

DRAFT
ENVIRONMENTAL ASSESSMENT
For
Integrated Natural Resources Management Plan
At
Joint Base Pearl Harbor-Hickam

November 2023



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Abstract

Designation: Environmental Assessment

Title of Proposed Action: Integrated Natural Resources Management Plan

Project Location: Joint Base Pearl Harbor-Hickam

Lead Agency for the EA: Department of Navy

Cooperating Agency: None

Affected Region: Hawaii

Action Proponent: Joint Base Pearl Harbor-Hickam

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Navy Region Hawaii, a Command of the United States Navy (hereinafter, jointly referred to as the Navy), has prepared this Environmental Assessment in accordance with the National Environmental Policy Act, as implemented by the Council on Environmental Quality Regulations and Navy regulations for implementing the National Environmental Policy Act. The Proposed Action would implement the 2023 Integrated Natural Resources Management Plan Joint Base Pearl Harbor-Hickam. This Environmental Assessment evaluates the potential environmental impacts associated with one action alternative (Preferred Alternative) and a No Action Alternative.



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EXECUTIVE SUMMARY

ES.1 Proposed Action

The Proposed Action is to adopt and implement the 2023 Integrated Natural Resources Management Plan (INRMP) for Joint Base Pearl Harbor-Hickam (JBPHH). The purpose of an INRMP is to implement an ecosystem-based conservation program that provides for conservation and rehabilitation of natural resources in a manner that is consistent with the military mission, integrates and coordinates all natural resources management activities, provides for sustainable multipurpose uses of natural resources, and provides for public access for use of natural resources subject to public safety and military security considerations. This Environmental Assessment (EA) has been prepared to evaluate the effects of the activities described in the 2023 JBPHH INRMP.

ES.2 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to implement the 2023 JBPHH INRMP, which provides an approach for natural resources management on JBPHH-administered lands that is consistent with the Sikes Act (as amended) as well as the most recent Department of Defense (DoD) and Department of Navy (DON) policy and guidance regarding INRMPs. The need for the Proposed Action is to provide a comprehensive, adaptive natural resources management approach for all JBPHH properties. Both the INRMP and the natural resources management programs that it supports must meet DoD and DON policy and guidance that collectively require a plan and management approach consistent with mission support (as defined in 10 United States Code [U.S.C.] Section 5062).

ES.3 Alternatives Considered

The DON Environmental Readiness Program Manual (Office of the Chief of Naval Operations Manual [M]-5090.1, 2021) states that for actions associated with the implementation of an INRMP, analysis of a Proposed Action and No Action Alternatives is acceptable without considering additional alternatives. Therefore, no additional alternatives are carried forward in this EA.

ES.4 Summary of Environmental Resources Evaluated in the EA

Council on Environmental Quality (CEQ) regulations, National Environmental Policy Act (NEPA), and DON instructions for implementing NEPA, specify that an EA should address those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact. The following resource areas have been addressed in this EA: water resources and biological resources. Because potential impacts were negligible or nonexistent, the following resources were not evaluated in this EA: air quality, geological resources, cultural resources, visual resources, land use, airspace, noise, infrastructure, transportation, public health and safety, hazardous materials and wastes, socioeconomics, and environmental justice. The analysis in this EA addresses the natural resource management program in a programmatic context. As management decisions are made and specific project designs are developed, further project and site-specific NEPA analysis and/or regulatory compliance may be required.

ES.5 Summary of Potential Environmental Consequences of the Action Alternatives

The following is a summary of the potential environmental consequences of the Preferred Alternative and No Action Alternative. The study area for the analysis of effects to resources associated with the

Preferred Alternative includes the lands and waters of JBPHH that are owned or leased by the Navy that could be affected by the proposed INRMP activities.

Water Resources. Implementing the activities described in the 2023 JBPHH INRMP would be expected to result in benefits to water resources. Wetland delineation and restoration measures, including removal and control of non-native mangroves, would result in beneficial effects to wetlands and surface water quality. Establishing oyster reefs, and controlling invasive algae, would also result in improvements to water quality in the marine environment. The most current best management practices (BMP) would be used when implementing these and other INRMP projects in order to prevent negative effects to water quality. Therefore, implementation of the Preferred Alternative would not result in significant impacts to water resources. The No Action Alternative would involve JBPHH continuing to operate under an outdated INRMP. This would lead to no change to the management of water resources. Though the benefits to water resources resulting from implementation of the Preferred Alternative would not be realized, no significant impacts to existing water resources would occur.

Biological Resources. Implementing the activities described in the 2023 JBPHH INRMP would result in benefits to biological resources. Species surveys and monitoring would add to knowledge of species distribution and abundance, ultimately aiding conservation efforts. Control of predators (including rodents, ungulates, and feral animals) and control of invasive and non-native species would reduce mortality and competition with species that can outcompete native species for resources. Habitat improvements, including debris reduction in the marine environment, revegetation with native plants, wetland restoration, and oyster reef restoration benefit native terrestrial and marine flora and fauna by providing the native habitats species require. Activities that result in education and outreach to the public, law enforcement, and recreation personnel would increase stewardship of biological resources. Developing BMPs with the United States (U.S.) Fish and Wildlife Service (USFWS) would streamline consultation processes, allowing for timely implementation of measures that would protect threatened and endangered terrestrial and marine species. Marine and aquatic species would also benefit from improved water quality that would result from many INRMP activities. Additionally, the use of the most current management practices in implementing these and other INRMP projects would prevent negative effects to biological resources. There would be no significant impact on threatened and endangered species. No formal consultation between the DON and USFWS or National Oceanic and Atmospheric Administration (NOAA) Fisheries would be required. Therefore, implementation of the Preferred Alternative would not result in significant impacts to biological resources. The No Action Alternative would involve JBPHH continuing to operate under an outdated INRMP. This would lead to no change to the management of biological resources. Though the benefits to resources resulting from implementation of the Preferred Alternative would not be realized, no significant impacts to existing water resources would occur.

ES.6 Public Involvement

A Notice of Availability of the Draft INRMP and EA for review by the public was published in the Honolulu Star-Advertiser. The documents were made available on the Naval Facilities Engineering Systems Command (NAVFAC) Pacific website: <https://pacific.navfac.navy.mil/Facilities-Engineering-Commands/NAVFAC-Hawaii/About-Us/Our-Services/Environmental/> and hard copies were placed in the Hawaii State Public Library, 478 S King St, Honolulu and the Salt Lake-Moanalua Library, 3225 Salt Lake Blvd, Honolulu. Comments will be accepted from November 20, 2023 through December 20, 2023.

Draft
**Environmental Assessment for Integrated Natural Resources
Management Plan Joint Base Pearl Harbor-Hickam**

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Abbreviations and Acronyms

ADCA	Animal Damage Control Act of 1931
AFB	Air Force Base
BMP	best management practice
BTSA	Brown Tree Snake Control and Eradication Act
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COMPACFLT	Commander, U.S Pacific Fleet
CRCA	Coral Reef Conservation Act
CWA	Clean Water Act
DLNR	Department of Land and Natural Resources
DoD	United States Department of Defense
DoDI	United States Department of Defense Instruction
DON	United States Department of the Navy
EA	Environmental Assessment
EFH	Essential Fish Habitat
EO	Executive Order
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Conservation Act
FY	Fiscal Year
GIS	Geographic Information Systems
INRMP	Integrated Natural Resources Management Plan
JBPHH	Joint Base Pearl Harbor-Hickam
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
MRR	Military Readiness Rule
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NAVFAC	Naval Facilities Engineering Systems Command
NAVMAG PH	Naval Magazine Pearl Harbor
NEPA	National Environmental Policy Act
NISA	National Invasive Species Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRH	Navy Region Hawaii
NRTF	Naval Radio Transmitter Facility
OPNAV	Office of the Chief of Naval Operations
PMRF	Pacific Missile Range Facility
PPA	Plant Protection Act
SGCN	Species of Greatest Conservation Need
SOH	State of Hawai'i
SWCA	Soil and Water Conservation Act
TMDL	total maximum daily load
U.S.	United States
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers

USEPA U.S. Environmental Protection Agency
USFWS U.S. Fish and Wildlife Service

1 Purpose of and Need for the Proposed Action

1.1 Introduction

The United States (U.S.) Department of the Navy (hereinafter, referred to as the DON) proposes to implement the Joint Base Pearl Harbor-Hickam (JBPHH) Integrated Natural Resources Management Plan (INRMP) on JBPHH-administered and Leased Terrestrial and Submerged Lands. The Navy has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality (CEQ) regulations (Title 40, Code of Federal Regulations [CFR], Parts 1500–1508) and DON regulations (32 CFR 775) for implementing NEPA. All natural resources management projects listed in the 2023 JBPHH INRMP were reviewed and assessed for potential impact by subject matter experts. NEPA analysis was conducted programmatically, that is on the collective effect of management projects relevant to each resource, rather than at a project-specific level.

The purpose of an INRMP is to implement an ecosystem-based conservation program that provides for conservation and rehabilitation of natural resources in a manner that is consistent with the military mission, integrates and coordinates all natural resources management activities, provides for sustainable multipurpose uses of natural resources, and provides for public access for use of natural resources subject to public safety and military security considerations. This EA has been prepared to evaluate the effects of the activities described in the 2023 JBPHH INRMP, which are different than those evaluated in the EA for the 2011 JBPHH INRMP.

As discussed in Chapter 1 of the 2023 JBPHH INRMP, the goal of the INRMP is to provide DON with a framework for managing the natural resources on the land and nearshore areas it owns, leases, or controls (**Table 1.1-1**). INRMPs are the primary means by which natural resources compliance and stewardship priorities are set and funding requirements are determined for Department of Defense (DoD) installations. In accordance with Department of Defense Instruction (DoDI) 4715.03, the INRMP provides for no net loss in the capability of installation lands to support the military mission, pursuant to Section 670a(b)(1)(I) of the Sikes Act (as amended).

Table 1.1-1 JBPHH-administered Terrestrial and Submerged Lands

<i>INRMP Study Area</i>	<i>Terrestrial Lands</i>	<i>Water</i>
JBPHH Main Base (combines Pearl Harbor Naval Complex and Hickam Air Force Base) and Surrounding Areas	10,728 acres (4,341 hectares)	40,199 acres (16,268 hectares)
Lualualei Annex (Naval Magazine Pearl Harbor Lualualei Branch and Naval Radio Transmitter Facility Lualualei)	9,220 acres (3,731 hectares)	NA
Wahiaiwā Annex (Naval Computer and Telecommunications Area Master Station Pacific Wahiaiwā, Camp Stover Family Housing Community, Opana Radar Site)	726 acres (294 hectares)	NA
Kalaeloa (formerly Naval Air Station Barbers Point)	416 acres (168 hectares)	NA
Total	21,090 acres (8,535 hectares)	40,199 acres (16,268 hectares)

Legend: INRMP = Integrated Natural Resources Management Plan; JBPHH = Joint Base Pearl Harbor-Hickam; NA=Not Applicable

1.2 Background

Naval Station Pearl Harbor and Hickam Air Force Base (AFB) were combined to form JBPHH on January 31, 2010. The DON acts as the Component Lead for JBPHH and Navy Region Hawaii (NRH) oversees all Base Operating Support. The 2023 JBPHH INRMP is a revision of the 2011 JBPHH INRMP, which included the 2007 Hickam INRMP as an insert (DON, 2011). The 2023 JBPHH INRMP was developed based on a thorough review of the 2011 INRMP, review of new data pertaining to these sites, and detailed discussions with Naval Facilities Engineering Systems Command (NAVFAC) Pacific, NAVFAC Hawaii, JBPHH installation personnel, partner agencies, and various INRMP stakeholders. The 2023 JBPHH INRMP strives to provide for the management of natural resources while assuring no net loss in the ability of installation land to support the military mission. **Table 1.2-1** lists the major sections in the 2023 JBPHH INRMP.

Table 1.2-1 Major Sections in the 2023 JBPHH INRMP

<i>Section Number</i>	<i>Section Title</i>
Chapter 1	Overview
1.1	Organization
1.2	Purpose
1.3	Scope
1.4	Responsibilities
1.5	Military Mission
1.6	Authority
1.7	Encroachment
1.8	INRMP Development
1.9	Goals and Objectives
1.10	Cooperative Management
1.11	Adaptive Management
1.12	Ecosystem Management
1.13	Training of Natural Resources Personnel
1.14	Management Strategy
Chapter 2	General Installation Description
2.1	Description of JBPHH Facilities
2.2	General Physical Environment
Chapter 3	Climate Adaptation
3.1	Introduction
3.2	Climate Science
Chapter 4	Main Base and Surrounding Areas
4.1	Current Conditions and Use
4.2	General Physical Environment
4.3	General Terrestrial Biotic Environment
4.4	General Marine Biotic Environment
4.5	Current Management
Chapter 5	Lualualei Annex
5.1	Current Conditions and Use
5.2	General Physical Environment
5.3	General Biotic Environment
5.4	Current Management

Section Number	Section Title
Chapter 6	Wahiawā Annex
6.1	Current Conditions and Use
6.2	General Physical Environment
6.3	General Biotic Environment
6.4	Current Management
Chapter 7	Kalaeloa
7.1	Current Conditions and Use
7.2	General Physical Environment
7.3	General Biotic Environment
7.4	Current Management
Chapter 8	Planning, Integration, and Implementation
8.1	Introduction
8.2	Implementation
8.3	Integrated Natural Resource Management Plan Review
8.4	Critical Habitat Exemptions
Chapter 9	References and Resources
Chapter 10	Preparers and Contributors
Appendices	

Legend: INRMP = Integrated Natural Resources Management Plan; JBPHH = Joint Base Pearl Harbor-Hickam.

1.3 Location

As discussed in Chapter 2 of the 2023 JBPHH INRMP, Naval Station Pearl Harbor and Hickam AFB were combined to form JBPHH in 2010. NRH oversees all Base Operating Support. This responsibility involves 21,090 acres (8,535 hectares) of land and approximately 40,199 acres (16,268 hectares) of water described in the following sections as well as in Chapters 4 through 7 of the INRMP (**Figure 1.3-1**).

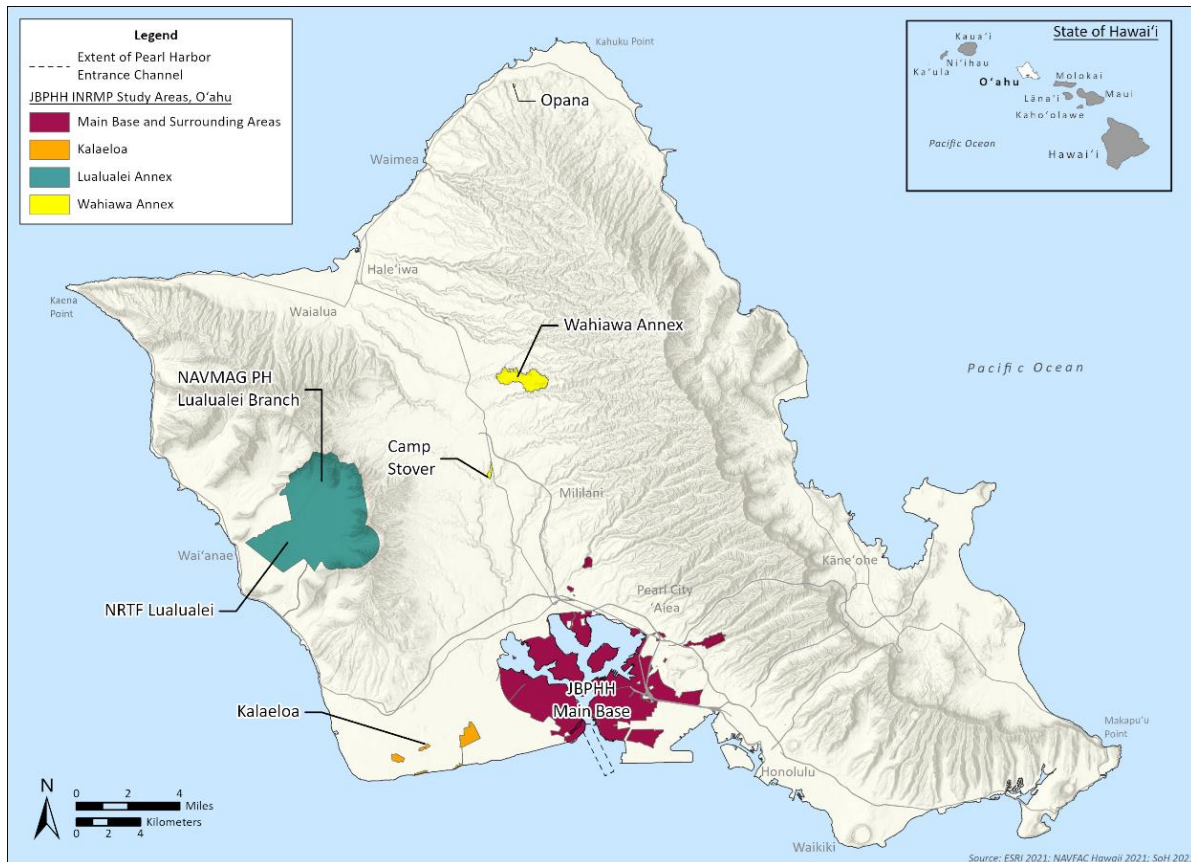


Figure 1.3-1 Joint Base Pearl Harbor-Hickam

1.3.1 JBPHH Main Base and Surrounding Areas

Main Base consists of the Pearl Harbor Shipyard, Intermediate Maintenance Facility, the former Hickam AFB, and surrounding areas. It is largely developed and includes industrial areas. Its primary function is to provide berthing for homeported and transient surface ships and submarines as well as maintenance and logistical support. Hickam Airfield supports the Pacific Air Forces’ strategic air operations, aircrew training and evaluation, munitions loading and unloading, airdrop operations, aircraft maintenance, logistics, and movement of personnel and material. Main Base also includes family and troop housing, community support, administrative buildings, recreation areas (including memorials and a museum), and managed landscape. The Main Base shoreline along the Southeast Loch of Pearl Harbor is industrial. Hickam Beach, Āhua Reef, and Āhua Wetland are located on the southern shoreline of Main Base adjacent to the Reef Runway at Daniel K. Inouye International Airport. The Main Base and Surrounding Areas comprise 10,728 acres (4,341 hectares) of land and 40,199 acres (16,268 hectares) of water. More details can be found in the JBPHH INRMP Chapter 4.

1.3.2 Lualualei Annex

The Lualualei Annex (9,220 acres [3,731 hectares]) consists of the Naval Magazine Pearl Harbor (NAVMAG PH) Lualualei Branch and the Naval Radio Transmitter Facility (NRTF) Lualualei. NAVMAG PH Lualualei Branch is a munitions magazine complex that includes storage and operational facilities, community and personnel support facilities, and large areas of open space. NRTF Lualualei is used to

transmit high and low frequency radio signals for the navigation of Navy vessels throughout the Pacific. More details can be found in the JBPHH INRMP Chapter 5.

1.3.3 Wahiawā Annex

The Wahiawā Annex includes operations, open space around antennas, and family housing and community support facilities. The stationed and developed area of Wahiawā are surrounded by undeveloped areas. Camp Stover Housing Community includes housing units and associated residential amenities including landscaped areas. The Opana Radar Site is the location of an active U.S. State Department telecommunications station. These areas comprise 726 acres (294 hectares). The area includes facilities and managed lawns and landscaping. More details can be found in the JBPHH INRMP Chapter 6.

1.3.4 Kalaeloa

Kalaeloa includes five non-contiguous DON-retained lands, totaling 416 acres (168 hectares), from the former Naval Air Station Barbers Point. These areas are largely developed with some previously disturbed open space. Land cover types include industrial areas, recreation, and disturbed open space. The shorelines along Nimitz Beach and White Plains Beach are coastal wetlands. More details can be found in the JBPHH INRMP Chapter 7.

1.4 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to implement the revised JBPHH INRMP, which provides an approach for natural resources management on JBPHH-administered lands that is consistent with the Sikes Act (as amended) as well as the most recent DoD and DON policy and guidance regarding INRMPs. The proposed action ensures the natural resources are managed in a consistent manner across all the administered lands, which were previously separately managed.

The need for the Proposed Action is to provide a comprehensive, adaptive natural resources management approach for all JBPHH properties. Both the INRMP and the natural resources management programs that it supports must meet DoD and DON policy and guidance that collectively require a plan and management approach consistent with mission support (as defined in 10 United States Code [U.S.C.] Section 5062). This would include multipurpose use, integration, ecosystem- or landscape-level management, environmental compliance, and stewardship objectives.

10 U.S.C. section 5062: “The Navy shall be organized, trained, and equipped primarily for prompt and sustained combat incident to operations at sea. It is responsible for the preparation of naval forces necessary for the effective prosecution of war except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Navy to meet the needs of war.”

1.5 Regulatory Framework

The Navy has prepared this EA based upon federal and state laws, statutes, regulations, and policies pertinent to the implementation of the Proposed Action, including the following:

- NEPA (42 U.S.C. Sections 4321–4370h), which requires an environmental analysis for major federal actions that have the potential to significantly impact the quality of the human environment

- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR parts 1500–1508)
- Navy regulations for implementing NEPA (32 CFR part 775), which provides Navy policy for implementing CEQ regulations and NEPA
- Clean Air Act (CAA) (42 U.S.C. Section 7401 et seq.)
- Clean Water Act (CWA) (33 U.S.C. Section 1251 et seq.)
- Rivers and Harbors Act (33 U.S.C. Section 407)
- Coastal Zone Management Act (16 U.S.C. Section 1451 et seq.)
- National Historic Preservation Act (54 U.S.C. Section 306108 et seq.)
- Endangered Species Act (ESA) (16 U.S.C. Section 1531 et seq.)
- Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (16 U.S.C. Section 1801 et seq.)
- Marine Mammal Protection Act (16 U.S.C. Section 1361 et seq.)
- Migratory Bird Treaty Act (16 U.S.C. Section 703–712)
- Comprehensive Environmental Response and Liability Act (42 U.S.C. Section 9601 et seq.)
- Emergency Planning and Community Right-to-Know Act (42 U.S.C. Sections 11001–11050)
- Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Section 136 et seq.)
- Resource Conservation and Recovery Act (42 U.S.C. Section 6901 et seq.)
- Sikes Act, as amended (16 U.S.C. § 670a et seq)
- Toxic Substances Control Act (15 U.S.C. Sections 2601–2629)
- Animal Damage Control Act of 1931
- Brown Tree Snake Control and Eradication Act
- Coral Reef Conservation Act
- Fish and Wildlife Conservation Act
- National Invasive Species Act
- Plant Protection Act
- SWCA = Soil and Water Conservation Act
- Executive Order (EO) 11990, Wetlands Protection
- EO 11988, Floodplain Management
- EO 12088, Federal Compliance with Pollution Control Standards
- EO 12114, Environmental Effects Abroad of Major Federal Actions, including the implementing regulation 32 CFR part 187, Environmental Effects Abroad of Major DoD Actions
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations
- EO 13045, Protection of Children from Environmental Health Risks and Safety Risks
- EO 13089, Coral Reef Protection
- EO 13693, Planning for Federal Sustainability in the Next Decade
- EO 13148, Greening the Government Through Leadership in Environmental Management

- EO 13186, Migratory Bird Conservation
- EO 13751/13112, Invasive Species

A description of the Proposed Action’s consistency with these laws, policies, and regulations, as well as the names of regulatory agencies responsible for their implementation, is presented in Chapter 4 (**Table 4.1-1**).

1.6 Public and Agency Participation and Intergovernmental Coordination

Regulations from the CEQ direct agencies to involve the public in preparing and implementing their NEPA procedures. For this project, the Draft and Final INRMP, including the Draft EA, Final EA, and Finding of No Significant Impact (FONSI) (if appropriate), will be published on the NAVFAC Pacific website: <https://pacific.navy.mil/Facilities-Engineering-Commands/NAVFAC-Hawaii/About-Us/Our-Services/Environmental/>. Hard copies were also made available at the Hawaii State Public Library, 478 S King St, Honolulu and the Salt Lake-Moanalua Library, 3225 Salt Lake Blvd, Honolulu. Notices of availability were published in the *Honolulu Star-Advertiser*. The public comment period for the Draft EA will extend from November 20, 2023 through December 20, 2023. Written comments on the Draft EA may be provided by mail to: ATTN: Code EV22AD, Naval Facilities Engineering Systems Command Hawaii, 400 Marshall Road Building X11, JBPHH, HI 96860, or by email: Navfachinaturalr.fct@navy.mil.

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2 Proposed Action and Alternatives

2.1 Proposed Action

This chapter describes the alternatives that are evaluated in this EA. The Proposed Action under consideration is to implement the 2023 JBPHH INRMP, consistent with the military use of the JBPHH-administered lands and the goals and objectives established in the Sikes Act (as amended). As required by NEPA regulations, a No Action Alternative is also analyzed. The No Action Alternative under consideration would continue the implementation of the 2011 JBPHH INRMP (DON, 2011). The No Action Alternative is evaluated to compare the outcomes of implementing the Proposed Action, versus continuing current practices.

2.2 Screening Factors

NEPA's implementing regulations provide guidance on the consideration of alternatives to a federally Proposed Action and require rigorous exploration and objective evaluation of reasonable alternatives. Only those alternatives determined to be reasonable and to meet the purpose and need require detailed analysis.

Potential alternatives that meet the purpose and need were evaluated against the following screening factors:

- provide for sustainable multipurpose use of natural resources
- maintain compliance with relevant environmental regulations
- provide for public access for use of natural resources subject to safety and military security considerations
- establish specific natural resources management objectives and timeframes for the Proposed Action
- prevent loss in the capability of military lands to support the military mission of the installation

2.3 Alternative Carried Forward for Analysis

Based on the reasonable alternative screening factors and meeting the purpose and need for the Proposed Action, only the No Action Alternative and the Proposed Action are carried forward and analyzed in this EA. The Proposed Action encompasses consideration of a wide variety of resource management projects (i.e., alternate actions) that can be implemented in the future, depending on environmental conditions and ecological considerations at the time. Many of these projects were addressed in the EA for the 2011 JBPHH INRMP, are currently being conducted, and will likely continue. All resource management projects in the 2023 JBPHH INRMP would result in beneficial effects to area resources, as "good environmental stewardship" is the purpose of the INRMP.

In addition, the U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), and State of Hawaii (SOH) Department of Land and Natural Resources (DLNR) provided technical assistance, review, and expert guidance regarding terrestrial and marine resources addressed in the INRMP. This ensures coordination on the natural resources management goals, objectives, and projects that are stated in the 2023 JBPHH INRMP. For these additional reasons, only the Proposed Action and the No Action Alternative were carried forward for detailed analysis in this EA.

2.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and natural resources would continue to be managed as characterized in the 2011 INRMP for JBPHH, including those projects that are recurring and ongoing (Table 8-7 of the 2023 JBPHH INRMP). This alternative represents the status quo. The No Action Alternative would not meet the purpose and need for the Proposed Action since the management goals, objectives, projects, strategies, and actions from the 2011 JBPHH INRMP do not take into account current conditions. Key differences between the No Action Alternative and the Proposed Action are that the latter provides: consistent management approach across all JBPHH-administered lands; includes management of species newly listed under the ESA; and reflects enhanced agency engagement and coordination, current state of the science, and improved terrestrial and marine resource management. However, as required by NEPA, the No Action Alternative is carried forward for analysis in this EA to serve as a comparative baseline for analysis.

2.3.2 Proposed Action (Preferred Alternative)

The Proposed Action is to implement the 2023 JBPHH INRMP, consistent with the military use of the JBPHH-administered lands considered in this EA and consistent with the requirements of the Sikes Act (as amended). The JBPHH INRMP has been developed to provide DON with an implementable framework for managing the natural resources on the land and nearshore areas it owns, leases, or controls. As described in greater detail in Section 1.9 of the 2023 JBPHH INRMP, its goals are to:

- Support and sustain the military mission of JBPHH while managing, protecting, and enhancing biological diversity, ecosystem integrity, and threatened and endangered species and their habitats.
- Apply ecosystem-based adaptive management strategies to ensure the long-term health, restoration, protection, and recovery of marine and terrestrial natural resources and biodiversity.
- Ensure regulatory requirements for the management, conservation, and protection of natural resources are met or exceeded through enforcement and outreach activities.

To achieve the goals and objectives of the 2023 JBPHH INRMP, a number of currently funded (recurring and ongoing) and planned projects are proposed. Ongoing projects, also part of the No Action Alternative, are listed in **Table 2.3-1**. Planned projects, their implementation status, and the regulatory drivers are also listed in **Table 2.3-1**. These projects are also listed in Tables 8-7 and 8-8 of the 2023 JBPHH INRMP along with information on the goals and objectives each address, funding sources and priority, frequency and timing, regulatory drivers, missions supported, and ecosystem and species groups affected. Details of mitigation requirements related to ESA compliance for terrestrial and marine species are listed in Tables 8-9 and 8-10 of the INRMP and are summarized here in **Table 2.3-2**.

Table 2.3-1 Ongoing and Planned Projects

<i>Project</i>	<i>Implementation Status</i>	<i>Regulatory Drivers</i>
Ongoing Projects		
JBPHH Predator/Feral Animal Control	Recurring annually	ESA, MMPA, Sikes Act, EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
JBPHH Flora/Fauna Surveys (Lualualei Pueo Survey, Lualualei Arthropod Survey, JBPHH Field Biology Support, Management of Black Twig Borer)	Recurring annually	ESA, MBTA, Sikes Act, EO13186, MRR, DoDI 4715.3, OPNAV 5090.1E
Āhua Wetland Restoration	Recurring annually	ESA, CWA, MBTA, MSFCM, Sikes Act, EO13186, MRR, DoDI 4715.3, OPNAV 5090.1E
JBPHH Protected Bird Species Surveys	Recurring annually	ESA, MBTA, NEPA, Sikes Act, EO13186, DoDI 4715.3, OPNAV 5090.1E
JBPHH Hawaiian Bat Acoustic Surveys	Recurring annually	ESA, NEPA, Sikes Act. DoDI 4715.3, OPNAV 5090.1E
JBPHH Hawaiian Waterbird Monitoring	Recurring annually	ESA, MBTA, Sikes Act, EO13186, MRR, DoDI 4715.3, OPNAV 5090.1E
JBPHH Marine Debris Reduction	Recurring annually	ESA, MMPA, CWA, CZMA, MSFCM, SWCA, Sikes Act, EO11990, DODI 4715.3, OPNAV 5090.1E
JBPHH - Flora Fauna Surveys	Recurring annually	ESA, MBTA, Sikes Act, EO13186/13112, DoDI 4715.3, OPNAV 5090.1E
JBPHH Control of Invasive Plants	Recurring annually	ESA, PPA, Sikes Act, EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
JBPHH Revegetation with Native Plants	Recurring annually	ESA, CWA, PPA, SWCA, Sikes Act, EO11990, EO13148, EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
JBPHH - Endangered Plant Species Rodent Control	Recurring annually	ESA, Sikes Act, EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
JBPHH - ESA-listed Species Predator/Feral Animal Control	Recurring annually	ESA, MMPA, MBTA, Sikes Act, EO13186, EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
JBPHH - ESA-listed Species Mangrove and Pickleweed Removal	Recurring annually	ESA, MBTA, CRCA, CWA, MSFCM, EO11990, EO13089, EO13751/13112, MRR
JBPHH INRMP Revision	Non-Annual Recurring	ESA, MMPA, MPTA, MSFCM, CWA, PPA, Sikes Act, EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
JBPHH Lualualei Endangered Plant Species Outplanting	Recurring annually	ESA, MBTA, Sikes Act, EO13186, MRR, DoDI 4715.3, OPNAV 5090.1E

<i>Project</i>	<i>Implementation Status</i>	<i>Regulatory Drivers</i>
JBP HH Lualualei Ungulate Fencing	Recurring annually	ESA, SWCA, PPA, Sikes Act EO 13751/13112, DoDI 4715.3, OPNAV 5090.1E
JBP HH Lualualei Endangered Plant and Snail Management	Recurring annually	ESA, PPA, SWCA, Sikes Act, EO 13751/13112, DoDI 4715.3, OPNAV 5090.1E
Coconut Rhinoceros Beetle Monitoring and Management	Recurring annually	ESA, NISA, Sikes Act, EO13751/13112
JBP HH Conservation Law Enforcement	Recurring annually	ESA, MBTA, CWA, MSFCM, CRCA, CZMA, Sikes Act, EO11990, EO13089, EO13186, EO13751/13112 DoDI 4751.3, DoDI 5525.ee, OPNAV 5090.1E
JBP HH - Lualualei Wildland Fire Management Plan	Non-Annual Recurring	ESA, PPA, SWCA, Sikes Act, EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
JBP HH Signage for ESA-listed Species	Non-Annual Recurring	ESA, Sikes Act, EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
JBP HH Marine Resources and Fisheries Surveys	Recurring annually	ESA, MBTA, MSFCM, FWCA, Sikes Act
JBP HH GIS Data Management	Recurring annually	ESA, MSFCM, Sikes Act, DoDI 4715.3, OPNAVIST 5090.1E
JBP HH - Feral Ungulate (Pig) Control	Recurring annually	SWCA, OPNAV5090.1E, Presidential Memorandum establishing the America's Great Outdoors Initiative
JBP HH Invasive Species Early Detection Roadside Surveys	Recurring annually	ESA, PPA, Sikes Act, EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
JBP HH Management Actions for Protected Species During Training	Recurring annually	ESA, CWA, MSFCM, MMPA, MBTA, NEPA, CRCA, Sikes Act, EO13089, EO13186, EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
JBP HH Biosecurity Management	Recurring annually	ESA, MSFCM, ADCA, BTSA NISA. EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
JBP HH - NRTF Niuli'i Ponds Waterbird Habitat Management	Recurring annually	ESA, CWA, MBTA, MMPA SWCA, EO11990, EO13186, DoDI 4715.3, OPNAV 5090.1E
BASH	Ongoing year-round	ESA, MBTA, Sikes Act, DoDI 4715.3, OPNAV 5090.1
Āhua Reef volunteer events	Ongoing 1-2 per month	ESA, CWA, MBTA, MSFCM, Sikes Act, EO13186, MRR, DoDI 4715.3, OPNAV 5090.1E
Arthropod Surveys in Lualualei	Ongoing, recurring as funding permits every 3-5 years	ESA, MBTA, Sikes Act, EO13186, MRR, DoDI 4715.3, OPNAV 5090.1E

<i>Project</i>	<i>Implementation Status</i>	<i>Regulatory Drivers</i>
Biodiversity in Stream Mouths	Ongoing, recurring as funding permits	ESA, MSFCM, MBTA, MMPA, CWA, CRCA, EO13089, EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
Fishpond Restoration	Ongoing monthly year-round	ESA, CWA, MBTA, MSFCM, Sikes Act, EO13186, MRR, DoDI 4715.3, OPNAV 5090.1E
Earth Day Events	Ongoing, once per year	Sikes Act, DoDI 4715.3, OPNAV 5090.1E
‘Elepaio surveys in Lualualei	Ongoing, recurring as funding permits every 3-5 years	ESA, MBTA, Sikes Act, EO13186, MMR, DoDI 4715.3, OPNAV 5090.1E
Hawaiian Monk Seal Haul out locations	Ongoing, throughout the year with annual reporting	ESA, MMPA, Sikes Act, DoDI 4715.3, OPNAV 5090.1E
Native Hawaiian Plant Nursery	Ongoing, year-round	ESA, PPA, Sikes Act, EO11990, OPNAV 5090.1E
Native Oyster Restoration	Ongoing, recurring as funding permits, every 3-5 years	ESA, MSFCM, MBTA, MMPA, CWA, CRCA, EO13089, EO13751/13112, DoDI 4715.3, OPNAV 5090.1E
Sea turtle presence/absence and use of Pearl Harbor	Ongoing, recurring as funding permits, every 3-5 years	ESA, Sikes Act, DoDI 4715.3, OPNAV 5090.1E
Sea turtle stranding data	Ongoing, year-round as needed	ESA, Sikes Act, DoDI 4715.3, OPNAV 5090.1E
Shearwater fallout Emergency line/pickup and drop off to rehabilitation centers	Ongoing, recurring seasonally each year (September to December)	ESA, MBTA, Sikes Act, DoDI 4715.3, OPNAV 5090.1E
Whale presence in Pearl Harbor	Ongoing, recurring seasonally each year (November to April)	ESA, MMPA, Sikes Act, DoDI 4715.3, OPNAV 5090.1E
Working Group and Committee Participation	Ongoing, recurring annually as needed throughout the year	ESA, ADCA, BTSA, CWA, CZMA, MBTA, CRCA, FWCA, MSFCM, MMPA, MRR, NISA4713, NEPA, PPA, SWCA, Sikes Act, EO13089, EO13148, EO13186, EO13751/13112, E13443, DoDI 4715.3, DoD 5525.ee, OPNAV 5090.1E
Planned Future		
Combine terrestrial ecosystem restoration with cleanup projects from EV1	Frequency TBD	MBTA, EO11990, EO13751/13112, MRR
Conservation Enforcement Education for Security		ESA, CWA, CZMA MBTA, CRCA, MSFCM, Sikes Act, EO11990, EO13089, EO13186, EO13751/13112, DoDI 4715.3, DoDI 5525.ee, OPNAV 5090.1E

<i>Project</i>	<i>Implementation Status</i>	<i>Regulatory Drivers</i>
Development of waterbird management plan informed by data from waterbird tracking study		ESA, Sikes Act, MBTA, MRR, EO 13186, DoDI 4715.3, OPNAV 5090.1
Early coordination for Essential Fish Habitat		ESA, CWA, CRCA, MSFCMA, MBTA, MMPA, EO 13089, EO 13751/13112, DoDI 4715.3, OPNAV 5090.1
Eradicate alien invasive species that are established in Pearl Harbor (i.e., <i>Xenia</i> spp., <i>Gracilaria salicornia</i>)		ESA, CWA, CRCA, MSFCMA, MBTA, MMPA, EO 13089, EO 13751/13112, DoDI 4715.3, OPNAV 5090.1
Establish a mitigation bank account for future impacts to ESA and EFH		ESA, CWA, CRCA, MSFCMA, MBTA, MMPA, EO 13089, EO 13751/13112, DoDI 4715.3, OPNAV 5090.1
Establish a programmatic consultation and agreed upon BMPs for in-water work and trainings with NMFS, USACE, and DOH		ESA, MSFCMA, MBTA, MMPA, CWA, CRCA, EO 13089, EO 13751/13112, DoDI 4715.3, OPNAV 5090.1
Establish a project which controls sediment impacts at the Hawaii Air National Guard parking lot		ESA, CWA, CRCA, MSFCMA, MMPA, EO 13089, EO 13751/13112, DoDI 4715.3, OPNAV 5090.1
Establish speed limits in areas with heavy Green Sea Turtle presence		MBTA, ESA, MSFCMA, MMPA, NEPA, CWA, Sikes Act, CRCA, EO 13089, EO 13186, EO 13751/13112, DoDI 4715.3, OPNAV 5090.1
Establish unused areas that do not and will not impact the mission, in JBPHH that will permanently serve, protect, and sustain EFH and ESA-listed species		CWA, CRCA, ESA, MSFCMA, MBTA, MMPA, EO 13089, EO 13751/13112, DoDI 4715.3, OPNAV 5090.1
Increase the priority of Conservation Enforcement		CWA, CZMA, Sikes Act, CRCA, MBTA, MSFCMA, ESA, EO 11990, EO 13089, EO 13186, EO 13751/13112, DoDI 4751.3, DoDI 5525, OPNAV 5090.1
Invasive Algae Control		CWA, CRCA, MSFCMA, MBTA, MMPA, ESA, EO 13089, EO 13751/13112, DoDI 4715.3, OPNAV 5090.1
Nest mortality study for Silts & Coots identifying causes & mortality rates		Sikes Act, ESA, MBTA, MRR, EO 13186, DoDI 4715.3, OPNAV 5090.1
Outreach program with DAR/MWR/Security		CWA, CZMA, Sikes Act, CRCA, MBTA, MSFCMA, ESA, EO 11990, EO 13089, EO 13186, EO 13751/13112, DoDI 4751.3, DoDI 5525, OPNAV 5090.1

<i>Project</i>	<i>Implementation Status</i>	<i>Regulatory Drivers</i>
White tern monitoring and mapping		Sikes Act, MBTA, EO 13186, DoDI 4715.3, OPNAV 5090.1
Implement wildlife friendly lighting practices		CZMA, Sikes Act, ESA, MBTA, DoDI 4715.3, OPNAV 5090.1
Hawaiian hoary bat fence line monitoring		ESA, NEPA
Marine species assessment and monitoring		CWA, CRCA, ESA, MSFCMA, MBTA, MMPA, EO 13089, EO 13751/13112, DoDI 4715.3, OPNAV 5090.1
Wetland delineation		CZMA, CWA, Sikes Act, MBTA, MSFCMA, ESA, EO 13186, DoDI 4715.3, OPNAV 5090.1
Creel Survey		ESA, MSFCMA, MBTA, MMPA, CWA, CRCA, EO 13089, EO 13751/13112, DoDI 4715.3, OPNAV 5090.1
Wildland Fire Management		ESA, Sikes Act, PPA, SWCA, EO 13751/13112, DoDI 4715.3, OPNAV 5090.1

Legend: ADCA = Animal Damage Control Act of 1931; BMP = Best Management Practice; BTSA = Brown Tree Snake Control and Eradication Act; CRCA = Coral Reef Conservation Act; CWA = Clean Water Act; DAR = Division of Aquatic Resources; DoDI 4715.3 = Natural Resources Conservation Program; DoDI 5525.ee = Conservation Law Enforcement Program; DOH = State of Hawaii Department of Health; EFH = Essential Fish Habitat; EO = Executive Order; Executive Order 11990, Wetlands Protection; Executive Order 13148 = Environmental Management, Coral Reef; Executive Order 13089 = Coral Reef Protection; EO 13186 = Migratory Birds; EO 13751/13112 = Invasive Species; ESA = Endangered Species Act; FWCA = Fish and Wildlife Conservation Act; GIS = Geographic Information Systems; MBTA = Migratory Bird Treaty Act; MMPA = Marine Mammal Protection Act; MRR = Military Readiness Rule; MSFCMA = Magnuson-Stevens Fishery Conservation and Management Act; MWR = Morale Welfare and Recreation; NISA = National Invasive Species Act; NMFS = National Marine Fisheries Service; OPNAV 5090.1E = Environmental Readiness Program Manual; PPA = Plant Protection Act; SWCA = Soil and Water Conservation Act; USACE = United States Army Corps of Engineers.

Table 2.3-2 Mitigation Requirements

<i>Driver/ Reference Document</i>	<i>Requirement</i>	<i>Species Benefited</i>	<i>Implementation Status</i>
USFWS Biological Opinion for Activities and Operations at Hickam AFB, August 2009	Maintain Āhua wetland with open water (1-6 inches in depth) and mudflat (saturated and dry)	Hawaiian stilt (primary), Hawaiian duck, Hawaiian coot, Hawaiian moorhen	Ongoing
	Maintain Āhua wetland interspersed with less than 25% cover of pest plants (pickleweed & red mangrove)	Hawaiian stilt (primary), Hawaiian duck, Hawaiian coot, Hawaiian moorhen	Ongoing
	Minimize predation of waterbirds by feral mammalian predators (cats, dogs) through year-round predator trapping at Āhua wetland	Hawaiian stilt (primary), Hawaiian duck, Hawaiian coot, Hawaiian moorhen	Ongoing
	Air Force shall enforce their policy to restrict pets from Āhua wetland area for the protection of listed waterbirds	Hawaiian stilt (primary), Hawaiian duck, Hawaiian coot, Hawaiian moorhen	Ongoing
USFWS Biological Opinion for Construction of Magazines for Munitions and Associated Improvements at JBPHH West Loch Annex, June 2020	Monitor newly-installed barbed wire fencing for Hawaiian hoary bat mortalities using plan previously implemented at PMRF	Hawaiian hoary bat	New, FY 2022
	Conduct carcass-scavenging and searcher efficiency trials 1 month prior to bat mortality surveys; use results to inform frequency and duration of mortality surveys	Hawaiian hoary bat	New, FY 2021–2022
	Provide the results of carcass and searcher efficiency trials and the protocol for bat mortality surveys along the fence line, including frequency and duration of the surveys, to USFWS	Hawaiian hoary bat	New, FY 2021–2022

<i>Driver/ Reference Document</i>	<i>Requirement</i>	<i>Species Benefited</i>	<i>Implementation Status</i>
EFH Consultation for Pearl Harbor Maintenance Dredge (FY14 Southeast Loch; FY17 Upper Middle Loch)	Establishment of at least 17,000 oysters for bioremediation	EFH, ESA	Ongoing
	Stabilization and restoration of 242.2 meters and 3,995 square meters of Hickam shoreline	EFH, ESA	Ongoing
	Completion of a desktop study on the Pearl Harbor area watershed	EFH, ESA	Complete
	Revision of fishing regulations in Pearl Harbor.	EFH	Ongoing
	Establishment of a Conservation Law Officer at JBPHH	EFH, ESA	Ongoing
USFWS Biological Opinion for West Loch Oxidation Pond Operations and Maintenance, Joint Base Pearl Harbor-Hickam, Oahu, August 2021	Monitor for waterbird presence once every two weeks during the months of September through January and once per week during the months of February through August for behavioral observations, use of the site over time, and signs of avian botulism. Any nests observed will be communicated to facilities staff and additional measures will be taken to ensure operations do not disturb active nests and broods	Hawaiian stilt (primary), Hawaiian coot, Hawaiian gallinule	Ongoing
	Minimize predation of waterbirds by feral mammalian predators (cats, mongoose) through year-round predator trapping at West Loch Oxidation Pond	Hawaiian stilt (primary), Hawaiian coot, Hawaiian gallinule	Ongoing
	Natural Resources staff will work closely with facilities to ensure maintenance activities occur outside of nesting season and pond is less attractive to nesting birds during nesting season (i.e., high water level, liner is free of debris, passive hazing during high-volume use of the pond)	Hawaiian stilt (primary), Hawaiian coot, Hawaiian gallinule	Ongoing

<i>Driver/ Reference Document</i>	<i>Requirement</i>	<i>Species Benefited</i>	<i>Implementation Status</i>
Addendum to the Integrated Natural Resource Management Plan June 2012	Survey documenting numbers and locations of plant species. Create and implement a Snail and Plant Management Plan	Plant Species	Ongoing
	Development of a <i>M. villosa</i> management plan based on recommendation strategies outlined in a dissertation, partly funded by the DON	Plant Species	Ongoing
	Expansion of funding for a fencing plan and fence construction for ungulate control with specified timeline	Plant Species	Ongoing
	Completion of aerial surveys for feral goats, with plans for their removal beginning in 2013	Plant Species	Ongoing
	Non-native plant removal within exclosures at Hālonā and Mikiula management areas	Plant Species	Ongoing
	Commitment to address outplanting needs for threatened and endangered species to augment and stabilize populations with U.S. Navy property at Lualualei Annex	Plant Species	Ongoing
	Allocation of funding for research on Black Twig Borer control methods	Plant Species	Ongoing
	Commitment to prioritize the production of a wildfire management plan	Plant Species	Ongoing

<i>Driver/ Reference Document</i>	<i>Requirement</i>	<i>Species Benefited</i>	<i>Implementation Status</i>
COMPACFLT Boathouse Repair	Removal and relocation of marine growth with important ecological functions, such as oysters, to an area nearby with similar environmental conditions where no future impacts are predicted. Monitoring of the survival of the relocated organisms	EFH, ESA	Ongoing

Legend: COMPACFLT = Commander, U.S Pacific Fleet; EFH = Essential Fish Habitat; ESA = Endangered Species Act; FY = Fiscal Year; JBPHH = Joint Base Pearl Harbor-Hickam; PMRF = Pacific Missile Range Facility; USFWS = United States Fish and Wildlife Service.

2.4 Alternatives Considered but not Carried Forward for Detailed Analysis

The DON Environmental Readiness Program Manual (Office of the Chief of Naval Operations [OPNAV] Manual [M]-5090.1, 2021) states that for actions associated with the implementation of an INRMP, analysis of a Proposed Action and No Action Alternatives is acceptable without considering additional alternatives. Therefore, no additional alternatives are carried forward in this EA.

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3 Affected Environment and Environmental Consequences

This chapter presents a description of the environmental resources and baseline conditions that could be affected from implementing any of the alternatives and an analysis of the potential direct and indirect effects of each alternative.

All potentially relevant environmental resource areas were initially considered for analysis in this EA. In compliance with NEPA, CEQ, and DON guidelines; the discussion of the affected environment (i.e., existing conditions) focuses only on those resource areas potentially subject to impacts. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact.

CEQ regulations state that the lead agency shall eliminate from detailed study issues that are not significant or that have been covered by prior environmental review, narrowing the discussion of these issues in the document to a brief presentation of why they would not have a significant effect on the human or natural environment. This section includes an analysis of the Proposed Action on Water and Biological Resources. Resources that have little to no potential to be affected by the Proposed Action have been eliminated from detailed evaluation. These include the following.

Air Quality: Effects on air quality from implementation of the updated INRMP would be limited to mobile sources and would be temporary in nature. As described in 40 CFR 51.851, *Determining Conformity of General Federal Actions to State or Federal Implementation Plans* (the “General Conformity Rule”), all federal actions occurring in air basins designated in nonattainment or in a maintenance area must conform to an applicable implementation plan. The Hawaii Air Quality Control Region where the proposed activities are located, is not classified as a nonattainment or maintenance area for any criteria pollutant, therefore the General Conformity Rule does not apply. The Proposed Action would have a negligible impact on air quality, including criteria pollutants and hazardous air pollutants and would emit negligible levels of greenhouse gases.

Geological Resources: Factors considered in determining whether alternatives would have a significant impact on geology, topography, and soils include the extent to which existing geology or soil conditions or topography would be altered. These include the potential for activities to result in a substantial change in soil or slope stability, disrupt geological features, or pose potential geological hazards, increase the rate of erosion and soil loss, reduce soil productivity, alter the landscape. Planned projects, such as erosion control and habitat restoration, would create long-term, beneficial impacts to soil resources. There would be no significant impacts to topography, geology, and soil resources. Minor short-term impacts to soils would result from natural resources management activities that involve ground disturbance.

Cultural Resources: The proposed natural resources management actions will be individually evaluated for impacts on historic resources in accordance with Section 106 of the National Historic Preservation Act to determine their effects on historic resources when project locations and details become available. There is a potential for additional previously unrecorded archeological resources to be affected by ground-disturbing activities, and additional archaeological surveys may be required. The INRMP does not propose activities that would affect historic properties. No further analysis is required at this time.

Land Use: The Proposed Action and No Action Alternative would not result in any change to or inconsistencies with existing land use designations. Negligible positive benefits to the installation’s ability to sustain military land use could result from protecting soil and water resources.

Visual Resources: Some of the proposed activities including vegetation restoration, debris removal, and invasive species control would have a slight beneficial effect on visual resources. No viewsheds or natural vistas would be altered.

Airspace: The activities proposed in the INRMP would not affect airspace. Therefore, no further analysis is needed.

Noise: Noise generated by INRMP activities would be generated from mobile equipment or vehicles and would be short term and minimal, with no long-term impacts to the existing noise environment.

Infrastructure: The activities proposed in the INRMP would not result in any changes to existing infrastructure. Implementation of projects that would result in erosion control would have a positive benefit to the existing infrastructure.

Transportation: The activities proposed in the INRMP would not result in any changes to existing traffic patterns or alter or create new transportation routes in land, sea, or air. Implementation of projects that would result in erosion control and control of nuisance wildlife would have a positive benefit to the existing transportation infrastructure. Implementation of activities could generate minimal use of existing road network; however, this traffic would be negligible and be short term.

Public Health and Safety: The activities proposed in the INRMP would not affect the safety or health of members of the public. Therefore, no further analysis is needed.

Hazardous Materials and Wastes: The activities proposed in the INRMP would not generate hazardous materials or wastes or change current conditions or management; therefore, no impacts would occur.

Socioeconomics: The activities proposed in the INRMP would not induce or inhibit changes in population, income, or the availability of housing; therefore, no impacts would occur.

Environmental Justice: The activities proposed in the INRMP would have no adverse human health or environmental effects and therefore would not have disproportionately high and adverse effects to minority or low-income populations. There is no evidence or suggestion that the Proposed Action would disproportionately affect any minority or low-income populations.

3.1 Water Resources

This discussion of water resources includes surface water (including marine waters and shorelines) and wetlands. Groundwater is not expected to be affected by the Proposed Action.

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. A Total Maximum Daily Load (TMDL) is the maximum amount of a substance that can be assimilated by a water body without causing impairment. A water body can be deemed impaired if water quality analyses conclude that exceedances of water quality standards occur.

Wetlands are jointly defined by U.S. Environmental Protection Agency (USEPA) and U.S. Army Corps of Engineers (USACE) as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Wetlands generally include “swamps, marshes, bogs, and similar areas.”

3.1.1 Regulatory Setting

The CWA establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES) program, on the amounts of specific pollutants that can be discharged into surface waters to restore and maintain the chemical, physical, and biological integrity of the water. The NPDES program regulates the discharge of point (i.e., end of pipe) and nonpoint sources (i.e., stormwater) of water pollution.

Wetlands are regulated by the USACE under Section 404 of the CWA as a subset of all “Waters of the United States.” Waters of the United States are defined as (1) traditional navigable waters, (2) wetlands adjacent to navigable waters, (3) non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow perennially or have continuous flow at least seasonally (e.g., typically 3 months), and (4) wetlands that directly abut such tributaries under Section 404 of the CWA, as amended, and are regulated by USEPA and the USACE. The CWA requires that states establish a Section 303(d) list to identify impaired waters and establish TMDLs for the sources causing the impairment.

EO 11990, *Protection of Wetlands*, requires that federal agencies adopt a policy to avoid, to the extent possible, long- and short-term adverse impacts associated with destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative.

3.1.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under water quality resources at JBPHH.

3.1.2.1 Surface Water

Surface Waters are described in greater detail in Sections 4.2.6, 5.2.6, 6.2.6, and 7.2.6 of the JBPHH INRMP.

Main Base and Surrounding Areas

Pearl Harbor is the largest estuary, a coastal area where fresh water from rivers and streams mix with salt water from the ocean, in Hawaii. Six perennial (year-round) streams: Waikele, Waiawa, Waiau, Waimalu, Kalauao, Hālawā; and two intermittent (periodic) streams: Honouliuli and ‘Aiea, flow into Pearl Harbor (Gonzalez et al., 2021). Additionally there is the E’o waterway, an artificially constructed stream outlet formed by dredging and draining the former Loko E’o fishpond.

Lualualei Annex

There is one perennial stream located in Lualualei, Pūhāwai Stream, which is located on the north-central portion of NAVMAG PH Lualualei. There were once streams in all five of the smaller valleys within Lualualei Valley; however, many of these streams have since disappeared or are now intermittent due to water diversions for agriculture and urban use (DON, 2001). After passing through the study area, all streams empty into the Pacific Ocean. There are no natural or permanent freshwater lakes, streams, or wetlands at Lualualei.

Wahiawā Annex

Wahiawā Annex is located on the upper reaches of a sloping plateau. Two branches of Poamoho Stream, contained in deep forested gulches, dissect the plateau. The largest gulch within the installation is a tributary of Poamoho Stream about 50 feet (15 meters) deep. At Camp Stover, Waieli Stream is located immediately west of the housing community and Waikakalaua Stream is located approximately 0.25 mile to the southeast. There is no surface water present at Opana.

Kalaeloa

There are no surface waters present at Kalaeloa.

3.1.2.2 Wetlands

Wetlands are discussed in greater detail in Sections 1.3.1, 5.3.1, 6.3.1, and 7.3.1 of the JBPHH INRMP.

Main Base and Surrounding Areas

Pearl Harbor is bordered by a variety of wetlands, including grassy marshes and woody (often red mangrove [*Rhizophora mangle*]) swamps. Table 4-5 of the INRMP lists wetlands within the Main Base and Surrounding Areas. These include coastal as well as stream and other inland wetland communities.

Lualualei Annex

There are three National Wetland Inventory-classified wetland areas in the Lualualei Valley: Mā'ili'ili Stream, the northern unnamed tributary to Mā'ili'ili Stream, and channeled Ulehawa Stream in the southern part of the Station. Mā'ili'ili Stream and its unnamed northern tributary are classified as riverine system, intermittent subsystem, streambed class, seasonal, non-tidal. The channeled Ulehawa Stream is classified as a riverine system, intermittent subsystem, streambed class, seasonal; non-tidal, excavated (DON, 2001).

Wahiawā Annex

There are no jurisdictional wetlands within the Wahiawā Annex.

Kalaeloa

There are no jurisdictional wetlands on the DON-retained lands at Kalaeloa.

3.1.3 Environmental Consequences

In this EA, the analysis of water resources looks at the potential impacts on surface waters and wetlands. The analysis of surface water quality considers the potential for impacts that may change the water quality, including both improvements and degradation of current water quality. Marine waters analysis includes potential changes to physical and chemical characteristics. The impact assessment of wetlands considers the potential for impacts that may change the local hydrology, soils, or vegetation that support a wetland. The analysis of shorelines considers if the Proposed Action will affect shoreline ecological functions such as channel movement and hydrological systems, flooding or storm surge areas, areas of erosion and sedimentation, water quality and temperature, presence of nutrients and pathogens, and sites with the potential for protection or restoration.

3.1.3.1 No Action Alternative

Under the No Action Alternative, the Navy would not implement the updated JBPHH INRMP and there would be no change to the management of water resources. Though the benefits to water resources described in Section 3.1.3.2 would not occur, no significant impacts to existing water resources would occur with implementation of the No Action Alternative.

3.1.3.2 JBPHH INRMP (Preferred Alternative) Potential Impacts

The study area for the analysis of effects to water resources associated with the Preferred Alternative includes the lands and waters of JBPHH that are owned or leased by the Navy.

The Preferred Alternative would be expected to result in benefits to water resources. Wetland delineation and restoration measures, including removal and control of non-native mangroves, would result in beneficial effects to wetlands and surface water quality. Establishing oyster reefs and controlling invasive algae would also result in improvements to surface water quality in the marine environment. **Table 3.1-1** provides a summary of the expected effects of those INRMP activities with the potential to affect water resources. The most current best management practices (BMPs) would be used when implementing these and other INRMP projects in order to prevent negative effects to water quality. Therefore, implementation of the Preferred Alternative would not result in significant impacts to water resources.

3.1.3.3 Cumulative Effects with Other Reasonably Foreseeable Actions

CEQ regulations (40 CFR 1502.16) require that the environmental consequences of the Proposed Action consider cumulative impacts, which are effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Cumulative impacts are most likely to arise when a relationship or synergism exists between a proposed action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in close proximity to the proposed action would be expected to have more potential for a relationship than those more geographically separated. Similarly, relatively concurrent actions would tend to offer a higher potential for cumulative impacts. To identify cumulative impacts, the analysis needs to address the following three fundamental questions.

Other reasonably foreseeable planned actions relevant to cumulative effects on water resources are provided in **Table 3.1-2** along with their anticipated effect. The proposed INRMP activities are expected to have positive impacts to wetlands and water quality and would contribute positively to cumulative impacts to these JBPHH water resources.

Table 3.1-1 INRMP Activities with Potential to Impact Water Resources

<i>Project</i>	<i>Impacts to Water Resources</i>
Āhua Wetland Restoration	Positive impacts to wetlands and surface water quality through restoration
JBPHH Marine Debris Reduction	Positive impacts to surface water quality
Conservation Law Enforcement Program	Potential positive impacts to surface water quality resulting from enforcement of water quality protections
JBPHH – NRTF Niuli’i Ponds Waterbird Habitat Management	Positive impacts to wetlands and water quality as a result of managing native habitat
Species Mangrove and Pickleweed Removal	Positive impacts to wetlands and water quality as a result of managing invasive species
Āhua Reef volunteer events	Potential positive effects to water quality and wetlands resulting from education and outreach as well as clean up and restoration activities
Biodiversity in Stream Mouths	Monitoring and managing for biodiverse native communities have the potential to have positive effects on wetlands and surface water quality as restoration occurs
Fishpond Restoration	Habitat restoration has the potential to positively affect water quality
Pearl Harbor Water Quality Remediation Using Oysters	Positive impacts to water quality are expected to result from remediation using oysters
Conservation Enforcement Education for Security	Potential positive impacts to surface water quality resulting from enforcement of water quality protections
Early coordination for EFH	Potential positive effects from effective coordination and protection of EFH
Establish a mitigation bank account for future impacts to ESA and EFH	Potential positive impacts to wetlands and water quality as a result of increased habitat
Establish a programmatic consultation and agreed upon BMPs for in-water work and trainings with NMFS, USACE, and SOH	Positive impacts to water quality and wetlands resulting from development of consistent and effective practices to mitigate and minimize impacts
Establish a project which controls sediment impacts at the Hawaii Air National Guard parking lot	Positive impacts to surface water quality from reduced runoff of sediments
Establish unused areas that do not and will not impact the mission, in JBPHH that will permanently serve, protect, and sustain EFH and ESA-listed species	Potential positive impacts to wetlands and water quality as a result of habitat protection
Increase the priority of Conservation Enforcement	Potential positive impacts to surface water quality resulting from enforcement of water quality protections
Invasive Algae Control	Positive effects on water quality and wetlands resulting from control of invasive algae which can outcompete and shade native species
Outreach program with DAR/MWR/Security	Potential positive effects to water quality and wetlands resulting from education and outreach
Wetland delineation	Formally delineating wetlands would provide protection of the resource

Legend: BMP = Best Management Practice; DAR = Division of Aquatic Resources; EFH = Essential Fish Habitat; ESA = Endangered Species Act; JBPHH = Joint Base Pearl Harbor-Hickam; MWR = Moral Welfare and Recreation; NMFS = National Marine Fisheries Service; NRTF = Naval Radio Transmitter Facility; SOH = State of Hawaii; USACE = United States Army Corps of Engineers

Table 3.1-2 Reasonably Foreseeable Actions that May Contribute to Effects on Water Resources

<i>Activity/Project</i>	<i>Sponsor</i>	<i>Description</i>	<i>Scope</i>	<i>Effect</i>
Ongoing installation infrastructure, operations, maintenance, and construction activities	Navy			Depending on the activity and mitigation measures implemented, could result in positive or short-term negative impacts to surface water. Negative impacts would be mitigated by the use of best management practices protective of water resources and designed for each project
Environmental Restoration Plan	Navy	A comprehensive plan containing recommendations for restoration of contaminated sites	Ongoing	Potential positive impact to water resources
Wind Energy Development	Various	Offshore wind projects for federal waters around Oahu	Proposed	Potential negative impacts to marine waters could result from accidental spills of fuel or similar hazardous materials during installation, maintenance and operation
Commercial Fishing	Various	Major fisheries in Hawaiian waters targeted by various entities	Ongoing	Potential negative impacts to marine waters could result from accidental spills of fuel
Maritime Traffic	Various	Ten harbors are located on the six Hawaiian Islands and serve cargo, passenger, and fishing industries	Ongoing	Potential negative impacts to marine waters could result from accidental spills of fuel

3.2 Biological Resources

Biological resources include living, native, or naturalized plant and animal species and the habitats within which they occur. Plant associations are referred to generally as vegetation, and animal species are referred to generally as wildlife. Habitat can be defined as the resources and conditions present in an area that support a plant or animal.

Within this EA, biological resources are divided into four major categories: (1) terrestrial vegetation, (2) terrestrial wildlife, (3) marine vegetation, and (4) marine wildlife. Threatened, endangered, and other special-status species are discussed in their respective categories.

3.2.1 Regulatory Setting

Special-status species, for the purposes of this assessment, are those species listed as threatened or endangered under the ESA and species afforded federal protection under the Marine Mammal Protection Act (MMPA) or the Migratory Bird Treaty Act (MBTA).

The purpose of the ESA is to conserve the ecosystems upon which threatened and endangered species depend and to conserve and recover listed species. Section 7 of the ESA requires federal action proponents to consult with the USFWS or NOAA Fisheries to ensure that their actions are not likely to jeopardize the continued existence of federally-listed threatened and endangered species or result in the destruction or adverse modification of designated critical habitat. Critical habitat cannot be designated on any areas owned, controlled, or designated for use by the DoD where an INRMP has been developed that, as determined by the Department of Interior or Department of Commerce Secretary, provides a benefit to the species subject to critical habitat designation.

All marine mammals are protected under the provisions of the MMPA. The MMPA prohibits any person or vessel from “taking” marine mammals in the U.S. or the high seas without authorization. The MMPA defines “take” to mean “to harass, hunt, capture, or kill or attempt to harass, hunt, capture, or kill any marine mammal.”

Birds, both migratory and most native-resident bird species, are protected under the MBTA, and their conservation by federal agencies is mandated by EO 13186 (Migratory Bird Conservation). Under the MBTA, it is unlawful by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, [or] possess migratory birds or their nests or eggs at any time, unless permitted by regulation. The 2003 National Defense Authorization Act gave the Secretary of the Interior authority to prescribe regulations to exempt the Armed Forces from the incidental taking of migratory birds during authorized military readiness activities. The final rule authorizing the DoD to take migratory birds in such cases includes a requirement for the Armed Forces to confer with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate adverse effects if an action would have a significant negative effect on the sustainability of a population of a migratory bird species.

The MSFCMA of 1976 requires federal agencies must consult with the NMFS for activities that may adversely affect Essential Fish Habitat (EFH) that is designated in a federal Fisheries Management Plan. EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.”

3.2.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under biological resources at JBPHH. Threatened and endangered species are discussed in each respective section below with a composite list applicable to the Proposed Action provided in **Table 3.2-1**.

3.2.2.1 Terrestrial Vegetation

Vegetation includes terrestrial plant as well as freshwater aquatic communities and constituent plant species. Terrestrial flora is discussed in greater detail in Sections 4.3.3.1, 5.3.3.1, 6.3.3.1, and 7.3.3.1 of the JBPHH INRMP.

Main Base and Surrounding Areas

There are no ESA- or SOH-listed plant species or designated critical habitat at JBPHH Main Base and Surrounding Areas.

Appendix J-2 of the 2023 JBPHH INRMP contains a list of the known terrestrial flora of the Main Base and Surrounding Areas. The majority of JBPHH Main Base is developed and has relatively little unmanaged vegetation. Most of the vegetation within JBPHH Main Base is managed grass and planted trees. Unmanaged vegetation is mostly found in the western portion (e.g., Waipi'o and West Loch) of JBPHH Main Base and includes sparse kiawe (*Prosopis pallida* and *P. juliflora*) scrub with a dense understory of buffelgrass (*Cenchrus ciliaris*), pickleweed (*Salicornia* spp.) flats, and red mangrove (*Rhizophora mangle*). Four native flora species (wiliwili [*Erythrina sandwicensis*], mā'o [*Gossypium tomentosum*], koki'o ke'oke'o [*Hibiscus arnottianus*], and 'ākia [*Wikstroemia uva-ursi*]) have been observed.

The Pearl Harbor Shoreline is dominated by non-native plant species. The non-native mangrove community is the dominant vegetation type. Mangroves occur in relatively sheltered, shallow water along the undeveloped portions of Pearl Harbor. Pickleweed marsh is found in low-lying areas behind the mangrove. Kiawe forest occurs inland of the mangrove community in some areas, mixed with 'opiuma (*Pithcellobium dulce*), monkeypod (*Samanea saman*), milo (*Thespesia populnea*), and coconut palm (*Cocos nucifera*). In addition, shrubs of koa haole (*Leucaena leucocephala*), Christmas berry (*Schinus terebinthifolius*), and Indian fleabane (*Pluchea indica*) are common to abundant (Char, 2000).

Lualualei Annex

Lualualei Annex native terrestrial ecosystems include areas transformed by human activity; lowland dry shrubland and grassland and mesic forest; woodland; and shrubland (Juvik et al., 1998). Botanical surveys were completed in 1998 and 2004 (NAVFAC Pacific, 1998; Char, 2004). A list of all naturally occurring (non-landscaped) terrestrial flora species at JBPHH Lualualei Annex is provided in Appendix K-1 of the 2023 JBPHH INRMP.

There are 53 ESA-listed endangered plant species and 9 SOH-listed plant species with potential to occur at NAVMAG PH Lualualei and NRTF Lualualei. No designated critical habitat is present. Table 5-3 of the JBPHH INRMP lists the plant species potentially occurring across all DON-owned lands at JBPHH Lualualei Annex; of these species, only three occur at NRTF Lualualei and the remaining 59 species occur or have the potential to occur at NAVMAG PH Lualualei.

Wahiawā Annex

There are no designated critical habitat, ESA, or SOH-listed threatened or endangered plant species known to occur within the JBPHH Wahiawā Annex.

Three hundred twenty-seven plant species have been recorded at the Wahiawā Annex from surveys conducted in 1986, 2004, and 2015 (DON, 2001; Hawaii Natural Heritage Program, 2004; AECOM 2016). Appendix L-1 of the 2023 JPPHH INRMP contains a complete species list. The 2015 survey found 16 native indigenous species (indigenous species are those native to an area) and 6 native endemic species

(endemic species are those found only in a defined geographic location), the remainder were introduced intentionally or accidentally after European contact.

Kalaeloa

There are no designated critical habitat, ESA, or SOH-listed plant species known to occur within the Kalaeloa DON lands. Although critical habitat has been designated in the vicinity of the study area for multiple plant species, the study area does not overlap the critical habitat boundaries.

The DON-retained lands at Kalaeloa have been previously developed and disturbed. Plant species found within Kalaeloa consist mostly of introduced species typically found within urban landscaped areas with some kiawe forest/scrub with pockets of coastal strand and ironwood forest. Appendix M-1 of the 2023 JBPHH INRMP contains a complete species list.

3.2.2.2 Terrestrial Wildlife

Wildlife includes all animal species (i.e., insects and other invertebrates, freshwater fish, amphibians, reptiles, birds, and mammals) focusing on the species and habitat features of greatest importance or interest. Terrestrial fauna is discussed in greater detail in Sections 4.3.3.2, 5.3.3.2, 6.3.3.2, and 7.3.3.2 of the JBPHH INRMP.

Main Base and Surrounding Areas

There are eight bird and one bat species listed as federally threatened or endangered (also listed by the SOH) and two additional bird species listed by the SOH. These are listed in Table 4-8 of the JBPHH INRMP and described in the paragraphs that follow. No designated critical habitat is present.

A list of terrestrial fauna species known to occur or with potential to occur within the study area is included in Appendix J-3 of the JBPHH INRMP. There are no native amphibian or reptile species present within JBPHH; limited surveys have detected three introduced gecko species. Numerous bird species occur at the Main Base. With the exception of the endangered Hawaiian hoary bat, all terrestrial mammals on Oahu are non-native species. Appendix J-3 of the 2023 JBPHH INRMP contains a list of the terrestrial fauna of the Main Base and Surrounding Areas.

Lualualei Annex

Eighteen threatened and endangered species occur or have the potential to occur at Lualualei, including 1 mammal, 2 mollusks, 3 insects, and 12 birds (Table 5-4 of the JBPHH INRMP). Critical habitat has also been designated within the Annex for the endangered Oahu 'elepaio.

Other common terrestrial animals include a variety of bird and invertebrate species as well as introduced amphibians, reptiles, and mammals. A list of terrestrial fauna species known to occur or with potential to occur within the study area is included in Appendix K-4 of the 2023 JBPHH INRMP.

Wahiawā Annex

The federally endangered Hawaiian hoary bat occurs at Wahiawā and has potential to occur at Camp Stover Housing Community and Opana. Several ESA-listed bird species have potential to fly over the study area from suitable nesting habitat in the Ko'olau and Wai'anae Mountains to the ocean but are not known to inhabit Wahiawā, Camp Stover Housing Community, or Opana. No designated critical habitat is present.

Natural resources surveys have not been conducted for the Camp Stover Housing Community or Opana. Additionally, no amphibian and reptile species or invertebrate species surveys have been conducted within the Wahiawā Annex. A total of 1,073 birds and 26 species were recorded during point count surveys conducted at Wahiawā. A list of terrestrial fauna species known to occur or with potential to occur within the study area is included in Appendix L-2 of the JBPHH INRMP. In addition to Hawaiian hoary bat, introduced mammals including Indian mongoose (*Urva edwardsii*), feral cats, feral dogs, and feral pigs have been observed at the Annex and it is likely that rat species including brown rat (*Rattus norvegicus*), roof rat (*Rattus rattus*), and Polynesian rat (*Rattus exulans*) species are also present.

Kalaeloa

Nine federally threatened and endangered species are known to occur at Kalaeloa (one mammal, one insect, and seven birds). The species are also listed by the SOH as is one other bird species. No designated critical habitat is present. Table 7-3 of the 2023 JBPHH INRMP lists these species, which are described in the paragraphs that follow.

No amphibian, reptile, and invertebrate surveys have been conducted within the DON-managed lands at Kalaeloa. Birds are the dominant wildlife within the Kalaeloa Annex. Several non-native mammals are known to occur including mongoose, cat, and rodent species. A list of terrestrial fauna species known to occur or with potential to occur within the study area is included in Appendix M-2 of the 2023 JBPHH INRMP.

3.2.2.3 Marine Vegetation

Marine vegetation includes plants occurring in marine or estuarine waters. These may include mangroves, algae, and various grasses. Of the DON-managed areas covered by the 2023 JBPHH INRMP, only the Main Base and Surrounding Areas include marine and estuarine waters. Marine flora are discussed in Section 4.4.4 of the 2023 JBPHH INRMP. Marine vegetation observed within Pearl Harbor includes algae (crustose coralline algae, turf algae, cyanobacteria, and macroalgae), mangrove, and seagrass.

3.2.2.4 Marine Wildlife

Marine wildlife includes the animals that occur in marine or estuarine waters including mammals, reptiles, fish, and invertebrates (including coral). Of the DON-managed areas covered by the 2023 JBPHH INRMP, only the Main Base and Surrounding Areas include marine and estuarine waters. Marine fauna species are discussed in Section 4.4.4, 4.4.5, 4.4.6, 4.4.7, and 4.4.8 of the 2023 JBPHH INRMP and Appendix J-7 contains a list of marine species of the Main Base and Surrounding Areas.

Marine Mammals

All marine mammals are protected under the MMPA. Jurisdiction over marine mammals is maintained by NMFS and the USFWS. NMFS maintains jurisdiction over whales, dolphins, porpoises, seals, and sea lions. The USFWS maintains jurisdiction for certain other marine mammal species, including walrus (*Odobenus rosmarus*), polar bears (*Ursus maritimus*), dugongs (*Dugong dugon*), sea otters (*Enhydra lutris*), and manatees (*Trichechus manatus*). No critical habitat has been designated for ESA-listed marine mammals in Pearl Harbor. Species descriptions are provided in Section 4.4.8.6 of the 2023 JBPHH INRMP.

There is one federally-listed marine mammal that has been observed in Hawaiian waters at Pearl Harbor, the endangered Hawaiian monk seal or ʻīlio holoikauaʻua (*Neomonachus schauinslandi*). The endangered humpback whale (*Megaptera novaeangliae*) or koholā is not federally-listed in Hawaii but is protected under the MMPA and has been seen on occasion in Pearl Harbor. One additional federally-listed species has been observed outside Pearl Harbor, within the Nearshore Training Areas, Main Hawaiian Islands insular false killer whale (*Pseudorca crassidens*) distinct population segment. In addition, the spinner dolphin (*Stenella longirostris*), a State of Hawaii Species of Greatest Conservation Need (SGCN), has also been observed within the Nearshore Training Areas.

Five additional federally endangered whale species have the potential to occur but have not been observed in Pearl Harbor. These include the sei whale (*Balaenoptera borealis*), fin whale (*Balaenoptera physalus*), blue whale or koholā polū (*Balaenoptera musculus*), and the sperm whale or koholā kēpama (*Physeter macrocephalus*).

Sea Turtles

The USFWS and NMFS share federal jurisdiction for sea turtles. The USFWS is responsible for the conservation actions on land such as at nesting and basking beaches, and NMFS is responsible for conservation in the marine environment. Two sea turtle species have been documented in Pearl Harbor, the federally threatened green sea turtle (*Chelonia mydas*) and the federally endangered hawksbill turtle (*Eretmochelys imbricata*). Three other species of sea turtles have the potential to occur but have not been observed within Pearl Harbor. These include the loggerhead turtle (*Caretta caretta*), the Olive Ridley turtle (*Lepidochelys olivacea*), and the leatherback turtle (*Dermochelys coriacea*). No critical habitat has been established for sea turtles within Pearl Harbor. Species descriptions are provided in Section 4.4.8.5 of in the 2023 JBPHH INRMP.

Fish

Fish are vital components of the marine ecosystem. They have great ecological and economic value. To protect this resource, NOAA Fisheries works with the regional fishery management councils to identify the essential habitat for every life stage of each federally managed species using the best available scientific information. Essential fish habitat has been described for approximately 1,000 managed species to date. Essential fish habitat includes all types of aquatic habitat including wetlands, coral reefs, seagrasses, and rivers; all locations where fish spawn, breed, feed, or grow to maturity.

Of the species of fish that have been observed in Pearl Harbor, none are ESA- or SOH-listed, and four are SGCN. These include the giant trevally (*Caranx ignobilis*), the Hawaiian anchovy or nehu (*Encrasicholina purpurea*), Hawaiian flagtail or āholehole (*Kuhlia xenura*), and the goby or 'o'opu (*Oxyurichys longhotus*). Species descriptions are provided in Section 4.4.8.4 of the 2023 JBPHH INRMP.

Coral

Corals are invertebrates that are related to anemones, jellyfish, and hydras. They are made of invertebrate polyps and can generally be categorized as either hard or soft. Hard corals have calcium carbonate skeletons, grow in colonies, and are reef-building animals that live in symbiosis with phytoplankton called zooxanthellae. Soft corals are flexible, have calcareous particles in their body walls for structural support, can be found in both tropical and cold ocean waters, do not grow in colonies or build reefs, and do not always contain zooxanthellae.

There are no federally-listed corals in Hawaii. Sixteen coral species found within Pearl Harbor are considered SGCN (see Table 4-15 of the 2023 JBPHH INRMP).

Non-Coral Invertebrates

Animals that live on the sea floor are called benthos. Most of these animals lack a backbone and are called invertebrates. Typical benthic invertebrates include sea anemones, sponges, corals, sea stars, sea urchins, worms, bivalves, crabs, and many more.

No ESA- or SOH-listed non-coral invertebrate species have been observed within Pearl Harbor. Three non-coral invertebrate species have the potential to occur in Pearl Harbor are considered SGCN (see Table 4-15 of the 2023 JBPHH INRMP). These species include the black nerite (*Nerita picea*), octopus (*Octopus cyanea*), and the black-lipped pearl oyster (*Pinctada margaritifera*).

3.2.3 Environmental Consequences

This analysis focuses on wildlife or vegetation that are important to the function of the ecosystem or are protected under federal or state law or statute.

3.2.3.1 No Action Alternative

Under the No Action Alternative, the Navy would not implement the 2023 JBPHH INRMP and there would be no change to the management of biological resources. Though the benefits to biological resources described in Section 3.2.3.2 would not occur, no significant impacts to existing biological resources would occur with implementation of the No Action Alternative.

3.2.3.2 JBPHH INRMP (Preferred Alternative) Potential Impacts

The study area includes the lands and waters of JBPHH that are owned or leased by the Navy and that would be affected by implementing the 2023 JBPHH INRMP activities.

The Preferred Alternative would result in benefits to biological resources. Species surveys and monitoring would add to knowledge of species distribution and abundance, ultimately aiding conservation efforts. Control of predators (including rodents, ungulates, and feral animals) and control of invasive and non-native species would reduce mortality and competition with species that can outcompete native species for resources. Habitat improvements, including debris reduction in the marine environment, revegetation with native plants, wetland restoration, and oyster reef restoration benefit native terrestrial and marine flora and fauna by providing the native habitats species require. Activities that result in education and outreach to the public, law enforcement, and recreation personnel would increase stewardship of biological resources. Developing BMPs with the USFWS would streamline consultation processes, allowing for timely implementation of measures that would protect threatened and endangered terrestrial and marine species. Marine and aquatic species would also benefit from improved water quality that would result from many INRMP activities.

Table 3.2-2 provides an overview of those INRMP activities with the potential to positively affect terrestrial and marine biological resources. Given the purpose and conservation goals of these projects, no negative impacts are expected. Additionally, the use of the most current management practices in implementing these and other INRMP projects would prevent negative effects to biological resources. There would be no significant impact on threatened and endangered species. No formal consultation between the U.S. Navy and USFWS or NOAA Fisheries would be required. Therefore, implementation of the Preferred Alternative would not result in significant impacts to biological resources.

Table 3.2-2 2023 JBPHH INRMP Activities with Potential to Impact Biological Resources

<i>Project</i>	<i>Terrestrial Biological Resources</i>	<i>Marine Biological Resources</i>
JBPHH Predator/Feral Animal Control	Yes	Yes
JBPHH Flora/Fauna Surveys (Lualualei Pueo Survey, Lualualei Arthropod Survey, JBPHH Field Biology Support, Management of Black Twig Borer)	Yes	No
Āhua Wetland Restoration	No	Yes
JBPHH Protected Bird Species Surveys	Yes	No
JBPHH Hawaiian Bat Acoustic Surveys	Yes	No
JBPHH Hawaiian Waterbird Monitoring	Yes	No
JBPHH Marine Debris Reduction	No	Yes
JBPHH - Flora Fauna Surveys	Yes	No
JBPHH Control of Invasive Plants	Yes	No
JBPHH Revegetation with Native Plants	Yes	No
JBPHH – Endangered Plant Species Rodent Control	Yes	No
JBPHH – ESA-listed Species Predator/Feral Animal Control	Yes	No
JBPHH – ESA-listed Species Mangrove and Pickleweed Removal	No	Yes
JBPHH Lualualei Endangered Plant Species Outplanting	Yes	No
JBPHH Lualualei Ungulate Fencing	Yes	No
JBPHH Lualualei Endangered Plant and Snail Management	Yes	No
Coconut Rhinoceros Beetle Monitoring and Management	Yes	No
JBPHH Conservation Law Enforcement	Yes	Yes
JBPHH – Lualualei Wildland Fire Management Plan	Yes	No
JBPHH Signage for ESA-listed Species	Yes	Yes
JBPHH Marine Resources and Fisheries Surveys	No	Yes
JBPHH GIS Data Management	Yes	Yes
JBPHH – Feral Ungulate (Pig) Control	Yes	No
JBPHH Invasive Species Early Detection Roadside Surveys	Yes	No
JBPHH Management Actions for Protected Species During Training	Yes	Yes
JBPHH Biosecurity Management	Yes	Yes
JBPHH – NRTF Niuli’i Ponds Waterbird Habitat Management	Yes	No
BASH	Yes	No
Āhua Reef volunteer events	No	Yes
Arthropod Surveys in Lualualei	Yes	No
Biodiversity in Stream Mouths	Yes	No
Fishpond Restoration	Yes	No
Earth Day Events	Yes	Yes
‘Elepaio surveys in Lualualei	Yes	No
Hawaiian Monk Seal Haul out locations	No	Yes
Native Hawaiian Plant Nursery	Yes	No
Native Oyster Restoration	No	Yes
Sea turtle presence/absence and use of Pearl Harbor	No	Yes
Sea turtle stranding data	No	Yes
Shearwater fallout Emergency line/pickup and drop off to rehabilitation centers	Yes	No
Whale presence in Pearl Harbor	No	Yes
Working Group and Committee Participation	Yes	Yes

<i>Project</i>	<i>Terrestrial Biological Resources</i>	<i>Marine Biological Resources</i>
Combine terrestrial ecosystem restoration with cleanup projects from EV1	Yes	Yes
Conservation Enforcement Education for Security	Yes	Yes
Development of waterbird management plan informed by data from waterbird tracking study	Yes	No
Early coordination for EFH	No	Yes
Eradicate alien invasive species that are established in Pearl Harbor (i.e., <i>Xenia</i> spp., <i>Gracilaria salicornia</i>)	No	Yes
Establish a mitigation bank account for future impacts to ESA and EFH	Yes	Yes
Establish a programmatic consultation and agreed upon BMPs for in-water work and trainings with NMFS, USACE, and SOH	No	Yes
Establish a project which controls sediment impacts at the Hawaii Air National Guard parking lot	No	Yes
Establish speed limits in areas with heavy Green Sea Turtle presence	No	Yes
Establish unused areas that do not and will not impact the mission, in JBPHH that will permanently serve, protect, and sustain EFH and ESA-listed species	Yes	Yes
Increase the priority of Conservation Enforcement	Yes	Yes
Invasive Algae Control	No	Yes
Nest mortality study for Silts & Coots identifying causes & mortality rates	Yes	No
Outreach program with DAR/MWR/Security	Yes	Yes
White tern monitoring and mapping	Yes	No
Implement wildlife friendly lighting practices	Yes	Yes
Hawaiian hoary bat fence line monitoring	Yes	No
Marine species assessment and monitoring	Yes	Yes
Wetland delineation	Yes	Yes
Creel Survey	No	Yes
Wildland Fire Management	Yes	No

Legend: BASH = Bird/Wildlife Aircraft Strike Hazard; DAR = Division of Aquatic Resources; EFH = Essential Fish Habitat; HESA = Endangered Species Act; GIS = Geographic Information System; JBPHH = Joint Base Pearl Harbor-Hickam; MWR = Morale Welfare and Recreation; NMFS = National Marine Fisheries Service; NRTF = Naval Radio Transmitter Facility; SOH = State of Hawaii; USACE = United States Army Corps of Engineers

3.2.3.3 Cumulative Effects with Other Reasonably Foreseeable Actions

Other reasonably foreseeable planned actions relevant to cumulative effects on biological resources are provided in **Table 3.2-3** along with their anticipated effect. The proposed INRMP activities are expected to have positive impacts to biological resources and would contribute positively to cumulative impacts to these JBPHH biological resources.

Table 3.2-3 Reasonably Foreseeable Actions that May Contribute to Effects on Biological Resources

<i>Activity/Project</i>	<i>Sponsor</i>	<i>Description</i>	<i>Scope</i>	<i>Effect</i>
Ongoing installation infrastructure, operations, maintenance and construction activities	Navy			Depending on the activity, could result in positive or short-term negative impacts to biological resources
State Wildlife Action Plan	Hawai'i Department of Land and Natural Resources	Addresses threats and conservation needs of native flora and fauna	Ongoing	Positive impact to biological resources
Biosecurity Plan for Micronesia and Hawai'i	Navy	Recommends actions for addressing threats from non-native and invasive species	Ongoing	Positive impacts to native flora and fauna
Hawaiian Bird Conservation Action Plan	USFWS, Pacific Rim Conservation	Identifies threats, needs and conservation goals for Hawaiian birds in need of conservation	Ongoing	Positive Impacts to native birds
Commercial Wind Energy Development	Various	Offshore wind projects for federal waters around O'ahu	Proposed	Potential impacts to marine species during installation. Possible effects to birds and marine species during operation
Commercial Fishing Activities	Various	Major fisheries in Hawaiian waters targeted by various entities	Ongoing	Potential negative impacts to marine wildlife
Maritime Traffic	Various	Ten harbors are located on the six Hawaiian Islands and serve cargo, passenger, and fishing industries	Ongoing	Potential negative impacts to marine flora and fauna

4 Other Considerations Required by NEPA

In accordance with 40 CFR Section 1502.16(c), analysis of environmental consequences shall include discussion of possible conflicts between the Proposed Action and the objectives of federal, regional, state and local land use plans, policies, and controls. **Table 4.1-1** identifies the principal federal and state laws and regulations that are applicable to the Proposed Action and describes briefly how compliance with these laws and regulations would be accomplished.

Table 4.1-1 Principal Federal and State Laws Applicable to the Proposed Action

<i>Federal, State, Local, and Regional Land Use Plans, Policies, and Controls</i>	<i>Status of Compliance</i>
NEPA; CEQ NEPA implementing regulations; Navy procedures for Implementing NEPA	Preparation of this EA has been conducted in compliance with NEPA and in accordance with CEQ regulations and the Navy’s NEPA procedures.
CAA	The Hawaii Air Quality Control Region where the proposed activities are located, is not classified as a nonattainment or maintenance area for any criteria pollutant, therefore the General Conformity Rule does not apply. Implementing the INRMP would not change air quality status. A CAA conformity determination is not required.
CWA; Rivers and Harbors Act	Implementing the INRMP would not require permits or authorizations under the CWA. If management actions have the potential to affect navigable waters and waters of the U.S., the Navy would obtain any required permits and authorizations as required.
Coastal Zone Management Act	Adopting the INRMP will comply with requirements under the Coastal Zone Management Act. If management actions have the potential to affect the coastal zone, the Navy would submit consistency determinations to the SOH as required.
NHPA	The INRMP does not propose actions that would adversely affect historic properties, buildings, structures, landscape, or land use patterns.
ESA	The Navy developed the INRMP cooperatively with the USFWS and the NOAA NMFS, determining that the Proposed Action would not adversely affect any federally threatened, sensitive, or endangered species. If management actions have the potential to affect species protected by ESA, the Navy would consult with the USFWS and NMFS as appropriate.
MSFCMA	Adopting and implementing the INRMP would not adversely affect marine fisheries and may provide benefit to some marine species. If management actions have the potential to affect species protected by ESA, the Navy would conduct any consultations required under the MSFCMA.
MMPA	Adopting and implementing the INRMP would likely benefit marine mammals through additional monitoring and data collection and other projects.
MBTA	Adopting and implementing the INRMP would not adversely affect migratory birds and would provide benefit to some species.
Comprehensive Environmental Response and Liability Act	Adopting and implementing the INRMP would not affect the Navy’s monitoring and restoration activities.
Resource Conservation and Recovery Act	Adopting and implementing the INRMP would not affect the Navy’s management of hazardous substances.

<i>Federal, State, Local, and Regional Land Use Plans, Policies, and Controls</i>	<i>Status of Compliance</i>
EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations	The activities proposed in the INRMP would have no adverse human health or environmental effects and therefore would not have disproportionately high and adverse effects to minority or low-income populations.
EO 13045, Protection of Children from Environmental Health Risks and Safety Risks	The Proposed Action would not cause environmental health risks or safety risks including any that would disproportionately affect children.

Legend: CAA = Clean Air Act; CEQ = Council on Environmental Quality; CWA = Clean Water Act; EA = Environmental Assessment; EO = Executive Order; ESA = Endangered Species Act; INRMP = Integrated Natural Resources Management Plan; MBTA = Migratory Bird Treaty Act; MMPA = Marine Mammal Protection Act; MSFCMA = Magnuson-Stevens Fishery Conservation and Management Act; NEPA = National Environmental Policy Act; NHPA = National Historic Preservation Act; NMFS = National Marine Fisheries Service; NOAA = National Oceanic and Atmospheric Administration; SOH = State of Hawaii; U.S. = United States; USFWS = United States Fish and Wildlife Service

4.1 Irreversible or Irrecoverable Commitments of Resources

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of non-renewable resources such as metal and fuel, and natural or cultural resources. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered an irretrievable resource. Another impact that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

Implementation of the Proposed Action would involve human labor and the consumption of fuel, oil, and lubricants for vehicles used to implement the natural resources activities. Implementing the Proposed Action would not result in significant irreversible or irretrievable commitment of resources.

4.2 Unavoidable Adverse Impacts

This EA has determined that the alternatives considered would not result in any significant impacts. No unavoidable adverse effects are expected to occur from implementation of the 2023 JBPHH INRMP.

4.3 Relationship between Short-Term Use of the Environment and Long-Term Productivity

NEPA requires an analysis of the relationship between a project’s short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development site reduces future flexibility in pursuing other options, or that using a parcel of land or other resources often eliminates the possibility of other uses at that site.

The Proposed Action would be beneficial, it would not adversely affect the long-term natural resource productivity of the area, or permanently narrow the range of beneficial uses of the environment. Implementing the 2023 JBPHH INRMP would enhance natural resources management and JBPHH in keeping with the intent of the Sikes Act and would maintain the environment in support of the military mission.

5 References

- AECOM. (2016). Botanical surveys of U.S. Navy properties in support of an integrated natural resources management plan at Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i. Prepared by AECOS. January.
- Char, W.P. (2000). Botanical Survey Mangrove Community in Pearl Harbor Pearl Harbor Hawai'i, O'ahu. Prepared for HHF. March.
- Char, W.P. (2004). Botanical Resources Assessment Study for the Hawaii Regional Security Operations Center at NCTAMS PAC, Wahiawā, O'ahu Hawai'i and Kunia, O'ahu., Hawai'i. Prepared for Helber Hastert and Fee, Planners, Navy Contract N62742-03-D-1832. October.
- Department of the Navy (DON). (2001). Final Pearl Harbor Naval Complex Integrated Natural Resources Management Plan. Prepared by Naval Facilities Engineering Command Pacific (NAVFAC Pacific). November.
- Department of the Navy (DON). (2011). Marine Species Monitoring for the U.S. Navy's Hawaii Range Complex and the Southern California Range Complex, 2011 Annual Report. Pearl Harbor, HI: U.S. Navy Pacific Fleet.
- Gonzalez, A., Tsang, Y., Renshaw, M., Higashi, G., Hazama, N., and Baker, M. (2021). Draft Biodiversity of Fish in Five Pearl Harbor Streams: Waikele, E'o, Waiawa, Kalauao, and Hālawa. Draft Report Prepared for Joint Base Pearl Harbor-Hickam, Navy Natural Resources by Department of Natural Resources and Environmental Management University of Hawai'i, at Mānoa. May.
- Hawai'i Natural Heritage Program (HNHP). (2004). Flora and Fauna Survey of the Naval Computer and Telecommunications Area Master Station Pacific, O'ahu, Hawai'i. Prepared for CNRH. October.
- Juvik, S.P., Juvik, J.O., Paradise, T.R., and University of Hawaii at Hilo, Department of Geography. (1998). Atlas of Hawai'i. Third Edition. University of Hawaii Press, Honolulu, Hawai'i.
- Naval Facilities Engineering Command Pacific (NAVFAC PAC). (1998). Lualualei Ecosystem Management Plan. Prepared by Joel Moribe for NAVFAC PAC.

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