types of aircraft used at the two sites, and different constraints based on the runway facilities at each site. The two million seabirds that use Midway during the peak season make aircraft flights to the island potentially hazardous to both the birds and the aircraft. Both Laysan and black-footed albatross use the runway as a soaring area on their way to feed during the day. However, bird use of the runway declines dramatically at night (363 versus 6 seabird runway crosses per minute, according to Dolbeer and Arrington [1996]), so night flights have a much reduced chance of hitting birds (Kenyon et al. 1958). During the primary albatross season, November through July, flights are scheduled to arrive and depart after dark, thus minimizing effects on albatross and other seabirds (US Fish and Wildlife Service 2004b). During August, September, and October, flights arrive during the day and may occasionally hit a white tern or brown noddy (US Fish and Wildlife, unpublished data). It is not possible to reduce the bird strike risk at Henderson Airfield to zero at any time of day or year, short of suspending all administrative and nonadministrative flight operations. However, the overall effects on natural resources becomes minimal with the small number of annual flights to the island, the requirement of night flights for most of the year, management of lights, advisory to pilots regarding flight paths, and runway clearing. Additionally, vegetation management along the

runways modifies bird flight and nesting behavior, and the runway is swept before each flight arrival or departure to remove or disburse birds.

At Tern Island, French Frigate Shoals, the species most commonly killed during aircraft operations is the sooty tern, but occasionally wedge-tailed shearwaters, great frigatebirds, and both species of albatross are also hit. Tern Island does not have runway lights, so all operations are done during daylight. Just before landings and takeoffs, all the staff on the island frighten birds way from the runway. Flight activities have a slight negative effect on migratory birds and a beneficial effect on all natural resources by facilitating management actions that benefit wildlife and habitats.

3.2.3 No Action

This section briefly describes activities that are currently under way in the Monument and provides analysis of the effects associated with these activities. Only those activities that could have an effect on natural resources are included in the analysis. The analysis describes the projected beneficial and negative effects that could be expected to continue under the No Action alternative, should this alternative be selected for implementation. Implementation of the No Action alternative could result in no change to the current situation; however, current activities could continue under the Proposed Action alternative, and their effects are summarized under the Proposed Action in Table 3.2-1 at the end of this section.

3.2.3.1 Understanding and Interpreting the Northwest Hawaiian Islands

Maritime Heritage Action Plan

Planning and Administrative Activities
As part of the No Action alternative, efforts are under way to plan for conservation of selected maritime artifacts (MH-1.4). Artifacts would be recovered only when this can proceed in a manner that respects the integrity of the ecosystem and the goals of the Monument. These activities could have a short-term minor negative effect on terrestrial and marine native species and habitat during recovery actions due to land disturbance, human disturbance, and noise. Once the recovery is completed, the disturbed areas would be restored.

Field Activity
The effort to monitor, map, and characterize existing resources includes maritime heritage as well as biological and ecological resources are identified in activity MH-1.2. Shoreline terrestrial surveys and inventories, marine remote sensing using magnetometer, and side-scan sonar would continue to be used to locate potential maritime heritage targets, and noninvasive diving surveys would continue for assessing and inventorying sites. All in-water and on-land activities are and would continue to be conducted in accordance with BMPs (See MMP, Volume III, Appendix I) that avoid the potential for any effects on threatened and endangered species. For example, should a Hawaiian monk seal or other listed species be observed during a dive, the standard procedure is to cease all activity until the animal departs the area. In addition, any person who encounters a monk seal on a beach while conducting an activity not related to monk seal population monitoring and recovery actions must not come within 150 feet of the seal. The 150 foot buffer around these animals is a general minimum distance, but for certain activities greater

distance may be necessary to avoid take. These BMPs have been in effect for decades to avoid negative effects on the Hawaiian monk seal. The agencies also commit to consultation under either the Endangered Species Act or the Marine Mammal Protection Act before beginning any action that could affect any marine mammal or federally listed species or designated critical habitat.

Prior to implementation of this activity, additional compliance may be required. There may be a minor short-term effect on Threatened and Endangered species, migratory birds, and marine species from vessels and diver presence. However, affected individuals could be expected to resume normal behavior within a short period of time, with no lasting negative effects. (See section 3.2.2 for detailed discussion of effects.) The agencies also commit to consultation under either the Endangered Species Act or the Marine Mammal Protection Act before beginning any action that could affect any marine mammal or federally listed species or designated critical habitat.

3.2.3.2 Conserving Wildlife and Habitats

Threatened and Endangered Species Action Plan

Planning and Administrative Activities
Plans are under way for education, training, and regular interaction with species and habitat experts to build the capacity of the consulting agencies to conduct consultations and coordinate with action agencies (TES-8.3). NOAA Fisheries and FWS would provide targeted workshops explaining the requirements for ESA consultations and work with partners to develop best management practices and other protocols to avoid effects on listed species and habitat. These best management practices and protocols would impose conditions on all future activities for additional protection to biological resources of the Monument.

Field Activities
The No Action alternative includes efforts to reduce marine debris within the Monument and to continue with large-scale efforts to remove debris from critical aquatic habitats (TES-1.1). There could be minor short-term effects on seabirds from boats and humans during marine debris removal activities. Common effects that occur when humans enter a seabird colony are discussed in paragraph 3.13.2. However, there could be an overall beneficial effect on the endangered Hawaiian monk seal by reducing injuries and mortality from entanglement in marine debris. Entanglements of migratory birds could also decrease. Marine habitat could benefit from minimizing damage to coral and other marine species from scouring by tangled nets.

Annual spinner dolphin mark/recapture photo identification surveys would be continued at Midway, Kure, and Pearl and Hermes Atolls (TES-2.2) under the No Action alternative. Understanding the population trends could aid in evaluating the success of management activities. Being able to adapt management actions based on real-time data could allow managers to make changes more quickly and could ultimately benefit spinner dolphin populations.

Activities in place to conserve green turtle nesting habitat (TES- 3.2) through the use of BMPs (See MMP, Volume III, Appendix I) currently prevent the introduction of mammalian predators on eggs and hatchlings, reduce artificial lighting near nesting beaches, prohibit undesirable

habitat alteration, and control human access. Limited-entry policies would be continued, and human activities would be strictly regulated at islands and reefs used by green turtles. Implementation of these activities would comply with ESA recovery permits that include terms and conditions to avoid or minimize effects. These activities could result in increased nesting success for the green turtle.

Laysan duck population monitoring on Laysan Island and Midway Atoll would continue through mark-recapture and monitoring of reproductive success and survival, disease screening and prevention to avoid translocation of unhealthy individuals, and genetics research to prevent loss of genetic diversity during population translocation (TES-5.1). Handling and marking individual ducks could disturb individual organisms, possibly causing them to temporarily leave a nest or other habitat, discontinue feeding, preening, basking or other behavior. (See section 3.2.2 for a detailed discussion of these effects.) While these short-term effects may disturb individuals of a population, the beneficial effects could result in an increase in the numbers and health of the entire population to more than offset these short-term effects. Monitoring activities are also a critical element in and could be used for adaptive management.

Before these monitoring activities were implemented, all necessary compliance requirements were completed. While every effort would be made to minimize effects, there could be a short-term minor negative effect on native habitat and disturbance to other bird species present from trampling of vegetation, human presence, and noise during mark and recovery efforts. However, affected individuals would be expected to resume normal behavior within a short period of time with no lasting negative effects.

Annual censuses of passerine populations and monitoring of their food and habitat would continue under the No Action alternative. This includes monitoring the status of native plant and terrestrial invertebrate populations (TES-6.1). This could result in a beneficial effect on passerines by enabling managers to identify changes in population dynamics early so that additional management activities could be implemented to preserve passerine populations. Field activities associated with monitoring passerines could have a short-term minor effect on passerine birds and native habitat through human presence and minor trampling of vegetation. Endangered passerines in the Monument (Nihoa finches, Nihoa millerbirds, and Laysan finches) are inquisitive and exploratory and thus can be at risk from human materials and equipment on their breeding islands. Open containers such as buckets and cooking pots that catch rainwater can result in drowning. Strings, netting, and loose fibers on tarps can entangle their feet. Openings in tents that allow entry can result in birds becoming trapped and succumbing to overheating. All activities would be planned to ensure that tent openings would remain tightly closed, and the types of materials described above would not be left unattended in campsites at Nihoa Island, Laysan Island, and Pearl and Hermes Atoll to avoid effects on these species. In addition the agencies commit to consultation under the Endangered Species Act, Marine Mammal Protection Act, as appropriate, prior to initiation of any action that my affect any marine mammal or federally-listed species or designated critical habitat.

Activity TES-7.3 continues actions for the preparations necessary for the establishment of a self-sustaining *Pritchardia remota* population on Laysan Island, including eliminating alien species (TES-7.3). Seeds of native species, e.g., *Pritchardia remota* and *Mariscus pennatiformis*, would

continue to be collected from the wild (taking no more than 15 percent of the seeds from any one plant) and reared in a greenhouse on Laysan Island. Strict protocols are followed during seed collection and propagation to avoid transport of pests, diseases, and pathogens. The Monument staff would also continue to propagate approved seed sources collected on Laysan Island in the greenhouse on Sand Island (TES-7.4). These activities could result in a beneficial effect on Threatened and Endangered species, native habitat, and migratory and passerine birds that utilize the habitat for cover, nesting, and feeding. To protect *Prichardia remota* from catastrophic events and achieve recovery objectives, this species is being established outside its known native range on Laysan Island, and Eastern and Sand Islands at Midway Atoll (TES-7.5). Effects on native species and risk of hybridization with closely related species would be evaluated before sites are chosen and species are translocated. The goal is to create three colonies with at least 100 mature individuals per colony. While every effort would be made to minimize effects, there could be a short-term minor negative effect on native habitat and disturbance to other bird species present from replacement of existing vegetation, human presence, and noise during restoration efforts. Common effects that occur when humans enter a seabird colony are discussed in section 3.2.2. The affected individuals would be expected to resume normal behavior within a short period of time with no lasting negative effects.

Migratory Birds Action Plan

Planning and Administrative

The Monument staff will work with partners to reduce the effect of commercial and sport fisheries outside the Monument on migratory bird populations (MB-2.5). The black-footed albatross and Laysan albatross that nest almost exclusively in the Monument are most affected by bycatch mortality (Flint 2004). FWS, NMFS, and the Regional Fisheries Management Councils have worked to guide the implementation of the National Plan of Action to reduce this mortality. Continued implementation of this plan could result in a beneficial effect on migratory bird populations in general and the black-footed albatross and Laysan albatross in particular.

Habitat Management and Conservation Action Plan

Field Activities

Efforts are under way to collect and fingerprint oil found washed ashore and on wildlife from mystery spills to determine its provenance, and build an oil sample archive for possible use as evidence in liability assignment (HMC-2.5). Being able to identify the source of oil spilled into the marine environment could help in understanding more about the primary sources of this pollution so that corrective measures could be developed to reduce the number of spills and lessen their effects. Past experience in similar circumstances indicate beneficial effects could likely result ocean, near-shore, and shoreline habitats and associated species by reducing illness and deaths of associated species including Threatened and Endangered species, migratory and resident birds, and marine mammals, and minimizing the fouling of plants in the near-shore and shoreline beaches.

Under the No Action alternative monitoring would continue at the area at Laysan Island that was contaminated by the insecticide carbofuran (HMC-2-6). Carbofuran was causing mortalities in carrion flies and ghost crabs at a beach crest site at Laysan Island. The area was cleaned and

treated on site. Continued monitoring would let the managers know if carbofuran were to resurface so that they could quickly institute a cleanup plan to prevent or minimize any future losses. This could result in a beneficial effect on endangered Laysan finches, the dune habitat, and associated insects and other arthropods on Laysan Island.

A plan is in place to propagate and outplant native species, chosen on the basis of historical records at Midway and historical and pollen records from Laysan Island, on 250 acres of vegetated area at Midway Atoll, focusing on the original footprint of the islets of Midway Atoll. Target species for outplanting include bunchgrass (*Eragrostis variabilis*), naupaka (*Scaevola sericea*), morning glory (*Ipomoea pes caprae, I. indica*), *Solanum nelsonii*, *Capparus sandwichiana*, *Chenopodium oahuense* and *Lepidium bidentatum* (HMC-4.1). The restoration of this native habitat could result in beneficial effects on Threatened and Endangered species, migratory birds, and other native plants and insects on Midway Atoll. There could be a short-term minor negative effect on native habitat and disturbance to other bird species present from replacement of existing vegetation, human presence, and noise during restoration efforts. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. However, affected individuals would be expected to resume normal behavior within a short period of time with no lasting negative effects. In addition the agencies commit to consultation under the Endangered Species Act, Marine Mammal Protection Act, as appropriate, prior to initiation of any action that my affect any marine mammal or federally-listed species or designated critical habitat.

Current efforts to reestablish 60 acres of native shrub community on Laysan Island would continue under activity HMC-4.3. Reestablishment of native shrubs is preceding the removal of the alien plant *Pluchea indica* to avoid an interim loss of nesting substrate for red-footed boobies, great frigatebirds, and black noddies. The restoration effort on Laysan Island would continue to focus on restoring plants, terrestrial arthropods, and avian components of the biological community that occurred prior to human contact. This activity could result in a beneficial effect on Threatened and Endangered species, migratory birds, terrestrial arthropods, and native habitat by expanding and improving the quality of existing habitat. There could be a short-term minor negative effect on native habitat and disturbance to other bird species present from human presence and noise during restoration efforts. Endangered Laysan finches are inquisitive and exploratory and thus can be at risk from human materials and equipment on their breeding islands. Open containers such as buckets and cooking pots that catch rainwater can result in drowning. Strings, netting, and loose fibers on tarps can entangle their feet. Openings in tents that allow entry can result in birds becoming trapped and succumbing to overheating. All activities would be planned to ensure that tent openings would remain tightly closed, and the types of materials described above would not be left unattended. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. Affected individuals would be expected to resume normal behavior within a short period of time with no lasting negative effects. In addition the agencies commit to consultation under the Endangered Species Act, Marine Mammal Protection Act, as appropriate, prior to initiation of any action that my affect any marine mammal or federally-listed species or designated critical habitat.

Monitoring of changes in species composition and structure of the coastal shrub and mixed grass communities on basaltic islands in the Monument would continue under activity HMC-4.7. Field

activities associated with monitoring vegetation communities could have a short-term minor effect on seabirds and native habitat through human presence and minor trampling of vegetation. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. Endangered passerines on Nihoa Island (i.e., Nihoa finches, Nihoa millerbirds,) are inquisitive and exploratory and thus can be at risk from human materials and equipment on their breeding islands. Open containers such as buckets and cooking pots that catch rainwater can result in drowning. Strings, netting, and loose fibers on tarps can entangle their feet. Openings in tents that allow entry can result in birds becoming trapped and succumbing to overheating. All activities would be planned to ensure that tent openings would remain tightly closed, and the types of materials described above would not be left unattended in campsites at Nihoa Island, Laysan Island, and Pearl and Hermes Atoll to avoid effects on these species. These individuals would be expected to resume normal behavior within a short period of time after the activity has ended with no lasting negative effects. In addition the agencies commit to consultation under the Endangered Species Act, Marine Mammal Protection Act, as appropriate, prior to initiation of any action that my affect any marine mammal or federally-listed species or designated critical habitat. Data from the monitoring activities could be used to determine future needs through adaptive management, resulting in a beneficial effect on the coastal shrub and mixed grass communities.

Water quality monitoring that includes monitoring of water level, salinity, and other water quality parameters of Laysan Lake and mudflats on Laysan Island `aulikuli flats at Southeast Island, Pearl and Hermes Atoll, and Spit Island at Midway Atoll, and documenting any loss of lake area would continue under activity HMC-6.1. Monitoring of changes in environmental factors such as lake water level and salinity, currently provide data by which to plan restoration activities and assess their efficacy. As needed, dune habitat on Laysan Island would be restored to stabilize movement if lake loss started to occur as identified in activity HMC-6.2. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. Overall, these activities would result in a beneficial effect on Threatened and Endangered species, migratory and passerine birds, and native vegetation by protecting existing freshwater and saline water sources, and by reducing lake loss from encroaching dunes. There would be minor short-term negative effects on species (e.g. migratory shorebirds and Laysan ducks) using the mudflats and lakes due to human disturbance during monitoring activities. However, affected individuals would be expected to resume normal behavior within a short period of time with no lasting effects once the activity was finished. In addition the agencies commit to consultation under the Endangered Species Act, Marine Mammal Protection Act, as appropriate, prior to initiation of any action that my affect any marine mammal or federally-listed species or designated critical habitat.

3.2.3.3 Reducing Threats to Monument Resources

Alien Species Action Plan

Field Activities

Hull inspection and cleaning of all vessels, SCUBA gear, marine construction material, and instruments deployed in the Monument would continue to be required (AS-3.2). Current quarantine protocols to prevent the introduction of invasive terrestrial species to the Monument

would continue under activity AS-3.1. The absence of activities to adequately control and eradicate invasive species, such as *Verbesina* sp., grey bird locust, and house mouse, would cause negative effects on migratory birds, endangered plant and bird species, and other native species and their habitats. Requiring hull inspections and following quarantine protocols would greatly reduce the potential of the introduction of invasive species into the Monument. Reducing competition with and predation by invasive species would protect the health and condition of all habitat and species in the Monument and would result in a beneficial effect on these resources.

Maritime Transportation and Aviation Action Plan

Infrastructure Development Activities
Efforts would continue to encourage the energy and water efficiency of vessels operating in the Monument under activity MTA-2.4. For example, the NOAA ship Hiialakai began a recycling program and installed water saving devices to reduce inputs to the Monument as much as possible. Plans are in place to test the use of biofuels and nonpetroleum-based hydraulic fluid. Increased efficiency would not have a direct effect on biological resources, but would create a benefit as global habitats and resources are conserved.

3.2.3.4 Managing Human Uses

Permit Action Plan

Planning and Administrative Activities
Coordination of appropriate environmental review for all permitted activities would continue under activity P-1.3. Permitting activities would insure that permittees are aware of all protocols and operating requirements and the required environmental review of all proposed activities would assess any potential effects of the activities to the resources of the Monument. This activity would result in a beneficial effect by protecting the natural resources of the Monument.

Enforcement Action Plan

Planning and Administrative Activities
Under the No Action alternative operation of the Vessel Monitoring System for all permitted vessels (EN-2.2) would continue. Additional automated monitoring systems and ship reporting systems for all vessels transiting the Monument would continue to be integrated under activity EN-2.3. In addition regulations briefings into pre-access training required for all Monument users would continue (EN-3.1). Being able to monitor all permitted vessels would allow enforcement personnel to ensure that vessels are following procedures identified in the pre-access training and that they operate within their permit area. Enforcement personnel would be able to respond quickly when violations occurred. This would result in a beneficial effect on all resources of the Monument by reducing the potential of grounding, spills, or other events.

Midway Atoll Visitors Services Action Plan

Planning and Administrative Activities
Activity VS-2.2 includes continuation of a review of the visitor program on a biennial basis by a team of visitor services specialists and Midway Atoll staff . The team would review the visitor

services activities to evaluate whether the program is meeting its objectives. This information would support an adaptive management approach to visitor use at Midway in which data reflecting visitor effects would inform management decisions on the extent of visitor interactions with wildlife that would be permitted in the future. If a potential problem were found to exist, changes could be made to the plan to minimize any effects visitors might cause to the Monument's natural resources, resulting in a beneficial effect. The effects of implementing the Interim Midway Atoll Visitor's Plan are evaluated in the associated final environmental assessment (EA) for the Interim Visitor Services Plan (U.S. Fish and Wildlife Service 2007b). That document may be found at http://www.fws.gov/midway/VSP/AppendixG.pdf and is incorporated by reference herein. The effects of the No Action alternative are the same as those set out in the EA for the Interim Plan.

3.2.3.5 Coordinating Conservation and Management Activities

Constituency Building and Outreach Action Plans

Planning and Administrative Activities
Under activity CBO-1.2 the Monument staff would continue to refine and implement the Monument Media Communications Protocol to engage news media in informing the public about the Monument's resources and activities including seeking out and participating in events that reach a broader audience and provide constituents with knowledge of the Monument (CBO-3.1). The Monument staff would continue participating in the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve Advisory Council through NOAA's National Marine Sanctuary Program until the Monument Alliance is established (CBO-3.8). This would result in a beneficial effect on the Monument as the members of the Council would be able to more easily provide input from stakeholders and to share information that might be useful in management of the Monument and the support of future programs.

Ocean Ecosystems Literacy Action Plan

Planning and Administrative Activities
At least four teacher workshops per year would be conducted in the main Hawaiian Islands to introduce and support the elementary school and middle/high school environmental education programs (OEL-1.4). This would result in increased awareness of the importance of natural resources among the teachers and students alike, and possibly among the students' families. It would result in increased interest in the Monument that would generate support for conservation of Monument resources. This activity could result in a beneficial effect on Monument natural resources by creating opportunities to expand public involvement in and support for protection and restoration efforts, including volunteer participation in Monument activities.

3.2.4 Proposed Action

This section describes the effects of the activities that would be conducted under the Proposed Action. Under the Proposed Action those activities described above for the No Action alternative, and their beneficial and negative effects, would continue. The effects of the Proposed Action are summarized in Table 3.2-1 and include those effects that would occur with the continuation of actions described in the No Action alternative.

In the subsections that follow, the component activities of the Proposed Action are briefly described, followed by a discussion of the effects of each activity.

3.2.4.1 Understanding and Interpreting the Northwest Hawaiian Islands

Marine Conservation Science Action Plan

Field Activities

The Monument staff would implement research priorities identified in the Monument Natural Resources Science Plan under activity MCS-2.4. In addition to implementation of research priorities, this activity includes monitoring activities. Prior to implementation of this activity, additional compliance might be required. This would allow researchers to focus on areas of greatest importance to the health and protection of the Monument, thereby more effectively applying resources to the most critical areas, resulting in beneficial effects on ocean and near-shore habitats. These data could also feed into an adaptive management strategy to improve research results.

Native Hawaiian Cultural and History Action Plan

Planning and Administrative Activities

The Proposed Action alternative includes the preparation of a Cultural Resources Program Plan (NHCH-4.1), and the integration of Native Hawaiian values and cultural information into general outreach and education programs (NHCH-5.1). The Proposed action also calls for the development of a culturally based strategy for education and outreach to the Native Hawaiian community (NHCH-5.2), and integration of Native Hawaiian values and cultural information into Monument permittee education and outreach program (NHCH-5.3). Native Hawaiian Cultural History Activities proposed under the NHCH Action Plan would increase access to Monument islands for observing Native Hawaiian cultural practices may result in effects such as temporary disturbance or displacement of native wildlife and plants. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. These effects are reduced by using best management practices for access, including quarantine protocols and searching for nests before approaching an area resulting in short-term minor negative effects. These activities would also educate the public as to the importance of the natural environment to Native Hawaiian culture, and ensure that efforts to maintain and restore the natural environment within the Monument take into account traditional Native Hawaiian values and culture. The Native Hawaiians and the general public can see that conservation management and respect for traditional beliefs and practices can work together. This in turn could generate greater public support efforts to maintain, restore, and protect the environment, resulting in a beneficial effect on the natural resources within the Monument.

Historic Resources Action Plan

Planning and Administrative Activities

Activity HR-1.1 proposes to reconcile the Historic Preservation Plan with the Midway Visitor Service Plan, lead-based paint abatement plan, and other facilities maintenance and use plans. HR-1.2 proposes to submit the updated Historic Preservation Plan for approval to the Advisory Council on Historic Preservation and Monument partners and activity HR-2.1 proposes that

within 3 years, a dedicated capacity to implement the updated Historic Preservation Plan is created The Proposed Action alternative proposes to .train Monument staff and the Midway contractors annually on the content of the Historic Preservation Plan and implementation of appropriate treatments (HR-2.2). The Historic Preservation Plan included protocols for not only carrying out historic resource preservation and restoration activities but protocols to ensure that actions taken as part of the plan would be done to avoid any effects on protected species and generally to minimize effects on the Monument's natural resources. The removal of the lead-based paint from buildings and adjacent soil, and following the protocols to minimize effects of preservation and restoration work, would result in a beneficial effect on all natural resources, including Threatened and Endangered species and terrestrial habitats. It is estimated that over the life of the project 6,745 - 9,900 Laysan albatross chicks would be saved from lead poisoning a year (Finkelstein 2006).

Maritime Heritage Action Plan

Planning and Administrative Activities
A status report on potential environmental hazards would be completed within 1 year, and updated it annually under activity MH-1.3. This activity would identify wreck sites and other debris that represent potential environmental hazards such as leaking fuel, debris containing hazardous material, and debris with unknown contaminants. The plan not only identifies these sites, but identifies plans for containment, cleanup, removal, and remediation to minimize the potential contamination to ocean, near-shore, and shoreline habitats. The beneficial effects of implementing the plan would be to protect and improve the health of these habitats and the species found there including Threatened and Endangered species, marine mammals, and migratory birds.

3.2.4.2 Conserving Wildlife and Habitats

Threatened and Endangered Species Action Plan

Planning and Administrative Activities
Activities that are proposed under the Threatened and Endangered Action Plan that include planning activities designed to conserve monk seal habitat (TES-1.3) and reduce the likelihood and effect of human interactions on monk seals (TES-1.4). Prior to implementation of these activities, additional compliance might be required. The goal of these proposed activities is to restore habitat for seals for resting, breeding, and rearing of pups, and to educate Monument users and implement standing protocols so that they implement BMPs (See MMP, Volume III, Appendix I) and standard operating procedures correctly. These activities would have a beneficial effect on the endangered Hawaiian monk seal by improving the health of adults and improving breeding success and juvenile survival rates. In addition, using existing BMPs to control activities and reduce disturbance along the beaches would provide benefits to other species as well, such as migratory birds using these areas for nesting and feeding.

Activity TES-1.5 includes actions that would support outreach and education on Hawaiian monk seals. Educating the public and interest groups with information to understand the critical status of the Hawaiian monk seal population would result in better protection of the seal while outside the Monument; for example, the public would know to give the monk seal space while resting on

beaches on the main Hawaiian Islands. This beneficial effect would reduce harassment and allow the seal to conserve energy for activities like feeding and reproduction.

Under activity TES-4.1, FWS would work with Japanese ornithologists on ways to establish one or more breeding populations of the endangered short-tailed albatrosses on Midway Atoll. The goal is to have two colonies of at least 250 breeding pairs per colony (U.S. Fish and Wildlife Service 2005a). Collaborative efforts would also include satellite tagging projects studying feeding patterns, how weather systems and winds influence short-tailed albatross movements, and how ocean productivity and seafloor bathymetry affect their distribution. This would protect the species by establishing nesting colonies on islands free from volcanic activity and mammal predators, resulting in a beneficial effect on the endangered short-tailed albatross species. Activity TES-4.3 would create and disseminate information on fisheries bycatch and bycatch reduction to all fisheries occurring outside the Monument. This activity would also provide information and train fisheries observers in seabird identification. Bycatch of endangered and migratory birds and nontarget marine species during sport and commercial fishing outside the Monument is a serious problem. This activity would make information on bycatch avoidance measures available to sport and commercial fishers and would result in a beneficial effect on endangered species, migratory birds, and other marine species that inhabit the Monument by reducing bycatch mortality when they are migrating outside the Monument.

To protect *Amaranthus brownii*, *Schiedea verticillata*, and *Prichardia remota* from catastrophic events and achieve recovery objectives, the potential for establishing these species outside their known native range on Mokumanamana, Laysan Island, Kure Atoll, and Eastern and Sand Islands at Midway Atoll, would be assessed under activity TES-7.5. To minimize the negative effects on native species the potential for displacement and risk of hybridization with closely related species would be evaluated before sites were chosen and species translocated. The goal is to create three colonies with a minimum of 500 mature individuals per colony of *Amaranthus brownie*, 300 mature individuals per colony of *Schiedea verticillata¸* and 100 mature individuals of *Prichardia remota* (U.S. Fish and Wildlife Service 1998). This would result in a beneficial effect on the translocated species. Prior to implementation of this activity, additional compliance may be required.

Field Activities

Activities supporting and facilitating emergency response for the endangered Hawaiian monk seal would put into place standardized protocol that could ensure a rapid and well-organized response to situations in the Monument that threaten endangered Hawaiian monk seals (TES-1.2). This rapid response could minimize the effects on seals due to events such as ship groundings, oil spills, and disease outbreaks. These activities could have a beneficial effect on the endangered Hawaiian monk seal by decreasing population loss. There could also be beneficial effects on migratory birds, marine mammals, and terrestrial and marine habitat by reducing exposure to oil spills. There may be short-term minor effects on marine mammals due to disturbance from response activities, but these could be offset by the beneficial effects described above. In addition the agencies commit to consultation under the Endangered Species Act, Marine Mammal Protection Act, as appropriate, prior to initiation of any action that my affect any marine mammal or federally-listed species or designated critical habitat.

Expanding field activity for the collection of biological information on nesting turtle populations (TES-3.1) could improve the health of the green sea turtle. Understanding the abundance of nesting sea turtles and their life history needs could result in effective management of existing populations. In addition, a new activity, protecting and managing marine turtle habitat, including foraging areas and migration routes (TES 3.2), could reduce losses due to disturbance. This could result in the management of activities such as anchoring and vessel transit to minimize their effects on foraging areas, reduce potential exposure to hazardous materials, and minimize vessel hazards to turtles in open waters. Both of these activities could have a long –term beneficial effect on the threatened green sea turtles by ensuring the health of sea turtles and minimizing losses from shipping and boating interactions.

Analysis of the feathers, eggs, and dead chicks of black-footed albatrosses at Midway Atoll (TES-4.2), to determine the level of persistent environmental contaminants, would be used as a surrogate for estimating contaminant body-burdens in short-tailed albatrosses. This information could be used to determine a correlation between contamination levels and nesting success and could assist in developing plans to reduce contaminant exposure of the short-tailed albatross by targeting cleanup of areas where albatross feed and nest. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. Reducing exposure to contaminants could result in a beneficial effect on the endangered short-tailed albatross through improved nesting success rates. Similar beneficial effects on other migratory birds could also occur. Collection of feather, eggs, and dead chicks could cause a short-term negative effect on seabirds from human interactions and a short-term negative effect on terrestrial vegetation from trampling plants during collection activities. (See section 3.2.2 for detailed discussion of effects). However, collection activities would occur infrequently at any given location, and the short-term negative effects could be minor.

Restoration or creation of habitat to support translocation of the endangered Laysan duck to other sites in the Monument would be implemented under activity TES-5.2. This would include transporting juveniles to additional islands and conducting post release monitoring. The goal is to have a total of at least 240 breeding adults at these sites (U.S. Fish and Wildlife Service 2004a). By monitoring the populations, changes could be made through adaptive management that could improve the success of this activity. This would assist in meeting recovery plan criteria by expanding the population throughout its range and protecting the population from a catastrophic event. This activity could result in a beneficial effect on the endangered Laysan duck and potential local short-term minor negative effect on native invertebrates at translocation sites.

Five endangered plant species are restricted to Nihoa and Laysan Islands and are subject to extinction from catastrophic events. To protect all endangered plant species from Nihoa and Laysan Islands, seeds would be collected and maintained in off-Monument locations (TES-7.1). This could allow for the restoration of these native plants if such a catastrophic event were to occur. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. Overall, this activity could result in a beneficial effect on these plants and terrestrial plant communities on Nihoa and Laysan islands and to the Laysan finch, Nihoa finch, and Nihoa millerbird that depend on the native plant community for food, cover, and nesting. Short-term minor negative effect on the terrestrial plant community could occur during seed collection

through trampling and reduced seed drop but could be offset by the beneficial effects described above.

Existing colonies of *Amaranthus brownii* and *Schiedea verticillata* on Nihoa would be supplemented, and factors restricting colony expansion, such as herbivory by alien species, would be addressed (TES-7.2) in order to increase numbers and locations of these species on Nihoa where they are endemic. The goal is be 300 to 500 individuals per colony.

Migratory Birds Action Plan

Planning and Administrative Activities
Activity MB-2.3 would ensure that all spill response plans have adequate coverage of actions necessary to minimize mortality to migratory birds. Monument staff would coordinate with and provide technical information regarding migratory birds to those responsible for multiagency spill prevention and pre-spill activities as well as actual response actions. This would allow agencies to develop plans that would minimize effects of spills on migratory birds and to develop recovery plans that would include protocols for handling birds that have been affected by spills. This would prevent mortalities and speed rescue efforts. This beneficial effect would help prevent reduction of migratory bird populations that might otherwise result from releases of oil or hazardous materials, or from the responses to such releases.

Habitat Management and Conservation Action Plan

Planning and Administrative Activities
The Proposed Action alternative includes activities that would identify and prioritize restoration needs in shallow-water reef habitats affected by anthropogenic disturbances within 5 years (HMC-1.1) and could evaluate costs to ecosystem function and benefits of removing anthropogenic iron sources, such as metal from shipwrecks and discarded debris from reefs, throughout the Monument (HMC-2.4). Managers would investigate opportunities for restoration and prioritize actions so that they could focus funds and resources to address the most important needs. This could result in a beneficial effect on marine and terrestrial habitats within the Monument.

An ecological risk assessment would be conducted to determine allowable lead levels in soils at Midway, and remove lead from buildings and soils to nonrisk levels under activity HMC-2.7. The ecological risk assessment could determine the cleanup level necessary to reduce risks to human and wildlife health. The beneficial effects of this effort could be to improve the health of nesting migratory birds suffering from droop-wing and other lethal and sublethal effects.

Activity MHC-4.4 would formulate and implement a restoration plan for Lisianski Island using guidelines established for neighboring Laysan Island. This plan calls for investigation of the botanical history of Lisianski and Laysan Island and could aid in native habitat restoration efforts, resulting in a beneficial effect on native plant species and to migratory and resident birds and other species dependent upon the habitat that would be restored.

Planning activity HMC-7.2 would evaluate the potential to restore and create, as needed, freshwater sources at proposed translocation sites for Laysan duck, Nihoa finch, Laysan finch,

and Nihoa millerbird. Prior to implementation of this activity, additional compliance might be required. This would provide an important habitat feature presently lacking in these areas, improving the chance of a successful translocation effort. These freshwater sources could also provide benefits to other migratory birds, native invertebrates, freshwater algae, terrestrial arthropods, and native habitat by expanding important habitat and improving reproductive success.

Other federal and state agencies would be educated about overflight rules and promote compliance regarding overflights and close approaches at the Monument under activity HMC-9.1. This effort could reduce the potential for aircraft collisions with birds, resulting in a beneficial effect on migratory and resident birds, as well as to the crews of the aircraft that might otherwise be damaged in collisions with the birds.

Aircraft operations occur at two Islands in the Monument, Sand Island at Midway Atoll and Tern Island at French Frigate Shoals. At both sites there are occasional bird strikes during takeoff and landings. These incidents cause mortality to the bird (most often a seabird) and in some cases could increase the risk to the aircraft and passengers. The frequency at which these bird strikes occurs varies by site, bird species, time of day, wind velocity, month of the year, and level of breeding activity in the bird colony. BMPs (See MMP, Volume III, Appendix I) to reduce risk of bird air strike vary between Midway and French Frigate Shoals were developed because of different species compositions of seabird colonies adjacent to the runways, different types of aircraft used at the two sites, and different constraints based on the runway facilities at each site. At Midway, the greatest risk of bird aircraft collision is from the two resident albatross species. Because they fly primarily during daylight hours, routine flight takeoffs and landings are scheduled to occur after sundown or before sunrise. Additionally, vegetation management along the runways modifies bird flight and nesting behavior, and a sweep of the runway to remove or haze birds is performed before each flight arrival or departure.

At Tern Island, French Frigate Shoals, the most commonly killed species is the sooty tern but occasionally wedge-tailed shearwaters, great frigatebirds, and albatrosses of both species are also hit. Tern Island does not have runway lights, so all operations are done during daylight hours. Just prior to landing and takeoffs, all the staff on the island make a sweep of the runway to haze birds from the runway. Flights would not be scheduled during the months of the year when sooty terns are most numerous (June – August) and most likely to be hit. Loads on takeoff could be minimized to improve the pilots' ability to get above the bird hazard zone as soon as safely possible, and flights could be curtailed on windless days when bird casualty has historically been highest. Flight activities have a minor negative effect on migratory birds and a beneficial effect on all natural resources by facilitating management actions that benefit a wide variety of plant and wildlife species and habitats.

Field Activities

Evaluate effects of contamination in terrestrial and near-shore areas from shoreline dumps at French Frigate Shoals and at Kure, Midway, and Pearl and Hermes atolls and prioritize cleanup action based on risk assessments (HMC-2.1), and work with partners and responsible parties to verify the integrity of known landfills and dumps and to conduct additional remediation if necessary (HMC-2.2). These activities would investigate the extent of contamination at these

sites and assess their integrity, containment effectiveness, and hazard potential. Based on this information the highest- priority sites would be removed, remediated, or sealed. Monitoring would continue to assess whether further action are needed. Some proposed activities will require further analysis and compliance by the agencies as more detailed information on these potential actions becomes available and specific plans are developed. These requirements may include additional analysis, in accordance with NEPA, and consultation under ESA, the Marine Mammal Protection Act, NHPA, and other relevant laws.

Possible short-term effects from these actions could include (1) disturbance to nesting and resting seabirds and other migratory birds, (2) effect on Hawaiian monk seals or green turtles swimming and feeding in the nearshore marine environment or resting on beaches, (3) effect on spinner dolphins, (4) effect on fish, cetaceans, marine invertebrates, and corals, (5) disturbance to Laysan ducks, Nihoa finches, Nihoa millerbirds, and Laysan finches, (6) trampling of native plants and insects, (7) damage to corals, (8) accidental release of pollution and contaminants, and (9) the accidental introduction and establishment of nonnative species. Overall, this activity could result in beneficial effect on marine, coastal, and terrestrial habitats, marine mammals, migratory birds, and Threatened and Endangered species by reducing exposure to hazardous materials from the dump sites.

The proposed activity HMC-2.3 would locate historic disposal sites at Tern Island (French Frigate Shoals) and at Kure, Midway, and Pearl and Hermes atolls, and investigate them for contamination. Efforts include searching for documented, but not yet located landfills and underground storage tanks, and evaluating their contamination levels. These sites would be evaluated, and remediation actions would be planned. Possible short-term minor negative effects from these actions include (1) disturbance to nesting and resting seabirds and other migratory birds, (2) effects on Hawaiian monk seals or green turtles swimming and feeding in the nearshore marine environment or resting on beaches, (3) effects on spinner dolphins, (4) disturbance to fish, cetaceans, marine invertebrates, and corals, (5) disturbance to Laysan ducks, Nihoa finches, Nihoa millerbirds, and Laysan finches, (6) trampling of native plants and insects, (7) damage to corals, (8) accidental release of pollution and contaminants, and (9) the accidental introduction and establishment of nonnative species. Overall, this activity could result in beneficial effects on marine, coastal, and terrestrial habitats, marine mammal, migratory birds and Threatened and Endangered species. These effects are reduced by using standard best management practices, such as timing maintenance work for periods when the fewest birds are in the area. Another method to reduce the effects of operations is, in advance of the planned work, to exclude that season's nesting birds by laying down geotextile fabric that prevents seabirds from burrowing or nest-building, as well as applying special terms and conditions in the Monument permitting process. A proposed activity on 34-acre Southeast Island at Pearl and Hermes Atoll would restore native plant vegetation that is critical to the survival of several native plants (HMC-4.5). After the invasive alien plant, *Verbesina encelioides*, are removed, native species would be propagated and outplanted. This restoration is considered critical to the survival of several native plant species and a small population of endangered Laysan finch. This activity could have beneficial effects on Threatened and Endangered species by improving the viability of the endangered Laysan finch and native plants. The beneficial effects would occur after a short-term minor negative effect from removing invasive alien vegetation that may currently provide cover or food for Laysan finches.

Coordinated ecosystem restoration activities on Kure Atoll would be implemented (HMC-4.6), including prioritizing and eliminating ecosystem threats caused by past human disturbance, removing invasive species, and increasing the range of and reintroducing native plant species. The beneficial effects include improving nesting, foraging and loafing habitat for migratory birds and improving the chances of survival of the translocated endangered Laysan finch and Laysan duck populations. There could be a short-term minor negative effect due to removal of invasive alien vegetation that may currently provide cover or feed to migratory birds. This could be offset by the improved conditions the restored native habitat would afford.

Inventorying and documenting the life histories of endemic terrestrial invertebrates on Nihoa and Mokumanamana (HMC-5.1) would aid in identifying and controlling those species that affect the native vegetative communities, including the five endangered plant species found there. This could have the beneficial effect of preserving the most intact native coastal plant assemblages in the state. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. Field activities could have a short-term minor negative effect on migratory species due to human presence. However, affected individuals would be expected to resume normal behavior within a short period of time after the activity has ended with no lasting effects.

3.2.4.3 Reducing Threats to Monument Resources

Emergency Response and Natural Resource Damage Assessment Action Plan

Planning and Administrative Activities

Damage assessment is an important component of any emergency response plan (ERDA-1.4). The Monument Emergency Response and Assessment Team would coordinate with the appropriate agencies to ensure that appropriate response, injury assessment, and restoration activities take place for any given emergency throughout the Monument. This could result in beneficial effects on all threatened and endangered species, migratory birds, marine mammals, marine and terrestrial species, and habitat by minimizing damage from the event and facilitating restoration, including minimizing unintentional damage that might otherwise result from response and restoration efforts, thereby allowing a faster recovery of any affected population. Any response, by either boat or vehicle, could disturb marine mammals, migratory birds, and other native species, including disturbance and mortality every time a seabird colony is entered. These effects are explained in section 3.2.2. These short-term effects could be offset by the benefits provided by the response actions, which could minimize damage from any event and aid in recovery. In addition, the agencies commit to consultation under either the Endangered Species Act or the Marine Mammal Protection Act before beginning any action that could affect any marine mammal or federally listed species or designated critical habitat.

Marine Debris Action Plan

Field Activities

The Proposed Action alternative calls for Monument staff to work with partners to remove marine debris in the Monument and to reduce additional debris entering the Monument (MD-1.1); to catalog, secure, contain, and properly remove hazardous materials that wash ashore in the NWHI (MD-1.2); and to work with partners on marine debris studies (MD-2.1). These efforts could reduce the potential exposure of species inhabiting marine and terrestrial habitats to

dangerous debris such as abandoned nets and to hazardous material. All in-water and on-land activities would continue to be conducted in accordance with BMPs (See MMP, Volume III, Appendix I) that avoid the potential for any effects on threatened and endangered species. For example, should a Hawaiian monk seal or other listed species be observed during a dive, the standard procedure is to cease all activity until the animal departs the area. In addition, any person who encounters a monk seal on a beach while conducting an activity not related to monk seal population monitoring and recovery actions must not come within 150 feet of the seal. These BMPs have been in effect for decades to avoid negative effects on the Hawaiian monk seal.

BMPs (See MMP, Volume III, Appendix I) to avoid or minimize effects on seabirds require that when a person first approaches a seabird colony they look for any nests or for adults flushing from inconspicuous nests. Also, all activities could be planned to avoid displacing adults from their eggs or chicks for more than 3 minutes. While removing the nets can result in short-term negative effects from mechanical damage to the reef ecosystem from breakage, abrasion, and infaunal disturbance, there could be a beneficial effect on these species. This could be from reducing injury or mortality and improving the health of the reef and associated species.

Alien Species Action Plan

Field Activities

Surveying distributions and populations of known alien species at regular intervals (AS-2.1) and developing and implementing monitoring protocols for early detection and characterization of new infestations (AS-2.3) would assist in understanding the distribution and populations of known alien species. This would allow for prioritizing control and eradication efforts and in monitoring the success of previous efforts. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. Instituting monitoring protocols would also assist in collecting data that are meaningful and useful to the manager. This could result in a beneficial effect on all native species within the Monument that are harmed by competition or predation by alien species.

Under activity AS-4.2, rodenticide would be used to eradicate the house mouse from all of Sand Island (1,128 acres) at Midway Atoll. Beforehand, though, additional compliance might be required. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. Active management could prevent negative effects on nontarget native species. Eradication of the house mouse would remove a potential vector for diseases and eliminate competition for seed and other food items that native species require, resulting in a beneficial effect.

To protect nontarget species, Activity AS-5.2 proposes to conduct toxicant trials on pesticides to evaluate their efficacy and document ecological effects at selected islands on highest-priority invasive species of ants and wasps. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. Determining the toxicant and treatment levels that would be least likely to negatively affect nontarget species and reduce or eliminate target invasives could benefit native species by preventing mortality from treatment methods and by eliminating alien species that may compete for food or directly prey on native species. This activity could

result in a short-term negative effect on native invertebrates. Additional agency analysis and targeted use of toxicants could reduce or eliminate the potential for harm.

Activity AS-5.3 would control and possibly eradicate the two introduced mosquito species at Midway Atoll within 10 years, using methods prescribed in the Integrated Pest Management Plan. The mosquito is a vector for avian pox that affects nesting seabirds, the endangered Laysan duck, and other endangered bird species that may be established on Midway Atoll. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. Eliminating or controlling the mosquito could reduce mortality and nonlethal effects of the pox. This could result in a beneficial effect on the Laysan duck and migratory birds by protecting existing populations and would improve the chances of success for future introductions of other endangered species. Some techniques for eliminating mosquitoes could have a short-term negative effect on native arthropods. Additional agency analysis and targeted use of toxicants could reduce or eliminate the potential for harm.

Actions under Activity AS-54 would develop and implement a plan to control and possibly eradicate the invasive gray bird locust on Nihoa Island, Mokumanamana, French Frigate Shoals, and Lisianski Island (AS-5.4). Additionally, Activity AS-5.5 could protect endangered plants threatened by gray bird locust outbreaks at Nihoa Island by developing appropriate baits for localized application of toxicants to protect specific high-priority plant sites. The locust feeds on native plants, including endangered species, and during periodic outbreaks can strip plants of their leaves and seed. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. This action could have temporary negative effects on native invertebrates. Additional agency analysis and targeted use of toxicants could reduce or eliminate the potential for harm. However, controlling this invasive species could provide benefit to endangered plants by removing this stressor. This could also benefit endangered birds that depend on the vegetation for cover, nesting, and feeding.

The Proposed Action alternative includes activities to control and eventually eradicate golden crownbeard (AS-6.1) and weedy shrubs on Kure, Midway, and Pearl and Hermes Atolls. Also, in all areas where they occur, the alternative could control and eradicate the invasive grass sandbur from Kure, Midway, and Pearl and Hermes Atolls, Lisianski Island, and French Frigate Shoals (AS-6.2) and Indian pluchea, *Sporobolus pyramidatus*, and swine cress from Laysan Island (AS-6-3). Activity AS-6.4 would also control and eventually eradicate prioritized alien plant species from Kure Atoll (AS-6.4). All of these are fast-growing prolific invasives that crowd out native species. Eradicating them could have beneficial effects on native plant species by allowing the natives to expand into areas where they historically occurred. Common effects that occur when humans enter a seabird colony are explained in section 3.2.2. Additional agency analysis and targeted use of toxicants could reduce or eliminate the potential for harm.

Endangered passerines in the Monument (Nihoa finches, Nihoa millerbirds, and Laysan finches) are inquisitive and exploratory and thus can be at risk from human materials and equipment on their breeding islands. Open containers such as buckets and cooking pots that catch rainwater can result in drowning. Strings, netting, and loose fibers on tarps can entangle their feet. Openings in tents that allow entry can result in birds becoming trapped and succumbing to overheating. All activities could be planned to ensure that tent openings would remain tightly

closed, and the types of materials described above would not be left unattended in campsites at Nihoa Island, Laysan Island, and Pearl and Hermes Atoll to avoid effects on these species. This could also benefit migratory and endangered birds dependent on the vegetation for cover, nesting, and feeding.

Map, control, and eventually eradicate invasive red algae where it occurs (AS-7.1). The red algae grow in dense mats and covers and can smother coral and other marine species. Mapping the location of these infestations could assist in eradication efforts. All in-water and on-land activities would continue to be conducted in accordance with BMPs (See MMP, Volume III, Appendix I) that avoid the potential for any effects on threatened and endangered species. While removal of red algae might have short-term negative effects on reef ecosystems from mechanical damage to the reef, such as breakage, abrasion, and infaunal disturbance, reducing the extent of the red algae infestation could allow native marine corals and marine species that depend on that coral to return to their historic levels. This could have a beneficial effect.

Activity AS-7.2 proposes to conduct surveillance at appropriate sites for snowflake coral and other incipient marine invasives. Snowflake coral can overgrow corals and hard reef surfaces and eat zooplankton that native corals depend on. Understanding this coral and sites of likely infestation could allow managers to move quickly to eradicate this invasive before it spreads to large areas. The beneficial effect of this effort could be to protect existing corals, reef, and associated species.

The Proposed Action alternative proposes to support and conduct research on alien species detection and effects of invasive species on native ecosystems (AS-8.1), and support and conduct research on invasive species prevention, control methods, and eradication techniques (AS-8.2). Understanding alien species and how they affect native species and researching effective control and eradication methods could allow managers to take proactive measures to prevent their establishment and to minimize the effects on native species. The beneficial effect of this effort could be to protect native habitats and the species dependent upon them.

3.2.4.4 Managing Human Uses

Permitting Action Plan

Planning and Administrative Activities

Certain strategies would improve the effectiveness of permit activities through reviewing and revising the permit process and establishing a Monument-wide reporting process. Specifically, these activities are engaging outside experts to review permit applications (P-1.4), analyzing permit data to inform management decision making (P-2.2), developing and implementing a Monument reporting process (P-2.4), and developing and implementing a permit and regulatory education program (P-3.1). By improving the effectiveness of the permitting process, permit requirements could be improved to ensure that Monument resources are being protected. This could provide beneficial effects for all Monument natural resources.

Developing and implementing a Native Hawaiian cultural education program for all permit recipients (P-3.2), coordinating permitting outreach (P-3.3), and developing a pre-access training and briefing program (P-3.4) could result in beneficial effects on all Monument natural

resources. This could be done by minimizing and preventing negative effects on the Monument's natural resources by ensuring that all permittees are aware of all protocols and requirements designed to protect the cultural, historic, and natural resources.

Midway Atoll Visitor Services Action Plan

Field Activities
Activity VS-1.1 would provide visitors with opportunities for wildlife-dependent recreation to enhance their knowledge and appreciation of the Monument's natural resources. Visitors could be given the opportunity to view wildlife on Midway Atoll only. Visitors could be required to follow rules and protocols to ensure that that their activities are carried out in ways to minimize negative effects. More specific descriptions of the effects of visitors at Midway atoll are contained in the Environmental Assessment for the Interim Midway Visitors Service Plan, and in relevant compatibility determinations that are in Volume III, Appendix G of the MMP.

Continuously monitoring the effects of visitors and other users on wildlife and historic resources to ensure their protection (VS-1.3) would support an adaptive management approach to visitor use of the Monument. Under this scenario, data reflecting visitor effects would inform management decisions on the extent of visitor use that could be permitted in the future. The beneficial effects of this action and VS-1.1 could be to minimize negative effects and to protect all natural resources in the Monument. More specific descriptions of the effects of visitors at Midway atoll are contained in the Environmental Assessment for the Interim Midway Visitors Service Plan and in relevant compatibility determinations that are in Volume III, Appendix G of the MMP.

3.2.4.5 Coordinating Conservation and Management Activities

Constituency Building and Outreach Action Plan

Planning and Administrative Activities
Increased public awareness of and interest in the Monument and in conservation of its natural resources could result from the following: Incorporating new perspectives for understanding the value of NWHI ecosystems, including socioeconomic studies, to increase ocean ecosystem literacy and conservation in the Monument within five years (CBO-1.4); Continuing to develop and update printed materials to aid Monument constituencies in understanding key aspects of the Monument (CBO-2.2); As needed, holding focused forums on various Monument-related issues or topics to inform and engage a broader range of constituents (CBO-3.2); Continuing to seek out and support partnership opportunities that focus on Oceania-related issues (CBO-3.3); Within one year, establishing and supporting a Papahānaumokuākea Marine National Monument Alliance to engage a broad range of constituents, who will regularly provide recommendations and information on specific management issues (CBO-3.5); Continuing to work with the Friends of Midway Atoll National Wildlife Refuge, through FWS and supporting the establishment of a Monument-related "friends" group (CBO-3.7); and Continuing to convene the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve Advisory Council through NOAA's National Marine Sanctuary Program until the Monument Alliance is established (CBO.3.8).

This might generate volunteers and support for ongoing Monument activities. This could result in a beneficial effect on Monument natural resources by creating opportunities to expand protection and restoration efforts.

Ocean Ecosystem Literacy Action Plan

Planning and Administrative Activities

Activity OEL-1.1 would expand and improve the NWHI educational partnership's Navigating Change curriculum for elementary and middle school students, with increased focus on ocean ecosystems literacy, within three years. As curricula are developed, Activity OEL-1.2 proposes for Monument staff to work with Hawaiian-language immersion schools and the Office of Hawaiian Affairs to ensure the curricula meet their needs, including translation into the Hawaiian language. Activity OEL-1.3 would develop an ocean stewardship program for middle school and high school students within 5 years. Educating school-age children could result in increased awareness of the importance of natural resources among teachers and students alike, and possibly among the students' families. It might lead to increased interest in and support for the conservation of Monument resources. This could result in a beneficial effect on Monument natural resources by creating opportunities to expand protection and restoration efforts.

3.2.4.6 Achieving Effective Monument Operations

Coordinated Field Operations Action Plan

Planning and Administrative Activities
Additional planning activities would target managing, maintaining, and coordinating the use of small boats and identifying aircraft service that would increase operation efficiency and delivery capacity (CFO-6.1). These planning activities could indirectly benefit biological resources by providing for the most efficient use of available resources to transport researchers and staff engaged in habitat restoration and other Monument management activities to the locations where their work is to be done, and by potentially avoiding and/or minimizing potential disturbance to or collisions with birds and marine mammals from transportation activities.

Infrastructure and Development Activities
Within five to ten years a small research/enforcement vessel would be stationed at Midway Atoll (CFO-6.3). This would allow enforcement personnel to respond to activities that represent a hazard to terrestrial or marine habitats. A rapid response could allow Monument management staff to avoid an event or at least minimize any damage that might be caused. This would result in a beneficial effect on marine and terrestrial natural habitat, threatened and endangered species, marine mammals, migratory birds, and other native species.

Providing logistical, infrastructure, and transportation support for threatened and endangered species recovery actions (CFO-9.3) would enhance the ability to transport Threatened and Endangered species, equipment, and personnel among the various atolls could aid in recovery efforts. Being able to capture, transport, treat, and return threatened and endangered animals to the wild is important for maintaining a healthy population and would result in a beneficial effect.

Table 3.2-1
Summary of Effects on Natural Resources of the Proposed Action Alternative

Understanding and Interpreting the Northwestern Hawaiian Islands		
Action Plan	**Action Areas**	**Effects**
Marine Conservation Science *(EA section 1.6.1)* *(EA section 1.7.1)*	Planning/ Administrative	• Beneficial effects on all natural resources of the Monument
Native Hawaiian Culture and Interpreting the NWHI *(EA section 1.6.2)* *(EA section 1.7.2)*	Planning/ Administrative	• Minor negative effects on native plants and wildlife • Short-term minor negative effects on seabirds • Beneficial effect on all natural resources of the Monument
Historic Resources *(EA section 1.6.3)* *(EA section 1.7.3)*	Planning/ Administrative	• Beneficial effect on all natural resources of the Monument • Beneficial effects on threatened and endangered species • Beneficial effects on terrestrial habitats
Maritime Heritage *(EA section 1.6.4)* *(EA section 1.7.4)*	Planning/ Administrative	• Beneficial effects on ocean, nearshore, and shoreline habitats • Beneficial effects on threatened and endangered species • Beneficial effect on marine mammals • Beneficial effects on migratory birds
	Field Activities	• Short-term minor negative effect on threatened and endangered species • Short-term minor negative effect on migratory birds • Short-term minor negative effect on marine species
Conserving Wildlife and Habitats		
Action Plan	**Action Areas**	**Effects**
Threatened and Endangered Species *(EA section 1.6.5)* *(EA section 1.7.5)*	Planning/ Administrative	• Beneficial effect on all threatened and endangered species • Beneficial effect on migratory birds • Beneficial effect on marine mammals • Minor negative effect on shoreline vegetation
	Field Activities	• Beneficial effect on the endangered spinner dolphin • Beneficial effect on the endangered Hawaiian monk seal • Beneficial effect on the threatened green sea turtle • Beneficial effect on the endangered Laysan duck • Beneficial effect on migratory birds • Beneficial effect on marine habitats • Beneficial effect on terrestrial habitat • Beneficial effect on passerines • Beneficial effect on the endangered *Prichardia remota* and *Mariscus pennatiformis* • Short-term minor negative effect on Hawaiian monk seal • Short-term minor negative effect on migratory birds • Short-term minor negative effect on seabirds • Short-term negative effect on terrestrial habitat • Short-term minor negative effects on native invertebrates • Short-term minor negative effects on terrestrial plants
Migratory Birds *(EA section 1.6.6)* *(EA section 1.7.6)*	Planning/ Administrative	• Beneficial effect on threatened and endangered species • Beneficial effect on migratory birds

Habitat Management and Conservation *(EA section 1.6.7)* *(EA section 1.7.7)*	Planning/ Administrative	• Beneficial effect on migratory and resident birds • Beneficial effect on marine mammals • Beneficial effect on marine, coastal, and terrestrial habitats • Beneficial effect on migratory and resident birds • Beneficial effect on freshwater habitat and species
	Field Activities	• Beneficial effect on the endangered Laysan finch and other threatened and endangered species • Beneficial effect on native coastal plant community • Beneficial effect on native plant communities • Beneficial effect on arthropods • Beneficial effect on migratory birds • Short-term minor negative effects on migratory and passerine birds • Short-term minor negative effects on marine species • Short-term minor negative effect on passerine birds • Short-term minor negative effect on terrestrial plants and habitat
Reducing Threats to Monument Resources		
Action Plan	**Action Areas**	**Effects**
Marine Debris *(EA section 1.6.8)* *(EA section 1.7.8)*	Field Activities	• Beneficial effect on the endangered Hawaiian monk seal • Beneficial effect on migratory birds • Beneficial effect on marine and terrestrial habitat • Short-term negative effects on reef ecosystem
Alien Species *(EA section 1.6.9)* *(EA section 1.7.9)*	Field Activities	• Beneficial effect on threatened and endangered species • Beneficial effect on native species • Beneficial effect on marine and terrestrial habitat • Beneficial effect on native corals and reef fish • Beneficial effect on migratory birds • Beneficial effect on native species • Short-term negative effect on native invertebrates • Short-term minor negative effect on seabirds • Short-term negative effect on reef ecosystem
Emergency Response and Natural Resource Damage Assessment *(EA section 1.6.11)* *(EA section 1.7.11)*	Planning/ Administrative	• Beneficial effect on threatened and endangered species • Beneficial effect on migratory birds • Beneficial effect on marine mammals • Short-term minor negative effect on marine mammals and migratory birds
Managing Human Uses		
Action Plan	**Action Areas**	**Effects**
Permitting *(EA section 1.6.12)* *(EA section 1.7.12)*	Planning/ Administrative	• Beneficial effect on all natural resources in the Monument
Midway Atoll Visitors Services *(EA section 1.6.14)* *(EA section 1.7.14)*	Field Activities	• Beneficial effect on all natural resources in the Monument

Coordinating Conservation and Management Activities		
Action Plan	**Action Areas**	**Effects**
Constituency Building and Outreach *(EA section 1.6.13)* *(EA section 1.7.13)*	Planning/ Administrative	• Beneficial effect on all natural resources in the Monument
Ocean Ecosystems Literacy *(EA section 1.6.18)* *(EA section 1.7.18)*	Planning/ Administrative	• Beneficial effect on all natural resources in the Monument
Achieving Effective Monument Operations		
Action Plan	**Action Areas**	**Effects**
Coordinated Field Operations *(EA section 1.6.21)* *(EA section 1.7.21)*	Planning/ Administrative	• Beneficial effect on threatened and endangered species • Beneficial effect on migratory and resident birds • Beneficial effect on marine mammals
	Infrastructure and Development	• Beneficial effect on threatened and endangered species • Beneficial effect on migratory birds • Beneficial effect on marine mammals • Beneficial effect on marine and terrestrial habitats • Beneficial effect on native species

3.3 CULTURAL AND HISTORIC RESOURCES

3.3.1 Effects Analysis Methodology

The method for assessing potential effects on cultural and historic resources involves identifying sensitive resources in the ROI, identifying activities that could affect those resources, and determining the type and magnitude of potential effects on those resources. Only cultural resources that are determined to be eligible for listing under the NRHP are subject to protection under the NHPA; however, additional protection for cultural resources is provided under ARPA, American Indian Religious Freedom Act (AIRFA), and Native American Graves Protection and Repatriation Act (NAGPRA) and several executive orders. Resources that are pending evaluation for NRHP eligibility have been treated and would continue to be treated as eligible until formal determinations are made.

The types of effects that would be difficult to quantify or qualify are the effects that certain activities may have on the spiritual and cultural values of cultural resources and their inseparability from the natural environment. Traditional Native Hawaiian practices tie current generations to their ancestors through genealogies that link them to the earliest creation in Hawai‘i. These ties hold that their ancestors become familial deities shortly after death and are personified in the natural and physical elements. Because of this familial relationship to these elements, the traditional values view of the world is that it is sacred and to be treated with high reverence. These values center on the integral nature of the cultural and ecological environment. Maintaining this principle is done through *pono* (righteous, necessary, appropriate) actions toward the natural environment/ecosystem, and more specifically by taking care of *wahi kūpuna* (ancestral sites), which provide a means to maintain connection with the *mauli ola* (spiritual life force, essence, literally “breath of life”) of their ancestors.

3.3.2 Effects Common to Proposed Actions on Cultural and Historic Resources

Section 106 of the NHPA requires federal agencies to consider the effects of their actions on properties listed on or eligible for listing on the NRHP. These properties also include those ATI that have been evaluated and determined to be eligible. Pending formal evaluations, all cultural resources and potential components of cultural landscapes could be treated as though they are eligible.

NHPA and NEPA compliance are separate and parallel processes, and the standards and thresholds of the two acts are not precisely the same. A negative effect on a historic property, as defined by the NHPA, is not necessarily a significant effect under NEPA. While mitigation under the NHPA does not necessarily negate the negative nature of an effect, mitigation measures identified under NEPA could reduce the significance of an effect. NHPA and NEPA compliance are separate and parallel processes, and the standards and thresholds of the two acts are not precisely the same.

Section 106 and its implementing regulations, 36 CFR Part 800, state that an undertaking has an effect on a historic property (i.e., NRHP-eligible resource) when it could alter those characteristics of the property that qualify it for inclusion on the NRHP. An undertaking is considered to have a negative effect on a historic property when it diminishes the integrity of the

property's location, design, setting, materials, workmanship, feeling, or association. Section 106 negative effects include, but are not limited to, the following:

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property or alteration of the character of the property's setting when that character contributes to the property's qualifications for the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or changes that may alter its setting;
- Neglect of a property, resulting in its deterioration or destruction; and
- Transfer, lease, or sale of a property without adequate provisions to protect its historic integrity.

A broader range of Native Hawaiian sites, including sacred sites, burials, and cultural items and other areas of traditional importance that might not necessarily be considered eligible for protection under NRHP, may still be protected under AIRFA, ARPA, or NAGPRA.

Activities that are not currently covered by a state cultural impact assessment (CIA) or that have not undergone Section 106 consultations may cause a short-term negative effect on both cultural and historic resources. Activities proposed to identify, collect, and review publications, data sets, and documents to identify cultural resources beyond Midway Atoll within 12 years are not covered under a CIA. Negative effects could be minimized by exercising the NHPA Section 106 process, which includes review and consultation among the Co-Trustees, the State Historic Preservation Officer, OHA, and Native Hawaiian organizations. Further discussion of the CIA can be found below in section 3.3.2.2.

Historic properties at Midway Atoll NWR are managed according to a 1999 Historic Preservation Plan (Speulda et al. 1999). The plan was drafted with recommendations from interest groups, historic preservation specialists, and the Advisory Council on Historic Preservation. The Midway Historic Preservation Plan prescribes one of six different treatment categories for each of the 63 historic properties on the atoll: reuse, secure, leave as-is, fill in, demolish, or relocate. The plan also identifies procedures for treating new discoveries and caring for museum collections and includes recommendations for interpretation, education, and public outreach.

3.3.2.1 Paleontological Resources

Paleontological sensitivity or potential is a qualitative measure of the density and scientific value of a site's fossils. It also gauges the probability that site development would directly or indirectly destroy a unique scientifically significant paleontological resource. Such a resource is generally considered to consist of vertebrate remains, of unusual, useful, or exceptionally well-preserved trace fossils or invertebrate/plant remains, or of exceptionally rich or diverse fossil assemblages. Paleontologists use a three-part classification of paleontological sensitivity outlined by the

Society of Vertebrate Paleontology (1995). It includes high sensitivity, low sensitivity, and undetermined sensitivity rankings. Within this classification scheme, a high sensitivity site has one of the following characteristics:

- It is underlain by or contains exposures of sedimentary rocks or some types of volcanic rocks that are of the right age, origin, and location to *potentially* contain significant fossils;
- It is underlain by or contains exposures of sedimentary rock or some types of volcanic rocks that are *known* to contain significant fossils; or
- It contains potentially datable remains older than the historic period, including nests and middens (a deposit of shells, bones, and other artifacts that suggest previous human settlement).

Sites that do not contain the characteristics listed above are not considered sensitive.

3.3.2.2 State of Hawai‘i Cultural Impact Assessment

Native Hawaiian customary and traditional subsistence, cultural, and religious sites and practices are protected under Section 7 of Article XII of the Constitution of the State of Hawai‘i. The State has a number of laws and programs to protect cultural rights and locations. Chapter 6E of the Hawai‘i Revised Statutes establishes the Historic Preservation Program for ongoing historical and archaeological research and development. This program includes statewide surveying and inventorying historic properties, aviation artifacts, and burial sites; preparing, reviewing, and revising a state historic preservation plan; providing interpretive programs for historic properties; holding burial sites in trust; and regulating archaeological activities. Section 6E-7 maintains that all historic property on lands and under waters owned or controlled by the State shall be property of the State and that property is not allowed to be transferred without consultation with appropriate island burial council. Section 6E-43 states that discovery of prehistoric and historic burial sites over 50 years old requires consultation with the island burial council. Section 6E-61 establishes a Hawai‘i biological survey consisting of an ongoing natural history inventory of the Hawaiian archipelago to locate and identify flora and fauna for a wide range of uses. Chapter 6E also defines violations regarding activities that take, excavate, injure, destroy, or alter any historic property, aviation artifact, and burial site, including manipulation of human remains. Chapter 300 of Hawai‘i Administrative Rules outlines the practices and procedures of Native Hawaiian burial sites to ensure their care and protection. It establishes the Islands Burial Councils, which determine the preservation or relocation of previously identified Native Hawaiian burial sites. These rules, along with Sections 6E-11, 6E-12, 6E-43, 6E-43.5, and 6E-43.6, HRS, were amended or enacted to provide additional protection for Native Hawaiian burial sites.

In addition to the above, the State Historic Preservation Program requires an assessment of potential impacts on cultural practices and features as part of the environmental review process. In assessing cultural effects, the CIA was developed along with Guidelines for Assessing Cultural Impacts by the State of Hawaii’s Department of Health’s Office of Environmental

Quality Control. A CIA for the Papahānaumokuākea Marine National Monument Management Plan was prepared in accordance with state laws and is found in Appendix A.

3.3.3 No Action

This section is a brief description of activities that are underway in the Monument and an analysis of the effects associated with these activities. Only those activities that could have an effect on cultural and historic resources are included. Analyzed are the projected beneficial and negative effects expected to continue under the No Action alternative, should this alternative be selected for implementation. The No Action alternative could result in no change to the current situation, but current activities could continue under the Proposed Action alternative, and their effects are summarized under the Proposed Action in Table 3.3-1 at the end of this section.

3.3.3.1 Understanding and Interpreting the NWHI

Native Hawaiian Cultural and History Action Plan

Planning and Administrative Activities

Monument regulations define Native Hawaiian practices as cultural activities conducted for the purposes of perpetuating traditional knowledge, caring for and protecting the environment, and strengthening cultural and spiritual connections to the NWHI that have demonstrable benefits to the Native Hawaiian community. Monument staff would identify cultural research needs, priorities and opportunities as they arise (NHCH-1.2) and would continue to manage cultural and historic resources through planning and administrative activities that could increase the staff's capacity to carry out strategies and activities (NHCH-3.1). These activities could have beneficial effects on cultural and historic resources by increasing the Monument staff's knowledge base, understanding, and interpretive values of cultural and historic resources, providing for better protection and management of cultural and historic resources.

Research needs that could be accomplished through Hawaiian cultural methods would be identified and used to increase staff knowledge. Such research could be conducted through ethnographic interviews, researching oral traditions, and archival searches (NHCH-1.1). The MMB would continue to support, provide, and facilitate research on issues and priorities identified by providing grants, logistical support, and berthing space aboard research vessels (NHCH-2.2). Native Hawaiian traditional ecological knowledge and management concepts would be identified and incorporated into the management of Monument resources (NHCH-3.4). Identifying research needs, providing financial and logistical support for research, and incorporating Native Hawaiian traditional ecological knowledge and associated practices into Monument management could have beneficial effects on cultural and historic resources. This would come about by enhancing, incorporating, and perpetuating understanding of Native Hawaiian culture and knowledge, in effort to better manage and protect the resources.

Maritime Heritage Action Plan

Planning and Administrative Activities

Preserving maritime heritage resources, such as submerged and beached shipwrecks, aircraft, and other sites of historical, cultural, and archaeological significance, provides records of the historical activities in the NWHI, and allows increased protection and management of the resources. The MMB would continue to carry out activities under the maritime heritage action plan and would complete a Monument Maritime Heritage Resource Research Plan (MH-3.3). Efforts would be made to collect and review maritime publications and develop regular status reports to develop a maritime heritage database (MH-1.1, MH-1-4). This internal maritime heritage resource database would be developed and maintained by maritime archaeologists to prioritize target sites (MH-1.5). All new data and findings, including recovered and conserved maritime artifacts, would be incorporated into education and outreach materials through the participation of Monument maritime archaeologists in coordinating and participating in public outreach regarding Monument heritage resources and maritime history (MH-2.1) and participating in select presentations, conferences, and events (MH-2.2). Protecting and managing maritime heritage resources through inventorying, evaluating and interpreting them would increase maritime heritage preservation in the Monument and awareness of these resources. This could have beneficial effects on cultural and historical resources.

For more effective use of facilities and equipment, the MMB would coordinate interagency communication regarding maritime resources management (MH-3.1). Protective status for specific sites would be sought as needed using federal recognition under the NHPA and the NRHP. Preservation measures of the Department of Land and Natural Resources would be implemented for resources on state bottomlands (3 nautical miles from emergent lands) via the SHPD (MH-3.2). Under the No Action alternative, there could be beneficial effects on cultural and historic resources as a result of improved management, preservation, and protection of cultural and historic resources.

Field Activities

Locating and preserving heritage sites within the Monument increases the understanding of these resources and fosters effective and protective management of historical sites. The MMB would continue to coordinate and carry out annual field mapping surveys and complete progress reports of select heritage sites to better understand and interpret heritage sites (MH-1.2). Knowledge gained from mapping would contribute to understanding and interpreting heritage sites and would lead to better management and protection; therefore, these activities could have beneficial effects on cultural and historic resources.

3.3.3.2 Conserving Wildlife and Habitats

Threatened and Endangered Species Action Plan

Planning and Administrative Activities

Through proper planning, implementation, and inclusion of established management practices, the protection of cultural and historic sites could be incorporated as appropriate into natural

resource management plans. Through protection of the natural environment, cultural and spiritual values of the Native Hawaiian culture in the Northwestern Hawaiians Islands can be maintained. This preserves intangible elements of the Hawaiian culture, such as their recognized spiritual and genealogical connections to the natural environment, the integrity of Native Hawaiian sacred sites, and the ability of people to perpetuate traditional practices. Protecting the surrounding natural habitats could have beneficial effects on the integrity of cultural and historic resource sites. This could be done by increasing the capacity of NOAA Fisheries and FWS to address ESA consultation for activities within the Monument and working with federal agencies proposing activities there (TES-8.1, TES-8.3).

Field Activities

The natural environment and its resources are seen as an integral part of Hawaiian culture and many of its practices. Field activities that are carried out to conserve, manage, monitor, and document natural habitats include supporting activities to advance recovery of Hawaiian monk seals removing marine debris from critical habitats (TES-1.1), encouraging increasing populations of Laysan ducks through monitoring (TES-5.1), and maintaining stable populations of passerine species by conducting annual censuses of populations and their required food and habitats (TES-6.1). These activities aim to protect surrounding natural resources and to increase or stabilize species' populations; therefore, having beneficial effects on cultural and historic resources.

Intangible elements of the Hawaiian culture, such as their recognized spiritual and genealogical connections to plants, would be maintained by establishing populations of listed plant species. Species abundance is increased and the natural environment is restored by increasing the number and locations of *Amaranthus brownii* and *Schiedea verticillata* on Nihoa (TES-7.2), establishing a self-sustaining *Pritchardia remota* population on Laysan Island (TES-7.3), and continuing greenhouse operations on Laysan Island to propagate and outplant rare plant taxa (TES-7.4). These activities aim to protect surrounding natural resources and to increase or stabilize species' populations; therefore, having beneficial effects on cultural and historic resources and traditional practices..

Migratory Birds Action Plan

Field Activities

By protecting the natural environment, cultural and spiritual values of Native Hawaiian culture in the NWHI can be maintained. Field activities that are carried out to conserve, manage, monitor, and document natural habitats and minimize the impact of threats to migratory birds include maintaining rigorous quarantine protocols to prevent the introduction of alien species, such as invasive plants or animals that may damage migratory bird habitats (MB-2.4). Protecting natural habitats for migratory birds could have beneficial effects on cultural and historic resource site integrity by maintaining natural values important to Native Hawaiian culture.

Habitat Management and Conservation Action Plan

Field Activities

The natural environment and its resources are seen as an integral part of the Hawaiian culture and many of its practices. Restoring and maintaining native ecosystems supports the traditional practices of Native Hawaiians for protecting and maintaining natural resources. Investigating and inventorying known contamination from historic human use in the NWHI include collecting and characterizing oil found washed ashore and on wildlife, building an oil sample archive (HMC-2.5), and monitoring the area at Laysan Island that was contaminated by carbofuran (HMC-2.6). The investigation and inventories of contaminated sites in the NWHI could have beneficial effects on cultural and historical resources by protecting and restoring native ecosystems from the numerous effects of known contaminants.

Restoring and maintaining coastal mixed grasses and shrubs on all the coralline islands and atolls of the Monument include propagating and outplanting native species (HMC-4.1), implementing the Draft Restoration Plan (HMC-4.2), and replacing 60 acres of introduced shrub *Indian pluchea* at Laysan Island with native species (HMC-4.3). The maintenance and better understanding of the Monument's wetland and mudflat habitats include monitoring water level, salinity, and other water quality parameters of Laysan Lake, documenting any loss of lake area (HMC-6.1), and restoring dune habitat on Laysan Island to minimize sand movement (HMC-6.2). These activities could have beneficial effects on cultural and historic resources by preserving the native ecosystems and natural habitats, thereby supporting traditional Hawaiian values of protecting and maintaining natural resources.

3.3.3.3 Reducing Threats to Monument Resources

Marine Debris Action Plan

Planning and Administrative Activities

Culture and historic resources that may be submerged or located on coastal sites provide evidence of historical activities in the NWHI. The MMB will work with fishery management councils to assess and address fishing practices or domestic fishing gear that contribute to marine debris problems (MD-1.5) The results of this planning activity would include coordinating with the Councils to initiate an accountability requirement for all vessels using the type of gear that contributes to marine debris in the NWHI. Planning for the removal of debris, detecting and preventing incoming debris, and educating the public to prevent future generations of debris in the Monument could prevent the destruction or desecration of undiscovered cultural and historic resources. This could result in beneficial effects on cultural and historic resources.

Alien Species Action Plan

Field Activities

The natural environment and its resources are seen as an integral part of the Hawaiian culture and many of its practices. Detecting, controlling, eradicating, and preventing the introduction of alien species supports the traditional Native Hawaiian values of protecting and maintaining natural resources. Measures taken to enforce the use of current quarantine protocols and hull

inspections and cleaning to prevent the introduction of invasive terrestrial species to the Monument could have a beneficial effect on cultural resources (AS-3.1, AS-3.2). Preventing alien species invasions could reduce the need to work on, near, or at cultural sites to eradicate alien species. This could have a beneficial effect on cultural and historic resources. While eradication of pests could yield a beneficial effect on cultural and historic resources, there is a potential for short-term minor negative effects through site disturbance during activities requiring work on, near, or at cultural sites.

3.3.3.4 Managing Human Uses

Permitting Action Plan

Planning and Administrative Activities

The natural environment is protected and strong cultural and spiritual ties of the Native Hawaiians to the NWHI is maintained through an effective and integrated permit program to manage human access and minimize and prevent negative impacts on the Monument. This is achieved by promptly reviewing permit applications to ensure informed permit-related decision making across Co-Trustee agencies (P-1.1); refining and updating the permit application, instructions, and permit template through feedback from permittees and other users (P-1.2); coordinating appropriate environmental review for all permitted activities (P-1.3); and regularly updating the public on proposed and permitted activities (P-3.5). These activities provide additional oversight of Monument activities, contributing to a well-informed resource management staff, who would be better equipped to manage and protect cultural and historic resources. This could result in beneficial effects on cultural and historic resources.

Enforcement Action Plan

Planning and Administrative Activities

The natural environment is protected and strong cultural and spiritual ties of the Native Hawaiians to the NWHI is maintained through an effective compliance and enforcement program within the Monument. Such activities as conducting a comprehensive threat assessment, drafting an enforcement plan (EN-2.1), and operating the mandatory Vessel Monitoring System for all permitted vessels (EN-2.2) provide additional oversight of Monument activities. This contributes to a well informed resource management staff, who would be better equipped to manage and protect cultural and historic resources. This could result in beneficial effects on cultural and historic resources.

3.3.3.5 Coordinating Conservation and Management Activities

Constituency Building and Outreach Action Plan

Planning and Administrative Activities

Public outreach for managing activities within the Monument helps maintain the connection between cultural and conservation practices. Outreach is improved by MMB agencies collaborating to reach a broader audience (CBO-3.1), to support partnership opportunities that focus on Oceania-related issues (CBO-3.3), and to convene the Northwestern Hawaiian Islands

Coral Reef Ecosystem Reserve Advisory Council to provide formal advice on management activities (CBO-3.8). Through public outreach, the Monument could garner public support for protecting and properly managing cultural and historic resources. This could result in beneficial effects on cultural and historical resources.

Native Hawaiian Community Involvement Action Plan

Planning and Administrative Activities

The unique biological, cultural, scientific, educational, historical, and recreational values of the NWHI require that the region be carefully managed to ensure these values are not diminished for future generations. Such activities as identifying how traditional ecological knowledge could be integrated into Monument activities (NHCI-3.1) would further engage the Native Hawaiian community in management activities in the Monument. Native Hawaiian involvement would perpetuate the relationship between their spirituality and the natural and physical elements of the NWHI, resulting in beneficial effects on cultural and historic resources.

Ocean Ecosystem Literacy Action Plan

Planning and Administrative Activities

The natural environment and its resources are seen as an integral part of the Hawaiian culture and many of its practices. The natural environment would be protected and the strong cultural and spiritual ties of the Native Hawaiians to the NWHI would be maintained by developing and implementing educational programs to increase ocean ecosystems literacy and promote stewardship values. Activities to accomplish this include expanding and improving the NWHI educational partnership's Navigating Change curriculum for elementary and middle school students, with increased focus on ocean ecosystems literacy, within three years (OEL-1.1). Through public outreach, the Monument could garner public support for protecting and properly managing cultural and historic resources. This could result in beneficial effects on cultural and historic resources.

Field Activities

The natural environment and its resources are an integral part of the Hawaiian culture and many of its practices. The natural environment would be protected and the strong cultural and spiritual ties of the Native Hawaiians to the NWHI would be maintained through educational expeditions to the NWHI. An example of this is activities that continue to provide educational opportunities for teachers and students at the NWHI (OEL-1.5, OEL-1.8). Through public outreach, the Monument could garner public support for protecting and properly managing cultural and historic resources. This could result in beneficial effects on cultural and historic resources.

3.3.3.6 Achieving Effective Monument Operations

Evaluation Action Plan

Planning and Administrative Activities

An annual program review would include a description of the status of activity implementation. Recommended adjustments would be provided in an annual report (EV-1.2). An annual review, including tracking the progress of the actions plans, would ensure ongoing protection and proper management of cultural and historic resources. This could result in beneficial effects on cultural and historic resources.

3.3.4 Proposed Action

The Proposed Action would expand current activities and includes new activities described in the Monument Management Plan; the effects of these activities are described below. Implementation of the Proposed Action includes continuing those activities described for the No Action alternative, described in Section 3.3.3 above. The effects of these activities would also continue under the Proposed Action. Only those activities that would have an effect on cultural and historic resources are included in this analysis.

The Proposed Action would require additional conditions of permittees accessing the Monument. The permittee and any person entering the Monument must attend a cultural briefing or view designated cultural informational materials outlining the region's cultural significance and native Hawaiians' spiritual and genealogical connection to the natural and cultural resources. Disturbance of any cultural or historic property is prohibited under the conditions of a Monument permit. The Proposed Action could result in additional funding for educational programs and exhibits for historic resources in the Monument. Further public outreach provided through new programs, visitor centers, and educational materials would bring heightened public awareness for historic resources within the Monument and a greater constituency base for support and protection of cultural resources. Repairing, maintaining, and restoring historic structures would prolong their integrity and would protect historic and cultural resources into the future.

3.3.4.1 Understanding and Interpreting the NWHI

Native Hawaiian Cultural and History Action Plan

Planning and Administrative Activities

Monument regulations define Native Hawaiian practices as cultural activities conducted to perpetuate traditional knowledge, to care for and protect the environment, and to strengthen cultural and spiritual connections to the NWHI that have demonstrable benefits to the Native Hawaiian community. In partnership with the Native Hawaiian Cultural Working Group, cultural practitioners, and other experts, the MMB would develop a Cultural Resources Program Plan (NHCH-4.1). The purpose would be to identify cultural resources, sites, and other locations within the Monument that are appropriate for use in contemporary Native Hawaiian culture. The Cultural Resources Program Plan would address protocols, policies, and procedures for

collections, curations, and dispositions of archaeological materials, artifacts, and human remains. Monument staff would continue to work with partners to compile existing information about the region and initiate new cultural and historic research (NHCH-2.1). Increasing the understanding of Native Hawaiian histories and culture and documenting the archaeological sites and sacred resources of the NWHI by developing a formal plan and facilitating research could have beneficial effects on the cultural and historic resources of the Monument by recognizing the significance of the NWHI to Native Hawaiians.

As part of the Cultural Resources Program Plan, the MMB would work towards establishing agreements with local universities and museums to provide proper stewardship of cultural resources and artifacts through curation, research, use, return, and repatriation of collections (NHCH-2.7). A Native Hawaiian nomenclature working group would also be established to evaluate newly discovered regions, islands, and geographical and oceanic features and sites (NHCH-2.4). Information developed through this working group would be recorded in the forthcoming Monument Information Management System (NHCH-2.5). Increasing the understanding and documentation of Native Hawaiian histories and culture through research efforts could have beneficial effects on the cultural and historic resources of the Monument. This would be done by enhancing and perpetuating understanding of Native Hawaiian culture and knowledge so as to better manage and protect the resources.

The MMB would work towards increasing resource managers' knowledge base of Native Hawaiian values and cultural information through "in-reach" programs. Monument resource managers and staff and MMB members would participate in informal and formal briefings, cultural workshops, and cultural exchanges in cooperation with other marine protected area sites that integrate traditional ecological knowledge into their management (NHCH-3.3). This activity could have a beneficial effect on cultural and historic resources by increasing the Monument staff's knowledge base, understanding and interpretive values of cultural and historic resources, and providing for better protection and management of cultural and historic resources.

Native Hawaiian values and cultural information would be used to guide outreach and the development of educational materials (NHCH-5.1). Traditional ways of storytelling such as *hula*, *mele*, and *oli* would be encouraged to develop a culturally based strategy for education and outreach (NHCH-5.2). Native Hawaiian values and cultural information would be integrated into Monument permittee education and outreach programs and would foster a deeper respect for the NWHI through better understanding of, and respect for, Hawaiian values and the cultural significance of the place (NHCH-5.3). Increasing the understanding and documentation of Native Hawaiian histories and culture practices through education and public outreach could have beneficial effects on the cultural and historic resources of the Monument. This would come about by recognizing and addressing the significance of the NWHI to Native Hawaiians and preserving their traditional and familial connections to their natural environments by implementing similar resource management practices.

Field Activities

The MMB would continue to support, provide, and facilitate research and educational activities on issues and priorities identified and make opportunities available to students, teachers, and researchers in the form of grants, logistical support, and berthing space aboard research vessels

(NHCH-2.3). In an effort to support access for Native Hawaiian practices and to assure that cultural research needs are met, partnership contracts, grants, or formal agreements with Native Hawaiian organizations would be created (NHCH-2.6). Conducting and supporting cultural and historical research and facilitating access to the NWHI could have beneficial effects on cultural and historic resources by providing Native Hawaiians with the opportunity to engage in the cultural traditions, practices, and histories of the NWHI, while educating the broader public on the significance of these resources. The MMB would actively engage the Native Hawaiian Cultural Working group and other Native Hawaiian cultural practitioners to develop and implement the Monument's management activities (NHCH-3.2). Engaging the Native Hawaiian community in management activities for the Monument could have beneficial effects on cultural and historic resources by integrating the traditional ecological knowledge of Native Hawaiian practitioners and experts.

Specific preservation plans would be developed to further protect cultural sites on and collections from Nihoa and Mokumanamana (NHCH-4.2). The plans would address monitoring and stabilization of cultural sites and curatorship or return and repatriation agreements with museums and institutions that house artifact collections. A Cultural Resources Program Plan that would fully integrate cultural resource protection would be initiated and implemented (NHCH-4.3). Planning, developing, and implementing a Monument Cultural Resources Program could have beneficial effects on cultural and historic resources by protecting the cultural resources in the Monument and acknowledging and preserving their cultural significance.

Historic Resources Action Plan

Planning and Administrative Activities

Preserving historic resources, including nonmarine sites, structures, artifacts, culture, and places from the Monument's historic period provides records of past activities and increases protection and management of the resources. Through the MMB, management plans existing under the different agencies would be reconciled to address Monument management needs as a whole, including the needs of the Historic Preservation Plan, Midway Visitor Service Plan, and the lead paint abatement plan (HR-1.1*)*. The consolidation of plans would allow for more effective use of facilities and equipment, while preserving the integrity of historic sites, thereby resulting in beneficial effects on historic resources.

The Midway Atoll Historic Preservation Plan and the National Historic Landmark would be updated and submitted to the Advisory Council on Historic Preservation (HR-1.2, HR-3.3). Capacity would be built for a staff dedicated to implementing the Midway Atoll Historic Preservation Plan, which would include archival research and data collection on the Battle of Midway National Historic Landmark and improvement of the function and capacity of the Midway Museum (HR-2.1, HR-3.1, HR-4.1). The Midway Museum collection would undergo organization and curation, and oral histories of life on Midway would be compiled, collected, curated, and published to ensure a record of alternative perspectives and unique history of life on Midway (HR-4.3, HR-5.1, HR-6.1). These efforts would improve the understanding and interpretation of the history and natural history of Midway Atoll, thereby possibly resulting in beneficial effects on culture and historic resources.

Monument staff would undergo annual training on the treatments identified in the Historic Preservation Plan to be aware of the responsibilities and procedures on the atoll (HR-2.2**)**. The staff would also plan, conduct, and report on field surveys and documentation of selected sites within 15 years (HR-5.2). Standard historic archaeological practice would be exercised in this activity. Protecting and managing historic resources through staff training and planning historic resource surveys would increase historic preservation and awareness of the Monument resources. This could have beneficial effects on cultural and historic resources.

Field Activities

The MMB would continue to support, provide, and facilitate research and educational activities on issues and priorities identified and make opportunities available to students, teachers, and researchers in the form of grants, logistical support, and berthing space aboard research vessels (NHCH-2.3). In an effort to support access for Native Hawaiian practices and to assure that cultural research needs are met, partnership contracts, grants, or formal agreements with Native Hawaiian organizations would be created (NHCH-2.6). Conducting and supporting cultural and historical research and facilitating access to the NWHI could have beneficial effects on cultural and historic resources by providing Native Hawaiians with the opportunity to engage in the cultural traditions, practices, and histories of the NWHI, while educating the broader public on the significance of these resources. The MMB would actively engage the Native Hawaiian Cultural Working group and other Native Hawaiian cultural practitioners to develop and implement the Monument's management activities (NHCH-3.2). Engaging the Native Hawaiian community in management activities for the Monument could have beneficial effects on cultural and historic resources by integrating the traditional ecological knowledge of Native Hawaiian practitioners and experts.

Specific preservation plans would be developed to further protect cultural sites on and collections from Nihoa and Mokumanamana (NHCH-4.2). The plans would address monitoring and stabilization of cultural sites and curatorship or return and repatriation agreements with museums and institutions that house artifact collections. A Cultural Resources Program Plan that would fully integrate cultural resource protection would be initiated and implemented (NHCH-4.3). Planning, developing, and implementing a Monument Cultural Resources Program could have beneficial effects on cultural and historic resources by protecting the cultural resources in the Monument and acknowledging and preserving their cultural significance.

Opportunities for visitors and volunteers would be incorporated into Midway Atoll visitor services program to implement historic preservation treatments. Volunteers, under expert supervision, would be able to maintain historic properties, such as painting, restoring windows, and landscaping (HR-2.3). The adaptive reuse of historic properties at Midway Atoll would foster increased preservation of historic sites, thereby resulting in beneficial effects on historic resources.

Selected National Historic Landmark sites would be documented through field surveys, using standard historic archaeological practices (HR-3.2). Additional field surveys and documentation of selected National Historic Landmark sites and features would be conducted, including an archaeological investigation of the Commercial Pacific Cable Station site to learn about the

lifestyle of Midway's earliest permanent residents (HR-6.2). Performing field surveys and conducting archaeological investigations provides insight into the rich history of the Monument, while preserving the resources. This could have beneficial effects on cultural and historic resources.

Infrastructure and Development Activities

The Midway Museum would be remodeled to meet professional curation standards, which would better preserve the artifacts and historic materials and enhance visitors' experience with historic resources (HR-4.2). Under the Proposed Action, repair and maintenance treatments at the National Historic Landmark features would be accomplished through volunteer work, unskilled labor work, and specially trained historic preservation architects and engineers, when required (HR-3.4). Renovating museums and visitor centers would bring heightened public awareness for historic resources within the Monument and a greater constituency base for supporting and protecting cultural resources. This could have beneficial effects on cultural and historic resources. Repairing and maintaining historic structures would maintain the integrity of these sites for longer periods, thereby having beneficial effects on the historic resources.

Maritime Heritage Action Plan

Planning and Administrative Activities

Preserving maritime heritage resources, such as submerged and beached shipwrecks, aircraft, and other sites of historical, cultural, and archaeological significance, provides records of past activities and increases protection and management of the resources. A status report would be compiled and updated annually to document wreck sites and other debris, which represent potential environmental hazards (MH-1.3). Protecting maritime heritage resources by assessing the need for responding to or remediating potential environmental hazards would increase maritime heritage preservation. This could have beneficial effects on cultural and historic resources.

3.3.4.2 Conserving Wildlife and Habitats

Threatened and Endangered Species Action Plan

Planning and Administrative Activities

Through proper planning, implementation, and inclusion of established management practices, cultural and historic site protection could be incorporated into natural environment, cultural, and spiritual resources. Planning and administrative activities to support the advance recovery of the Hawaiian monk seal include evaluating the loss of critical habitat (TES-1.3); ensuring that all users of the NWHI are aware of the impacts of disturbing monk seals on breeding beaches and in nearshore waters to reduce the likelihood of impacts from human interaction (TES-1.4); and increasing outreach and education activities focusing on Hawaiian monk seals (TES-1.5). These activities would protect surrounding resources and would increase species populations; therefore, having beneficial effects on cultural and historic resources.

Cooperatively working with international recovery teams and governments to increase short-tailed albatross populations by establishing one or more breeding populations on islands free of

threats (TES-4.1) and disseminating public outreach information on fisheries bycatch and bycatch reduction for to fisheries occurring outside the Monument (TES-4.3 would further reduce the potential threats to threatened and endangered species. to provides. There could be beneficial effects on cultural and historic resource site integrity by increasing the awareness of irreplaceable resources in the Monument in order to provide better protection and management. This could be done by reducing negative effects on threatened and endangered species through outreach and education and by exchanging data with domestic and international groups.

Field Activities

The natural environment and its resources are seen as an integral part of the Hawaiian culture and many of its practices. Field activities that are carried out to conserve, manage, monitor, and document species and their natural habitats include facilitating emergency response activities for monk seals (TES-1.2); determining the status of cetacean populations (TES-2.1); verifying and managing potential threats to cetaceans (TES-2.3); preventing negative human-cetacean interactions (TES-2.5); ensuring that nesting populations of green turtles at source beaches are stable or increasing (TES-3.1); protecting marine habitats used by green turtles for foraging and migration routes (TES-3.3); and conducting studies to protect short-tailed albatross and contaminant loads (TES 4.2). These activities aim to protect surrounding natural resources, increase or stabilize species' populations, and protect critical habitats. This would have beneficial effects on cultural and historic resources.

Maintaining stable populations of species by relocating Laysan ducks (TES-5.2) and finches, Nihoa finches, and Nihoa millerbirds (TES-6.2) to other sites in the Monument would protect surrounding natural resources and critical habitats and would increase or stabilize species' populations. This would have beneficial effects on cultural and historic resources.

Developing ecological baselines of listed species and critical habitat (TES-8.2) would assist Monument managers, consulting agencies, and action agencies in determining whether activities may affect listed species. The activities described above would contribute to a well-informed management staff who would be better equipped to manage and protect surrounding natural resources, increase or stabilize species' populations, and protect critical habitats. This would have beneficial effects on cultural and historic resources.

Migratory Birds Action Plan

Field Activities

Protecting the natural environment and surrounding natural resources maintains the strong cultural and spiritual values of the Native Hawaiians to the NWHI. Field activities that are carried out to conserve, manage, monitor, and document natural habitats and minimize the negative effects of threats to migratory birds include controlling or eradicating nonnative species that have a negative effect on migratory birds (MB-1.1); restoring components of the native vegetation communities that are important to seabird nesting (MB-1.2); and monitoring other conditions that might limit the success of existing colonies, hinder restoration efforts, or change the quantity or quality of habitat on which migratory birds depend (MB-2.2, MB-3.1, and MB-3.2, MB-3.3).Protecting natural habitats for migratory birds and their populations could have

beneficial effects on cultural and historic resource site integrity by increasing the awareness of irreplaceable resources in the Monument and by preserving the natural environment.

Habitat Management and Conservation Action Plan

Planning and Administrative Activities

The natural environment and its resources are seen as an integral part of the Hawaiian culture and many of its practices. Restoring and maintaining native ecosystems supports the traditional Native Hawaiian practices of protecting and maintaining natural resources. Planning activities include identifying and prioritizing restoration needs in shallow reef habitats (HMC-1.1); evaluating the costs to ecosystem function and benefits of removing scrapped iron debris from reefs in the Monument (HMC-2.4); and conducting ecological risk assessments of lead-based paint to determine necessary cleanup levels (HMC-2.7). These activities would increase the protection of the native ecosystems and natural resources in the Monument and therefore could have beneficial effects on cultural and historical resources.

Developing and implementing culturally appropriate and innovative remote and direct techniques and methods for monitoring plant and animal populations on cliff habitats in the Monument (HMC-9.2) could have beneficial effects by minimizing the amount of on-site management near cultural sites.

Field Activities

The natural environment and its resources are seen as an integral part of the Hawaiian culture and many of its practices. Restoring and maintaining native ecosystems supports the traditional Native Hawaiians practices for protecting and maintaining natural resources. Monitoring changes in the species composition and structure of mixed grass and shrub plant communities on all the coralline islands and atolls of the Monument (HMC-4.7) could have a short-term minor negative effect on cultural and historic resources. This could be minimized through a programmatic agreement.

The following field activities could have a short-term minor negative effect on cultural and historic resources from physical disturbance as these activities are conducting remedial actions at shoreline dumps at FFS and at Kure, Midway, and Pearl and Hermes Atolls (HMC-2.3); restoring native vegetation on the 34-acre Southeast Island at Pearl and Hermes Atolls (HMC-4.5); implementing coordinated ecosystem restoration activities on Kure Atoll (HMC-4.6); inventorying and documenting life histories of endemic terrestrial invertebrates at Nihoa and Mokumanamana (HMC-5-1); and removing ironwood on 50-acres on Sand Island. These minor negative effects could be minimized by exercising the NHPA Section 106.

3.3.4.3 Reducing Threats to Monument Resources

Marine Debris Action Plan

Planning and Administrative Activities

Cultural and historic resources that may be submerged or located on coastal sites provide evidence of historical activities in the NWHI. Protecting the historical resources by reducing the amount of debris entering the North Pacific Ocean is critical to preserving the history of the Monument. Gaining international cooperation and involvement for the marine debris issue (MD-1.3), developing standard monitoring protocols and outreach (MD-2.2, MD-3.1, MD-1.4), and removing hazardous materials that wash ashore (MD-1.2) would further protect the cultural and historic resources that may be submerged or located on coastal sites. Destruction or desecration of known and undiscovered cultural and historic resources could be minimized with the heightened awareness created through working with groups at an international level, through knowledge gained by the Monument staff garnered from investigative marine debris studies, and through continued outreach of multiagency partnerships. This could have beneficial effects on culture and historic resources.

Field Activities

Cultural and historic resources that may be submerged or located on coastal sites provide evidence of historical activities in the NWHI. Protecting the historical resources by reducing the amount of debris entering the North Pacific Ocean is critical to the preserving the history of the Monument. The MMB would work with partners and with fishery management councils and other partners to remove marine debris in the Monument and reduce additional debris entering the Monument (MD-1.1, MD-1.5, MD-2.1). Removing debris, detecting and preventing incoming debris, and preventing future generations of debris entering the Monument could prevent destruction or desecration of existing and undiscovered cultural and historic resources. This would result in a beneficial effect on cultural and historic resources.

Alien Species Action Plan

Planning and Administrative Activities

The natural environment and its resources are seen as an integral part of the Hawaiian culture and many of its practices. Detecting, controlling, eradicating, and preventing the introduction of alien species supports the traditional Native Hawaiian values for protecting and maintaining natural resources. Activities aimed at preventing, controlling, and eradicating alien species include developing management practices through integrated management plans (AS-1.2); maintaining a GIS database of marine and terrestrial alien species (AS-2.2); encouraging participation in statewide and Pacific regional alien species efforts (AS-10); and integrating alien species information into the overall outreach program for Monument permittees and outreach materials (AS-9.1, AS-9.2). These activities to prevent alien species invasions would reduce the need to work on, near, or at cultural sites, and, therefore, could have beneficial effects on cultural resources. While eradication of pests would yield beneficial effects on cultural and historic resources, there is potential for short-term minor negative effects through site disturbance. Activities may require work on, near, or at cultural sites. Unintended harm may be caused to

known and yet-to-be-found cultural and historic resources through alien species eradication. Resource managers would be required to use best management practices while working at these sites.

Field Activities

The natural environment and its resources are seen as an integral part of the Hawaiian culture and many of its practices. Detecting, controlling, and eradicating alien species supports the traditional Native Hawaiian values for protecting and maintaining natural resources. By protecting the natural environment, strong cultural and spiritual values of the Native Hawaiian culture in the Northwestern Hawaiians Islands may be maintained. Activities aimed at preventing, controlling and eradicating alien species include surveying distributions and populations of known alien species (AS-2.1); detecting and characterizing new infestations (AS-2.3); eradicating the house moused (AS-4.2); conducting toxicant trials (AS-5.2); controlling and eradicating two mosquito species (AS-5.3); controlling and eradicating the gray bird locust with the use of toxicants(AS-5.4, AS-5.5); controlling and eradicating invasive grass sandbur (AS-6.2); controlling and eradicating *Indian pluchea, Sporobolus pyramidatus*, and *swine cress* (AS-6.3); controlling and eradicating prioritized alien plant species (AS-6.4); mapping, controlling and eradicating invasive red algae (AS-7.1); and conducting surveillance of snowflake coral and other incipient marine invasives (AS-7.2). Controlling and eradicating alien species could have beneficial effects on cultural and historic resources by protecting and maintaining the natural environment and resources. While eradication of pests could yield beneficial effects on culture and historic resources, there is potential for short-term minor negative effects resulting from the potential disturbance of cultural and historic sites during activities to control alien species, such as vegetation removal, pesticide treatments, etc.

Maritime Transportation and Aviation Action Plan

Planning and Administrative Activities

Through proper planning, implementation, and inclusion of established management practices, cultural and historic sites would be protected. Activities aimed at reducing potential threats from maritime transportation and aviation include improving the pre-access information for inclusion on the Monument Web site and in permit application instructions (MTA-2.3) and updating nautical charts (MTA-1.3). These activities would increase Monument users' awareness and knowledge of cultural and historic sites within the Monument, reducing the potential for their activities to affect undiscovered resources. This would result in beneficial effects on cultural and historic resources.

Permitting Action Plan

Planning and Administrative Activities

Protecting the natural environment and the strong cultural and spiritual ties of the Native Hawaiians to the NWHI is maintained through an effective and integrated permit program to manage human access and minimize and prevent negative effects on the Monument. Implementing an effective and integrated permit program includes external review of Monument permit applications (P-1.4); investigations of individual and vessel insurance (P-1.5); analyzing

permit data for management decisionmaking and for patterns of compliance (P-2.2, P-2.3); implementing a Monument reporting process (P-2.4); developing and implementing education programs (P-3.1, P-3.2); coordinating permitting outreach (P-3.3); and developing a preaccess training and briefing program. These activities provide additional oversight of Monument activities contributing to a well-informed resource management staff who would be better equipped to manage and protect cultural and historic resources and through public outreach, the public could develop a greater understanding of the values of the Monument; therefore, resulting in beneficial effects on cultural and historic resources.

Enforcement Action Plan

Planning and Administrative Activities

The natural environment and the strong cultural and spiritual ties of the Native Hawaiian to the NWHI are protected by chartering a Monument law enforcement working group (EN-1.1); developing interagency agreements (EN-1.2); developing an integrated law enforcement training program (EN-1.3); assess law enforcement capacity and program effectiveness (EN-1.4); integrating additional automated monitoring systems and ship reporting systems (EN-2.3) and integrating regulations briefings into preaccess training (EN-3.1). These activities provide additional oversight of Monument activities contributing to a well-informed resource management staff who would be better equipped to manage and protect cultural and historic resources; therefore, resulting in beneficial effects on cultural and historic resources.

Midway Atoll Visitors Service Action Plan

Field Activities

The natural environment and its resources are seen as an integral part of the Hawaiian culture and many of its practices. The natural environment and the strong cultural and spiritual ties of the Native Hawaiians to the NWHI would be protected by offering visitors opportunities to enhance their knowledge and appreciation of the Monument's resources. Activities to enhance the visitor's service program include providing visitors with opportunities for wildlife-dependent recreation (VS-1.1); providing opportunities to learn about cultural and historic resources (VS-1.2); monitoring impacts of visitors and other users on wildlife and historic resources (VS-1.3); and monitoring visitor satisfaction surveys (VS-2.1).

Through these activities, visitors would have the opportunity to enhance their knowledge and appreciation of the Monument's natural resources and learn about and appreciate cultural and historic resources at the Monument and the continuous monitoring of visitor effects would help resource managers manage and protect cultural and historic sites. This would result in beneficial effects on cultural and historical resources.

3.3.4.4 Coordinating Conservation and Management Activities

Constituency Building and Outreach Action Plan

Planning and Administrative Activities

The following activities involve efforts to cultivate an informed constituency that supports the conservation of the natural, cultural, and historic resources of the Monument: engaging in efforts to increase ocean ecosystem literacy and conservation (CBO-1.4); establishing a Monument website for Monument-related information (CBO-2.1); developing and updating printed material to aid in understanding key aspects of the Monument (CBO-2.2); supporting other entities' efforts to broaden knowledge of and appreciation for Monument resources and management priorities (CBO-2.3); continuing support of the Native Hawaiian Group through the office of Hawaiian Affairs (CBO-3.6); and developing interagency Monument interpretive themes to guide all interpretive products and activities (CBO-4.1) Through public outreach, the Monument could garner public support for the protection and proper management of cultural and historic resources. This would result in a beneficial effect by generating an increased interest in restoration and protection of cultural and historic resources in the Monument.

Field Activities

The natural environment and its resources are seen as an integral part of the Hawaiian culture and many of its practices. The natural environment and the strong cultural and spiritual ties of the Native Hawaiians to the NWHI would be protected by involving the public in the activities occurring within the Monument. Researching and implementing new technologies and tools to increase public understanding of the NWHI ecosystems (CBO-1.5), including telepresence technology, would allow people to feel as if they were present. Through such technologies, Monument staff would be able to share cultural and historic resources without risking negative effects from physical access, resulting in beneficial effects on cultural and historic resources.

Infrastructure and Development Activities

Engaging constituents in the management of activities within the Monument through public outreach enhances the ability to maintain the connection between cultural and conservation practices. Initiatives to develop an engaged constituency to enhance management of the Monument include developing partnerships with the National Park Service and other key entities. These partnerships would develop off-site exhibits on the Battle of Midway and the associated National Memorial, to be integrated into World War II memorial sites of the Pearl Harbor Historic District (CBO-4.4). Through public outreach, the Monument could garner public support for protecting and properly managing cultural and historic resources. Through the availability of off-site exhibits, Monument staff would be able to share cultural and historic resources without risking negative effects resulting from physical access. This could result in beneficial effects on cultural and historic resources.

Native Hawaiian Community Involvement Action Plan

Planning and Administrative Activities

The Proposed Alternative includes activities that would expand and convene the Native Hawaiian Cultural Working Group (NHCI-1.1); develop and annually maintain partnerships with Native Hawaiian organizations and institutions (NHCI-1.2); establish an annual cultural resources exchange NHCI-1.3); expand and explore opportunities to partner with institutions serving Native Hawaiians (NHCI-2.1); and use and integrate Native Hawaiian traditional ecological knowledge in Monument management activities (NHCI-3.2). Native Hawaiian involvement would perpetuate the relationship between their spirituality and the natural and physical elements of the NWHI which could increase support for future protection or restoration activities, therefore resulting in beneficial effects on cultural and historic resources.

Ocean Ecosystem Literacy Action Plan

Field Activities

The natural environment and its resources are seen as an integral part of the Hawaiian culture and many of its practices. The natural environment and the strong cultural and spiritual ties of the Native Hawaiians to the NWHI would be protected by developing and implementing educational programs to increase ocean ecosystems literacy and promote stewardship values. Activities included are those that provide educational opportunities for teachers at Midway Atoll (OEL-1.7) and using telepresence technologies for educational and outreach activities (OEL-2.2). Through public outreach, the Monument could garner public support for the protection and proper management of cultural and historic resources. Through such technologies, Monument staff would be able to share cultural and historic resources without risking negative effects from physical access, resulting in beneficial effects on cultural and historic resources.

3.3.4.5 Achieving Effective Monument Operations

Coordinated Field Operations Action Plan

Infrastructure and Development Activities

The preservation of historic resources provides a record of the historical activities in the NWHI and allows increased protection and management of these historical resources. Activities to preserve historical structures include rehabilitation of “Officers Row” Housing at Midway Atoll (CFO-3.4, CFO-9.4) and treatment of all wooden historic structures at Midway Atoll for termites (CFO-5.3). Rehabilitation of historical structures would preserve the integrity of historic sites, resulting in a beneficial effect on historic resources. Unintended harm may be caused to known and undiscovered cultural and historic resources through infrastructure and development work under this or any of the other infrastructure operations called for in the sections analyzed in this chapter. Resource managers would be required to use established management practices while working at these sites to avoid such harm. Short-term minor negative effects that might result from infrastructure and development activities generally could be minimized by exercising the NHPA Section 106 process, as explained above.

Table 3.3-1
Summary of Effects on Cultural and Historic Resources of the Proposed Action Alternative

Understanding and Interpreting the Northwestern Hawaiian Islands		
Action Plan	**Action Areas**	**Effects**
Native Hawaiian Culture and History *(EA section 1.7.2)* *(EA section 1.8.2*	Planning/ Administrative	• Beneficial effects on cultural and historic resources.
	Field	• Beneficial effects on cultural and historic resources.
Historic Resources *(EA section 1.7.3)* *(EA section 1.8.3)*	Planning/ Administrative	• Beneficial effects on cultural and historic resources.
	Field	• Beneficial effect on cultural and historic resources.
	Infrastructure and Development	• Beneficial effects on cultural and historic resources.
Maritime Heritage *(EA section 1.7.4)* *(EA section 1.8.4)*	Planning/ Administrative	• Beneficial effects on cultural and historic resources.

Conserving Wildlife and Habitats		
Action Plan	**Action Areas**	**Effects**
Threatened and Endangered Species *(EA section 1.7.5)* *(EA section 1.8.5)*	Planning/ Administrative	• Beneficial effect on cultural and historic resources.
	Field	• Beneficial effect on cultural and historic resources.
Migratory Birds *(EA section 1.7.6)* *(EA section 1.8.6)*	Field	• Beneficial effect on cultural and historic resources.
Habitat Management and Conservation *(EA section 1.7.7)* *(EA section 1.8.7)*	Planning/ Administrative	• Beneficial effect on cultural and historic resources.
	Field	• Short-term minor negative effects on cultural and historic resources.

Reducing Threats to Monument Resources		
Action Plan	**Action Areas**	**Effects**
Marine Debris *(EA section 1.7.8)* *(EA section 1.8.8)*	Planning/ Administrative	• Beneficial effect on cultural and historic resources.
	Field	• Beneficial effect on cultural and historic resources.
Alien Species *(EA section 1.7.9)* *(EA section 1.8.9)*	Planning/ Administrative	• Beneficial effect on cultural and historic resources. • Short-term minor negative effects on cultural and historic resources.
	Field	• Beneficial effect on cultural and historic resources. • Short-term minor negative effects on cultural and historic resources.
Maritime Transportation	Planning/	• Beneficial effect on cultural and historic

Reducing Threats to Monument Resources		
Action Plan	**Action Areas**	**Effects**
and Aviation *(EA section 1.7.10)* *(EA section 1.8.10)*	Administrative	resources.

Managing Human Uses		
Action Plan	**Action Areas**	**Effects**
Permitting *(EA section 1.7.12)* *(EA section 1.8.12)*	Planning/ Administrative	• Beneficial effect on cultural and historic resources.
Enforcement *(EA section 1.7.13)* *(EA section 1.8.13)*	Planning/ Administrative	• Beneficial effect on cultural and historic resources.
Midway Atoll Visitors Services *(EA section 1.7.14)* *(EA section 1.8.14)*	Field	• Beneficial effect on cultural and historic resources.

Coordinating Conservation and Management Activities		
Action Plan	**Action Areas**	**Effects**
Constituency Building and Outreach *(EA section 1.7.16)* *(EA section 1.8.16)*	Planning/ Administrative	• Beneficial effect on cultural and historic resources.
	Infrastructure and Development	• Beneficial effect on cultural and historic resources.
	Infrastructure and Development	• Beneficial effect on cultural and historic resources.
Native Hawaiian Community Involvement *(EA section 1.7.17)* *(EA section 1.8.17)*	Planning/ Administrative	• Beneficial effect on cultural resources.
Ocean Ecosystems Literacy *(EA section 1.7.18)* *(EA section 1.8.18)*	Field	• Beneficial effect on cultural and historic resources.

Achieving Effective Monument Operations		
Action Plan	**Action Areas**	**Effects**
Coordinated Field Operations *(EA section 1.7.21)* *(EA section 1.8.21)*	Infrastructure and Development	• Beneficial effect on cultural and historic resources. • Short-term minor negative effects on cultural and historic resources.

3.4 SOCIOECONOMICS

3.4.1 Effects Analysis Methodology

In the description of the No Action and Proposed Action alternatives, activities presented in the Monument Management Plan were divided into three categories: planning and administrative, field, and infrastructure and development. Planning and administrative activities are not considered to directly affect socioeconomic resources (human use, human health, safety and hazardous materials, land use, and economics), either because they relate to the development of the coordination mechanisms described in the MOA and proclamation or they are specifically administrative in nature. However, many activities identified as a result of these planning and administrative actions ultimately would have a direct effect and to the extent adequate information is currently available they are analyzed below. For activities proposed within the Monument or intended to improve management of the Monument, the method used to determine the effect on socioeconomic resources is as follows:

- Review and evaluate current and past activities to identify their potential effect on socioeconomic resources (human use, human health, safety and hazardous materials, land use and economics);
- Review and evaluate activities within the Monument Management Plan to identify their potential to beneficially or negatively affect socioeconomic resources (human use, human health, safety and hazardous materials, land use, and economics) and its components within the Monument; and
- Assess whether or not each activity within the Monument Management Plan is consistent with applicable federal, state, or local laws, regulations, and policies.

3.4.2 No Action

This section briefly describes activities that are underway in the Monument and analyzes the effects associated with these activities. Only those activities that would have an effect on human health, safety and hazardous waste, human uses and land use are included in the analysis. The analysis describes the projected beneficial and negative effects that would be expected to continue under the No Action alternative, should it be selected for implementation. The No Action alternative would not change the current situation. However, these activities would continue under the Proposed Action alternative, and their effects are summarized under the Proposed Action in Table 3.4-1 at the end of this section.

3.4.2.1 Understanding and Interpreting the Northwestern Hawaiian Islands

Marine Conservation Science Action Plan

Planning and Administrative Activities

Human Uses
Characterizing types and spatial distributions of shallow-water marine habitats (MCS-1.4) and monitoring shallow-water coral reef ecosystems (MCS-1.2) provides a framework for biogeographical assessments that would offer up-to-date research findings for the project area.

These research and monitoring activities have a beneficial effect on the use of the area by research personnel because the activities offer the opportunity for more effective use of resources while conducting research activities in the project area.

Maritime Heritage Action Plan

Planning and Administrative Activities

Human Uses
Field mapping surveys and status reports would continue under the Maritime Heritage Action Plan (MH-1.2). Different phases of research on Maritime Heritage include shoreline terrestrial surveys and inventories, as well as remote sensing using state of the art technology, such as sidescan sonar and magnetometers in order locate potential heritage areas. These activities have a beneficial effect on use of the area by research personnel because they offer the opportunity for more effective use of resources while personnel are conducting continuing research activities.

3.4.2.2 Managing Human Uses

Permitting Action Plan

Field Activities

Human Uses
Consistent with the Monument proclamation, sustenance fishing for bottom fish or pelagic (open water) species may be permitted as an activity incidental to an otherwise permitted activity. In recent years, sustenance fishing has occurred in the Monument from research vessels, from Midway Atoll, from ships transiting the area, and in association with Native Hawaiian cultural practices. However, since February 2007, sustenance fishing has not been allowed at Midway Atoll, awaiting a FWS compatibility determination. Fish caught include both pelagic and bottom fishes. Sustenance fishing would enhance the quality of life for vessel- and land-based individuals living in this remote area, often for extended periods of time. It would provide a supply of fresh fish that is otherwise difficult and expensive to transport from commercial sources in the main Hawaiian islands. This would result in a minor beneficial effect on human uses.

3.4.2.3 Achieving Effective Monument Operations

Central Operations Action Plan

Planning and Administrative Activities

Human Health, Safety, and Hazardous Materials
There is currently coordination and implementation of an annual operating plan (CO-1.1), which includes several administrative tasks, such as budget tracking, in addition to field activity planning. Specifically, the annual plan includes functional information about emergencies to ensure staff safety. This coordination adds to the efficiency of safety operations throughout the Monument, as well as the health of staff persons. Under the No Action alternative, this coordinated plan would continue to be implemented, so this activity would have a beneficial effect on human health and safety within the Monument.

3.4.3 Proposed Action

The Proposed Action would expand current activities and includes new activities described in the Monument Management Plan; the effects of these activities are described below. Implementation of the Proposed Action includes continuation of those activities described for the No Action alternative described in section 3.4.2 above. The effects of these activities would also continue under the Proposed Action. Only those activities that would have an effect on human uses, human health, safety and hazardous materials, and land use are included in this analysis.

Economics and Environmental Justice

The economic effects of the Proposed Action alternative are analyzed based on the entire budget of all activities. This is because personnel may work on more than one activity and budget dollars may be shared between activities. Therefore, the effects by activity are not analyzed here.

Economics

The Proposed Action would provide an integrated framework for Monument management among the Co-Trustees. While this coordination could save money, it is anticipated that activities needed to address priority management needs will never be fully funded. As such, savings achieved through coordination would be channeled into research and management. A few additional jobs would be generated as a result of the Proposed Action, such as facilities repair and construction at Midway. An integrated approach presented in the Monument Management Plan could result in increased funding for research and management. However, overall, the total level of funding would still be subject to annual budgetary process and would likely experience increases or decreases, depending on overall federal spending. The cost of implementing the Proposed Action is estimated to average $23 million a year over 15 years, but because funding is subject to federal and state budget and appropriations and private donations, it is not possible to determine in advance what level of funding may be available in any given year, or over the life of the plan. Overall, the Proposed Action alterative is not expected to have an effect on population, employment, industry, income or the broader Hawai‘i economy, compared to the No Action alternative.

Environmental Justice

The Proposed Action would not result in a disproportionate placement of negative environmental or health effects on minority or low-income populations compared to the No Action alternative. The proposed activities in the Monument Management Plan would be conducted largely in the Northwestern Hawaiian Islands, away from human population. Since potential changes in environmental, health, or economic conditions are not expected to disproportionately affect any particular low-income or minority groups, as in accordance with EO 12898, no effects on environmental justice are anticipated from the Proposed Action compared to the No Action alternative.

3.4.3.1 Understanding and Interpreting the Northwestern Hawaiian Islands

Marine Conservation Science Action Plan

Field Activities

Human Uses
With the establishment of data collection protocols, statistical sampling design, and site selection criteria, new research opportunities would arise for research personnel within the Monument. In establishing these new research techniques and using the shallow-water ecosystem monitoring protocols as a guide, the goal of monitoring deepwater ecosystems would be achieved (MCS-1.4). With new research activities being conducted, the opportunity to include live Web sites from research vessels using written updates, imagery, and video is possible (MCS-3.3). These activities would have beneficial effects on research personnel who would benefit from new research opportunities. The public, especially students and teachers, would benefit from new activities aboard NOAA research vessels because they would be given an inside look at up-to-date research techniques and research findings that were not previously available.

Historic Resources Action Plan

Planning and Administrative Activities

Human Health, Safety, and Hazardous Materials
Within the Historic Resources Action Plan, the Midway Atoll Historic Preservation Plan would be updated within one year, including reconciling it with the current lead-based paint abatement plan (HR-1.1). This activity would require consultation and coordination among refuge program specialists and Monument staff to balance the needs of each plan. The preservation efforts regarding historic resources, coupled with revitalization efforts involved with visitor service centers, would provide the impetus for increased planning for removing hazardous building materials from structures. The eventual removal of these hazardous materials would decrease the risk of human exposure and therefore would have a beneficial effect on human health and safety within the Monument.

Maritime Heritage Action Plan

Planning and Administrative Activities

Human Health, Safety, and Hazardous Materials
Within the Maritime Heritage Action Plan, a status report on potential environmental hazards is to be completed within one year and would be updated annually (MH-1.3). This plan would identify wreck sites and other debris through field work. The report would also identify any potential hazards in order to assess the need for response and remediation. Because most accidental oil spills occur due to vessel groundings and accidents, this status report would have a beneficial effect on the likelihood of the release of hazardous materials. The identification of hazards would also have a beneficial effect on vessel safety because operators would be able to avoid incidents with more accuracy.

Historic Resources Action Plan

Field Activities

Human Uses
Opportunities currently available for volunteers include assisting with historic preservation tasks, working with FWS on historic restoration projects, and, for well-qualified volunteers, assisting Monument staff with the operation of visitors services programs. With the expansion of current volunteer programs, there would be opportunities available to visitors to continue these activities and to participate in new historic preservation treatments deemed necessary by the agencies (HR-2.3). With continuing archaeological investigations throughout the Monument, new archaeological and historical research would be necessary. New research opportunities within the next 10 years could include excavation in such areas as the Commercial Pacific Cable Station (HR-6.2). These research opportunities would provide visitors and research personnel with an insight into Midway Atoll's earliest residents. These activities under the Historic Resources Action Plan would have minor beneficial effects on research personnel because they would be able to participate in new research that would help in understanding the history of the NWHI. The activities would have a minor beneficial effect on the public because, with new visitor and volunteer opportunities, the public would be given more opportunities and different reasons to visit the Monument. These opportunities would not increase the total number of visitors and volunteers on Midway but could shift some focus from habitat restoration toward historic preservation and restoration activities.

Native Hawaiian Culture and History Action Plan

Field Activities

Human Uses
The expansion of current research activities in the Monument would include field research and cultural education opportunities for students, teachers, and cultural specialists. Specifically, these researchers would be provided with space aboard research vessels and logistical and technical support from personnel on the research vessels and from the agencies (NHCH-2.3). This activity would have a beneficial effect on students, teachers, and cultural specialists because new cultural education opportunities would be made available.

In support of Native Hawaiian cultural research, Activity NHCH-2.6 would offer Native Hawaiian organizations contracts, grants, or formal agreements for cultural access needs. These needs include access to Mokumanamana for cultural practices and regular access for Polynesian voyaging canoes for cultural practices training. This activity would be beneficial to the Native Hawaiian community because it would ensure that cultural practice needs were met.

In order to develop management activities for the Monument that include understanding the history of the Monument and its peoples, Activity NHCH-3.2 allows for the Native Hawaiian community and the Native Hawaiian Cultural Working Group to participate in developing these management needs. This would include engaging younger generations of Native Hawaiians in cultural research field activities. This would be beneficial to the Native Hawaiian community because it would allow them more access to preserving the cultural and historical resources of the NWHI through research opportunities and consultations with the agencies.

In developing and implementing specific preservations plans, including the Monument Cultural Resources Program, it would be possible for new sites to be listed on the National Register of Historic Places on Nihoa and Mokumanamana Islands (NHCH-4.2 and -4.3). This would result in no effect on human use of the area because these two islands would remain closed to general public access. Native Hawaiian use of these areas is allowed only under trip-specific permits from the MMB. Increased educational material that would result in the research of cultural resources and new historic sites would have a beneficial effect on the public, who would gain more knowledge of the history of the Monument.

3.4.3.2 Conserving Wildlife and Habitats

Threatened and Endangered Species Action Plan

Planning and Administrative Activities

Human Uses
Various practices are instituted by the agencies that work to eliminate human interactions with marine mammals, seabirds, sea turtles, and other endangered or threatened species. These practices include "Best Practices for Minimizing the Impact of Artificial Light on Sea Turtles," "Precautions for Minimizing Human Impacts on Endangered Land Birds in Papahānaumokuākea Marine National Monument," "Special Conditions and Rules for Moving between Islands and Atolls and Packing for Field Camps in Papahānaumokuākea," "Human Hazards to Seabirds in Papahānaumokuākea Marine National Monument" (all found in Appendix I.). Other practices include "Disease and Introduced Species Prevention Protocol for Permitted Activities in the Marine Environment, Papahanaumokuakea Marine National Monument" (PIRO 2007), "Marine Wildlife Viewing Guidelines (NOAA-NMFS, undated), and compatibility determinations for activities on the refuges (all found in Appendix D.). In order to reduce the likelihood and negative effect of human interactions on Hawaiian monk seals (*Monachus schauinslandi*), Activity TES-1.4 would include the extensive permit review process of any activities (including nearshore ship traffic, beach use, noise, research, and any other effect that could negatively affect the marine or terrestrial habitat of the seal) and thus would have a negative effect on human use in any areas that include the marine or terrestrial habitat of the monk seal. At the same time, to the extent these restrictions contribute to the recovery of the monk seal, these actions could result in a beneficial effect on human uses because of increased observational opportunities at Midway and the main Hawaiian Islands.

Field Activities

Human Uses
Currently, limited entry policies, no-access areas, and BMPs (See Volume III, Appendix I) are in place for avoiding threatened and endangered species and human interactions. Most beaches on the western side of Sand Island at Midway Atoll are closed to public access to protect the Hawaiian monk seal from human disturbance. "Turtle Beach," on the east side of Sand Island, is inhabited by the endangered Laysan duck (*Anas laysanensis*) and is therefore closed to public use. Spit Island and Eastern Island at Midway are closed to visitors, with the exception of FWS-trained escorts conducting scheduled trips to Eastern Island. The critical habitat of the Hawaiian monk seal covers all beach areas, lagoon waters, and ocean waters to a depth of 20 fathoms, with the exception of Sand Island and its harbor. Therefore, these areas are strictly regulated by the

agencies. Activities TES-2.5 and TES-3.3 would continue to prevent human interactions with cetaceans and sea turtle nesting habitat through controls that would make off limits such areas as sea turtle nesting areas and Monument lagoons and nearshore areas where cetaceans rest. Both of these activities would therefore increase limits on current human use. Green turtle (*Chelonia mydas*) nesting habitat occurs throughout the beaches of the NWHI. Continuing efforts do not limit human use overall, but beaches (deemed public use areas) could be temporarily closed. Because there are currently controls limiting public access, these activities could result in a long-term minor negative effect on human use.

Human Health, Safety, and Hazardous Materials
The Threatened and Endangered Species Action Plan includes facilitating emergency response for monk seals (TES-1.2). Although the response would be focused specifically on monk seals, the protocols include ensuring that a rapid and well-organized response is possible. Incidents that threaten monk seals include oil spills, disease outbreak, and ship groundings. The interagency coordination involved with improving emergency response logistical capabilities and transportation could increase the efficiency of the current emergent vessel capacity. Although instituting protocols for monk seal rescue would not directly reduce the occurrence of the incidents described above, the coordination and planning efforts could have a beneficial effect on safety operations within the Monument.

Protecting and managing marine habitat includes identifying and mapping foraging areas and migration routes in and around the Monument (TES-3.3). By identifying and mapping turtle foraging areas, necessary information would be obtained to manage anchoring and vessel transit activities.

Migratory Bird Action Plan

Planning and Administrative Activities

Human Health, Safety, and Hazardous Materials
To minimize migratory bird mortality during oil spills, the Migratory Bird Action Plan calls for adequate coverage of appropriate actions in all spill response plans (MB-2.3). This would include multiagency coordination during spill prevention planning and actual spill response actions. Although this activity is not a directed human-related emergency response, the coordination and planning efforts would have a beneficial effect on the emergency response operations and therefore safety within the Monument.

Habitat Management and Conservation Action Plan

Planning and Administrative Activities

Human Health, Safety, and Hazardous Materials

The Habitat Management and Conservation Action Plan calls for a cost evaluation for the removal of iron sources, such as shipwrecks, from Monument waters (HMC-2.4). This would include cataloging all the existing sources. The plan would also build an oil sample archive from oil washed ashore, as well as wildlife affected by mystery spills (HMC-2.5). This inventory would be used to determine liability and understanding of the primary sources of oil pollution.

These two activities would increase the knowledge of hazardous materials within the Monument and help decision makers determine the best course of action for their removal. HMC-2.5 would also help determine appropriate preventative measures for oil spill occurrence by discovering the key factors in mystery cases. Therefore, these two activities would have beneficial effects on hazardous material practices within the Monument.

Field Activities

Human Health, Safety, and Hazardous Materials

There are several activities in the Habitat Management and Conservation Action Plan focused on reducing the effects of human actions. The first activity is to evaluate the effects of contamination from shoreline dumps and landfills at French Frigate Shoals, Kure Atoll, Midway Atoll, and Pearl and Hermes Atolls and to prioritize cleanup action based on risk assessments (HMC-2.1). The risk assessments would evaluate the effects of runoff, erosion, and seepage from hazardous waste sites. The plan would also work to verify the integrity of known landfills and to conduct additional remediation where necessary (HMC-2.2). This activity would occur at the old bulky waste landfill and the "Rusty Bucket" at Midway. The dump site material would continue to be removed from Tern Island and French Frigate Shoals. The investigations and cleanup efforts would target PCB contamination. Finally, under the plan, historic disposal sites would be located at Tern Island and Kure, Midway, Pearl, and Hermes Atolls, the sites would be investigated for contamination (HMC-2.3).

These assessment activities could help characterize the nature and extent of contamination within the Monument. Appropriate cleanup and remediation actions could then be determined from information obtained through these studies. These activities could increase compliance with regulations and could reduce the likelihood of further contamination or release. There could be a benefit to human health because of the decreased risk of human exposure to and release of potentially hazardous waste within the Monument.

There would also be an ecological risk assessment performed at Midway to determine the levels of lead in the soil for possible removal. Field activities include removing flaking lead-based paint from buildings and effectively removing lead-contaminated soils on Midway Atoll (HMC 2.7). This includes conducting an ecological risk assessment to determine the allowable lead levels in the soils. Paint removed from buildings is stored short term in sealed 55-gallon barrels in a secure, dry storage area on Sand Island. Due to the extremely high cost of transporting these materials off island, current plans call for storing the barrels at Midway until all lead-based paint is removed. At that time, a fully licensed hazardous waste contractor would be hired to repack if necessary and then ship all wastes to a licensed disposal site on the mainland.

While the ecological risk assessment to determine soil lead-based paint cleanup levels at Midway would not be affected under the No Action alternative, the proposed activity under the Proposed Action alternative could result in a faster clean up and therefore could reduce the long-term exposure time (HMC-2.7). Except for a few employees that have lived at Midway for 10 to 25 years, most staff members do not live at Midway for more than three to five years, and most visitors and researchers stay for only a few weeks to months. This could help bring the Monument into compliance with hazardous waste regulations and could decrease the risk of

human exposure; therefore, it could have a long-term beneficial effect on human health and safety within the Monument.

3.4.3.3 Reducing Threats to Monument Resources

Maritime Transportation and Aviation Action Plan

Planning and Administrative Activities

Human Uses
Developing boundary and zoning information tools (MTA-1.2), including updates to nautical charts and Notices to Mariners (MTA-1.3), would provide Monument permittees with up-to-date information on vessel and airplane allowances in the Monument. Activity MTA-2.3 would improve access information to permittees that would be included in pre-trip training for these permittees. Informational materials provided and pre-trip training exercises currently include waste discharge locations and types, preventing the introduction of nonnative species and preventing and reporting interactions with federally and state protected species, as well as other wildlife. Providing updates to navigational charts, informational materials, and notices to mariners is a beneficial effect because it enhances public safety and awareness of the environment. These activities are proposed in order to reduce the effects of marine and air traffic on the Monument, but, because these are planning activities, they would not create new limits on use of the Monument in relation to permittees.

Marine Debris Action Plan

Planning and Administrative Activities

Human Health, Safety, and Hazardous Materials
There is a measure within the Marine Debris Action Plan to catalog, secure, contain, and properly remove hazardous materials that wash ashore (MD-1.2). These materials include unidentified chemical containers, unexploded ordnance, oceanographic instruments, and objects that regularly wash ashore. The items would be documented, identified, and secured until removed and disposed of by approved contractors. The proper handling of hazardous materials within the Monument would increase compliance with hazardous materials regulations. It would also decrease the likelihood of threat to human health. Therefore, this activity could have a beneficial effect on hazardous waste and human health within the Monument.

The Maritime Transportation and Aviation Action Plan outlines several activities to assess potential aircraft and vessel hazards and effects (MTA-2.1). There are many research studies, including an assessment of how discharge from vessels effects the environment. If needed, protocols and restrictions would be modified. The research conducted for this study may decrease the likelihood of effects from discharge by discovering where current practices can be improved. Therefore, these activities could have a beneficial effect by implementing practices to reduce the potential release of hazardous materials from vessels within the Monument.

Alien Species Action Plan

Planning and Administrative Activities

Human Health, Safety, and Hazardous Materials
There are several activities within the Alien Species Action Plan that aim to eradicate pests and alien species. The eradication of house mouse would require treatment with rodenticide, which falls under the Federal Insecticide, Fungicide, and Rodenticide Act (PL 95-516; U.S.C. 136-136y) (AS-4.2). Toxicants would be used on invasive species of ants and wasps (AS-5.2) and gray bird locusts (AS-5.5). Glyphosate would be applied to reduce and eradicate various invasive plant species (AS-6.1, AS-6.2); Garlon (AS-6.3) and Garlon 4 (AS-6.4) would be painted on stumps to prevent further growth of additional invasive species. These hazardous chemicals would be applied in accordance with the Alien Species Management Plan and therefore would comply with all applicable local, state, and federal laws. Although the use of toxic chemicals may increase the risk of exposure or spills, all applicable rules and procedures, including use of personal protective clothing, would be followed to safeguard the health of the person applying them. Additionally, the beneficial effect on species and humans threatened by the invasive species (such as wasps, mosquitoes, and ants) outweighs the potential risk. Therefore, these toxicant applications could have a short-term minor negative affect on hazardous waste introduction within the Monument.

The Alien Species Action Plan also calls for controlling and possibly eradicating two introduced mosquito species that pose risks to humans and special status species health (AS-5.3). This activity could decrease threats to human health by minimizing mosquito breeding habitat and killing larvae in freshwater ponds. Therefore, this activity could have a beneficial effect on human health within the Monument.

Field Activities

Human Uses
Within the next 10 years, Activity AS-5.3 would control and, if possible, eradicate the two mosquito species that were introduced to Midway Atoll. In order to eradicate these insects, staff members would kill mosquito larvae in freshwater ponds and would eliminate mosquito breeding habitat by getting rid of standing water sources where possible and appropriate. The eradication measures that would generally be used are draining standing water, stocking mosquito-eating fish, and using biological controls. If chemical agents are used in the eradication process, staff members would be properly trained and would be provided with appropriate protective gear, thus there would be no effect on staff members from this activity. Human visitors and staff living on the island could benefit from this activity because it could minimize the possibility of mosquito-vector diseases, such as West Nile virus and avian pox. Thus these actions result in the beneficial effects of protecting public health.

Maritime Transportation and Aviation Action Plan

Planning and Administrative Activities

Human Health, Safety, and Hazardous Materials
The Maritime Transportation and Aviation Action Plan would improve pre-access information including pre-trip training that would cover regulations and compliance, navigation hazards, zoning designations, including waste discharge locations and types, preventing light and noise pollution, and preventing anchor damage to coral reefs and other benthic (bottom-dwelling) organisms and their habitats (MTA-2.3). All vessel operators, captains, crews, and trip participants would have access to this information. The Monument staff would work with the ICC to convene a group of vessel and aircraft personnel to discuss safety for boating and flight operations (MTA-2.2). These suggestions would be incorporated into the pre-trip training. By increasing access and training opportunities concerning hazards and potential pollution pathways, the likelihood of accidental vessel groundings and hazardous waste discharge could decrease. The MMB would get the benefit of expert experience by convening a group of seasoned operators, thus further improving the communication and implementation of Monument regulations for safety and spill prevention. Therefore, this plan could have a beneficial effect on hazardous waste and safety within the Monument.

Emergency Response and Natural Resource Damage Assessment Action Plan

Planning and Administrative Activities

Human Health, Safety, and Hazardous Materials
The Emergency Response and Natural Resource Damage Assessment Action Plan includes activities to plan for and respond to an emergency within the ICS for the region, or other unanticipated events that fall outside the scope of the Area Contingency Plan for the Hawaiian Islands. The plan would create an ERAT for ICS responses (ERDA-1.1). ERAT members would be required to acquire training and certifications appropriate for response preparedness and maintain them (ERDA-1.2, ERDA-2.3), to participate in emergency response drills (ERDA-1.3), and to participate in damage assessment programs and training (ERDA-1.4). These activities would properly prepare the ERAT for emergencies and disasters within the ICS.

In the second year of the plan, the appropriate type and response to non-ICS emergencies would be determined (ERDA-2.1). Monument staff would be designated for each non-ICS response team, including species experts for protected species incidents (ERDA-2.2). The plan would require an update and, if needed, improvement of the Area Contingency Plan and the Environmental Sensitivity Indexes (ERDA-3.1). Finally, within three years, the ERAT would create damage assessment criteria and protocols for non-ICS incidents.

These activities could not only increase the efficiency of response to special status species incidents but increase response efficiency to emergency and safety hazard occurrences as well. This could increase the speed of emergency vehicle response time by streamlining protocols and adequately training team members. The ERAT would be well qualified to assist region-wide incidents as well as local emergencies. Therefore, the plan could have a beneficial effect on safety, human health, and hazardous waste practices within the Monument.

3.4.3.4 Managing Human Uses

Permitting Action Plan

Planning and Administrative Activities

Human Health, Safety, and Hazardous Materials
The Permitting Action Plan outlines several activities that develop tracking, evaluation, and outreach components. A GIS-based permit tracking system would allow each agency to input and track activities within the Monument that pertain to individual requirements (P-2.1). A system would then be instituted to analyze this data to inform management decisions (P-2.2) and discover patterns of compliance (P-2.3). In conjunction, a Monument reporting process would be developed to ensure adherence to regulations and, if necessary, issue compliance visits from enforcement agents (P-2.4). A permit and regulatory education program would be required for all permit applicants (P-3.1). Outreach efforts would be coordinated between agencies to avoid delays and to ensure the highest level of regulatory understanding by permittees (P-3.3). Finally, pre-access training for first time Monument visitors to communicate regulations and permit requirements, and best conduct would be implemented (P-3.4).

These activities could increase accountability and compliance with permits required to enter the Monument. The outreach component would integrate understanding of regulations by all Monument users, which could decrease the likelihood of accidents and hazardous waste spills. This could decrease the demand on emergency response, as well as risks to human health from vessel groundings and hazardous waste exposure. Therefore, this plan could have a beneficial effect on human health, safety, and hazardous materials practices within the Monument.

Field Activities

Human Uses
Midway Atoll is the main gateway to the Monument. Because it is outside the State of Hawai`i, regulations at 50 CFR 38 were put in place to provide for public safety at Midway. In order to develop means of understanding enforcement and to share resources between the different enforcement agencies, as well as to ensure visitor and staff safety, Activity EN-1.5 would provide for the presence of credentialed officers at Midway Atoll. These officers would ensure safety, regulatory compliance, and enforcement, which could benefit Monument visitors because of the assurance of their safety while visiting or living at Midway.

Midway Visitors Services Action Plan

Planning and Administrative Activities

Human Uses
With the current, expanded, and new activities that are possible through this management plan for visitors to come to the Monument, it becomes necessary to have a way to assess the visitor programs in order to provide the most beneficial services to the public. Activities VS-2.2 and VS-2.3 would create a team of visitors services members at Midway Atoll who would review the visitors program every other year and would use the results from these reviews to improve the visitors programs. These activities could have a beneficial effect on visitors to the Monument

because of the assurance that Monument staff are providing and offering the most beneficial programs and activities in the NWHI.

Field Activities

Human Uses
Activity VS-1.1 would provide opportunities for additional visitors to enjoy wildlife-dependent recreation. These opportunities include guided interpretive tours, wildlife photography, snorkeling, diving, kayaking, and self-guided walks. Currently, 25 percent of visitors staying three days or longer are given the opportunity to assist with wildlife population monitoring as volunteers. Seven compatibility determinations are in place that allows activities on Midway. The covered activities are allowed under agreed-on terms and conditions that comply with state and federal policies. Additional compatibility determinations allow for other beach use activities for visitors, such as swimming, volleyball, nonadministrative airport operations, bicycling, jogging, and amateur radio use. While most of these activities are currently available to Midway Atoll visitors, this activity in the Monument Management Plan outlines opportunities for additional recreational activities for a slightly greater number of visitors. These activities would be evaluated, monitored, and implemented in accordance with the preservation and conservation of the Monument's biological, cultural, and historic resources. The goal of this activity is to provide recreation for visitors that would educate them about the environment and would allow them to gain knowledge of all of the resources the Monument has to offer. This activity could be beneficial to visitors because they could be given a variety of opportunities to experience the resources of Midway Atoll and the Monument.

Visitors' effects on the various resources of the Monument are being monitored through the MVSP. In addition to a visitors services review team outlined in planning Activity VS-2.2, Activity VS-2.1 would monitor visitor satisfaction surveys completed by visitors leaving Midway Atoll. Based on these satisfaction surveys, in addition to monitoring Monument resources, this activity also includes the monthly adjustment of activities, facilities, and maintenance schedules to provide the best possible visitor services. While continuing to comply with the preservation and protection of Monument resources, this activity could be beneficial to the visitors because it would allow them the assurance that they were given the best possible experiences while visiting Midway.

3.4.3.5 Coordinating Conservation and Management Activities

Ocean Ecosystems Literacy Action Plan

Field Activities

Human Uses
The "Navigating Change" program is an educational program that focuses on raising awareness of marine ecosystems and their conservation in the Hawaiian Islands. Over the past few years, over 15 workshops have been conducted throughout the Hawaiian Islands to provide teachers with the educational materials and methods for effectively teaching this material. The Navigation Change Curricula would provide wildlife-dependent educator workshops at Midway Atoll, targeting a mix of science teachers and those from other fields of education (OEL-1.7). Every two years, these workshops would provide teachers with major themes of the ocean ecosystem-

based curriculum. Moreover, teaching materials, such as telepresence and ocean stewardship programs, would be developed. These workshops could be beneficial to the teachers of the Hawaiian Islands, who would be given hands-on experience and the opportunity to learn the most effective way of presenting this material to their students.

3.4.3.6 Achieving Effective Monument Operations

Central Operations Action Plan

Planning and Administrative Activities

Human Uses
Activity CO-2.1 would enhance human resources and organizational capacity in the Monument. Currently, human resources capacities are examined regularly in order to organize and make better use of current staff. Alternative human resources capacity-building activities could include internships, volunteer programs, and partnerships, all of which could benefit researchers and the public because they would be given additional opportunities for helping to conserve Monument resources.

Coordinated Field Operations Action Plan

Planning and Administrative Activities

Human Uses
Originally, Midway's infrastructure was built to service a population of up to 5,000 individuals. The current population of Sand Island is less than 100 people, with future projections of no more than 200 individuals. This includes interagency personnel, volunteers, researchers, and visitors. In order to be efficient for this population, FWS has allotted the time, money, and resources to downsizing the infrastructure on Sand Island. In order to meet this downsizing goal, such activities as developing a strategy for long-term sustainability for operations throughout the Monument using alternative energy systems and waste reduction would be implemented within two years (CFO-1.3) and would benefit those researchers and visitors. Also, sustainability activities would help keep the human presence in the Monument at the levels anticipated under either alternative. The facilities on Midway would require less energy, would grow limited amounts of produce (at Midway only), and perhaps would use sustainable fuel types, in addition to other sustainable efforts. This could require fewer shipments of fuel and materials to and from the main Hawaiian islands. Thus, these activities could have a beneficial effect on sustaining the human presence within the Monument for management, research, and visitation purposes.

Human Health and Hazardous Materials
The Coordinated Field Operations Action Plan would require the integration of alternative energy systems and waste reduction within two years (CFO-1.3) and the use of sustainable construction and landscape architecture throughout the Monument (CFO-1.4). These sustainable development activities could decrease the likelihood of hazardous materials release and subsequent human exposure by integrating nontoxic building materials and lubricants for Monument building and operations. Thus, this plan could have a beneficial effect on human health and hazardous waste practices within the Monument.

Infrastructure Development Activities

Human Uses

In relation to the downsizing plan described above, several infrastructure activities in the Proposed Action would help in achieving this goal. These activities include rehabilitating "Officer's Row" Housing at Midway Atoll (CFO-3.4), which would increase the housing capacity for increased agency and partner personnel; maintaining and enhancing the infrastructure at Kure Atoll (CFO-3.5), which would maintain, expand, or replace communications equipment, solar and water power equipment, sewage treatment, and buildings and facilities on Green Island; and completing Phase I rehabilitation of Midway Mall and Commissary (CFO-9.4), which would offer space for Monument staff and partner offices, classrooms, storage, visitor services, and laboratories. These activities could greatly benefit the overall human presence in the Monument for management, research, and visitation because they would be provided with housing sufficient for an increased number of staff and visitors. Researchers at Kure Atoll who rely on housing and facilities for permanent biological monitoring and restoration programs would be provided with these necessities. The Visitors Services Program could benefit from a better and well-maintained space to hold such events as lectures and training.

In order to improve transportation, education, evacuation, research, surveillance, management, and enforcement within the Monument, it is necessary to have improved aircraft services, perhaps including an aircraft dedicated to Monument purposes. Activity CFO-7.3 proposes to acquire an aircraft dedicated to these activities within 15 years following the implementation of the Monument Management Plan. This activity could benefit the human presence within the Monument for research and management purposes, as well as visitors, because it would allow more frequent and perhaps less expensive access to Midway, including transport of people, equipment, and supplies necessary for activities outlined in the Monument Management Plan.

Human Health and Hazardous Materials

The Coordinated Field Operations Action Plan calls for the rehabilitating Officers Row and maintaining infrastructure at Kure Atoll (CFO-3.4 and CFO-3.5). This includes renovating and improving Midway and Kure Atolls. At Kure Atoll, this would apply to the ongoing need to maintain, expand, or replace communications equipment, solar power and water units, sewage treatment infrastructure, buildings, and equipment. Because the structures at both Midway and Kure Atolls were built with materials that may contain hazardous materials, these activities increase the likelihood of release and subsequent human exposure. However, structures would be demolished or rehabilitated in accordance with Monument regulations and protocols, including the handling of PCB-containing materials, lead-based paint, and other such toxic substances. Disposal of hazardous materials through proper EPA and Hawai'i Department of Health protocols could decrease the overall quantity of hazardous materials within the Monument and, thus, the risk of human exposure. Therefore, these activities could have a beneficial effect on hazardous waste and human health within the Monument.

With the increased number of research activities that would be taking place according to this Monument Management Plan, the opportunities for new vessels to operate in the Monument would be addressed by Activities CFO-6.2 and CFO-6.3. One or possibly more new vessels would be stationed at Midway Atoll for expanded or new field activities and to act as a stepping

stone to establish research and monitoring programs in the northern end of the Monument. A new, small research vessel would be stationed at Midway to service field activities from French Frigate Shoals to Kure Atoll. This new vessel would expand research, education, enforcement, and emergency response capabilities. These activities could be beneficial to the current and projected future human presence in the Monument for management and research purposes because they could provide equipment for carrying out new and expanded field activities outlined in this Monument Management Plan and emergency and law enforcement response capabilities that do not currently exist.

Currently, nonintrusive research diving is allowed within the Monument. Activities CFO-8.1, CFO-8.2, and CFO-8.3 include replacing the dive recompression chamber at Midway Atoll, investigating the acquisition of a portable dive recompression chamber, and incorporating a dive operations center at Midway Atoll. All of these activities could benefit researchers and diving visitors because they could have a more effective and better managed dive program. This includes having additional safety equipment available, which could increase their ability to scuba dive for more research activities. Having this new equipment available would also assist in the event of any dive-related injuries.

Currently at Midway, humans living and working in buildings are potentially exposed to lead-based paint. Under the No Action alternative, replacing Bravo (CFO-3.2) and Charlie (CFO-3.3) barracks, rehabilitating Officer's Row at Midway Atoll (CFO-3.4), and rehabilitating Midway Mall (CFO-9.4) would take many more years than it would under the Proposed Action alternative, so the risk to humans would last longer. Except for a few employees that have lived at Midway for 10 to 25 years, most staff members do not live there for more than three to five years, and most visitors and researchers stay for only a few weeks to months. Therefore, this extension of the time to replace or rehabilitate the buildings would not prolong exposure to most individuals, but it could expose more individuals.

Table 3.4-1
Summary of Effects on Socioeconomic Resources of the Proposed Action Alternative

Economics and Environmental Justice		
Resource Area	**Action Areas**	**Proposed Action**
Economics and Environmental Justice	All	• Minor beneficial effect on population, employment, industry, or income • No effect on environmental justice

Understanding and Interpreting the Northwestern Hawaiian Islands		
Action Plan	**Action Areas**	**Proposed Action**
Marine Conservation Science *(EA section 1.6.1)* *(EA section 1.7.1)*	Field	• Beneficial effects on human uses
Native Hawaiian Culture and History *(EA section 1.6.2)*	Field	• Beneficial effect on human uses

Economics and Environmental Justice		
Resource Area	**Action Areas**	**Proposed Action**
Economics and Environmental Justice	All	• Minor beneficial effect on population, employment, industry, or income • No effect on environmental justice

Understanding and Interpreting the Northwestern Hawaiian Islands		
Action Plan	**Action Areas**	**Proposed Action**
(EA section 1.7.2		
Historic Resources *(EA section 1.6.3)* *(EA section 1.7.3)*	Planning/ administrative	• Beneficial effects on human health, safety, and hazardous materials
	Field	• Minor beneficial effects on human uses
Maritime Heritage *(EA section 1.6.4)* *(EA section 1.7.4)*	Planning/administrative	• Beneficial effects on human health, safety, and hazardous materials

Conserving Wildlife and Habitats		
Action Plan	**Action Areas**	**Proposed Action**
Threatened and Endangered Species *(EA section 1.6.5)* *(EA section 1.7.5)*	Planning/administrative	• Beneficial effect on human uses
	Field	• Beneficial effect on human health, safety, and hazardous materials • Long-term minor negative effect on human uses
Migratory Birds *(EA section 1.6.6)* *(EA section 1.7.6)*	Planning/administrative	• Beneficial effect on human health, safety, and hazardous materials
Habitat Management and Conservation *(EA section 1.6.7)* *(EA section 1.7.7)*	Planning/ administrative	• Beneficial effect on human health, safety, and hazardous materials
	Field	• Beneficial effect on human health, safety, and hazardous materials

Reducing Threats to Monument Resources		
Action Plan	**Action Areas**	**Proposed Action**
Marine Debris *(EA section 1.6.8)* *(EA section 1.7.8)*	Planning/administrative	• Beneficial effect on human health, safety, and hazardous material.
Alien Species *(EA section 1.6.9)* *(EA section 1.7.9)*	Planning/administrative	• Beneficial effect on human health, safety, and hazardous materials • Short-term minor negative effect on human health, safety, and hazardous materials
	Field	• Beneficial effect on human uses
Maritime Transportation and Aviation *(EA section 1.6.10)*	Planning/ administrative	• Beneficial effect on human uses • Beneficial effect on human health, safety, and hazardous materials

Reducing Threats to Monument Resources		
Action Plan	**Action Areas**	**Proposed Action**
(EA section 1.7.10)		.
Emergency Response and Natural Resource Damage Assessment *(EA section 1.6.11)* *(EA section 1.7.11)*	Planning/administrative	• Beneficial effect on human health, safety, and hazardous materials

Managing Human Uses		
Action Plan	**Action Areas**	**Proposed Action**
Permitting *(EA section 1.6.12)* *(EA section 1.7.12)*	Planning/administrative	• Beneficial effect on human health, safety, and hazardous materials
Enforcement *(EA section 1.6.13)* *(EA section 1.7.13)*	Field	• Beneficial effect on human uses
Midway Atoll Visitors Services *(EA section 1.6.14)* *(EA section 1.7.14)*	Planning/ administrative	• Beneficial effect on human uses
	Field	• Beneficial effect on human uses

Coordinating Conservation and Management Activities		
Action Plan	**Action Areas**	**Proposed Action**
Ocean Ecosystems Literacy *(EA section 1.6.18)* *(EA section 1.7.18)*	Field	• Beneficial effect on human uses

Achieving Effective Monument Operations		
Action Plan	**Action Areas**	**Proposed Action**
Central Operations *(EA section 1.6.19)* *(EA section 1.7.19)*	Planning/administrative	• Beneficial effect on human uses
Coordinated Field Operations *(EA section 1.6.21)* *(EA section 1.7.21)*	Planning/ administrative	• Beneficial effect on human uses
	Infrastructure and development	• Beneficial effect on human health, safety, and hazardous materials • Beneficial effect on human uses

3.5 OTHER RESOURCES

3.5.1 Effects Analysis Methodology

In the description of the No Action and Proposed Action alternatives, activities presented in the plan were divided into three categories: 1) Planning and Administrative, 2) Field, and 3) Infrastructure and Development. Planning and administrative activities are not considered to directly affect water quality, transportation, and utilities either because they relate to development of the coordination mechanisms described in the MOA and proclamation, or because they are solely administrative in nature. However, many activities identified as a result of these planning and administrative actions ultimately will have a direct effect and to the extent adequate information is currently available are analyzed below. For activities proposed within or intended to improve management of the Monument, the methodology used to determine whether effects on water quality, transportation, and utilities would occur is as follows:

- Review and evaluate ongoing and past activities to identify the action's potential effect on water quality, transportation, and utilities;
- Review and evaluate activities within the plan to identify their potential to beneficially or negatively affect the ecosystem and its component parts within the Monument; and
- Assess the compliance of each activity within the plan with applicable federal, state, or local regulations.

In addition, all proposed activities that may affect water quality under the Clean Water Act or other federal or state law will only proceed after compliance with applicable laws, including, as necessary, consultation, receipt of permits, and compliance with all permit terms and conditions.

3.5.2 Effects Common to Human Interactions on Water Quality, Transportation, and Communications and Utilities in the Monument

Possible effects from increased air, marine, and terrestrial transportation traffic associated with the Monument to general transportation within and to the Monument include: 1) potential effects from delays to transiting vessels, 2) infrastructure improvements to accommodate increased traffic within the Monument, 3) potential conflicts between research vessels, cruise ships, and transiting vessels, and 4) effects of increased air traffic to and from Midway Atoll. All activities would be designed and managed using best management practices to avoid or minimize these effects, as analyzed below.

3.5.3 No Action

This section briefly describes activities that are underway in the Monument and provides analysis of the effects associated with these activities. Only those activities that would have an effect on water quality, transportation, and utilities are included in the analysis. The analysis describes the projected beneficial and negative effects that would be expected to continue under the No Action alternative, should this alternative be selected for implementation. Implementing the No Action alternative would result in no change to the current situation. However, these

activities would continue under the Proposed Action alternative, and their effects are summarized under the Proposed Action in Table 3.5-1 at the end of this section.

3.5.3.1 Understanding and Interpreting the NWHI

Maritime Heritage Action Plan

Field Activities

Transportation
Efforts to monitor, map, and characterize maritime heritage and biological and ecological resources are ongoing (MH-1-2). Shoreline terrestrial surveys and inventories, marine remote sensing using magnetometer, and side-scan sonar would continue to be used to locate potential maritime heritage targets, and noninvasive diving surveys would continue to assess and inventory sites. Field activities may require a small increase in vessel traffic within the Monument. Existing marine, air, and terrestrial traffic associated with ongoing activities at the Monument currently have no effect on transportation outside and through the Monument. Under the No Action alternative, transiting vessels would still be able to pass through the Monument no delays.

3.5.3.2 Conserving Wildlife and Habitats

Threatened and Endangered Species Action Plan

Field Activities

Transportation
Efforts to reduce marine debris within the Monument also continue, along with large-scale efforts to remove debris from sensitive aquatic habitats (TES-1.1). Sites would continue to be prepared for establishing a self-sustaining *Pritchardia remota* population on Laysan Island, including eliminating alien species and ensuring the purity of seed stocks (TES-7.3). To protect *Pritchardia remota* from catastrophic events and to achieve recovery objectives, this species is being established outside its known native range on Laysan Island and on Eastern and Sand Islands at Midway Atoll NWR (TES-7.5). These activities may require a small increase in vessel traffic within the Monument. Existing marine, air, and terrestrial traffic associated with ongoing activities at the Monument currently have no effect on transportation outside and through the Monument.

Habitat Management and Conservation Action Plan

Field Activities

Transportation
The Habitat Management and Conservation Action Plan includes the following continuing field activities: 1) Continue collecting and fingerprinting oil found washed ashore and on wildlife from mystery spills to determine its provenance, and build an oil sample archive for possible use as evidence in liability assignment (HMC-2-5); 2) Continue monitoring the area at Laysan Island that was contaminated by the insecticide Carbofuran (HMC-2-6); 3) Propagate and outplant native species (HMC-4.1); 4) Continue efforts to reestablish 60 acres of native shrub community

on Laysan Island (HMC-4.3); and 5) Monitor changes in species composition and structure of the coastal shrub and mixed grass communities on basaltic islands in the Monument (HMC-4.7). The general effects of these field activities on transportation would be a small increase in vessel traffic within the Monument. Existing marine, air, and terrestrial traffic associated with ongoing activities at the Monument currently have no effect on transportation outside and through the Monument. Under the No Action alternative, transiting vessels would still be able to pass through the Monument with no delays.

3.5.3.3 Reducing Threats to Monument Resources

Alien Species Action Plan

Field Activities

Transportation
The Alien Species Action Plan includes the following continuing field activities: 1) Continue to require hull inspection and cleaning of all vessels, SCUBA gear, marine construction material, and instruments deployed in the Monument (AS-3.2); and 2) Enforce the use of current quarantine protocols to prevent the introduction of invasive terrestrial species to the Monument (AS-3.1). These activities may generate a slight inconvenience to vessels harboring within the Monument. Existing marine, air, and terrestrial traffic associated with ongoing activities at the Monument currently have no effect on transportation outside and through the Monument. Under the No Action alternative, transiting vessels would still be able to pass through the Monument with no delays.

Maritime Transportation and Aviation Action Plan

Infrastructure Development Activities

Transportation
Efforts would continue to encourage the energy and water efficiency of vessels operating in the Monument (MTA-2.4). For example, the NOAA ship *Hi‘ialakai* began a recycling program and installed water-saving devices to reduce effects on the Monument. Plans are in place to test the use of biofuels and nonpetroleum-based hydraulic fluid. Increased efficiency would not have a beneficial effect on transportation but would create a benefit as resources are conserved. Existing marine, air, and terrestrial traffic associated with ongoing activities at the Monument currently have no effect on transportation outside and through the Monument. Under the No Action alternative, transiting vessels would still be able to pass through the Monument with no delays.

3.5.3.4 Achieving Effective Monument Operations

Central Operations Action Plan

Planning and Administrative Activities

Utilities
As part of the No Action alternative, coordination and implementation of annual operating plans would continue (CO 1.1). Annual operating plans are guided by site-specific needs and are designed to increase efficiencies and establish standard operating procedures, where possible.

The administrative procedures and functions included in the annual operating plans address required maintenance of communication equipment, including telephones, cellular phones, satellite phones and connections, and radios in the Monument. The Monument's staffs continued coordination and implementation of annual operating plans provides beneficial effects on Monument communications by extending the life of the communications systems, identifying system deficiencies and identifying needs for system upgrades.

Coordinated Field Operations Action Plan

Infrastructure and Development Activities

Utilities
As part of the No Action alternative, maintenance of the fuel farm at Midway would continue (CFO 4.1). The recent replacement fuel farm constructed at Midway Atoll was designed to meet current FWS, FAA, and USCG needs. Efforts are underway to increase the capacity of gasoline and biodiesel or other sustainable fuel types available to multi-agency partners. The new fuel farm provides beneficial effects on the environment at Midway by eliminating the threats of spills associated with the aging system, including storing the fuel in multiple smaller tanks rather than one or two extremely large tanks and providing new easily maintained tanks and infrastructure. The new fuel farm also contributes to the overall beneficial effects of Monument management activities under both alternatives by supporting the current scale of human presence at Midway, including operation of the airfield and refueling capacity, while being capable of ready expansion, as needed.

3.5.4 Proposed Action

The Proposed Action would expand current activities described above under the No Action alternative, while implementing the new activities described in the Monument Management Plan. The effects of these activities on water quality, transportation, and utilities are described below.

3.5.4.1 Understanding and Interpreting the Northwest Hawaiian Islands

Marine Conservation Science Action Plan

Field Activities

Transportation
The Marine Conservation Science Action Plan would implement research priorities identified in the Monument Natural Resources Science Plan (MCS-2.4), including implementing monitoring activities. The effect of increased science-based activities may result in a minor increase in the number of research cruises. Considering the current low levels of vessel traffic, this minor increase would not have an effect on transportation.

Native Hawaiian Cultural and History Action Plan

Field Activities

Transportation
Within the Native Hawaiian Culture and History Action Plan, one activity provides for regular access for Polynesian voyaging canoes for wayfinding and navigational training (NHCH-2.6). The trips would likely occur once or twice per year and would include a canoe and support vessel. Considering the current low levels of vessel traffic, this minor increase would not have an effect on transportation.

Maritime Heritage Action Plan

Planning and Administrative Activities

Water Quality
Wreck sites and other debris can represent potential hazards that may contribute hydrocarbons, chemicals, or iron to the marine ecosystem. Iron has been shown to be a limiting nutrient and may cause increased growth of algae or corallomorphs that smother surrounding reefs. The MMB would be informed of any discovered potential hazards in order to assess the need for response or remediation (refer to section 3.3.4 of the Monument Management Plan). A status report on potential environmental hazards would be completed within one year and would be updated annually thereafter (MH-1.3). While planning and administrative activities would not directly affect physical water quality changes, there could be beneficial effects on water quality by removing debris that could contain hazardous materials and could have a negative effect on water quality.

3.5.4.2 Conserving Wildlife and Habitats

Threatened and Endangered Action Plan

Planning and Administrative Activities

Transportation
Activities proposed under the Threatened and Endangered Action Plan include planning activities designed to conserve monk seal habitat (TES-1.3) and to reduce the likelihood and effects of human interactions on monk seals (TES-1.4). The plan also would support outreach and education on Hawaiian monk seals (TES-1.5). Under activity TES-4.1, Monument staff would work with Japanese ornithologists to establish one or more breeding populations of the endangered short-tailed albatrosses on Midway Atoll NWR. To protect *Amaranthus brownii*, *Schiedea verticillata*, and *Pritchardia remota* from catastrophic events and to achieve recovery objectives, the potential for establishing these species outside their known native range on Mokumanamana (Necker Island), Laysan Island, Kure Atoll, and Eastern and Sand Islands at Midway Atoll is being assessed (TES-7.5). This could result in a minor increase in small vessel traffic. Considering the current low levels of vessel traffic, this minor increase would not have an effect on transportation.

Field Activities

Transportation
Supporting and facilitating emergency response for the endangered Hawaiian monk seal would put into place standardized protocols that would ensure a rapid and well-organized response to situations in the Monument that threaten monk seals (TES-1.2). Although the response would be focused specifically on monk seals, the protocols include ensuring that a rapid and well-organized response to groundings and oil spills is possible. The interagency coordination involved with improving emergency response logistical capabilities and transportation would increase the efficiency of the existing emergency vessel capacity. Although instituting protocols for monk seal rescue would not directly reduce the occurrence of the incidents described above, the coordination and planning efforts could reduce the number of vessel trips required. Therefore, this would have a beneficial effect on vessel operations and transportation within the Monument.

To reduce the potential for cetaceans to be negatively affected by marine debris, the MMB would monitor, characterize, and address the effects of marine debris on cetaceans (TES-2.3). This measure would augment the activities within the Marine Debris Action Plan that are aimed at reducing the quantity of marine debris introduced into the Monument. The overall effects of proposed marine debris activities would result in a minor increase in vessel trips within the Monument to collect the debris. Considering the current low levels of vessel traffic, this minor increase would not have an effect on transportation.

Protecting and managing marine habitat, including foraging areas and migration routes (TES 3.2), would manage activities such as anchoring and vessel traffic within the Monument to minimize disturbance to foraging areas, reduce potential exposure to hazardous materials, and minimize vessel hazards to turtles in open waters. This activity would have a negligible effect on transportation.

Habitat Management and Conservation Action Plan

Planning and Administrative Activities

Water Quality
Planning and administrative activities would evaluate costs to ecosystem function and benefits of removing anthropogenic iron sources such as metal from shipwrecks and discarded debris from reefs throughout the Monument (HMC-2.4). An ecological risk assessment would be conducted to determine allowable lead levels in soils at Midway and would remove lead-based paint from buildings and soils to nonrisk levels (HMC-2.7). Ecological risk assessments, cost evaluation efforts, and other planning activities would work to improve water quality and thus could have a beneficial effect on water quality.

Transportation
The Habitat Management and Conservation Action Plan would identify and prioritize restoration needs in shallow-water reef habitats affected by anthropogenic disturbances within five years (HMC-1.1) and would evaluate the costs to ecosystem function and the benefits of removing anthropogenic iron sources such as metal from shipwrecks and discarded debris from reefs throughout the Monument (HMC-2.4). Managers would investigate opportunities for restoration

and would prioritize actions so that funds and resources would be focused to address the most important needs. The plan also calls for ecological risk assessment to determine allowable lead levels in soils at Sand Island on Midway Atoll NWR and removing lead from buildings and soils to nonrisk levels (HMC-2.7); an ecological risk assessment to determine the cleanup level necessary to reduce risks to human and wildlife health; formulating and implementing a restoration plan for Lisianski Island using guidelines established for neighboring Laysan Island (HMC-4.4); and evaluating the potential to restore, and create as needed, freshwater sources at proposed translocation sites for Laysan duck, Nihoa finch, Laysan finch, and Nihoa millerbird (HMC-7.2). Implementing these planning activities may involve field activities that could result in a minor increase in vessel and air traffic. Considering the current low levels of vessel and air traffic, this minor increase would not have an effect on transportation.

An effort to educate other federal and state agencies about overflight rules and to promote compliance regarding overflights and close approaches (HMC-9.1) would increase safety awareness and may reduce the potential for aircraft collisions with birds, thus resulting in a beneficial effect on air traffic.

Field Activities

Water Quality

Field activities would include efforts to evaluate the effects of contamination in terrestrial and nearshore areas from shoreline dumps at FFS and at Kure, Midway, and Pearl and Hermes Atolls and to prioritize cleanup action based on risk assessments (HMC-2.1); to work with partners and responsible parties to verify the integrity of known landfills and dumps and to conduct additional remediation, if necessary (HMC-2.2); and to locate historic disposal sites at Tern Island (FFS) and at Kure, Midway, and Pearl and Hermes Atolls and investigate them for contamination (HMC-2.3). Contamination evaluation, risk assessment, and remediation efforts would work to remove or encapsulate contaminants, thereby improving water quality and resulting in a beneficial effect on water quality.

Additional field activities would include efforts to monitor salinity, parasites, contaminants, and native arthropods associated with groundwater, freshwater seeps, and ponds (HMC-7.1) and to evaluate the potential for developing and creating additional freshwater sources at potential translocation sites for avifauna species, as needed (HMC-7.2). These field activities would provide data to support improvement to terrestrial water and groundwater quality; therefore, there could be a beneficial effect on water quality.

Transportation

The Habitat Management and Conservation Action Plan would evaluate effects of contamination in terrestrial and nearshore areas from shoreline dumps at FFS and at Kure, Midway, and Pearl and Hermes Atolls and prioritize cleanup action based on risk assessments (HMC-2.1); the plan also would work with partners and responsible parties to verify the integrity of known landfills and dumps and to conduct additional remediation, if necessary (HMC-2.2). These activities would investigate the extent of contamination at these sites and would assess their integrity, containment effectiveness, and hazard potential. Based on this information, the highest priority sites would be removed, remediated, or sealed. Monitoring would continue to assess if further action is needed. Coordinated ecosystem restoration activities on Kure Atoll would be

implemented (HMC-4.6), as would inventorying and documenting the life histories of endemic terrestrial invertebrates on Nihoa and Mokumanamana (HMC-5.1). The effects of these activities would be minor increase in vessel traffic. Considering the current low levels of vessel traffic, this minor increase would not have an effect on transportation.

3.5.4.3 Reducing Threats to Monument Resources

Marine Debris Action Plan

Planning and Administrative Activities

Water Quality
Activities proposed under the Marine Debris Action Plan include planning activities to develop and implement a five-year marine debris removal and prevention strategy for the Monument (MD-1.3); working with the U.S. Department of State to gain international cooperation and involvement for marine debris issues (MD-1.4); developing and standardizing monitoring protocols for marine and terrestrial habitats (MD-2.2); and working with partners to continue to develop and implement an outreach strategy for marine debris (MD-3.1). These activities would work to improve water quality and to prevent potential degradation to water quality; therefore, these activities would have a beneficial effect.

Field Activities

Water Quality
Activities that are proposed under the Marine Debris Action Plan include field activities that would allow Monument staff to continue working to remove marine debris in the Monument and to reduce additional debris entering the Monument (MD-1.1); would catalog, secure, contain, and properly remove hazardous materials that wash ashore in the NWHI (MD-1.2); and would work with partners on marine debris studies (MD-2.1). These activities would work to improve water quality and to prevent potential degradation to water quality; therefore, these activities would have a beneficial effect.

Transportation
Activities to institute preventative measures include gear modifications, gear loss reporting requirements, dockside gear accountability inspections of vessels prior to their departure on fishing trips and upon their return, working with the fishery and management councils to reduce illegal fishing and destructive fishing practices, and pursuing technological means to detect and retrieve lost gear (MD-1.1). The MMB would continue to participate in multiagency cleanup efforts of current infrastructure, protocols, and experience and would work with fishery management councils, including the Western Pacific and North Pacific Fishery Management Councils, to assess and address fishing practices and gear that contribute to marine debris (MD-1.4). This collaborative effort may include inspections, technological requirements, and implementing incentive programs. In addition, the MMB would work with the Marine Debris Program to determine the sources of marine debris and to support studies that determine economical and biological effects of marine debris. Finally, the MMB would continue working with partners to remove marine debris in the Monument and to reduce additional debris entering the Monument (MD-1.1), catalog, secure, contain, and properly remove hazardous materials that wash ashore in the NWHI (MD-1.2); and work with partners on marine debris studies (MD-2.1).

These activities may result in a minor increase in vessel traffic and prolong their duration of stay in the Monument, but the effects on transportation would be negligible. Removing marine debris may benefit vessel traffic by reducing the potential of prop fouling from nets and other debris.

Utilities
Under the Proposed Action, expanded marine debris removal activities would include retrieving existing debris at sea and continuing reef and beach cleanup efforts. The MMB would continue working with partners to remove marine debris and reduce additional debris from entering the Monument (MD 1.1). Currently, a small quantity of the collected marine debris is burned in the incinerator at Midway Atoll, and the remaining marine debris is stored for eventual shipping and disposal in the Main Hawaiian Islands. The limited capacity of the existing landfill on Sand Island precludes its use for disposal of marine debris; therefore, no marine debris is deposited in the landfill at Midway. No effects on the landfill in Midway Atoll are expected from marine debris removal activities; however, long-term minor negative effects from increased solid waste are expected at the respective disposal sites in the Main Hawaiian Islands.

Alien Species Action Plan

Field Activities

Transportation
The Alien Species Action Plan contains a number of actions to reduce the presence of alien species in the NWHI, including surveying distributions and populations of known alien species at regular intervals (AS-2.1); developing and implementing monitoring protocols for early detection and characterization of new infestations (AS-2.3); implementing and completing house mouse eradication (AS-4.2); conducting toxicant trials to evaluate their efficacy and documenting ecological effects at selected islands on highest-priority invasive species of ants and wasps (AS-5.2); controlling, and, if possible, eradicating the two introduced mosquito species at Midway Atoll NWR within 10 years using methods prescribed in the Integrated Pest Management Plan (AS-5.3); and developing and implementing a plan to control and, if possible, eradicate the invasive gray bird locust on Nihoa, Mokumanamana (Necker Island), FFS, and Lisianski Island (AS-5.4).

Additionally, the plan would protect endangered plants threatened by gray bird locust outbreaks at Nihoa by developing appropriate baits for localized application of toxicants to protect specific high-priority plant sites (AS-5.5) and would control and eventually eradicate golden crownbeard (AS-6.1) and co-occurring weedy shrubs on Kure, Midway, and Pearl and Hermes Atolls. In all areas where they occur, the plan would control and eradicate the invasive grass sandbur from Kure, Midway, and Pearl and Hermes Atolls, Lisianski Island, and FFS (AS-6.2); Indian pluchea, *Sporobolus pyramidatus*, and swine cress from Laysan Island (AS-6-3); and prioritized alien plant species from Kure Atoll (AS-6.4).

The plan would map, control, and eventually eradicate invasive red algae where it occurs (AS-7.1); conduct surveillance at appropriate sites for snowflake coral and other incipient marine invasives (AS-7.2); support and conduct research on alien species detection and effects of invasive species on native ecosystems (AS-8.1); and support and conduct research on invasive species prevention, control methods, and eradication techniques (AS-8.2). Research regarding

the introduction, control, and eradication of species under the Alien Species Action Plan would focus on determining the likely introduction patterns to aid prioritization of control and eradication efforts (AS-7.1, AS-7.2, and AS-8.1). Specifically, research documenting the effectiveness of preventative methods would aid decision makers in quarantine protocol choices (AS-8.2).

Activities under the Alien Species Action Plan would result in a minor increase in vessel traffic and would extend the duration of vessel stay in the Monument to conduct invasive species removal and associated activities. Considering the current low levels of vessel traffic, this minor increase would not have an effect on transportation.

Maritime Transportation and Aviation Action Plan

Planning and Administrative Activities

Water Quality
Activities proposed under the Maritime Transportation and Aviation Action Plan include planning activities that would develop protocols and practices as needed and that would integrate with current protocols for safe aircraft and vessel operations (MTA-2.2). These activities would work to prevent potential degradation to water quality; therefore, these activities would have a beneficial effect.

Transportation
The Maritime Transportation and Aviation Action Plan is aimed at establishing a framework for evaluating the effects of various activities conducted by ships and aircraft. There are several planning activities within the plan that would have a beneficial effect on transportation within the Monument. The MMB would develop boundaries and zoning information tools to help all Monument users comply with maritime transportation requirements (MTA-1.2). The MMB would also provide updates to nautical charts and Notice to Mariners to reflect Monument boundaries, zones, and other pertinent designations (MTA-1.3). These updates may require coordination with research vessels already conducting other research within the Monument. This would be accomplished through dual-purpose surveying and cost-sharing, which would increase the efficiency of current research ventures in addition to the maritime and aircraft benefits from such research.

The plan would also improve pre-access information, including a pre-trip training that would cover regulations and compliance; navigational hazards; zoning designations, including waste discharge locations and types; and information on preventing the introduction of alien species, preventing and reporting interactions with protected species and other wildlife, preventing light and noise pollution, and preventing anchor damage to coral reefs and other benthic habitats and organisms (MTA-2.3). All vessel operators, captains, crews, and trip participants would have access to this information. The MMB would work with the International Code Council to convene a group of vessel and aircraft personnel to discuss safety for boating and flight operations (MTA-2.2). These suggestions would be incorporated into the pre-trip training.

The plan would address aircraft and airfield equipment hazards to wildlife and would minimize these hazards at Midway Atoll and Tern Island. At Midway, actions taken to minimize hazards

include reducing the height of airport signs to prevent bird collisions, using a striped painting and lighting to make airport equipment more visible to birds, scheduling nighttime flights during albatross nesting season, and turning off unnecessary lighting around the airfield that disorients seabirds. At Tern Island, wildlife hazards are minimized for take-offs and landings by maintaining small wildlife exclusion areas at the ends of the runway and removing birds from the runway before aircraft take-offs or landings. Contracted pilots must follow strict flight guidelines for minimizing impacts on wildlife. Use of these BMPs constrains aircraft operations in terms of timing and loads, but there are no substantive effects on transportation activities.

The coordination and outreach efforts within the Maritime Transportation and Aviation Action Plan would increase the efficiency and effectiveness of current and future transportation needs. Combining research efforts, costs, and beneficial knowledge will benefit vessel and aircraft operations. The outreach components will also improve compliance with Monument transportation guidelines. Therefore, these activities would have a beneficial effect on transportation within the Monument.

Field Activities

Water Quality
Activities that are proposed under the Maritime Transportation and Aviation Action Plan include field activities that would conduct studies on potential aircraft and vessel hazards and effects (MTA-2.1). These activities would work to prevent potential degradation to water quality; therefore, these activities would have a beneficial effect.

Transportation
The Maritime Transportation and Aviation Action Plan outlines several field activities aimed at studies of potential aircraft and vessel hazards and effects (MTA-2.1). The studies include anchoring and mooring location feasibility, hull inspections, alien species introduction pathways, wildlife strikes by aircraft, and the effects of permit reporting requirements on protected species, light and noise, and discharge. These assessments will determine transportation effects on resources within the Monument and suggest possible improvements to be implemented. The research conducted for these studies will increase the efficiency and effectiveness of many transportation activities within the Monument, including alien species introduction prevention, minimizing bird strikes by aircraft anchoring locations and practices, hull inspections, and light and noise regulations. The effectiveness of current practices will be evaluated and improved upon, thus increasing the ease and efficiency of vessel and aircraft traffic within the Monument. Therefore, the plan would have a beneficial effect on transportation within the Monument.

Emergency Response and Natural Resource Damage Assessment Action Plan

Planning and Administrative Activities

Water Quality
Activities proposed under the Maritime Transportation and Aviation Action Plan include creating a Monument Emergency Response and Assessment Team for ICS responses (ERDA-1.1); acquiring and maintaining training and certification to complement and support the Regional Response Team (ERDA-1.2); participating in emergency response and preparedness drills and meetings (ERDA-1.3), and implementing damage assessment programs and training

throughout the life of the plan (ERDA-1.4); in the second year, determining the non-ICS emergencies and the necessary type and scope of responses (ERDA-2.1); designating appropriate Monument personnel for each non-ICS response team (ERDA-2.2); ensuring that appointed personnel acquire and maintain training and certifications throughout the life of this plan (ERDA-2.3); updating and improving upon the Area Contingency Plan and the Environmental Sensitivity Indices (ERDA-3.1); and within three years, creating damage assessment criteria and protocols (ERDA-3.2). While these planning and administrative activities would have no direct and immediate effect on water quality, they would work to prevent potential degradation to water quality by improving emergency response to water quality threats. This improved response could reduce the duration of and level of potential degradation of water quality and would therefore have an overall beneficial effect.

Transportation
Damage assessment is an important component of any emergency response (ERDA-1.4). The Monument Emergency Response and Assessment Team would coordinate with the appropriate agencies to ensure that appropriate response, injury assessment, and restoration activities take place for any given emergency throughout the Monument, including an Unusual Mortality Event (UME) in monk seals or other species. The effects of these activities would be a minor increase in vessel traffic. Considering the current low levels of vessel traffic, this minor increase would not have an effect on transportation. However, there would be beneficial effects on transportation safety and emergency response to vessel, aircraft, or vehicle accidents.

3.5.4.4 Managing Human Uses

Permitting Action Plan

Planning and Administrative Activities

Transportation
The Permitting Action Plan outlines several activities that develop tracking, evaluation, and outreach components. A GIS-based permit tracking system would allow each agency to input and track activities within the Monument that pertain to individual requirements (P-2.1). A system would then be instituted to analyze these data to inform management decisions (P-2.2) and discover patterns of compliance (P-2.3). In conjunction, a Monument reporting process would be developed to ensure adherence to regulations and, if necessary, issue compliance visits from enforcement agents (P-2.4). A permit and regulatory education program would be required for all permit applicants (P-3.1). Outreach efforts would be coordinated between agencies to avoid delays and to ensure the highest level of regulatory understanding by permittees (P-3.3). Finally, pre-access training for first-time Monument visitors to communicate regulations, permit requirements, and best conduct would be implemented (P-3.4).

These activities would increase accountability and compliance with permits required to enter the Monument. The outreach component would integrate understanding of regulations by all Monument users, which would decrease the likelihood of accidents. It would also familiarize Monument users with quarantine protocols, hull inspection regulations, and alien species introduction prevention methods. In turn, vessel operators would not be delayed, disrupted, or

displaced by noncompliance with regulations. Therefore, this plan would have a beneficial effect on transportation within the Monument.

Enforcement Action Plan

Planning and Administrative Activities

Water Quality
Planning and administrative activities would include creating a Monument law enforcement working group (EN-1.1); developing an integrated law enforcement training program (EN-1.3); assessing Monument law enforcement capacity and program effectiveness (EN-1.4); and integrating additional automated monitoring systems and ship reporting systems for all vessels transiting the Monument (EN-2.3). While these planning and administrative activities would have no direct and immediate effects on water quality, they would work to improve water quality by improving enforcement to prevent anthropogenic water quality threats, resulting in an overall beneficial effect.

Transportation
One tenant of the Enforcement Action Plan is to integrate briefings into pre-access training of Monument users that would inform users of regulations, permit requirements, and best management practices (EN-3.1). Similar to the outreach component of the Permitting Action Plan, this activity would increase compliance with regulations and thus have a beneficial effect on transportation within the Monument.

Midway Atoll Visitor Services Action Plan

Field Activities

Transportation
The Midway Atoll Visitor Services Action Plan would provide visitors with opportunities for wildlife-dependent recreation to enhance their knowledge and appreciation of the Monument's natural resources (VS-1.1). Visitors would be given the opportunity to view wildlife on Midway Atoll NWR only, and the effects of visitors and other users on wildlife and historic resources would be continuously monitored to ensure their protection (VS-1.3). The indirect effects of these activities may be a minor increase in vessel and air traffic as a result of improving the visitor experience and potentially attracting more visitors to the Midway Atoll NWR. Considering the current low levels of vessel and air traffic and planned improvements for mooring and to the airport, this minor increase would not have an effect on transportation.

More specific descriptions of the effects of visitors at Midway Atoll are contained in the Environmental Assessment for the Interim Midway Visitors Service Plan and in relevant compatibility determinations presented in Volume III, Appendix G.

3.5.4.5 Achieving Effective Monument Operations

Coordinated Field Operations Action Plan

Planning and Administrative Activities

Transportation
The Coordinated Field Operations Action Plan calls for developing interagency agreements to facilitate effective field coordination throughout the Monument (CFO-2.1). It also calls for the inventory, maintenance, and coordinated use of small boats and related field resources (CFO-6.1). Generally, this activity would increase transportation efficiency by increasing communication between agencies that use and manage the Monument. The coordination of field resources would also logistically improve transportation operations. Therefore, this activity would have a beneficial effect on transportation.

This plan outlines the development of an aircraft capacity within the Monument. The USFWS charters a twin-engine aircraft (Gulf Stream 1 or G-1) to transport people and supplies to Midway. The G-1 would continue to provide service through fiscal year 2008 (CFO-7.1). Within five years, an inter-island aircraft transportation carrier would be identified to deliver passengers and cargo between Honolulu and Midway (CFO-7.1), followed by an evaluation of the need for a dedicated aircraft for transportation, management, research, evacuation, education, surveillance, and enforcement (CFO-7.2). These planning mechanisms would increase the capacity of aircraft transportation within the Monument incrementally. The ability of staff to accomplish many of the tasks outlined within this document, such as emergency response improvements, data collection, and research, would be augmented by this new aircraft capacity. Therefore, these activities would have beneficial effects on transportation within the Monument.

Utilities
Planning and administrative activities would include initiating and completing necessary planning for implementing the draft Midway Atoll Conceptual Site Plan (CFO 1.1); developing conceptual site plans for the Hawaiian Island National Wildlife Refuge and Kure Atoll Wildlife Sanctuary (CFO 1.2); developing a plan for long-term sustainability of operations in the Monument through the use of alternative energy system and waste reduction within two years (CFO 1.3); and planning for sustainable construction and landscape architecture throughout the Monument (CFO 1.4). While these planning and administrative activities would have no direct and immediate effects on utilities, they would work to improve the utilities services in the Monument by conducting necessary site planning and infrastructure development and would therefore have an overall beneficial effect.

Infrastructure Development Activities

Transportation
The Coordinated Field Operations Action Plan outlines infrastructure improvements in the future. These improvements include additional vessels at Midway for summer marine research (CFO-6.2), a small research/enforcement vessel at Midway (CFO-6.3), and an appropriate aircraft to service the Monument and Pacific region (CFO-7.3). The plan would also improve dive capabilities by acquiring a portable dive recompression chamber for a research vessel (CFO-8.2) and incorporating a dive operations center at a boathouse at Midway (CFO-8.3). The

plan also provides for improved logistical, infrastructure, and transportation support for endangered species recovery actions (CFO-9.3). Finally, there are provisions for the construction of an airport welcome center on Sand Island within two years, including capacity to handle passenger arrival and departures from Midway Atoll NWR.

These infrastructure developments will increase the efficiency of many current and future transportation demands within the Monument. The ability of staff to accomplish many of the tasks outline within this document, including emergency response improvements, data collection, and research, would be augmented by these new vessels and facilities. Therefore, these activities would have a beneficial effect on transportation within the Monument.

Utilities

Restoration activities would include rehabilitating "Officers Row" Housing at Midway Atoll (CFO 3.4) and existing housing and facilities on Green Island at Kure Atoll (CFO 3.5). These activities would increase the housing capacity and would provide maintenance, expansion, or replacement of existing utility systems. Additional demands on utilities, including electricity, wastewater, potable water supply, solid waste and communications, would result from increased housing capacity. The current utilities are adequate for the existing demands at Midway Atoll, but expanded operations and housing that is currently planned will require additional analysis to determine which system upgrades are necessary. Additional compliance associated with Midway site infrastructure improvements may be required as planning and design details are developed.

Minor negative effects are expected from increased demands on utilities but would be offset by rehabilitation and replacement of existing infrastructure with more sustainable and efficient systems, having beneficial effects overall.

Constructing an airport welcome center on Sand Island (CFO 9.5) would include restroom facilities construction. The current utilities are adequate for the existing demands at Midway Atoll, but planned expanded operations would require additional analysis to determine which system upgrades are necessary. Additional compliance associated with Midway site infrastructure improvements may be required as planning and design details are developed.

Table 3.5-1
Summary of Effects on Other Resources (Water Quality, Transportation, and Communications Infrastructure and Utilities) of the Proposed Action Alternative

Understanding and Interpreting the Northwestern Hawaiian Islands		
Action Plan	**Action Areas**	**Effects**
Marine Conservation Science *(EA section 1.6.1)* *(EA section 1.7.1)*	Field	• No significant effects on transportation.
Native Hawaiian Culture and History *(EA section 1.6.2)* *(EA section 1.7.2)*	Field	• No significant effects on transportation.

Understanding and Interpreting the Northwestern Hawaiian Islands		
Action Plan	**Action Areas**	**Effects**
Maritime Heritage *(EA section 1.6.4)* *(EA section 1.7.4)*	Planning/ Administrative	• Beneficial effects on water quality.

Conserving Wildlife and Habitats		
Action Plan	**Action Areas**	**Effects**
Threatened and Endangered Species *(EA section 1.6.5)* *(EA section 1.7.5)*	Planning/ Administrative	• No significant effects on transportation.
	Field	• No significant effects on transportation.
Habitat Management and Conservation *(EA section 1.6.7)* *(EA section 1.7.7)*	Planning/ Administrative	• Beneficial effects on water quality. • Beneficial effects on transportation.
	Field	• Beneficial effects on water quality. • No significant effects on transportation.

Reducing Threats to Monument Resources		
Action Plan	**Action Areas**	**Effects**
Marine Debris *(EA section 1.6.8)* *(EA section 1.7.8)*	Planning/ Administrative	• Beneficial effects on water quality.
	Field	• Beneficial effects on water quality. • Beneficial effects on transportation. • Minor negative effects on utilities.
Alien Species *(EA section 1.6.9)* *(EA section 1.7.9)*	Field	• No significant effects on transportation.
Maritime Transportation and Aviation *(EA section 1.6.10)* *(EA section 1.7.10)*	Planning/ Administrative	• Beneficial effects on water quality. • Beneficial effects on transportation.
	Field	• Beneficial effects on water quality. • Beneficial effects on transportation.
Emergency Response and Natural Resource Damage Assessment *(EA section 1.6.11)* *(EA section 1.7.11)*	Planning/ Administrative	• Beneficial effects on water quality. • Beneficial effects on transportation

Managing Human Uses		
Action Plan	**Action Areas**	**Effects**
Permitting *(EA section 1.7.12)* *(EA section 1.8.12)*	Planning/ Administrative	• Beneficial effects on transportation.

Managing Human Uses		
Action Plan	**Action Areas**	**Effects**
Enforcement *(EA section 1.6.13)* *(EA section 1.7.13)*	Planning/ Administrative	• Beneficial effects on water quality. • Beneficial effects on transportation.
Midway Atoll Visitors Services *(EA section 1.6.14)* *(EA section 1.7.14)*	Field	• No significant effects on transportation.

Achieving Effective Monument Operations		
Action Plan	**Action Areas**	**Effects**
Coordinated Field Operations *(EA section 1.6.21)* *(EA section 1.7.21)*	Planning/ Administrative	• Beneficial effects on transportation. • Beneficial effects on utilities.
	Infrastructure and Development	• Beneficial effects on transportation. • Beneficial effects on utilities. • Minor negative effect on utilities.

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CHAPTER 4:

OTHER REQUIRED NEPA ANALYSIS

CHAPTER 4
OTHER REQUIRED NEPA ANALYSES

4.1 INTRODUCTION

In addition to the analyses discussed in Chapter 3, NEPA requires additional evaluation of the project's effects with regard to the following:

- Cumulative effects;
- Significant unavoidable negative effects;
- The relationship between short-term uses and long-term productivity; and
- Any irreversible or irretrievable commitment of resources.

Issues related to environmental justice and the protection of children are addressed in section 2.4.4 of this document.

4.2 CUMULATIVE EFFECTS ANALYSIS

The CEQ's regulations implementing NEPA require that the cumulative effects of a Proposed Action be assessed (40 CFR Parts 1500-1508). A cumulative effect is an "impact on the environment which results from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions" (40 CFR § 1508.7; NOAA 1999). Cumulative effects can result from individually minor but collectively significant actions taking place over time (40 CFR § 1508.7).

The CEQ's guidance for considering cumulative effects states that NEPA documents "should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant" (CEQ 1997). Cumulative projects considered below in Section 4.2.2 are similar to the Proposed Action, large enough to have far-reaching effects, or are in proximity to the Proposed Action with similar types of effects.

4.2.1 Cumulative Effects Evaluation Methodology

The CEQ's cumulative effects guidance sets out several different methods to determine the significance of cumulative effects, such as checklists, modeling, forecasting, and economic effect assessment, where changes in employment, income, and population are evaluated (CEQ 1997). Very little definitive data are available at this time for determining cumulative effects of potential future projects (see Table 4-1). As a result, this EA looks primarily at resource trends and the expected effects the cumulative projects would have based on the individual project purpose; for example, a project that is expected to bring additional visitors to the Monument might be expected to result in minor disturbances to terrestrial species. In general, past, present, and future foreseeable projects are assessed by resource area.

Cumulative effects may arise from single or multiple actions and may result in additive or interactive effects. Interactive effects may be countervailing, where the negative cumulative effect is less than the sum of the individual effects, or synergistic, where the net negative cumulative effect is greater than the sum of the individual effects (CEQ 1997). Where applicable, the resource sections below include a discussion of whether project effects will accelerate any ongoing trends of resource degradation. The ROI for cumulative effects is often larger than the ROI for direct and indirect effects. The cumulative effect ROI is defined for each specific resource.

4.2.2 Past, Present, and Reasonably Foreseeable Future Projects

The project information provided in Table 4-1 was compiled from a number of sources, including NOAA, FWS, DLNR, USCG, the Navy, and the University of Hawai`i. The initial list of identified projects was reviewed and revised to include only those with some potential to contribute to cumulative effects (Table 4-1).

Filling at Whale-Skate Island

Whale-Skate Island has been shrinking over the last decade and is now an ephemeral island. NOAA is evaluating a filling project to restore monk seal haul-out areas.

Establish Regular Visitation at Midway Atoll

FWS was unable to offer a visitor program from early 2002 until early this year. FWS goal is to maintain Midway as the only remote island National Wildlife Refuge open to public visitation, primarily for wildlife and ecotourism tours. An Interim Visitor Services Plan, with a final EA, was approved in May 2007 and implemented in January 2008. A draft plan for a long-term visitor program based on this is included in the Monument Management Plan and analyzed in this document. Both the interim and proposed visitor plans include on-going monitoring and evaluation of effects.

Table 4-1
Cumulative Projects

Project	Related Project Location	Project Sponsor	Project Description
Filling at Whale-Skate Island	French Frigate Shoals	NOAA Protected Species Division	NOAA is evaluating a filling project to restore monk seal haul-out areas.
Establish regular visitation at Midway	Midway Atoll	FWS	The goal is to re-establish public visitation at Midway on a regular basis.
New water treatment system	Midway Atoll, Sand Island	FWS	Upgrades to treatment system to accommodate future demands.
New wastewater treatment system	Midway Atoll	FWS	Upgrades to treatment system to accommodate future demands.
Airport runway resurfacing and restriping	Midway Atoll	FWS	Upgrade runway to meet FAA Part 139 standards.
Develop Biodiesel or Appropriate Alternative Fuel Capacity	Midway Atoll	FWS	To advance sustainable use at Midway Atoll.
Design and Construct a Low Impact Shelter	Midway Atoll	FWS	To develop housing with low impact on natural resources.
Replace Bravo Barracks	Midway Atoll	FWS	To provide safe housing for residents and transients working on future projects.
Complete Phase I Rehabilitation of the Commissary building and Midway Mall	Midway Atoll	FWS	To provide needed office, classroom, storage, and basic laboratory space.
Termite treatment on all wooden/historic structures	Midway Atoll	FWS	To extend the life of existing structures for future uses and to protect historic resources.
Redevelop Existing Boathouse into New Boathouse, Dive Center, and Water-based Storage Facilities	Midway Atoll	FWS	Convert existing structure to a multipurpose boathouse, dive center, and storage facility.
Construct New Finger Piers along North Wall of Inner Harbor	Midway Atoll	FWS	Construct piers for fueling, loading, and short-term in-water storage of vessels.
Design and Construct Marine Laboratory	Midway Atoll	FWS	To meet research and educational needs of future users.
Complete Full Rehabilitation of Midway Mall	Midway Atoll	FWS	To provide office space, visitor services, and classrooms.
Rehabilitate Officers' Row Housing	Midway Atoll	FWS	To provide housing for projected increased Monument personnel.
Remodel or Replace Clipper House	Midway Atoll	FWS	To provide expanded food service needs.
Rehabilitate Seaplane Hangar	Midway Atoll	FWS	Work would be primarily to restore this historic structure.
Replace Charlie Barracks	Midway Atoll	FWS	Provide safe housing for visitors and transient personnel
Repair Inner Harbor Sea Wall	Midway Atoll	FWS	To protect the harbor repair of this seawall is needed.

New Wastewater Treatment System, Midway Atoll

The wastewater treatment system at Midway Atoll includes 20,280 feet (6,181.3 meters) of underground line and lift stations, and a septic and leach field system that was added in 1997. FWS is rehabilitating and replacing the existing wastewater collection and treatment system as required to adequately service the buildings. Work will include constructing a new wastewater treatment system, including septic tanks and drain fields, eliminating rainfall entry into the system, and replacing distribution lines as required. Any major site work would take place August through October to minimize wildlife effects.

Airport Runway Resurfacing and Restriping, Midway Atoll

The Midway Island runway is 7,904 feet (2,409 meters) by 200 feet (61 meters), with an asphalt surface. It is subject to the following weight limitations: 195,000 lbs for single wheel aircraft, 260,000 lbs for double wheel aircraft, and 390,000 lbs for double tandem aircraft. In the past, an average of 226 aircraft landed at Midway every year. This project is not yet funded in its entirety. Proposed construction will be beyond 2008.

Develop Biodiesel or Appropriate Alternative Fuel Capacity ad Midway Atoll

In an effort to advance the use of sustainable technologies at Midway, small boats, vehicles, and heavy equipment will be evaluated and where feasible, transitioned to the use of biodiesel. Ideally, this fuel would be stored on the existing concrete pad along the north wall of the inner harbor near the location where new finger piers will be constructed. Alternatively tanks would be located near the newly constructed fuel farm on the southwest corner of the inner harbor.

Design and Construct a Low Impact Shelter

Construct low impact shelter for short term housing in the housing zone. The housing will be constructed as a sustainable design pilot project intended to showcase the synergistic potential of innovative design on the island. The design will elevate the building off the ground, providing for human habitation while increasing the total amount of available wildlife habitat, and providing environmental security from tsunamis and storm surges. This structure will incorporate Pacific Island regional design principles to consider local wind and sunlight patterns, will aim to be nonpolluting and will incorporate recycled materials. The use of solar power, composting toilets, and, if needed, a small rain catchment system will be explored in an effort to sustain the building off the power grid and minimize wildlife impacts.

Replace Bravo Barracks

Demolition costs for existing building must be included in construction cost. Bravo Barracks replacement is essential in order to provide safe housing for permanent island residents and transients working on future maintenance/construction projects.

Complete Phase I Rehabilitation of the Commissary building and Midway Mall

Collectively the commissary building and the Midway Mall present ideal central locations for Co-Trustee and partner office, classroom, storage, and basic laboratory space. Phase I rehabilitation of the commissary will include cleaning and maintenance, construction of office and classroom space, and a feasibility study of how best to incorporate solar power and other sustainable design principles. The Midway Mall will require more substantial design and a preservation plan for renovation to provide basic office and storage space along with visitor information.

Termite treatment on all wooden/historic structures

By treating all wooden/historic structures immediately we buy ourselves 5-10 more years to find funding for ultimate rehabilitation/restoration. Without treatment these structures either need to be rehabilitated immediately or abandoned forever.

Redevelop Existing Boathouse into New Boathouse, Dive Center, and Water-based Storage Facilities

Redevelop the existing boathouse at Midway into a multipurpose boathouse, dive center, and storage facility to support agency operations in the northwestern end of the Monument. The facility will have maintenance bays and equipment for servicing small boats; a dive locker including a compressor, recompression chamber; and appropriate storage and work areas. The dive center may also support the visitor program. The building will be re-sited or reconstructed and potentially raised to address concerns of flooding on the seaplane pad.

Construct New Finger Piers along North Wall of Inner Harbor

To meet small boat needs, within 5 years construct three finger piers along the north wall of the inner harbor across from the existing concrete pad. These piers may be used for fueling, loading, and short term in-water storage of vessels. These vessels will be used to support programs at Midway and neighboring atolls in the future.

Design and Construct Marine Laboratory

A variety of needs will be met by a marine laboratory at Midway. An evaluation and planning effort will help determine if the research and educational needs of potential users will be best met by developing several small facilities over time, or by a modular design that allow new requirements to be filled as they arise. Initially the lab would provide basic amenities to augment research and education capacity including field schools, seasonal research, and long-term monitoring. A monk seal captive care facility, wet/dry lab infrastructure, quarantine standards, and possibly freezer space will be included in the plan. Several locations are well suited for a small laboratory including the old commissary building adjacent to the Midway Mall as well as several sites on the seaplane apron. The commissary building may be ideal for a first phase location, but would have to be reevaluated in order to accommodate a captive care facility.

Complete Full Rehabilitation of Midway Mall

Midway Mall would be rehabilitated as the "Midway Atoll Visitor Center" and would be used as office space for FWS, NOAA, State of Hawai'i and other potential partner personnel; as well as a hub for visitor services, classrooms, and education. Phase I rehabilitation would allow for agency offices and be completed within 3 years.

Rehabilitate Officers' Row Housing

The 10 historic Officers' row houses serve as examples of historic Albert Kahn architecture and will be restored. This increased housing capacity will accommodate increased agency and partner personnel

Remodel or Replace Clipper House

The Clipper House presently serves as the primary food service facility for Midway. Overall food services will need to be expanded to accommodate future population increases and enlargement of the Clipper House, reuse of older existing food service facilities, or construction of a new dining facility will be evaluated.

Rehabilitate Seaplane Hangar

Due to its size (large enough to hold heavy equipment, boats, workshops, etc.), its location (short distance from inner harbor and boat ramp) and its historic significance (designed by Albert Kahn, still contains scars from the Battle of Midway), this building needs to be utilized and preserved. Rehabilitation work will be guided by a detailed preservation plan.

Replace Charlie Barracks

Charlie Barracks replacement is essential in order to provide safe housing for island visitors and transient personnel. Demolition costs for the existing building must be included in the construction cost. This replacement is expected to take place within 10 years.

Repair Inner Harbor Sea Wall

The harbor is critical to operations at Midway. Any future expansion of docking/pier facilities in the southwest corner of the harbor must be preceded by the repair of the existing sea wall.

4.2.3 Cumulative Effects

Summary of Cumulative Effects

The contributions of the No Action and Proposed Action to cumulative effects on various resource areas are summarized in Table 4-2. It is anticipated that the cumulative projects would have overall beneficial cumulative effect for all resource areas with the exception of cultural and historic resources and Environmental Justice, where the project will have no effects.

Table 4-2
Summary of Potential Contribution of the No Action and Proposed Action Alternatives to Cumulative Effects

Resource Area	Effects
Natural Resources	Beneficial
Cultural and Historic Resources	None
Socioeconomics	Beneficial
Other	Beneficial
Environmental Justice	None

Natural Resources

For the evaluation of cumulative effects relative to natural resources, the ROI is the same as that described in section 2.2. The cumulative projects described above would not have an effect beyond the Monument boundary.

Cumulative effects for biological resources use are assessed based on the past trends described in section 3.2. These trends are important because they are used as the context for determining whether the project alternatives would contribute to negative trends occurring in the ROI. The effects of the project alternatives are then added to the past, present, and reasonably foreseeable future project effects to determine if the incremental effects of all the projects would add to the historical or existing trends in land use and recreation.

Beneficial effects to natural resources by the cumulative projects are anticipated under both the No Action and Proposed Action alternatives. The infrastructure projects, which will be built on existing disturbed area, will improve waste treatment, communications, water treatment, housing, and will result in better management of fuels and more efficient power generation. These projects will reduce potential pollution from wastewater discharges and fuel spills.

Cultural and Historical Resources

For cumulative effects on historic, cultural, and archeological resources including Midway's historic context, the ROI would be the same as described in section 2.3, which includes all the islands and surrounding waters of the Monument. Hawaii's rich history produced a large collection of historic properties on several of the islands. Since Western contact, commercial and military operations and natural forces have destroyed or damaged many cultural and historic resource sites and have caused negative cumulative effects. Today more is known about historic and cultural resources, their importance, and how to minimize effects on them. No other projects were identified in the foreseeable future that would result in cumulative effects to cultural and historical resources under the No Action or Proposed Action alternatives.

Socioeconomic Resources

Human Uses and Activities

For cumulative effects on human uses and activities, the ROI would be the same as described in section 2.4.1, which includes all the islands and surrounding waters of the Monument. Historic events have resulted in various levels and types of human use and activity. The height of human

activity likely occurred in the 1940s during World War II, when military construction and use was at its highest. Over the past 65 years, the level of human use has decreased, with the military pulling out of Midway Atoll. Human use is now limited to managers, contractors, researchers, and visitors of the Monument. Controlling human use will have a beneficial cumulative effect.

Under the No Action alternative, the cumulative effects to human use and activities would be beneficial. Activities may include SCUBA diving, snorkeling, bird watching, ecotours, and cruise ship visits, as safe mooring becomes available.

Human Health, Safety, and Hazardous Materials

The ROI for the cumulative effects on hazardous materials and conditions is the same as described in section 2.4.2. Past activities and actions have caused spills of hazardous materials and conditions that threaten human health and safety. Hazardous conditions have included spills of oil and fuels from commercial and military activities, and hazardous conditions on commercial vessels are compounded by the remote location of the Northwestern Hawaiian Islands, making rescue and response operations difficult. The cumulative effects of past activities on human health and safety and hazardous materials are considered significant. However, present and future cumulative projects would improve conditions, particularly with the improvement of the infrastructure on Midway Atoll NWR. For example, improvement to the lodgings would improve living conditions, and improvements to the airfield would improve aircraft safety.

Land Use

The ROI for the cumulative effects on land use is the same as described in section 2.4.3. Past activities have caused a major shift in land use from undisturbed native habitat to military uses. This change is most notable at Midway Atoll, French Frigate Shoals, and Kure Atoll. The cumulative effects of past activities on land use are considered significant. However, present and future cumulative projects would take place on the existing footprint of buildings or facilities presently in place, with no changes in land use. The proposed action would result in a beneficial cumulative change as some developed area would be restored to native habitat.

Economics

For cumulative effects on socioeconomics, the ROI would be the same as described in section 2.4.4, which would include all the islands and surrounding waters of the Monument. Under the No Action and Proposed Action alternatives, the cumulative effects to socioeconomics would be beneficial, with the re-establishment of public visitation and construction of the infrastructure facilities at Midway Atoll. The increase in visitation could provide very minor increased income to cruise lines, air charter services, the service industry supporting these activities on the main Hawaiian Islands, and the agencies responsible for management activities.

Other Resources

Water Quality

For cumulative effects on marine water quality, the ROI would be the same as described in section 2.5.1, which includes all the islands and surrounding waters of the Monument. Historic activities and actions have resulted in discharges to the marine waters from wartime activities, including oils and fuels from downed aircraft and sunken vessels, to spills from fishing boats and

other vessels that have sunk or run aground throughout the island chain. However, because of the long time span between events, in some cases decades, and the frequent exchange of waters surrounding the location of discharges, these past activities have had a less than significant cumulative effect.

Existing Federal laws and Monument regulations already provide safeguards for protecting marine water quality. The Monument Management Plan, which fulfills Comprehensive conservation planning requirements for the Midway Atoll NWR by FWS, and the upgrade of sanitation systems at Midway Atoll will allow for further control of vessel traffic and discharges. The net result is that there would be a beneficial cumulative effect on marine water quality.

Traffic and Communication Infrastructure

For cumulative effects on marine traffic, the ROI would be the same as described in section 2.5.2, which includes all the islands and surrounding waters of the Monument. Historic activities and actions have had little effect on marine traffic. Commercial traffic has historically avoided the Northwestern Hawaiian Islands because of grounding hazards. Some ships do transit the chain between Pearl and Hermes Atoll and Laysan Island, but most skirt the chain to the north. Past and present projects have had no cumulative effect on marine traffic. The future cumulative projects listed in Table 3-1 would not affect marine traffic. There would be a beneficial effect on communications with the construction of the communications network proposed by FWS at Midway. This would provide a higher level of services in the area than presently exists. Neither these projects nor the Proposed Action would restrict marine commercial vessel transit; therefore, they would have no cumulative effects.

Utilities

The ROI for the cumulative effects on utilities is the same as described in section 2.5.3. Past activities included construction of a power plant, water treatment facility, sewage treatment, and fuel storage tanks as a result of military use, and more recently, FWS operations. These facilities can be found on Sand Island at Midway Atoll and Tern Island, FFS. There were no cumulative effects of past activities on utilities, as adequate capacity was constructed based on demand. However, some of the present and future cumulative projects would place a demand on the utilities that might exceed capacity. The balance of the proposed project is designed to upgrade sewage treatment to meet future demands. Therefore, the present and proposed projects would have no cumulative effect on utilities.

Environmental Justice

For cumulative effects on environmental justice, the ROI would be the same as described in section 2.4.4, which includes all the islands and surrounding waters of the Monument. The cumulative projects listed in Table 3-2 would have no effect on environmental justice. No disproportionate negative environmental or health effects from the cumulative projects would occur on minority or low-income populations.

4.3 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

NEPA requires consideration of the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.

The short-term uses of the environment relating to the No Action and Proposed Action alternatives would improve the health and quality of the environment by managing vessel traffic through a permit system, requiring VMS on all vessels, and requiring hull inspections, thereby reducing the potential for groundings and hazardous spills, reducing the potential for the spread of invasive species, and reducing human activities and disturbance of special status species. In addition, control of terrestrial invasive species, restoration of native habitat and species populations, upgrades to infrastructure, and establishment of a permit process to control access and activities would reduce the potential of the spread of alien species, reduce stressors to special status species, reduce potential hazardous events, and improve health and safety for researchers, management staff, and visitors.

The long-term productivity related to the No Action and Proposed Action alternatives is based on the Proclamation establishing the Monument; prohibitions and regulated activities codified in Monument regulations; the Memorandum of Agreement between Co-Trustees that establishes the vision, mission, and guiding principles for the Monument; and the Monument Management Plan that defines strategies and activities to achieve long-term productivity of the resources.

4.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA requires an analysis of the extent to which the proposed project's primary and secondary effects would commit nonrenewable resources to uses that future generations would be unable to reverse.

The No Action and Proposed Action alternatives would require minor commitments of both renewable and nonrenewable energy and material resources for the management, public use, and research activities associated with the Monument. The Proposed Action alternative in the Monument Management Plan would also commit substantial resources, staff time, and funds for conservation and management activities. Nonrenewable resources that would be used during management and research activities include fuel, water, power, and other resources necessary to maintain and operate the equipment and facilities at the field stations, field camps, vessels, and offices of the Monument.

CHAPTER 5:

AGENCY AND PUBLIC PARTICIPATION

CHAPTER 5
AGENCY AND PUBLIC PARTICIPATION

The establishment of the NWHI Coral Reef Ecosystem Reserve (Reserve), and steps taken to designate it as a proposed sanctuary, represent a long and extensive history of public consultation and involvement. As a result of this outreach, nearly 52,000 public comments were received in support of strong protection of NWHI.

Since 2000, NOAA conducted over 100 meetings with interagency partners, the Reserve Advisory Council, Western Pacific Fishery Management Council, Native Hawaiian community groups, stakeholders, and the general public. The purpose of the meetings was to identify issues related to designating a proposed sanctuary and to solicit input on developing the alternatives to be considered in a draft environmental impact statement. Furthermore, these stakeholder groups helped prepare a draft management plan for the proposed sanctuary, which serves as the basis for the Monument Management Plan.

Monument regulations established as a result of Presidential Proclamations 8031 and 8112 and codified in 50 CFR Part 404 reflect input received during agency and public participation. After the Monument was established, public informational meetings were held on all main Hawaiian Islands to inform the public. A total of 471 people attended. Overall, the establishment of the Monument and the regulations codified under 50 CFR 404 were well received by the public, most of whom supported strong protection of the ecosystem of the Monument.

In addition, in December 2006, FWS released the draft Midway Atoll NWR Interim Visitor Services Plan proposing small-scale visitation at Midway. The draft Interim Visitor Plan was publicly distributed and received over 6,000 comments during the review. This interim plan was finalized in May 2007 and a final plan is incorporated in the draft Monument Management Plan.

On April 4, 2007, FWS and NOAA issued a *Federal Register* notice (72 FR16328) to prepare the Monument Management Plan and associated EA for the Monument. The notice stated that “It is the intent of the Co-Trustees to integrate agency planning and operational needs into a single Monument Plan. A draft Monument Plan [and associated environmental assessment] will be distributed for public review and comment early in 2008.” The public was directed to focus additional comments “on any new environmental issues identified as a result of new information

or changed circumstances since the comment periods identified above." The public comment period for this notice ended on June 4, 2007. A scoping report was prepared that summarized all issues raised over the course of this process and a September planning update was publicly distributed that described the primary issues identified during the scoping process.

CHAPTER 6:

REFERENCES

CHAPTER 6
REFERENCES

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SECTION 7:

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CHAPTER 7
LIST OF PREPARERS

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APPENDIX A

CULTURAL IMPACT ASSESSMENT

CULTURAL IMPACT ASSESSMENT

Papahānaumokuākea Marine National Monument
Management Plan

March 21, 2008

STATE OF HAWAI‘I
DEPARTMENT OF LAND AND NATURAL RESOURCES

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1.0 Introduction

The State of Hawai‘i Department of Land and Natural Resources (DLNR), Division of Aquatic Resources has prepared this Cultural Impact Assessment (CIA) associated with the proposed implementation of the Papahānaumokuākea Marine National Monument Management Plan (MMP), and the Environmental Assessment (EA) for proposed MMP activities. The MMP and EA were prepared in compliance with the statutory requirements of the Federal National Environmental Policy Act (NEPA), the State of Hawai‘i Revised Statute (HRS) Chapter 343 Environmental Impact Statements law, and in accordance with the State of Hawai‘i' Department of Health's Office of Environmental Quality Control (OEQC) *Guidelines for Assessing Cultural Impacts* as adopted by the Environmental Council, State of Hawai‘i, on November 19, 1997.

The Papahānaumokuākea Marine National Monument (Monument) is the largest protected area in the United States and is the world's largest fully protected marine area. It was created by Presidential Proclamation under the authorities of the Antiquities Act, 16 U.S.C. §§ 431-433. Creation of the Monument was based on extensive public input, including hearings and the involvement of a broad spectrum of stakeholders and interested persons. Nearly 52,000 public comments were received, the majority of which supported strong protection for the Northwestern Hawaiian Islands (NWHI). Based upon this extensive public input, and in order to provide additional immediate protection to the NWHI, the Monument was created on June 15, 2006, by Presidential Proclamation 8031. National Monument status ensures the immediate, comprehensive, strong, and lasting protection of the resources of the NWHI.

The three principal entities with responsibility for managing lands and waters of the Monument are the Department of Commerce, via the National Oceanic and Atmospheric Administration (NOAA), the Department of the Interior, via the U.S. Fish and Wildlife Service (USFWS), and the State of Hawai‘i (collectively, the Co-Trustees). The Co-Trustees work cooperatively and consult to administer the Monument. The Proclamation provides that the Co-Trustees shall develop a management plan for the region, based upon the draft management plan developed during the sanctuary designation process. The management plan will include provisions for coordinated permitting, research, education, enforcement, cultural practices, and other management related activities. In December 2006, Governor Lingle and the Secretaries of Commerce and the Interior signed a Memorandum of Agreement (MOA) that outlined the roles and responsibilities for the Co-Trustee agencies for coordinated conservation and management of the Monument. The MOA created a governance structure for the Monument and established the Monument Management Board (MMB) which is composed of representatives from the Federal and State agency offices that carry out the day-to-day management and coordination of Monument activities. In addition to the Co-Trustee agencies, the Office of Hawaiian Affairs (OHA) is a member of the MMB and participates in management activities.

2.0 Affected Area Description

2.1 Physical and Natural Setting

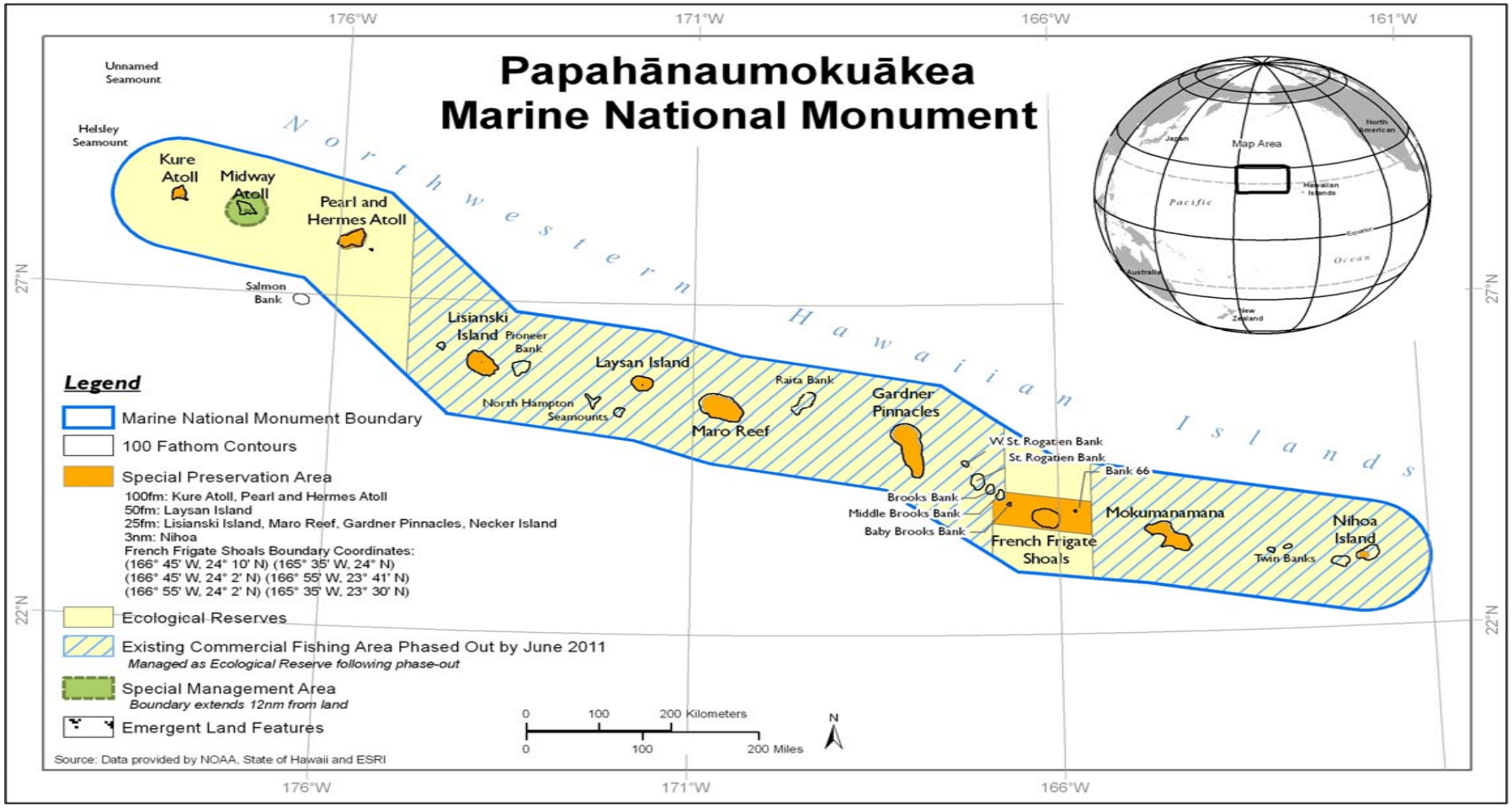
The Papahānaumokuākea Marine National Monument is located in the northwestern portion of the Hawaiian Archipelago, and encompasses the NWHI (Fig. 1). The Monument is located between approximately 22°N and 30°N latitude and 161° W and 180°W longitude, and is roughly 1,200 miles long and 100 miles wide, with a total area of more than 140,000 square miles.

Beginning 125 miles from the main Hawaiian Island of Kaua‘i, the ten islands and atolls are referred to as the NWHI, or in past decades as the Leeward Islands. None of these islands are more than 2–3 square kilometers in size, and all but four have an average mean height of less than 10 m. As a group, they represent a classic geomorphological sequence, consisting of highly eroded high islands, near-atolls with volcanic pinnacles jutting from surrounding lagoons, true ring-shaped atolls with roughly circular rims and central lagoons, and secondarily raised atolls, one of which bears an interior hypersaline lake. These islands are also surrounded by numerous submerged ancillary banks and seamounts. This geological progression along the Hawaiian Ridge continues northwestward beyond the last emergent island, Kure Atoll, as a chain of submerged platforms that makes a sudden northward bend to become the Emperor Seamounts, which extend across the entire North Pacific to the base of the Kamchatka Peninsula in Russia.

The Monument contains a wide range of marine and terrestrial habitats ranging from ocean basins more than 15,000 feet below sea level, to emergent land with hills and cliffs rising to 900 feet above sea level. These habitats include deep and shallow coral reefs, lagoons, littoral shores, dunes, dry grasslands, and shrub lands that support a wide variety of plants and animals. More than 7,000 marine species are found in the NWHI, of which 25% are endemic (NOAA 2006). High densities of apex predators such as sharks, groupers, and jack dominate the marine environment. These species thrive because of minimal anthropogenic stressors. Friedlander et al. (2005) noted that the NWHI are one of the few large-scale, intact predator dominated reef ecosystems in the world. The physical isolation of the Hawaiian Archipelago explains the relatively low species diversity and high endemism levels of its biota (DeMartini and Friedlander, 2004) and the direction of flow of surface waters explain biogeographic relationships between the NWHI and other sites such as Johnston Atoll to the south as well as patterns of endemism and population structure and density of reef fish within the archipelago (DeMartini and Friedlander, 2006).

The majority of the Monument consists of deep pelagic waters that surround the island platforms. At least 13 banks lie at depths between 100 and 1,300 feet (30 and 400 meters) within the Monument, providing important habitat for bottomfish and lobster

Figure 1. Papahānaumokuākea Marine National Monument



species, although only a few of these banks have been studied in any detail (Kelley and Ikehara, 2006). These waters represent important deep water foraging grounds for endangered Hawaiian monk seals, as well as a spatial refugium for pelagic fishes such as tunas and their allies that are currently in declared states of overfishing throughout the Pacific region.

Scientists using deep-diving submersibles have recorded the presence of deep-water precious coral beds within the Monument at depths of 1,200-1,330 feet (365–406 m); these include ancient gold corals whose growth rate is now estimated to be only a few centimeters every hundred years and whose ages may exceed 2,500 years (Roark et al., 2006). At depths below 1,640 feet (500 meters), a diverse community of octocorals and sponges flourish. These deepwater sessile animals prefer hard substrates devoid of sediments (Baco-Taylor et al., 2006). Even deeper yet, the abyssal depths of the Monument, while harboring limited biomass, are home to many poorly documented fishes and invertebrates with remarkable adaptations to this extreme environment. The deep-waters are also important insofar as they support an offshore mesopelagic boundary community (Benoit-Bird et al. 2002), a thick layer of pelagic organisms that rests in the deep ocean (1,300-2,300 feet or 400–700 m) during the day, then migrates up to shallower depths (from near zero to 1,300 feet or 400 m) at night, providing a critical source of nutrition for open-ocean fishes, seabirds, and marine mammals. Overall, the fauna of the Monument's waters below standard SCUBA diving depths remains poorly surveyed and documented, representing an enormous opportunity for future scientific research in a system largely undisturbed by recent trawling or other forms of resource extraction.

The marine and coastal areas of the Monument are home to several species of marine mammals. Over 20 species of whales and dolphins are found in the Monument, of which 6 species are listed as endangered or threatened under the federal Endangered Species Act. The NWHI support a majority of the critically endangered Hawaiian monk seal population. Additionally, five species of sea turtles use the coastal areas for nesting.

The rates of marine endemism in the NWHI are unparalleled in the world. In addition, the mass of apex predators in the marine system is simply not seen in areas subject to higher levels of human impact. The Monument represents one of the last unspoiled marine wilderness areas remaining on the planet.

In contrast to its marine systems, the terrestrial area of the Monument is comparatively small but supports significant endemic biodiversity. This includes six species of endemic plants, including a palm, and four species of endemic birds, including remarkably isolated species such as the Nihoa finch, Nihoa millerbird, Laysan finch, and Laysan duck, one of the world’s rarest ducks. In addition, over 14 million seabirds nest on the tiny islets in the chain, including 99 % of the world’s Laysan albatrosses and 98 % of the world’s black-footed albatrosses. Although still poorly documented, the terrestrial invertebrate fauna also shows significant patterns of precinctive speciation, with endemic species present on Nihoa Island, Mokumanamana Island, French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Atoll, and Kure Atoll.

2.2 Cultural Setting

More than 1,500 years ago, Polynesian voyagers arrived in the Hawaiian Archipelago, the Polynesian Triangle's most northern point, where they found islands filled with all the natural resources needed to sustain a vibrant society, from fertile soil to reefs rich with fish. Over the next millennia, Native Hawaiians, the descendents of the first Polynesians who discovered Hawai'i, would alter the islands' landscapes, creating agricultural terraces along the hillsides; extensive water paddies for their staple food, kalo (taro), in the valleys; and impressive fishponds over the shallow reefs.

The first discoverers of the Hawaiian Archipelago, Native Hawaiians inhabited these islands for thousands of years prior to Western contact. During this time, Native Hawaiians developed complex resource management within these islands. Native Hawaiians continue to maintain their strong cultural ties to the land and sea and continue to understand the importance of managing the islands and waters as inextricably connected to one another (Beckwith 1951; Lili'uokalani 1978). Poetically referred to as *ke kai popolohua mea a Kāne* (the deep dark ocean of Kāne), the ocean was divided into numerous smaller divisions and categories, beginning 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.

More specifically the ocean played an important role to Native Hawaiians as it was used for resources and physical and spiritual sustenance in their everyday lives. In Hawaiian traditions, the NWHI are considered a sacred place, a region of primordial darkness from which life springs and spirits return after death (Kikiloi, 2006). Much of the information about the NWHI has been passed down in oral and written histories, genealogies, songs, dance, and archaeological resources. Through these sources, Native Hawaiians are able to recount the travels of seafaring ancestors between the NWHI and the main Hawaiian Islands. Hawaiian language archival resources have played an important role in providing this documentation, through a large body of information published over a hundred years ago in local newspapers (e.g., Kaunamano 1862 in *Hoku o ka Pakipika*; Manu 1899 in *Ka Loea Kalai'aina*; Wise 1924 in *Nupepa Kuoko'a*). More recent ethnological studies (Maly 2003) highlight the continuity of Native Hawaiian traditional practices and histories in the NWHI. Only a fraction of these have been recorded, and many more exist in the memories and life histories of kūpuna (elders).

Native Hawaiians made detailed observations of the oceanic environment, its interrelation to the terrestrial environment, seasonal and lunar patterns, and species life cycles, and used this information to develop and conserve their resources (Kamakau 1976; Malo 1951; Beckwith 1951). Kapu, or restrictions, on resource extraction were implemented based on these ecological understandings (Pukui and Handy 1950; Handy et al. 1972). Other traditional strategies were set up to naturally enhance marine resources through increased protection, growth, and reproduction (Kikiloi 2003).

2.2.1 Archaeological Background

Physical remnants of wahi kūpuna (ancestral places), Hawaiian language archival and oral resources, and historical accounts provide evidence of the various past uses of the NWHI and the surrounding ocean by Native Hawaiians (Kaunamano 1862 in Hoku a ka Pakipika; Manu 1899 in *Ka Loea Kalaiaina*; Wise 1923 in *Nupepa Kuokoa*). Evidence indicates that the area served as a home and a place of worship for centuries. It is posited that the first Native Hawaiians to inhabit the archipelago and their descendants frequented Nihoa and Mokumanamana for at least a 500- to 700-year period (Emory 1928; Cleghorn 1988; Irwin 1992). They brought many of the skills necessary to survive with them from their voyaging journeys throughout Polynesia. Over time, they developed complex resource management systems and additional specialized skill sets to survive on these remote islands with limited resources (Cleghorn 1988).

The impressions left by ancient Hawaiians can be seen through the distinctive archaeology of Nihoa and Mokumanamana. The ceremonial terraces and platform foundations with upright stones found on both Nihoa and Mokumanamana are not only amazing examples of unique traditional Hawaiian architectural forms of stone masonry work, but they also show similarities to samples from inland Tahiti (Emory 1928). The structures are some of the best preserved early temple designs in Hawai‘i, and have played a critical role in understanding Hawai‘i’s strong cultural affiliation with the rest of Polynesia, and the significant role of Native Hawaiians in the migratory history and human colonization of the Pacific (Cleghorn 1988).

It is believed that Mokumanamana played a central role in Hawaiian ceremonial rites and practices a thousand years ago because it is directly in line (23° 34.5’ N latitude) with the rising and setting of the equinoctial sun along the Tropic of Cancer. Because Mokumanamana sits on the northernmost limit of the path the sun makes throughout the year, it sits centrally on an axis between two spatial and cultural dimensions: *po* (darkness, creation, and afterlife) and *ao* (light, existence). During the summer solstice (the longest day of the year), the sun travels slowest across the sky on this northern passage, going directly over Mokumanamana.

Archaeological surveys on Nihoa and Mokumanamana have documented numerous archaeological sites and cultural material (Emory 1928; Cleghorn 1988; Ziegler 1990; Graves and Kikiloi, 2006.). Nihoa Island and Mokumanamana (Necker Island) are both listed on the National Register of Historic Places, with 140 archaeological sites documented thus far on these two islands. Though quite barren and seemingly inhospitable to humans, the number of cultural sites they support is testimony to their occupation and use prior to European discovery. On Nihoa Island, 88 cultural sites have been documented so far, including residential features, agricultural terraces, ceremonial structures, shelters, cairns, and burial sites. This island also has sufficient soil development for limited agriculture, along with stone terraces that suggest expenditure and investment in agricultural food production. On Mokumanamana, at least 52 cultural sites exist, including 33 ceremonial features, making it the highest concentration of such

religious sites found anywhere in the Hawaiian Archipelago. All of these sites are strategically placed and act as physical reminders of the important spiritual role these sites play in Hawaiian culture. The sites and structures on these islands are believed to be channels for the creation of new life, and facilitate Native Hawaiians' return to their spiritual source after death (Liller 2000). Several archaeological surveys have collected cultural artifacts from both of these islands which are now stored in the Bernice Pauahi Bishop Museum and the University of Hawaiʻi Archaeological Laboratory. The range in types of cultural artifacts stored in these collections is testimony to the various uses these islands and the surrounding oceans served for Native Hawaiians. These ancient sites on Nihoa and Mokumanamana provide important examples of how human colonization and settlement can occur even in seemingly marginal environments, and provide enduring monuments to the adaptive tenacity of the ancient Polynesian explorers of the Pacific.

2.2.2 Historical Period

By the time of Western European contact with the Hawaiian Islands, little was collectively known about the NWHI by the majority of the population, as relatively few individuals traveled to these remote islands and had seen them with their own eyes, except families from Kauaʻi and Niʻihau who voyaged to these islands to perpetuate subsistence fishing practices (Maly 2003). Within the next century, a number of expeditions were initiated by Hawaiian aliʻi to visit these islands and bring them under Hawaiian political control and ownership. The accounts of these historical expeditions were published in great detail in the Hawaiian newspapers from 1857 through 1894, as they related to each visit.

Contact between the main Hawaiian islands and the NWHI seems to have slowed for a period until the 19th century, when Hawaiian monarchs exhibited a strong interest in reuniting the entire Hawaiian Archipelago by consolidating the NWHI into the Kingdom of Hawaiʻi. Title to the islands and waters of the NWHI was vested in the Kingdom of Hawaiʻi throughout the 1800s (Mackenzie and Kaiama 2003). In 1822, Queen Kaʻahumanu organized and participated in an expedition to locate and claim Nihoa Island under the Kamehameha Monarchy. In 1856, Nihoa was reaffirmed as part of the existing territory of Hawaiʻi by authority of Alexander Liholiho, Kamehameha IV (March 16, 1856 Circular of the Kingdom of Hawaiʻi). The following year, King Kamehameha IV voyaged to Nihoa and then returned to Honolulu. He instructed Captain John Paty on the vessel *Manuokawai* to explore the rest of the northwestern region to annex any lands discovered during the expedition. Paty traveled to Nihoa, Mokumanamana, Gardner, Laysan, Lisianski, and Pearl and Hermes. Later in 1857, the islands of Laysan and Lisianski were declared new lands to be included into the domain of the Kingdom (Kingdom of Hawaiʻi 1857).

In 1885, the most famous visit by Hawaiian royalty was made by then princess Lydia Liliʻuokalani and her 200 person party who visited Nihoa on the ship *Iwalani*. In 1886, King David Kalakaua, through Special Commissioner Colonel James Harbottel annexed Kure Atoll (Ocean Island) and announced formal possession of the island (Harbottel-Boyd 1886). In 1893, Queen Lydia Liliʻuokalani was illegally overthrown by the self-

proclaimed provisional government, with the assistance of U.S. Minister John L. Stevens. In 1898, the archipelago, inclusive of the NWHI, was collectively ceded to the United States through a domestic resolution, called the "New Lands Resolution".

The sovereignty, life (ea), and responsibility (kuleana) for the entire Hawaiian Archipelago continues to exist in the hearts and minds of many Native Hawaiians. The "Apology Bill" (U.S. Public Law 103-150), a joint resolution of Congress that was signed by the President in 1993, recognizes that "the health and well-being of the Native Hawaiian people is intrinsically tied to their deep feelings and attachment to the land." The Apology Bill "apologizes to Native Hawaiians on behalf of the people of the United States for the overthrow of the Kingdom of Hawaii on January 17, 1893 with the participation of agents and citizens of the United States, and the deprivation of the rights of Native Hawaiians to self-determination."

2.2.3 Contemporary Connections to the Northwestern Hawaiian Islands

Today, Native Hawaiians remain deeply connected to the NWHI on genealogical, cultural, and spiritual levels. Kaua‘i and Ni‘ihau families voyaged to these islands indicating that they played a role in a larger network for subsistence practices into the 20th century (Tava and Keale 1989; Maly 2003). The NWHI as a region qualifies as an important traditional place of Native Hawaiian culture worthy of global recognition. The Monument includes a collection of wahi pana (places of great cultural significance and practice) (OHA, wahi pana list) that are linked together throughout the expanse of the ten main atolls and islands. Wahi pana benefit all Hawaiian people - past, present and future-born, as well as inspiring generations of all cultures. The wahi pana and geography of this remote area includes storied names that give connotative value and meaning. Much of the cultural information about the NWHI has been passed down in oral and written histories, genealogies, songs, dance, and via archaeological sites. Through these sources, Native Hawaiians are able to recount the travels of seafaring ancestors between the NWHI and the main Hawaiian Islands in centuries past. Hawaiian language archival resources have played an important role in providing this documentation, through a large body of information published more than a hundred years ago in local newspapers. More recent ethnological studies have highlighted the continuity of Native Hawaiian traditional practices and histories in the NWHI. Only a fraction of these have been recorded, and many more exist in the memories and life histories of kūpuna (elders).

In recent years, Native Hawaiian cultural practitioners voyaged to the NWHI to honor their ancestors and perpetuate traditional practices. In 1997, Hui Malama i Na Kupuna o Hawai‘i Nei repatriated sets of human remains to Nihoa and Mokumanana that were collected by archaeologists in the 1924-25 Bishop Museum Tanager Expeditions (Ayau and Tengan 2002). In 2003, a cultural protocol group, Na Kupu‘eu Paemoku, traveled to Nihoa on the voyaging canoe Hokule‘a to conduct traditional ceremonies. In 2004, Hokule‘a sailed over 1,200 miles to the most distant end of the island chain to visit Kure Atoll as part of a statewide educational initiative called "Navigating Change." In 2005, Na Kupu‘eu Paemoku sailed to Mokumanamana to conduct protocol ceremonies on the longest day of the year, June 21, the summer solstice. Cultural practitioners

(Kamakakokalani Center for Hawaiian Studies and the Edith Kanakaʻole Foundation) continued this practice in 2006 and in 2007.

2.2.4 Cultural Access for Native Hawaiian Practices

Presidential Proclamation 8031 recognizes that the NWHI has great cultural significance to Native Hawaiians and provides a means to issue permits for Native Hawaiian practices. The Proclamation defines these practices as cultural activities conducted for the purposes of perpetuating traditional knowledge, caring for and protecting the environment, and strengthening cultural and spiritual connections to the Northwestern Hawaiian Islands that have demonstrable benefits to the Native Hawaiian community. This may include, but is not limited to, the non-commercial use of Monument resources for direct personal consumption while in the Monument. Monument goals and objectives reinforce this position and the MMP includes several activities that support access and use of the NWHI for Native Hawaiian practices.

3.0 Monument Management Plan

The Monument Management Plan (MMP) was developed cooperatively by the State of Hawaiʻi Department of Land and Natural Resources (DLNR), Office of Hawaiian Affairs (OHA), the U.S. Fish and Wildlife Service (FWS), and National Oceanic and Atmospheric Administration (NOAA), and was based on the earlier draft NOAA Sanctuary management plan. The MMP outlines current and future planning, administrative, and field activities to enhance the conservation and protection of the natural, cultural, and historic resources in the NWHI.

The draft MMP will be available for public review and comment in mid-2008. The MMP consists of 22 Action Plans that describe the wide-ranging and coordinated management process necessary to achieve the vision, mission, and guiding principles, and desired outcomes of the Monument. The mission of the Monument is to: “carry out seamless integrated management to achieve strong, long-term protection and perpetuation of NWHI ecosystems, Native Hawaiian tradition and customary cultural and religious practices, and heritage resources for current and future generations”

The vision, mission, guiding principles, and goals outlined in the MMP honor and protect the significance of the NWHI for Native Hawaiians. Monument Goal no. 6 specifically is written to: “support Native Hawaiian practices consistent with long-term conservation and protection.”

The MMP includes a Native Hawaiian Cultural and History Action Plan, and a Native Hawaiian Community Involvement Action Plan, with the goal to increase the understanding and appreciation of Native Hawaiian cultural values related to Papahānaumokuākea Marine National Monument.

The desired outcome for the Native Hawaiian Cultural and History Action Plan is to:

"Increase the understanding and appreciation of Native Hawaiian histories and cultural practices related to Papahānaumokuākea Marine National Monument and effectively manage resources for their cultural, educational and scientific value".

Five strategies have been identified to achieve this outcome.

1: Identify and prioritize scientific and Native Hawaiian cultural research needs.

1.1: Identify and research needs that can be accomplished through anthropological, archaeological, historical, and Hawaiian cultural methods.

1.2: Develop cultural research priorities alongside associated management challenges and opportunities.

2: Conduct, support, and facilitate Native Hawaiian cultural and historical research of the NWHI.

2.1: Continue to compile information and conduct new cultural and historical research about the NWHI.

2.2: Continue to provide direct financial and logistical support.

2.3: Facilitate field research and cultural education opportunities annually during the field season.

2.4: Convene a Native Hawaiian nomenclature working group.

2.5: Incorporate cultural resources information into the Monument Information System.

2.6: Support Native Hawaiian cultural accesses to assure cultural research needs are met.

2.7: Establish agreements with local universities and museums to address possible curation, research, use, return, and repatriation of collections.

3: Increase cultural resource management capacity across MMB agencies.

3.1: Assess Monument cultural resource capacity.

3.2: Engage Native Hawaiian practitioners and cultural experts and the Native Hawaiian Cultural Working Group in the development and implementation of the Monument's management activities.

3.3: Increase knowledge base of Native Hawaiian values and cultural information through "in-reach" programs for resources managers.

3.4: Identify and integrate Native Hawaiian traditional ecological knowledge and management concepts into Monument management.

4: Plan, develop, and implement a Monument Cultural Resources Program.

4.1: Prepare a Cultural Resources Program Plan.

4.2: Develop and implement specific preservation plans, as appropriate, to protect cultural sites and collections on Nihoa and Mokumanamana.

4.3: Initiate implementation of the Monument Cultural Resources Program.

5: Provide cultural outreach and educational opportunities to the Native Hawaiian community and the general public.

5.1: Integrate Native Hawaiian values and cultural information into general outreach and education programs.

5.2: Develop a culturally based strategy for education and outreach to the Native Hawaiian community.

5.3: Integrate Native Hawaiian values and cultural information into the Monument permittee education and outreach program.

The desired outcome of the Native Hawaiian Community Involvement Action Plan is to:

"Engage the Native Hawaiian community in active and meaningful involvement in Papahānaumokuākea Marine National Monument management.

Three strategies have been identified to achieve this outcome.

1: Regularly involve the Native Hawaiian community.

1.1: Formalize, expand, and convene the Native Hawaiian Cultural Working Group.

1.2: Engage the Native Hawaiian Cultural Working Group in the development of a Monument Cultural Resource Program.

1.3: Establish an annual cultural resources exchange.

2: Develop and annually maintain partnerships with Native Hawaiian organizations and institutions.

2.1: Continue to expand and explore opportunities to partner with institutions serving Native Hawaiians.

3: Identify and integrate Native Hawaiian traditional ecological knowledge and management concepts into Monument management annually.

3.1: Engage the Native Hawaiian community to identify how traditional ecological knowledge will be integrated into Monument activities.

3.2: Use and integrate Native Hawaiian traditional ecological knowledge in Monument management activities.

The development of the MMP included extensive consultation with the Native Hawaiian community and Native Hawaiian cultural practitioners. Initial consultations with the Native Hawaiian community occurred at the inception of the designation of the NWHI as a Coral Reef Ecosystem Reserve in 2000 and continued during the process to designate this area as a sanctuary through the National Marine Sanctuary Program. During this process a Native Hawaiian Cultural Working Group (CWG) was formed as a part of the Reserve Advisory Council. Over 200 individuals in the Native Hawaiian community were consulted in the development of the draft sanctuary management plan. The formation of the CWG increased Native Hawaiian involvement in the planning process for the Monument. The CWG and additional Native Hawaiian practitioners were consulted by DLNR during the development of the State's NWHI Marine Refuge. The consultation resulted in a recommendation that cultural importance should be weighed equally with biological importance during the review of proposed activities within the NWHI. This recommendation was subsequently incorporated into the MMP and the Co-Trustees joint permitting process.

In summary, the implementation of the MMP will expand the current Monument efforts to incorporate Native Hawaiian traditional and customary cultural and religious practices and research needs into the day-to-day management of the Monument. Native Hawaiian cultural research needs will continue to be identified and prioritized through consultation with OHA and other Native Hawaiian institutions and organizations. The MMB will continue to assess capacity needs to support cultural resource management activities. Native Hawaiian traditional ecological knowledge and management concepts will continue to inform management decisions in the Monument.

4.0 Native Hawaiian Community Consultation

As indicated above, the development of the draft sanctuary management plan for the NWHI included extensive consultation with the Native Hawaiian community and Native Hawaiian cultural practitioners. The CWG was maintained after Presidential Proclamation 8031 established the Monument, and is now hosted by OHA. OHA worked with MMB members to convene four workshops on proposed Native Hawaiian practices in the NWHI as a part of the process to revise the draft sanctuary management plan. The outcome of these workshops provided the basis for the action plan strategies and activities outlined in the Native Hawaiian Cultural and History Action Plan of the MMP.

Several additional Native Hawaiian organizations and individuals were contacted in 2008 by DLNR to provide supplementary information regarding Native Hawaiian cultural practices and resources in the Papahānaumokuākea Marine National Monument in relation to the implementation of the MMP. Individuals and organizations that received scoping letters were identified in consultation with OHA and using the Native Hawaiian

Cultural Working Group member lists. The following organizations and individuals were contacted via consultation request letters as part of the consultation process (Table 1):

Table 1. Native Hawaiian organizations and individuals contacted during the 2008 DLNR Cultural Impact Assessment.

Name	Affiliation
Marilyn Leimomi Khan	Association of Hawaiian Civic Clubs
Buzzy Agard	Kūpuna
Professor Carlos Andrade	University of Hawai‘i at Manoa
Kehaulani Souza	Cultural Surveys Hawai‘i
Edward Halealoha Ayau	Hui Malama I Na Kupuna O Hawai‘i Nei
Vicky Takamine & Wayne Kaho’onei Panoke	‘Ilio‘ulaokalani Coalition
State Historic Preservation Program - Burial Councils	Burial Councils for: • Hawai‘i • O‘ahu • Kaua‘i/Ni‘ihau • Moloka‘i • Maui/Lana‘i
Issac & Tammy Harp	Kama‘āina
Dr. Emmett Aluli, Chair	Kaho‘olawe Island Reserve Commission
Sol Koho’ohalahala	Kaho’olawe Island Reserve Commission
Kainani Kahaunaele	Kama‘āina
Kaliko Amona	Kama‘āina
Kamana’opono Crabbe	Kama‘āina
Kekuewa Kikiloi	Kamehameha Schools
Nainoa Thompson	Kamehameha Schools
Kepa Maly	Kumupono Consultants
Laura Thompson	Kama‘āina
Manu Boyd	Kama‘āina
Mahealani Kama’u-Wendt	Native Hawaiian Legal Corporation
Clyde Namu’o	Office of Hawaiian Affairs
Oswald Stender	Office of Hawaiian Affairs
Kim Birnie	Papa Ola Lokahi
Professor Isabella Abbott	University of Hawai‘i at Manoa
Professor Lilikala Kame’eleihia	University of Hawai‘i at Manoa
Pua Kanaka’ole Kanahele	Kama‘āina
Representative Mina Morita	Hawai‘i State Legislature
State Historic Preservation Program	State Historic Preservation Office
William Aila	Wai‘anae Harbor Master
Wilma Holi	Kama‘āina

The consultation letters sent by DLNR requested kōkua and guidance regarding the following aspects of the assessment:

- General history, and current and past uses of the land and marine resources in the NWHI.
- Knowledge of cultural sites that may be impacted by activities taking place in the Monument, including natural resource research activities and cultural practices and research activities.
- Knowledge of traditional gathering practices and rights in the NWHI.
- Legends and traditional uses of the NWHI.
- Referrals of kūpuna and kamaʻāina who might be willing to share their cultural knowledge of the NWHI.
- Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the NWHI.

The responses received as a result of DLNR's solicitation of the above members of the Native Hawaiian Community in regard to the implementation of the MMP were favorable. Responses received acknowledged that the MMB were actively striving to incorporate Native Hawaiian histories and cultural practices into Monument management strategies.

Additionally, the activities and programs (undertakings) implemented by the MMP will be subject to review under the National Historic Preservation Act of 1966 (NHPA). Specifically, Section 106 of the NHPA requires the Monument Co-Trustees agencies to take into account potential effects of MMP undertakings on historic and cultural properties. The NHPA requires consultation with Native Hawaiian organizations regarding historic properties with religious or cultural significance to the Native Hawaiian community during the Section 106 review process.

5.0 Assessment of Cultural Impacts

There are many similarities between the MMP ecosystem-based management approach for the NWHI and the traditional ecological knowledge and practices implemented by Native Hawaiians to manage their natural resources. Both approaches share the view of nature as a holistic and dynamic system of interrelated parts and emphasize the need for long-term sustainability and health of our natural resources.

The Native Hawaiian traditional ecological knowledge and worldview is valued for its rich base of empirical knowledge and practical methods of resource management, developed over hundreds of years of living and interacting with the lands and ocean waters of Hawaiʻi (Titcomb and Pukui 1952; Kikuchi 1976; Titcomb et. al. 1978; Poepoe et. al 2003; Kikiloi 2003). Traditional management practices take advantage of understanding seasonal patterns in weather, patterns of biological species, and the designation of ecological zones (Handy et al. 1972; Kelly 1989; Gon 2003).

The significance of the NWHI natural, cultural, and historical resources led to the establishment of the Papahānaumokuākea Marine National Monument to protect these resources. In developing a management framework for the Monument, consultation with the Native Hawaiian community was sought to address how to best conserve cultural sites and practices. Ongoing consultation and engagement with the Native Hawaiian community is an important aspect for the success of the Monument's management through the implementation of the MMP. Protection of cultural resources and access to the NWHI is of high importance to the Native Hawaiian community to maintain traditional practices. Proclamation 8031 recognizes the cultural significance of the NWHI and outlines specific procedures to grant access to the Monument to engage in Native Hawaiian practices. In addition, when prioritizing management objectives for the Monument Management Plan, the MMB developed two action plans within the MMP to specifically address Native Hawaiian cultural practices and involvement in the Monument.

The MMP action plan strategies and activities strengthen the relationship between the Monument Co-Trustees and the Native Hawaiian community, and increase Native Hawaiian participation in the management process. Potential impacts to cultural and historic resources are carefully considered with science and management when assessing the applicability of a project or action. Additionally, cultural assessments by members of the Native Hawaiian community are part of the permit application review process for allowing access to the Monument. All activities proposed in permit applications for cultural access are assessed to determine if the purpose and intent of the activity are appropriate and deemed necessary by traditional standards in the Native Hawaiian culture (pono) and demonstrate an understanding of, and background in, the traditional practice, and its associated values and protocols. All persons entering the Monument pursuant to a Monument permit are required to attend a cultural briefing on the significance of the NWHI resources to Native Hawaiians.

Monument goals as implemented through the MMP reinforce the area's great cultural significance to Native Hawaiians. The implementation of the MMP will have a beneficial cultural impact and will provide increased opportunities for Native Hawaiians to play a significant role in the management of the NWHI, an area of great natural, historic, and cultural importance.

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