ENVIRONMENTAL ASSESSMENT

for

SHORELINE STABILIZATION

at

PUULOA RANGE TRAINING FACILITY, OAHU, HAWAII

August 2019

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Abstract

Designation:	**Environmental Assessment**
Title of Proposed Action:	**Puuloa Range Training Facility Shoreline Stabilization**
Project Location:	**Hawaii**
Lead Agency for the EA:	**Marine Corps Base Hawaii**
Cooperating Agency:	**None**
Affected Region:	**Island of Oahu, State of Hawaii**
Action Proponent:	**Marine Corps Base Hawaii**
Point of Contact:	EV21 Project Mgr Puuloa Range EA Naval Facilities Engineering Command, Pacific 258 Makalapa Dr, Ste 100 JBPHH 96860-3134
Date:	August 2019

The Naval Facilities Engineering Command, Pacific, on behalf of the United States Marine Corps (hereinafter USMC), has prepared this Environmental Assessment in accordance with the National Environmental Policy Act, as implemented by the Council on Environmental Quality regulations and USMC regulations for implementing the National Environmental Policy Act. The Proposed Action is to initiate measures to mitigate coastal erosion at Puuloa Range Training Facility, Puuloa, Ewa Beach, on the south central shore of Oahu. The range is approximately 165 acres in size, has been in operation since 1915, consists of six small-arms ranges (pistols, rifles up to 7.62mm, and shotguns) of different known distances, and is required for maintenance of small-arms proficiency by all U.S. Armed Forces personnel, as well as for law-enforcement personnel from many other agencies. It is the only range of its kind on Oahu.

This Environmental Assessment evaluates potential environmental impacts associated with the Proposed Action and Alternatives relative to the following environmental components: air quality, water resources, geological resources, cultural resources, biological resources, recreational resources, land use, visual resources, noise, infrastructure, public health and safety, and hazardous materials and waste.

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SUMMARY

S.1 Proposed Action

The Proposed Action is to initiate measures to mitigate coastal erosion at Puuloa Range Training Facility (PRTF), Puuloa, Ewa Beach, on the south central shore of Oahu. The Proposed Action would be expected to commence when funding becomes available.

The United States Marine Corps (USMC) is the lead agency for this Proposed Action. There is no cooperating agency.

S.2 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to protect PRTF from continuing shoreline erosion that could compromise its use.

The Proposed Action is needed to ensure the long-term sustainability of the range to support mandated U.S. Armed Forces training requirements.

S.3 Alternatives Considered

Alternatives were developed for analysis based upon the following reasonable alternative screening factors:

- Timeframe - executable in the near-term and within a reasonable amount of construction time
- Operations – minimal disruption to range operations
- Effectiveness – of erosion mitigation to stabilize the shoreline over the long-term
- Cost – reasonable cost of execution, weighed against the cost of taking no action

USMC considered several potential action alternatives for meeting the purpose of and need for the Proposed Action, as well as the No-Action Alternative. Potential action alternatives considered included revegetation of the existing fast land area (i.e., land above the high wash of the waves) in front of all ranges (A through F) in the Range complex; installation of a subsurface structure – i.e., sheet pile – fronting and protecting the range impact berms of some or all of the ranges and; moving some or all of the ranges back from the shoreline.

It was determined that none of the considered alternatives, individually, would meet the purpose and need nor satisfy all of the screening factors, especially within the dynamic environment of the Puuloa shoreline. Instead, two action alternatives were developed which consist of a combination of the individual alternatives considered. These two action alternatives, along with the No-Action Alternative, were carried forward for analysis in the EA.

S.3.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur. The range complex would continue to be subjected to shoreline erosion from wave action associated with storms, sea-level rise, and potential seismic-wave events. These actions could eventually lead to erosion of the earthen berms along the seaward boundaries of the ranges, seawater intrusion into the ranges rendering them unusable, and increased potential for erosion and lead contamination of the beach and water.

The No-Action Alternative would not meet the purpose of and need for the Proposed Action; however, as required by NEPA, the No-Action Alternative is carried forward for analysis in this EA. The No-Action Alternative will be used to analyze the consequences of not undertaking the Proposed Action, and will serve to establish a comparative baseline for analysis.

S.3.2 Alternative 1 (the Preferred Alternative): Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

The Preferred Alternative would consist of the installation of sheet pile along the fast land boundary of Ranges A and B; a maximum-feasible retreat/setback from the shoreline of Ranges C-F; and revegetation of available fast land areas fronting all ranges as feasible (Figure 2-1). The sheet pile would be installed on the ocean side of the ranges to mitigate erosion to the toe of the impact berms. The sheet pile is proposed to wrap-around the eastern and western edges of the range impact berms in order to provide erosion protection at the ends of the berms. The maximum feasible retreat of the four short distance ranges (Ranges C-F) is estimated at 100-feet. Retreat of the ranges may require relocation of existing backstop berms, structures, and/or utilities.

S.3.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

Alternative 2 presents an alternative shoreline stabilization strategy to the Preferred Alternative. It is similar to the Preferred Alternative regarding the proposed sheet pile installation along Ranges A and B and the revegetation efforts along all ranges; the difference is that Alternative 2 includes a combination of retreat from the shoreline and/or installation of sheet pile along the fast land boundary of one or more of Ranges C-F, as influenced and determined by environmental conditions.

To ensure that all of the potential environmental impacts of Alternative 2 are considered, the environmental impact analysis will assess the full extent of Alternative 2. This includes the installation of sheet pile at Ranges A and B; revegetation of available fast land areas fronting all ranges as feasible; and the installation of sheet pile along Ranges C-F as well as the retreat of those ranges from the shoreline. However, the particular combination of actions which would ultimately be implemented to achieve the purpose and need of the Proposed Action may be less than the full extent of actions described in this section, and will be dependent upon the existing conditions at the site when project design would be initiated.

This alternative meets the purpose and need for the action and was evaluated against the screening factors for alternatives. It was determined to be a reasonable alternative and is carried forward for analysis in this EA.

S.4 Summary of Potential Environmental Consequences of the Action and No-Action Alternatives and Major Mitigating Actions

Table S-1 provides a tabular summary of the potential impacts to the environmental components associated with each of the alternative actions analyzed.

S.5 Public Involvement

Regulations from the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations part 1506.6) direct agencies to involve the public in preparing and implementing their NEPA procedures. A list of parties contacted is provided in Chapter 8.

The USMC solicited public and agency input regarding the National Historic Preservation Act Section 106 consultation process during a 30-day public comment period prior to starting the EA. A notice was published in the Honolulu Star-Advertiser newspaper on September 2, 3 and 4, 2016, and in the State of Hawaii Office of Environmental Quality Control (OEQC) bi-monthly Environmental Notice on September 8, 2016. No comments were received.

In accordance with Department of Defense (DoD) and USMC policies and guidance for implementing NEPA, the USMC prepared a Proposed Finding of No Significant Impact (FONSI) for public review. The Proposed FONSI and EA were made available on the Marine Corps Base Hawaii website. A Notice of Availability of the Proposed FONSI was published in the Honolulu Star-Advertiser (August 29-31, 2019) soliciting public comment on the Proposed FONSI during a 15-day public review period (August 29–September 13, 2019).

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Table S-1 Summary of Potential Impacts to Environmental Components

Environmental Component	*No-Action Alternative*	*Alternative 1 (Preferred Alternative): Sheet Pile Construction, (Ranges A&B); Range Retreat (Ranges C-F); Revegetation*	*Alternative 2: Sheet Pile Construction (Ranges A&B); Range Retreat and Sheet Pile Construction (Ranges C-F); Revegetation*
Air Quality	No impact	No significant construction period impacts. No long-term impacts to air quality.	Less than significant impacts. Impacts would similar to the Preferred Alternative.
Water Resources	No short-term impacts. The long-term impacts could include the continual shoreline erosion and release of terrestrial sediment into nearshore marine waters thereby negatively impacting marine water quality.	No significant construction period impacts due to ground disturbance and the potential for sediment and pollutant transport to nearshore marine waters. These potential short-terms impacts would be avoided or mitigated by BMPs associated with the required NPDES Permit. No impacts to the floodplain. The Preferred Alternative could result in long-term beneficial impacts to marine water quality due to the protection of the PRTF shoreline from erosion of the fast land which could otherwise contribute to a reduction in future marine water quality.	No significant impacts. Impacts would be similar to the Preferred Alternative except, the installation of the additional sheet pile along Ranges C-F could result in additional construction-period impacts due to a larger ground disturbance footprint and a proportional increase in potential for sediment and pollutant transport to the nearshore environment.

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Geological Resources	No short-term impacts. In the long-term, potential shoreline erosion could result in negative impacts. Erosion of the fast land, inland from the beach, could undermine the range impact berms.	No significant construction period impacts due to site preparations and ground disturbing construction activities. Potential impacts to geological resources would be avoided, minimized, or mitigated through the implementation of BMPs required by the NPDES permit, and the project area topography would be returned to its pre-construction state to the maximum extent practicable. In the long-term, the proposed sheet pile bulkhead would protect Ranges A-B from future erosion. No significant impacts are expected to adjacent shoreline areas due to the predominant west to east longshore sand transport, the buffer areas provided at either end of the proposed sheet pile, and the design elements of the proposed sheet pile which would minimize impacts from end scour.	No significant impacts. Impacts would be similar to the Preferred alternative except, the installation of the additional sheet pile along Ranges C-F could result in additional construction-period impacts due to a larger site and associated ground disturbing footprint. However, potential impacts to geological resources would be avoided or minimized through the implementation of BMPs. In the long-term, the installation of additional sheet pile would protect Ranges C-F. Still, no significant impacts are expected to adjacent shoreline areas due to the predominant west to east longshore sand transport, the buffer areas provided at either end of the proposed sheet pile, and the design elements of the proposed sheet pile which would minimize impacts from end scour.
Cultural Resources	No impact	No impact. The Preferred Alternative would result in no historic properties affected and would not impact traditional Hawaiian (or other ethnic group's) rights related to gathering, access, or other customary activities exercised for subsistence, cultural, and religious purposes.	No impact, similar to the Preferred Alternative.

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Biological Resources	No short-term impacts. In the long-term, potential future shoreline erosion could result in the continual release of terrestrial sediment into nearshore marine waters, which would have a negative impact on marine biological resources	No significant construction period impacts to terrestrial vegetation, terrestrial wildlife, or marine species. The implementation of BMPs would eliminate or minimize potential construction period impacts associated with siltation, turbidity, spills, noise, and direct physical impacts. The Preferred Alternative may affect, but is not likely to affect endangered species in the project area (Green sea turtles, and Hawaiian Monk Seals). The Preferred Alternative may adversely affect designated EFH, but effects would be minimal and insignificant.	No significant impacts. Impacts would be similar to the Preferred Alternative except, the installation of additional sheet pile along Ranges C-F could create greater potential impacts to ESA-listed species (Green sea turtles, and Hawaiian monk seals) and EFH. Alternative 2 was not included in the consultations with the USFWS and NMFS. Should the implementation of Alternative 2 be required due to future changes in shoreline erosion at PRTF, the USMC would reinitiate consultation with USFWS and NMFS to determine the potential impacts to threatened and endangered species and EFH.
Recreational Resources	No Impact	No impacts to recreational resources. Implementation of the Preferred Alternative would not change existing public access at PRTF, and therefore would not impact public access or associated recreational activities in the project area.	No impacts, similar to the Preferred Alternative.
Land Use	No Impact	No impact to land use. Implementation of the Preferred Alternative is compatible with the PRTF Area Development Plan, and would not impact land use outside of the PRTF installation.	No impacts, similar to the Preferred Alternative.

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Visual Resources	No Impact	No significant construction period impacts due to the presence of a construction site along the shoreline. The retreat of the short-distance ranges would improve longshore views from the publicly accessible beach to the east of PRTF. Vegetation restoration and landscaping would eventually improve the visual aesthetic of the PRTF shoreline. No significant long-term impacts. Buffer areas would dampen any potential negative visual effects of the sheet pile becoming exposed from shoreline erosion, and the exposure of the sheet pile would not affect any of the significant views identified in the Ewa Development Plan.	No significant impacts, similar to the Preferred Alternative.
Noise	No impact	No significant impacts to noise-sensitive receptors during the construction period. No long-term impacts.	No significant impacts, similar to the Preferred Alternative.
Infrastructure	No impact	No impacts to public infrastructure systems. During construction period, the installation of the proposed sheet pile and utility relocation for the retreat of the short-distance ranges could result in potential disruptions to electrical, communications, and water service at PRTF, but the impacts would be limited to the installation and would not impact critical functions such as the PRTF “big voice” public notification system.	No impacts, similar to the Preferred Alternative.

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Public Health and Safety	No impact	No impacts are expected to public health and safety because public access to the PRTF installation would continue to be restricted. The Preferred Alternative would not generate disproportionate environmental health or safety risks for children living near PRTF.	No impacts, similar to the Preferred Alternative.
Hazardous Materials and Wastes	No impact	No significant impacts are expected from hazardous materials and waste. Temporary secondary containment measures would be employed to ensure that potential accidental releases of hazardous substances (e.g., spent lead, anti-freeze, petroleum, oils, and lubricants) are prevented or limited in scope. Any lead uncovered during the retreat of the short-distance range impact berms would be disposed of in accordance with all applicable regulatory requirements.	No significant impacts, similar to the Preferred Alternative.

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ENVIRONMENTAL ASSESSMENT
PUULOA RANGE TRAINING FACILITY SHORELINE STABILIZATION
OAHU, HAWAII
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Abbreviations and Acronyms

Acronym	Definition
APE	area of potential effect
BFE	Base Flood Elevation
BMP	best management practice
CAA	Clean Water Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNRH	Commander Navy Region Hawaii
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted sound level
DoD	United States Department of Defense
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
IRP	Installation Restoration Program
MBTA	Migratory Bird Treaty Act
MCBH	Marine Corps Base Hawaii
MCO	Marine Corps Order
MLLW	Mean Lower Low Water
MMRP	Military Munitions Response Program
µPa	micropascal
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MLLW	mean lower low water
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Reparation Act
NEPA	National Environmental Policy Act
NHO	Native Hawaiian Organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOA	notice of availability
NOAA	National Oceanic and Atmospheric Administration
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PHNDSA	Pearl Harbor Naval Defensive Sea Area
PRTF	Puuloa Range Training Facility
SDZ	surface danger zone
SHPO	State Historic Preservation Officer
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TSCA	Toxic Substances Control Act
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
USGS	U.S. Geological Survey
USMC	U.S. Marine Corps

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1 Purpose of and Need for the Proposed Action

1.1 Introduction

The United States Marine Corps (USMC) proposes to initiate measures to mitigate coastal erosion of the fast land (i.e., above the tidal influence) in order to protect existing range structures (i.e., impact berms) at the Puuloa Range Training Facility (PRTF) small-arms training range at Puuloa, Ewa Beach, Oahu. The Range, in operation since 1927, is owned and operated by the USMC, but utilized by all military branches as well as by State and County police and other agencies (e.g., the Federal Bureau of Investigation, Hawaii National Guard, State of Hawaii Department of Land and Natural Resources conservation officers, and the Honolulu Police Department, among others) requiring small arms training and practice. It is the only range of its kind on Oahu, where Marines can qualify on rifles such as the M4, M16, or M110, and is heavily utilized (generally five days per week, but may be used on any day of the week).

1.2 Background

Periods of erosion and shoreline recession at PRTF have been noted over many years. Marine Corps Base Hawaii (MCBH) addressed erosion issues of PRTF's fast land in 1998, and a successful restoration of vegetation, which included irrigation, was completed in the year 2000. This restoration functioned until about 2014, when increasing erosion led to a steepening of the slope and undermining of approximately 90% of the vegetation.

Beginning immediately east of the range at Keahi Point, the west end of the Kapilina residential area, the shoreline had been chronically and severely eroding for more than 60 years, with 300 feet of shoreline recession occurring in the vicinity of Keahi Point. The erosion prompted the construction (mid-2013 completion) of the Iroquois Point beach nourishment and stabilization project, which included construction of nine T-head groins along the beach to the east of the PRTF area (Figure 1-2). The nearest groin to the project area is located about 500 feet east of the PRTF boundary. Shoreline profiles surveyed annually for each of the four years post-construction of the T-head groins indicate that the shoreline along the eastern half of PRTF has moved seaward (accreted) or remained unchanged during the first four years post-construction, while the western half moved landward (receded) for the first two years and then showed little change the following two years.

1.3 Location

PRTF is located on the south-central shore of Oahu, west of the Pearl Harbor entrance channel, between the Kapilina residential area (formerly Iroquois Point Family Housing) to the Range's east, and the off-base residential community of Ewa Beach to the west of the Range (Figure 1-1). The ocean area directly adjacent to the PRTF shoreline is located within the Pearl Harbor Naval Defensive Sea Area (PHNDSA). The 165-acre range extends along about 3,000 feet of sandy shoreline, and consists of six small-arms ranges (pistols, rifles up to 7.62mm, and shotguns) of different distances. Ranges A and B on the west end are long-distance ranges (up to 3,000 yards) and their ocean end consists of large earthen berms with concrete barrier walls on top. The other four ranges (C, D, E and F) are shorter rifle and pistol ranges from 150 to 250 feet long with earthen berms along the beach.

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Figure 1-1 Location Map

Figure 1-2 Project Area Map

1.4 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to protect the PRTF shoreline from continuing erosion that could compromise its use.

The need for the Proposed Action is to ensure long-term sustainability of the heavily used range for training and equipping combat-capable forces ready to deploy worldwide. In this respect, the Proposed Action furthers the USMC's execution of its congressionally mandated roles and responsibilities under 10 U.S.C. section 5063, as well as its range management responsibilities under Marine Corps Order P3550.10.

10 U.S.C. section 5063: The Marine Corps shall be organized, trained, and equipped to provide fleet marine forces of combined arms, together with supporting air components, for service with the fleet in the seizure or defense of advanced naval bases and for the conduct of such land operations as may be essential to the prosecution of a naval campaign.

MCO P3550.10 Policies and Procedures for Range and Training Area (RTA) Management: Effective RTA management provides programs and funding consistent with the range investment strategy pillars of sustainment, upgrade, and modernization/transformation in order to protect limited resources (i.e., training facilities (ranges, buildings, and associated structures), range target systems, target mechanisms, scoring equipment, and associated training areas, to include real estate and airspace), while ensuring compliance with environmental regulations.

1.5 Scope of Environmental Analysis

This EA includes an analysis of potential environmental impacts associated with the action alternatives and the No-Action Alternative. The environmental components analyzed in this EA include: air quality, water resources, geological resources, cultural resources, biological resources, recreational resources, land use, visual resources, noise, infrastructure, public health and safety, and hazardous materials and waste.

1.6 Key Documents

Key documents are sources of information incorporated into this EA. Documents are considered to be key due to similar actions, analyses, or impacts that may apply to this Proposed Action. The CEQ guidance encourages incorporating documents by reference. Documents incorporated by reference in part or in whole include:

- Puuloa Shoreline Erosion Study, April 2015. Identified several potential shoreline protection and restoration solutions for PRTF.
- Puuloa Range Training Facility Shoreline Stabilization Final Conceptual Site Planning Report, September 2016. Presented four conceptual site plan alternatives for the short distance range retreat and shoreline stabilization improvements.
- Environmental Assessment: Iroquois Point Beach Nourishment and Stabilization, November 2011. Evaluated the potential environmental impacts of proposed beach nourishment and stabilization at Iroquois Point Beach, located at the existing Kapilina residential area (formerly Iroquois Point Family Housing), between PRTF and the Pearl Harbor entrance channel.

1.7 Relevant Laws and Regulations

The USMC has prepared this EA based upon federal and state laws, statutes, regulations, and policies that are 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)
- Environmental Compliance and Protection Manual, Chapter 12, Marine Corps Order (MCO) P5090.2, CH 3 of 26 August 2013
- Clean Air Act (CAA) (42 U.S.C. section 7401 et seq.)
- Clean Water Act (CWA) (33 U.S.C. section 1251 et seq.)
- Coastal Zone Management Act (CZMA) (16 U.S.C. section 1451 et seq.)
- National Historic Preservation Act (NHPA) (54 U.S.C. section 306108 et seq.)
- Endangered Species Act (ESA) (16 U.S.C. section 1531 et seq.)
- Migratory Bird Treaty Act (MBTA) (16 U.S.C. sections 703-712)
- Rivers and Harbors Act of 1899 (33 USC §403 et seq.)
- Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)
- EO 11988, Floodplain Management
- 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

A description of the Proposed Action's consistency with the relevant laws, policies and regulations, as well as the names of regulatory agencies responsible for their implementation, is presented in Chapter 5 (Table 5-1).

1.8 Public and Agency Participation and Intergovernmental Coordination

Regulations from the CEQ (40 CFR part 1506.6) direct agencies to involve the public in preparing and implementing their NEPA procedures. The USMC solicited public and agency input regarding the National Historic Preservation Act Section 106 consultation process during a 30-day public comment period prior to starting the EA. The notice was published in the Honolulu Star-Advertiser newspaper on September 2, 3 and 4, 2016, and in the State of Hawaii Office of Environmental Quality Control (OEQC) bi-monthly Environmental Notice on September 8, 2016. No comments were received.

In accordance with Department of Defense (DoD) and USMC policies and guidance for implementing NEPA, the USMC prepared a Proposed Finding of No Significant Impact (FONSI) for public review. The Proposed FONSI and EA were made available on the Marine Corps Base Hawaii website. A Notice of Availability of the Proposed FONSI was published in the Honolulu Star-Advertiser (August 29-31, 2019) soliciting public comment on the Proposed FONSI during a 15-day public review period (August 29–September 13, 2019).

Pursuant to Section 7 (a) (2) of the ESA the USMC conducted informal consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) regarding potential

impacts to ESA-listed species. The USMC determined and the agencies (USFWS and NMFS) concurred that the Preferred Alternative may affect, but is not likely to adversely affect the green sea turtle and the Hawaiian monk seal. Additionally, in accordance with the MSFCMA the USMC conducted consultation with NMFS regarding potential impacts to essential fish habitat (EFH). The USMC determined and NMFS concurred that the Preferred Alternative may adversely affect designated EFH, but that the effects would be minimal and insignificant (see ESA Section 7 and Magnuson-Stevens Act consultation correspondence in Appendix A)

In accordance with Section 106 of the NHPA, the USMC consulted with the State Historic Preservation Officer (SHPO), Native Hawaiian Organizations (NHOs), and interested parties regarding a determination of "no historic properties affected" for the Proposed Action. The SHPO concurred with the USMC's determination (see Section 106 consultation correspondence in Appendix B).

The Proposed Action falls under the Navy/Marine Corp's De Minimis Activities List (State of Hawaii CZMA letter, dated July 9, 2009). The USMC notified the State of Hawaii Coastal Zone Management (CZM) Program of the use of the list and the preparation of the EA, and the State CZM program acknowledged receipt of the USMC notification (see CZMA consultation correspondence in Appendix C).

1.9 List of Permits and Approvals

Table 1-2 lists all federal, state, and county permits and approvals that could be required for the Proposed Action.

Table 1-2 Permits and Agency Consultations that May be Required to Implement the Proposed Action

Permit or Consultation	*Agency*
Coastal Zone Management Act Federal Consistency concurrence	Department of Business, Economic Development and Tourism
Construction Noise Permit	Department of Health
Endangered Species Act Section 7 Consultation	National Marine Fisheries Service and U.S. Fish and Wildlife Service
Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Assessment	National Marine Fisheries Service
National Historic Preservation Act Section 106 concurrence	Department of Land and Natural Resources, State Historic Preservation Officer
National Pollutant Discharge Elimination System permit	Department of Health

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2 Proposed Action and Alternatives

2.1 Proposed Action

The Proposed Action would include: construction of a subsurface structure – i.e., protecting sheet pile – inland from the shoreline, along the fast land boundary between the ranges and the beach, either along the entire Range complex boundary or along a portion of it, in conjunction with; relocation of up to four short ranges back from the shoreline by the maximum distance practicable, and; revegetation of fast land areas as practicable.

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 may meet the purpose and need were evaluated against the following screening factors:

- Timeframe - executable in the near-term and within a reasonable amount of construction time
- Operations – minimal disruption to range operations
- Effectiveness – of erosion mitigation to stabilize the shoreline over the long-term
- Cost – reasonable cost of execution, weighed against the cost of taking no action

Several alternatives were evaluated against the screening factors. The alternatives considered included revegetation alone; installation of sheet piling as a defensive mechanism against further erosion; or moving range components back from the shoreline.

2.3 Alternatives Carried Forward for Analysis

Based on the screening factors, it was determined that none of the alternatives alone would be sufficient to address the erosion issue, nor would they provide the flexibility required for a solution to the current and anticipated future erosion issue at this site, particularly when considered in light of the dynamic nature of the shoreline environment in the area of the PRTF.

Revegetation of the shoreline area may be the least time-consuming and least-cost option, but has had limited success previously, and, in some areas fronting the ranges, there is minimal width of fast land available for revegetation.

Retreat of the two long ranges (Ranges A and B) is not believed to be feasible in the short or medium timeframe, would be costly to effect, involves acquisition of land, and would disrupt training operations on the two most-needed ranges at PTRF. Retreat of some or all of the shorter ranges (Ranges C-F), especially to the point inland where the harder, more resistant coralline substrate is exposed, may be feasible in the medium-to long-term, and may provide a buffer against further erosion. In addition, it would be less operationally disruptive than any retreat of the long ranges (Ranges A and B).

Therefore, two potential action alternatives, each using variations of a defensive mechanism against further erosion (i.e., sheet pile), retreat from the shoreline, and revegetation where feasible, are analyzed within this EA.

2.3.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur. The range complex would continue to be subjected to boundary erosion from wave action associated with storms, sea-level rise, and potential seismic-wave events. These actions could eventually lead to erosion of the earthen berms along the seaward boundaries of the ranges, seawater intrusion into the ranges rendering them unusable, and increased potential for erosion and lead contamination of the beach and water.

The No-Action Alternative would not meet the purpose of and need for the Proposed Action; however, as required by NEPA, the No-Action Alternative is carried forward for analysis in this EA. The No-Action Alternative will be used to analyze the consequences of not undertaking the Proposed Action, and will serve to establish a comparative baseline for analysis.

2.3.2 Alternative 1 (the Preferred Alternative): Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

The Preferred Alternative would consist of the installation of approximately 1,500 feet of sheet pile along the fast land boundary of the long-distance ranges (Ranges A and B); a maximum-feasible retreat/setback from the shoreline of the short-distance ranges (Ranges C-F); and revegetation of available fast land areas fronting all ranges as feasible (Figure 2-1). The sheet pile would be installed on the ocean side of the range impact berms to mitigate erosion to the toe of the berms. The sheet pile is proposed to wrap-around the eastern and western edges of the Range A and B impact berms in order to provide erosion protection at the ends of the berms. The maximum feasible retreat of the four short distance ranges (Ranges C-F) is estimated at 100-feet. Retreat of the ranges may require relocation of existing backstop berms, structures, and/or utilities.

2.3.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

Alternative 2 presents an alternative shoreline stabilization strategy to the Preferred Alternative. It is similar to the Preferred Alternative regarding the proposed sheet pile installation along Ranges A and B and the revegetation efforts along all ranges; the difference is that Alternative 2 includes a combination of retreat from the shoreline and/or installation of up to 1,000 feet of additional sheet pile along the fast land boundary of one or more of Ranges C-F, if necessary.

To ensure that all of the potential environmental impacts of Alternative 2 are considered, the environmental impact analysis assessed the full extent of Alternative 2. This includes the installation of sheet pile at Ranges A and B; revegetation of available fast land areas fronting all ranges as feasible; and the installation of sheet pile along Ranges C-F as well as the retreat of those ranges from the shoreline (Figure 2-2). However, the particular combination of actions which would ultimately be implemented to achieve the purpose and need of the Proposed Action may be less than the full extent of actions described in this section, and will be dependent upon the existing conditions at the site when project design would be initiated.

This alternative meets the purpose and need for the action and was evaluated against the screening factors for alternatives. It was determined to be a reasonable alternative and is carried forward for analysis in this EA.

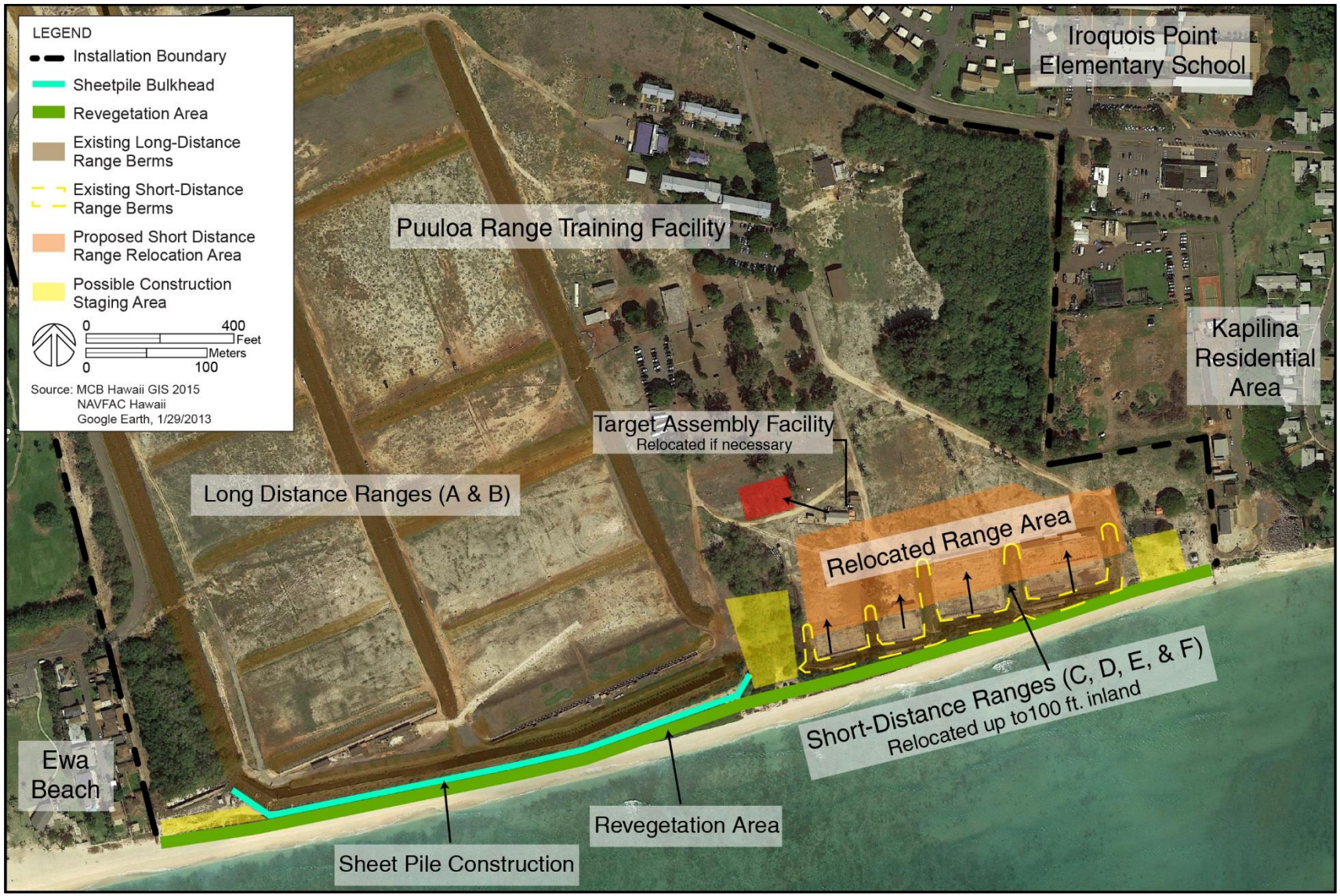

Figure 2-1 Preferred Alternative: Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

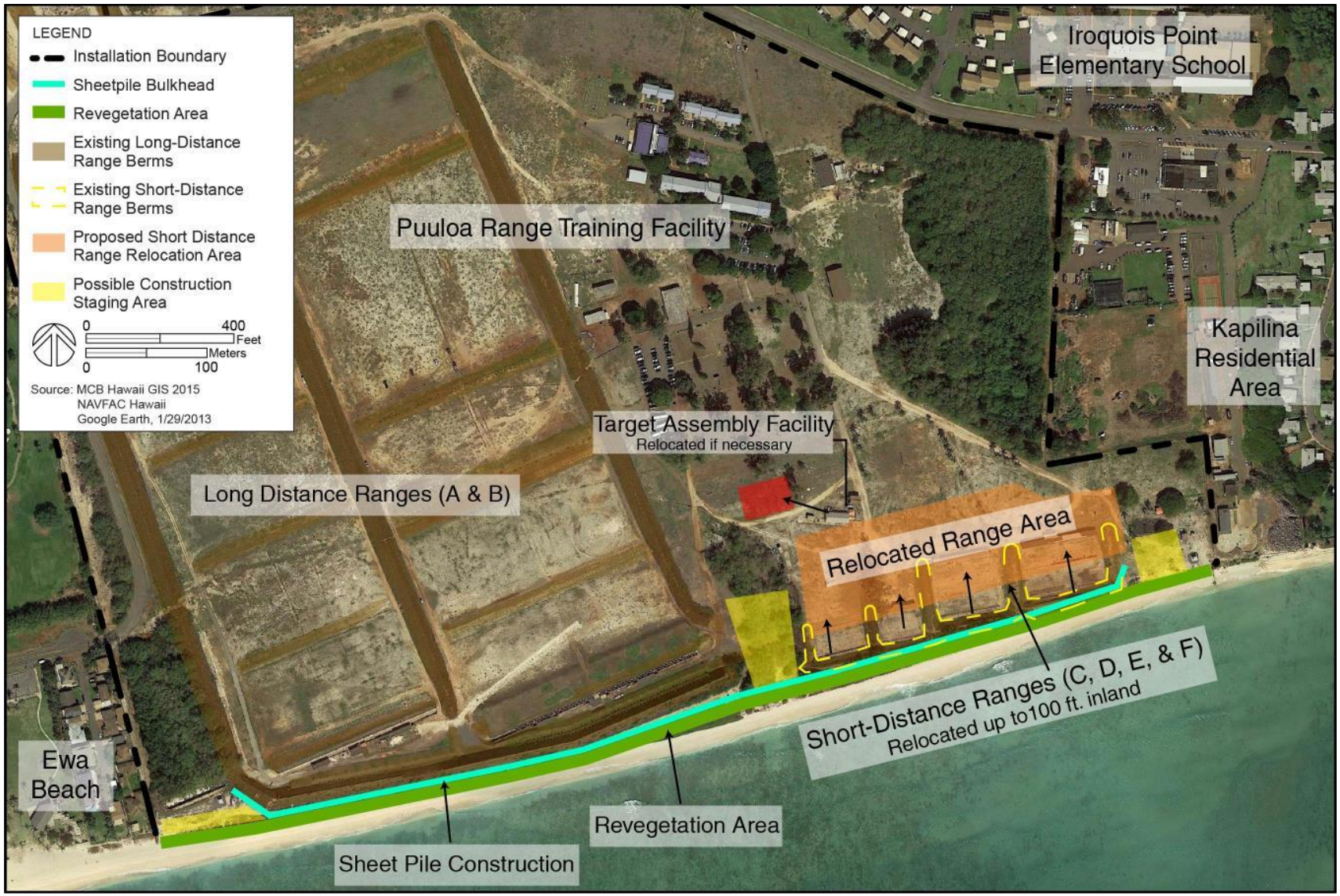

Figure 2-2 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

2.3.4 Project Components

The project components of the Preferred Alternative and Alternative 2 are very similar. The only difference is that Alternative 2 could include the installation of sheet pile along the shoreline boundary of all of the ranges, instead of just Ranges A and B as proposed in the Preferred Alternative. The project components for both Alternatives are described in detail below. The difference in the extent of the proposed sheet pile installation is specifically called out in the description of the sheet pile installation (Section 2.3.4.2).

2.3.4.1 Range Retreat

One or more of the short-distance ranges would be relocated inland up to 100 feet to provide a buffer from potential future erosion and shoreline retreat. Retreat of the ranges would require the relocation of all physical components of the ranges to be retreated, but the general dimensions and capacities of the ranges would remain the same. The physical components of the ranges that would require relocation are illustrated in Figure 2-3.

Range Components

Wood frame shooting houses are provided on concrete slab foundations at the firing lines for the short distance ranges. Targets are mounted on metal turning target supports on a concrete slab foundation. Impact berms are located directly behind the target line, and side berms provide a lateral barrier, from the shooting line to the impact berm, along the sides of the individual ranges. All berms reach a height of approximately 10 feet above grade elevation.

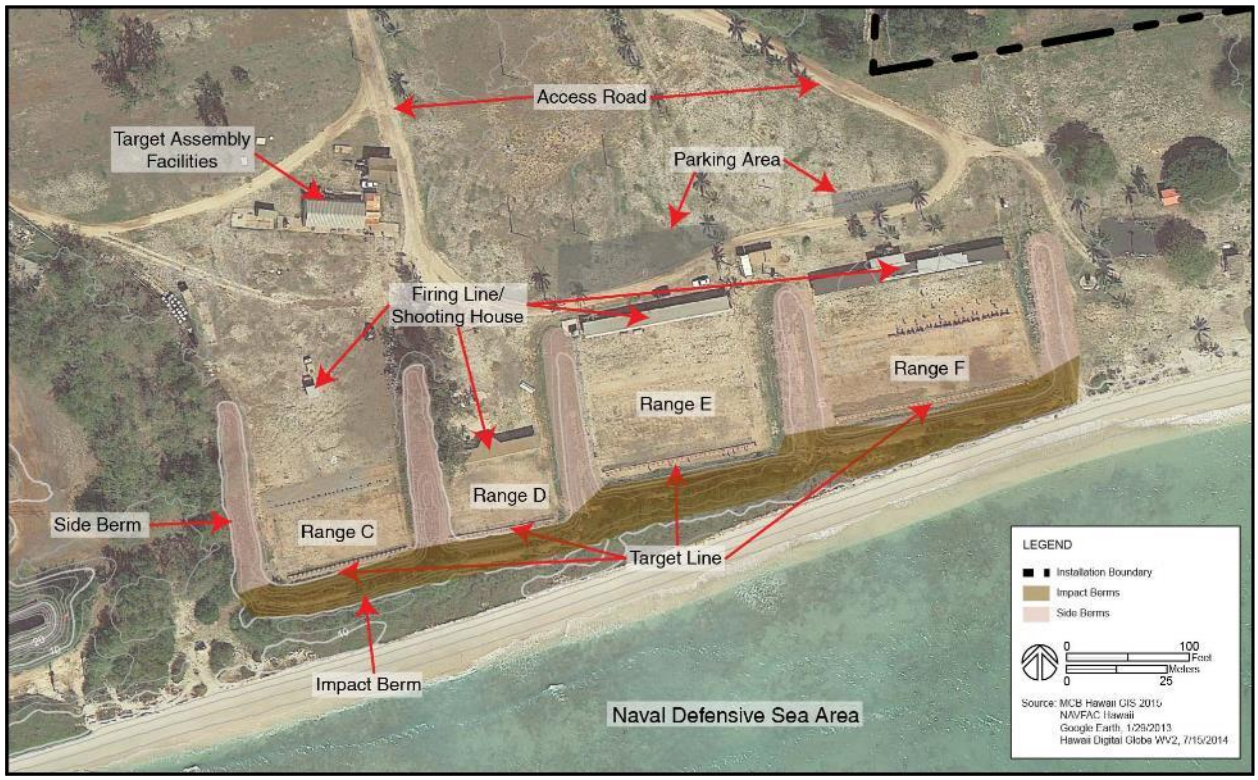

Figure 2-3 Range Components and Support Facilities

Support Facilities

The short distance ranges are served by a network of unpaved access roads. The roads are little more than dirt tracks with little to no grading or drainage improvements. The short distance ranges are served by informal parking areas on the flat ground area directly behind each of the respective ranges. The area directly behind Ranges C and D is occupied by a target assembly and storage area with two structures. If the proposed retreat of the ranges conflicts with the locations of these buildings, they would be relocated on-site.

Utilities

Irrigation is provided to the ranges mainly to wet the impact berms and suppress dust during training exercises. The existing irrigation system consists of hose bibs located at the respective range shooting house, with a long hose and sprinkler used to wet the impact berms. Potable water service is currently provided to Ranges E and F with one water fountain and one sink at each range. Overhead electrical service is provided to each of the ranges to support the communications/speaker system and to power the target systems. The main connection point is generally at the firing line/shooting house with a below grade conduit running the length of the range to serve the target systems. The shooting houses at Ranges E and F are equipped with speaker systems which are utilized during training exercises, but no exterior communication service (telephone, cable, etc.) is provided. No latrine facilities are provided to any of the ranges.

2.3.4.2 Sheet Pile Construction

Sheet pile would be installed on the ocean side of the ranges to mitigate erosion to the toe of the berms (Figure 2-4). At Ranges A and B, the existing unpaved access road would be used by the installation equipment and to minimize the amount of grading to provide a work area for construction.

For Alternative 2, sheet pile could also be installed along one or more of Ranges C-F. Along these ranges, there is no existing access road on the ocean side of the berms. Therefore, installation of the sheet pile along this section of the shoreline could include the clearing of a construction access way. At Ranges E and F, as of this time, there is a lack of sufficient width of fast land between the shoreline and the toe of the existing impact berm to allow for the installation of the proposed sheet pile. Therefore, at this location installation of the sheet pile would be dependent on the retreat of Ranges E and F to create sufficient space between the shoreline and the toe of the new impact berms.

Should erosion reach a point of removal of all sand and soil up to the installed sheet pile, it would act as a defensive mechanism to minimize the loss of soil from the range berms. Conceptually, the sheet pile would function as a bulkhead assuming loss of sand due to scour of the beach by wave action, and migration of the sand laterally along the beach. The top of the sheet pile would approximately match the existing finish grade (toe of the range berm). At this preliminary stage, a reasonably conservative estimate of scour depth adjacent to the sheet pile is approximately -10 feet MLLW (Mean Lower Low Water, the average height of the lowest tide recorded at a tide station each day during the recording period). This is based on sand loss down to the depth of the flat nearshore reef elevation, about -4 feet MLLW, and a possible scour trench depth below the sea floor equal to the wave height at the wall, estimated at 5 to 6 feet. The existing elevation of the grades to the land side of the proposed location of the sheet pile is between 4 to 10 feet. Considering a loss of sand down to elevation -10 feet, the sheet pile would be designed to retain up to 20 feet of sand.

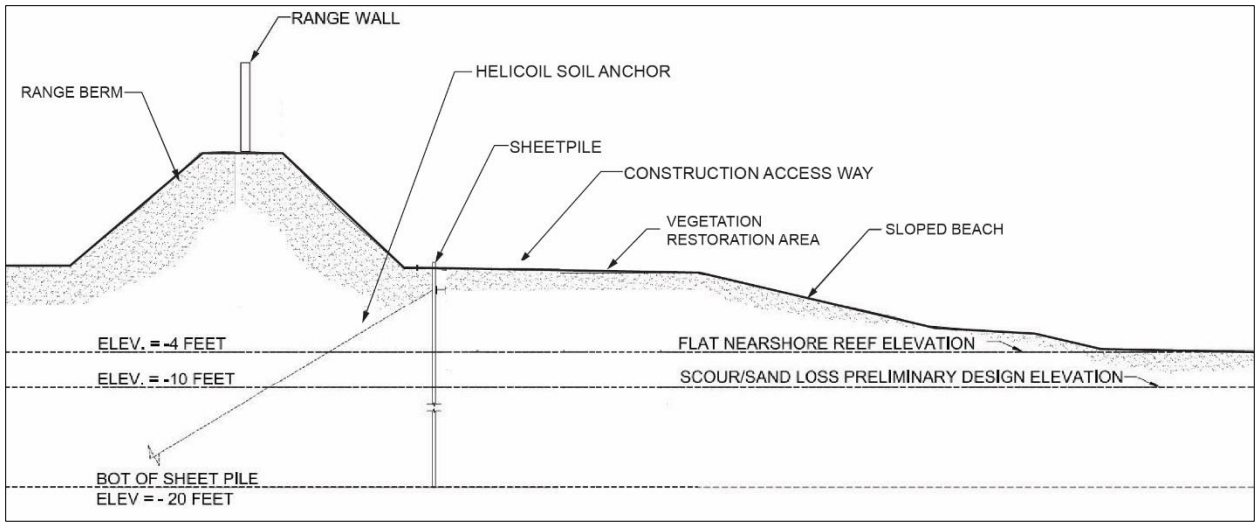

Figure 2-4 Sheet Pile Construction Conceptual Cross Section

Helical soil anchors in conjunction with a steel whaler beam may be used to laterally support the sheet pile. Other forms of lateral resistance include a deadman anchor to support the top of the sheet pile and resist lateral loading. Typically deadman anchors are located outside of the soil failure plane which may not be possible in some areas due to the proximity of the existing range walls. The anchors are needed to hold the sheet pile in place should all the fast land erode away from in front of the sheet piling. As long as there is fast land in front of the sheet pilings the anchors are not supporting any load.

Sheet pile is typically installed using either a vibratory hammer or an impact hammer to drive the piles (typically connected to a hydraulic arm on a tracked vehicle). Vibratory hammer installation can provide advantages including reduced ground vibration and noise levels, but it can reduce the reliability of the sheet pile bearing capacity. The sheet pile installation method to be utilized for the Proposed Action would be determined during the design process. Based on the geotechnical review of the existing data, the soil conditions consist of sand overlaying coralline layers at varying depths. The existence of coralline material may require pre-drilling prior to the installation of the sheet pile. Further geotechnical investigation is required to determine the potential for liquefaction (loss of soil stability due to saturation and an applied stress). This would influence the sheet pile depth and installation method of the sheet pile because it is not recommended to use vibratory methods in soil with high liquefaction potential.

At this time, installation of steel sheet pile is assumed. Steel sheet pile is the most widely available and most cost-effective type of sheet pile for this condition. To mitigate corrosion, a heavy duty coating system is assumed to be applied to the sheet pile.

2.3.4.3 Revegetation

Shoreline vegetation restoration and landscape repair – utilizing native species to the maximum extent practicable - would be included in any areas damaged by the sheet pile construction, including an area extending at least 15 to 20 feet on either side of the proposed sheet pile if space allows. Vegetation restoration would extend along the entire PRTF shoreline, beyond the limits of the proposed sheet pile. This would include the west end (between the western edge of the Range A and the installation boundary), and the east end (between the eastern edge of Range F and the installation boundary). Vegetation restoration would include ground preparation, planting, temporary irrigation, and

maintenance. Restored vegetation would be installed over a bio-degradable erosion-control fabric. To minimize manmade erosion over time at the training facility, the Proposed Action also includes landscape treatment consisting of planting, protective fencing, and walkways. These solutions would establish traffic control for beach users and discourage further development of informal paths (see Figure 2-5 for revegetation and landscape treatments at the west end).

2.3.4.4 Site Preparation and Construction

During site preparation, surface vegetation in the areas to be disturbed would be cleared and grubbed (i.e., roots and stumps extracted) as necessary. Ground disturbance during construction would include the relocation of range components, support facilities, and utilities associated with range retreat; construction of the access road on the ocean side of Ranges C-F; installation of the sheet pile; ground preparation for vegetation restoration; and miscellaneous civil works (i.e., protective fencing, access roads, and laydown areas). For the relocation of loadbearing foundations associated with range retreat, the ground would be excavated and compacted at the proposed locations. During construction, materials would be transported to the project sites by truck, where they would be stored, assembled (as necessary), and moved into place. Temporary construction staging areas for materials, equipment, and vehicle parking would be provided on adjacent areas within PRTF. For installation of the sheet pile and shoreline revegetation work, staging areas would likely be provided near one of the three shoreline access points at PRTF (Figure 2-1 and Figure 2-2). These include the areas to the west of Range A (west end), between Ranges B and C (middle), and to the east of range F (east end). Prior to construction, site boundaries or limits of disturbance would be surveyed and staked to identify areas where construction activities would occur.

2.4 Alternatives Considered but not Carried Forward for Detailed Analysis

The following alternatives were considered, but not carried forward for detailed analysis in this EA because they did not meet the purpose and need for the project and did not satisfy the reasonable alternative screening factors presented in Section 2.2. In general, alternatives that would require the expansion of existing federally owned or controlled real property, and alternatives that would reduce the operational capacity of the ranges below current maximum use thresholds, or alternatives that may negatively impact neighboring shorelines, were not considered viable.

2.4.1 Relocate PRTF

This alternative would relocate range activities to other existing ranges on Oahu, or to an entirely new site. This alternative was considered but is not being carried forward for detailed analysis in this EA because there is no practical site or available DoD-owned range or vacant land that would meet the purpose of and need for the Proposed Action.

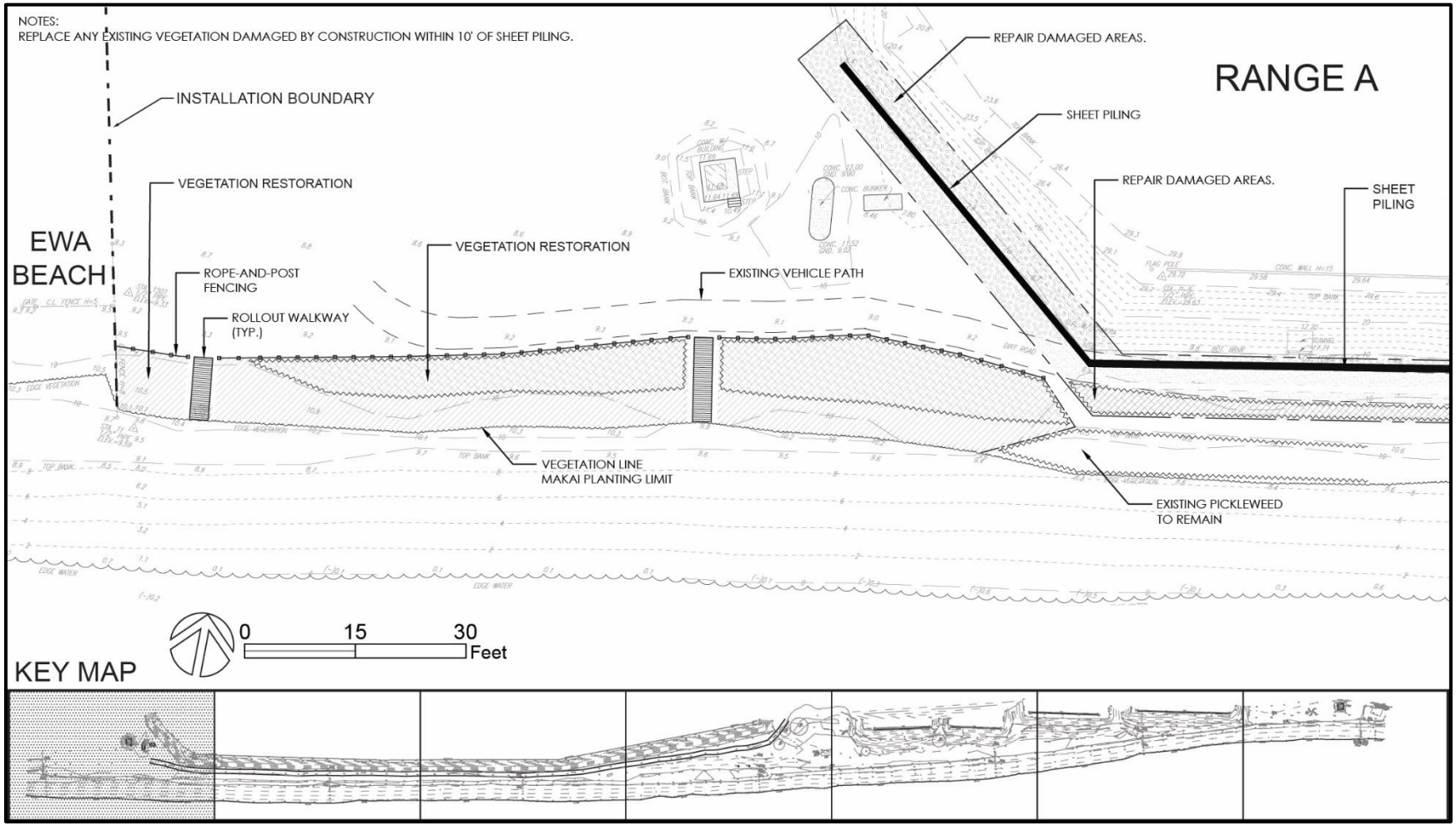

Figure 2-5 Revegetation and Landscape Treatments at the West End

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2.4.2 Move PRTF Ranges A and B Inland from Shoreline

This alternative would require acquisition of land located immediately inland of the two longest ranges, Ranges A and B, and would involve moving those ranges back from the shoreline, potentially negating the need for construction to stabilize the shoreline. This alternative was considered but is not being carried forward for detailed analysis in this EA because the land immediately inland from the two ranges is an active Federal Aviation Administration communications site; the resulting Surface Danger Zone from the relocated/reconfigured ranges might encumber civilian population located off-base; the timeframe for accomplishing this action would be long-term; and the expense of this alternative would be unjustified.

2.4.3 Other Shoreline Hardening Methods

This alternative could utilize a seawall or rock revetment. This alternative was considered but is not being carried forward for detailed analysis in this EA because these types of shoreline hardening often lead to sand-scour at the base and/or beach erosion along adjacent beach areas.

2.4.4 Sand Stabilizing/Retention Structures

This alternative would use various types of groins or breakwaters to stabilize the sand. This alternative was considered but is not being carried forward for detailed analysis in this EA because these types of structures may lead to unpredicted impacts to adjacent shoreline or to the shoreline they are designed to protect, and often require supplementation with beach nourishment with large amounts of sand that do not have locally-available sources.

The Puuloa Shoreline Erosion Study (NAVFAC HI, 2015) evaluated the construction of one or a series of groins along the PRTF shoreline to stabilize the beach. The study did not recommend construction of the groin(s) as a preferred alternative for several reasons. Due to the nature of the in-water construction, and the size of the undertaking, construction of the groins would be expensive and could have complex environmental effects within the project area and on adjacent shorelines. The project would require time-consuming and costly environmental studies to evaluate and monitor potential impacts. Finally, construction of the groin(s) would require beach nourishment, but at present there is no known source of readily available beach quality sand to meet this requirement (NAVFAC HI, 2015). Due to the reasons explained above, the construction of one or a series of groins along the PRTF shoreline has been dismissed from consideration under this EA. However, if shoreline erosion accelerates along the PRTF shoreline or if sources of beach-quality sand become available, the construction of the groin(s) could be reconsidered. At such time, the alternative would be fully analyzed under a separate environmental study to meet the requirements of NEPA.

2.4.5 Beach Nourishment

This alternative would deposit beach-quality sand along the shoreline fronting the ranges. This alternative was considered but is not being carried forward for detailed analysis in this EA because it is generally a temporary measure, and there are currently no on-land sources of commercially available calcareous beach sand, and limited offshore deposits of suitable beach sand which can be recovered.

2.4.6 Soft/Temporary/Low-Cost Measures

These measures generally range from vegetation planting to geotextile use or sandbags or combinations of these. This alternative was considered but is not being carried forward for detailed analysis in this EA because such methods, while often effective for areas subject to seasonal shoreline changes, tend to be

temporary, break down, and may be less efficient where a shoreline is subject to long-term wave attack. Additionally, given the current status of beach erosion at PRTF, there is not enough width of shoreline remaining to justify revegetation as a stand-alone and practical alternative; thus, revegetation is proposed as combined with other alternatives.

2.5 Best Management Practices

This section presents an overview of the best management practices (BMPs) that are incorporated into the Proposed Action in this document. BMPs are existing policies, practices, and measures that the USMC would adopt to reduce the environmental impacts of designated activities, functions, or processes. Although BMPs mitigate potential impacts by avoiding, minimizing or reducing/eliminating impacts, BMPs are distinguished from potential mitigation measures because BMPs are (1) existing requirements for the Proposed Action, (2) ongoing, regularly occurring practices, or (3) not unique to this Proposed Action. In other words, the BMPs identified in this document are inherently part of the Proposed Action and are not potential mitigation measures proposed as a function of the NEPA environmental review process for the Proposed Action. The following BMPs would be implemented as part of the Proposed Action. Mitigation measures are discussed separately in Chapter 3.

1. During all construction activities, surveys shall be made prior to the start of work each day, and prior to resumption of work following any break of more than one half hour, checking for protected species presence, and also disturbance to the beach indicative of nighttime sea turtle nesting.
2. Personnel shall remain alert for marine mammals and sea turtles before and during construction. Do not commence operations if a marine mammal or sea turtle is observed either hauled out or in nearshore waters within 150 feet of operations. If a monk seal/pup pair is seen, a minimum 300 foot buffer will be observed with no humans approaching them. Wait 30 minutes after the last sighting of the marine protected species on land or in the nearshore water before recommencing activities.
3. All work shall be postponed or halted when ESA-listed marine species are within 150 feet (or 300 feet for seal/pup pairs) of the proposed work, and shall only begin/resume after the animals have voluntarily departed the area.
4. All personnel will stay more than 150 feet from monk seals and sea turtles that haul out on the beach.
5. If marine protected species are seen, record information on the species, numbers, behavior, time of observation, location, start and end times of project activity, sex or age class (when possible), and any disturbances (visual or acoustic) by the construction project.
6. Personnel will not perform work on the beach if turtle nesting is known or suspected to be occurring.
7. Personnel will not perform work on the beach during the time that a Hawaiian monk seal is hauled out if the work would be so loud as to expose them to 100 decibels (dB) in-air.
8. Special attention will be given to verify that no ESA-listed marine animals are in the area where equipment or material is expected to contact the substrate before that equipment/material may enter the water.

9. Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed marine species.
10. A contingency plan to control toxic materials is required.
11. Appropriate materials to contain and clean potential spills shall be stored at the work site, and be readily available.
12. The project manager and heavy equipment operators shall perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations shall be postponed or halted should a leak be detected, and shall not proceed until the leak is repaired and equipment cleaned.
13. All project-related materials and equipment placed in the water shall be free of pollutants.
14. Fueling of land-based vehicles and equipment shall take place at least 100 feet away from the water, preferably over an impervious surface.
15. Turbidity and siltation from project-related work shall be minimized and contained through the appropriate use of erosion control practices, effective silt containment devices, and the curtailment of work during adverse weather and tidal/flow conditions. If turbidity will result from construction activities, silt curtains shall be used to contain turbidity to the minimum area possible.
16. A plan shall be developed to prevent debris and other wastes from entering or remaining in the marine environment during the project.
17. Dust barriers would be erected around active construction areas to minimize the effects of fugitive dust on adjacent land uses in the area.
18. Ground preparation will include, as appropriate and feasible, the use of bio-degradable erosion-control fabric); vegetation planting (including hydroseed method); temporary irrigation; and maintenance.
19. Boardwalks will be utilized, as appropriate and feasible, to limit vehicle access along the shoreline and keep recreational equipment (e.g., boats, picnic tables, wood platforms) off the shoreline.
20. Landscaping will be consistent with the MCBH Base Landscape Manual. Native vegetation will be used to the extent practicable to re-vegetate the site.

Best management practices would also be identified as conditions of the National Pollutant Discharge Elimination System (NPDES) permit required for the discharge of storm water associated with construction activity, including a Storm Water Pollution Prevention Plan (SWPPP).

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3 Affected Environment and Environmental Consequences

This chapter presents a description of the environmental components 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: the No-Action Alternative, the Preferred Alternative, and Alternative 2. Alternative 2 is identical to the Preferred Alternative regarding the treatment of Ranges A and B. The difference with Alternative 2 is that it proposes to potentially install sheet pile along Ranges C-F in addition to range retreat, where the Preferred Alternative proposes only range retreat for Ranges C-F. Therefore, the potential impacts associated with Alternative 2 would be the same as those identified for the Preferred Alternative plus any additional potential impacts associated with the installation of sheet pile along Ranges C-F.

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

"Significantly," as used in NEPA, requires considerations of both context and intensity. Context means that the significance of an action must be analyzed from several viewpoints such as society as a whole (e.g., human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of a Proposed Action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant. Intensity refers to the severity or extent of the potential environmental impact, which can be thought of in terms of the potential amount of the likely change. In general, the more sensitive the context, the less intense a potential impact needs to be in order to be considered significant. Likewise, the less sensitive the context, the more intense a potential impact would be expected to be significant.

Environmental components analyzed in depth in this EA include air quality, water resources, geological resources, biological resources, cultural resources, recreational resources, land use, visual resources, noise, infrastructure, public health and safety, and hazardous materials and wastes.

Potential impacts to the following environmental components are considered to be negligible or non-existent so they were not analyzed in detail in this EA:

Airspace: Implementation of the Proposed Action does not involve impacts to military or civilian airspace.

Transportation: The Proposed Action is located entirely within DoD property, and would not directly impact any public roadways, bikeways, railways, or harbors. Public roadways and harbors could potentially be used to support the delivery and disposal of construction materials and equipment, and construction workers would contribute to a minor increase in the number of daily trips to and from PRTF. However, these construction period impacts would be temporary and would have a negligible effect on the transportation system.

Socioeconomics: Implementation of the Proposed Action would not impact population; employment/industry characteristics; demand for schools, housing, recreational facilities; or demographic, economic, or fiscal conditions of the State of Hawaii or City and County of Honolulu. Economic benefits of job creation would be temporary and associated with project construction. The

proposed shoreline stabilization improvements would not result in secondary impacts related to increasing development capacity or population growth.

Environmental Justice: Executive Order 12898 (February 11, 1994) requires federal agencies to identify and address the potential for disproportionately high and adverse human health and environmental effects of their actions on minority and low-income populations. Because the proposed shoreline stabilization improvements would be located on DoD property, exposure and risk to the general public would be limited. In addition, since the Proposed Action is not expected to have a significant impact upon environmental resources, it would not create environmental health or safety risks that would disproportionately affect minorities or disadvantaged populations. The implementation of the Proposed Action would not disrupt the structure or cohesion of the community since the Proposed Action would occur on DoD lands. The Proposed Action would not affect environmental justice factors because there would be no significant changes in land use or aesthetics and there would be no disproportionate human health or environmental impacts to low income or minority populations.

3.1 Air Quality

This discussion of air quality includes criteria pollutants, standards, sources, permitting and greenhouse gases. Air quality in a given location is defined by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions.

Most air pollutants originate from human-made sources, including mobile sources (e.g., cars, trucks, buses) and stationary sources (e.g., factories, refineries, power plants), as well as indoor sources (e.g., some building materials and cleaning solvents). Air pollutants are also released from natural sources such as volcanic eruptions and forest fires.

3.1.1 Regulatory Setting

Under the Clean Air Act (CAA), the U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) (40 CFR part 50). NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation and damage to buildings. Some pollutants have long-term and short-term standards. Short-term standards are designed to protect against acute, or short-term, health effects, while long-term standards were established to protect against chronic health effects.

Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment.

The CAA requires states to develop a general plan to attain and maintain the NAAQS in all areas of the country and a specific plan to attain the standards for each area designated nonattainment for a NAAQS. These plans, known as State Implementation Plans, are developed by state and local air quality management agencies and submitted to USEPA for approval.

3.1.2 Affected Environment

Air quality in the State can be generally characterized as relatively clean and low in pollution. Data from State of Hawaii Department of Health air quality monitoring stations indicate that the State was in attainment of all NAAQS in 2014, with the exception of exceedances for SO_2 and $PM_{2.5}$ in communities near the volcano on Hawaii Island (State of Hawaii, 2016) (considered by the USEPA as a natural, uncontrollable event). Because the State is in attainment of the NAAQS, it is not subject to the Clean Air Act's General Conformity Rule.

3.1.3 Environmental Consequences

Effects on air quality are based on estimated direct and indirect emissions associated with the action alternatives. The study area for assessing air quality impacts is the air basin in which the project is located, the State of Hawaii.

3.1.3.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur and there would be no change to baseline air quality. Therefore, no impacts to air quality or air resources would occur with implementation of the No-Action Alternative.

3.1.3.2 Preferred Alternative: Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

The Preferred Alternative would not introduce any new major air emissions sources or stationary air emissions sources. Short-term, temporary air emissions (e.g., fugitive dust, combustion of fossil fuels) would be generated during the construction period. These potential impacts would be minor and the contractor would employ BMPs to minimize particulate emissions during the construction period. All construction activities would comply with the provisions of HAR 11-60.1-33 (Fugitive Dust).

Because the State of Hawaii is in attainment of the NAAQS, the Preferred Alternative is not subject to the Clean Air Act's General Conformity Rule. The Preferred Alternative would not involve any new major stationary air emissions sources or major modifications to existing stationary sources.

Implementation of the Preferred Alternative would contribute directly to emissions of greenhouse gases from the combustion of fossil fuels during the construction process, including site preparation, range relocation, sheet pile construction and revegetation activities. Once the proposed shoreline stabilization improvements have been constructed, PRTF operations would generate approximately the same level of greenhouse gases each year as is currently produced by the existing operations. This limited amount of construction period emissions generated from the Preferred Alternative would be temporary and not likely to contribute to global warming to any discernible extent.

Therefore, implementation of the Preferred Alternative would not result in significant impacts to air quality.

3.1.3.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

Similar to the Preferred Alternative, Alternative 2 would have no significant impacts on air quality.

Due to the additional construction required to install the sheet pile along Ranges C-F, the short-term, temporary air emissions associated with construction would potentially be greater for Alternative 2.

However, these potential impacts would be minor and the contractor would employ BMPs to minimize particulate emissions during the construction period. All construction activities would comply with the provisions of HAR 11-60.1-33 (Fugitive Dust).

Therefore, implementation of Alternative 2 would not result in significant impacts to air quality.

3.2 Water Resources

This discussion of water resources includes groundwater, surface water, marine waters, wetlands, and floodplains. This section discusses the physical characteristics of water resources; wildlife and vegetation are addressed in Section 3.5, Biological Resources.

3.2.1 Regulatory Setting

Groundwater quality and quantity are regulated under several statutes and regulations, including the Safe Drinking Water Act.

The Clean Water Act (CWA) establishes federal limits, through the 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., storm water) of water pollution.

Waters of the United States are defined as (1) traditional navigable waters, (2) wetlands adjacent to navigable waters, (3) nonnavigable 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 U.S. Army Corps of Engineers (USACE).

Section 438 of the Energy Independence and Security Act establishes storm water design requirements for development and redevelopment projects. Under these requirements, federal facility projects larger than 5,000 ft^2 must "maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow."

The Hawaii NPDES storm water program requires construction site operators engaged in clearing, grading, and excavating activities that disturb one acre or more to obtain coverage under an NPDES Construction General Permit for storm water discharges. Construction or demolition that necessitates an individual permit also requires preparation of a Notice of Intent to discharge storm water and a Storm Water Pollution Prevention Plan that is implemented during construction. As part of the 2010 Final Rule for the CWA, titled *Effluent Limitations Guidelines and Standards for the Construction and Development Point Source Category*, activities covered by this permit must implement non-numeric erosion and sediment controls and pollution prevention measures.

Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into wetlands and other Waters of the United States. Any discharge of dredge or fill into Waters of the United States requires a permit from the USACE.

Section 10 of the Rivers and Harbors Act provides for USACE permit requirements for any in-water construction. USACE and some states require a permit for any in-water construction. Permits are required for construction of piers, wharfs, bulkheads, pilings, marinas, docks, ramps, floats, moorings, and like structures; construction of wires and cables over the water, and pipes, cables, or tunnels under

the water; dredging and excavation; any obstruction or alteration of navigable waters; depositing fill and dredged material; filling of wetlands adjacent or contiguous to waters of the United States; construction of riprap, revetments, groins, breakwaters, and levees; and transportation of dredged material for dumping into ocean waters.

Executive Order 11988, *Floodplain Management*, requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development unless it is the only practicable alternative. Flood potential of a site is usually determined by the 100-year floodplain, which is defined as the area that has a one percent chance of inundation by a flood event in a given year. EO 11988 states that agencies shall provide opportunity for early public review of any plans or proposals for actions in floodplains.

The Coastal Zone Management Act of 1972 (CZMA) provides assistance to states, in cooperation with federal and local agencies, for developing land and water use programs in coastal zones. Section 307 of the CZMA stipulates that where a federal project initiates reasonably foreseeable effects to any coastal use or resource (land or water use, or natural resource), the action must be consistent to the maximum extent practicable with the enforceable policies of the affected state's federally approved coastal management plan. The Hawaii State Office of Planning is the lead agency for coastal management and is responsible for enforcing the State's federally approved coastal management plan. The Preferred Alternative's requirements under and compliance with CZMA are discussed in Section 5.1.

3.2.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the components under water resources at the project area.

3.2.2.1 Groundwater

On Oahu, groundwater occurs principally as either basal water (a lens of fresh to brackish water that floats on seawater) or high-level water (freshwater that does not rest on seawater). Basal water is the most abundant form of groundwater on Oahu (CNRH, 2011). The *Aquifer Identification and Classification for Oahu: Groundwater Protection Strategy for Hawaii* (Mink & Lau, 1990) identifies the project area as sitting above the Waipahu Aquifer System of the Pearl Harbor Aquifer Sector. The study identifies the aquifer type as either basal, unconfined, sedimentary; or basal, confined, flank. Both aquifer types are considered to be ecologically important, irreplaceable, and moderately to highly vulnerable to contamination (Mink & Lau, 1990).

3.2.2.2 Surface Water

The project area is located within the Pearl Harbor watershed, a 110-square mile watershed subdivided into nine subwatersheds. These subwatersheds contain the headwaters of nine streams that drain into Pearl Harbor (CNRH, 2011). The project area is located within the Honouliuli subwatershed of the Pearl Harbor watershed. Honouliuli is the westernmost subwatershed within the Pearl Harbor Watershed. Annual rainfall ranges from an average of 47 inches at the Waianae Mountain peaks to 24 inches near the H-1 Freeway (Oahu Resource Conservation and Development Council, 2013). PRTF is located in the coastal plain approximately 3.7 miles to the southwest of the Honouliuli Stream. There are no surface waters or wetlands at PRTF.

3.2.2.3 Marine Waters

Marine waters are classified and regulated by the State of Hawaii under Title 11 Hawaii Administrative Rules, DOH, Chapter 54 Water Quality Standards. The waters off shore from PRTF are designated Class A marine waters. The management objective of Class A waters is to protect the waters for recreational and aesthetic enjoyment. However, the waters off shore from the project area are located within the Pearl Harbor Naval Defensive Sea Area (PHNDSA), and Joint Base Pearl Harbor-Hickam (JBPHH) regulates public access to these waters. Navigation in the waters adjacent to PRTF is restricted from 6:00 a.m. to 5:00 p.m. daily (including Saturdays and Sundays), and at other times upon notification (NOAA, 2015).

DOH conducts water quality assessments at monitoring locations across the state, and is required by the CWA to report on the state's water quality on a two year cycle. The most recent report, *2016 State of Hawaii Water Quality Monitoring and Assessment Report*, identifies the marine waters in the vicinity of the project area (measured at Puuloa Beach Park approximately 300 feet west of PTRF) to be in attainment of all reported water quality parameters, including bacteria (enterococcus), turbidity, total suspended solids (TSS), chlorophyll a, and nutrients (total nitrogen [TN], nitrate+nitrite-nitrogen [NO_3+NO_2], ammonium-nitrogen [NH_4], and total phosphorus [TP]) (Hawaii State Department of Health, 2017).

The Iroquois Point Beach Nourishment and Stabilization Project conducted water quality sampling from 2004 to 2007 in support of the EA for the project (Joint Base Pearl Harbor-Hickam, 2011). The water quality was sampled at seven transect locations between the east border of PRTF and the Pearl Harbor Entrance Channel The findings of the water quality sampling efforts was summarized as follows:

> "In summary, basic water quality parameters (temperature, salinity, DO saturation and pH) in the nearshore waters of Iroquois Point are in compliance with State water quality criteria. However, turbidity levels, chlorophyll α concentrations, and nutrients exceed their respective geometric mean criteria … The water quality parameters which exceed State criteria neither pose a human health risk for swimmers or divers, nor do they result in any fish contamination."

The Iroquois Point Beach Nourishment and Stabilization Project EA also suggests that the project (now completed) would have a long-term beneficial impact on water quality because it would reduce shoreline erosion and wave-action which previously served as a continual source of turbidity in nearshore waters (Joint Base Pearl Harbor-Hickam, 2011).

3.2.2.4 Floodplains

According to Flood Insurance Rate Map (FIRM) data produced by the FEMA (figure 3-1), most of the PRTF installation is located in Zone D, areas in which flood hazards are undetermined but possible. The south western corner of PRTF, which includes a portion of the proposed sheet pile and revegetation improvements, is located in Zone X, other flood areas of 0.2 percent annual chance of flood (also known as the "500-year flood"). The shoreline area of PRTF is located within Zone VE, coastal areas with a one percent or greater annual chance of flood and additional hazards associated with storm waves. Each VE zone identifies a static base flood elevation (BFE) that represents the anticipated elevation of flood waters during the base flood. Most of the PRTF shoreline is located in Zone VE with a BFE of seven feet above mean sea level (MSL); the south western corner of the PRTF shoreline is located in a Zone VE with a BFE of eight feet above MSL. Shoreline surveys completed in 2013 and 2014 show the elevation of the beach berm crest consistently at an elevation of approximately ten feet above MLLW (approximately nine feet above MSL). The proposed shoreline stabilization improvements would be located on the inland side of the beach berm crest, and therefore would be outside of the Zone VE flood plain.

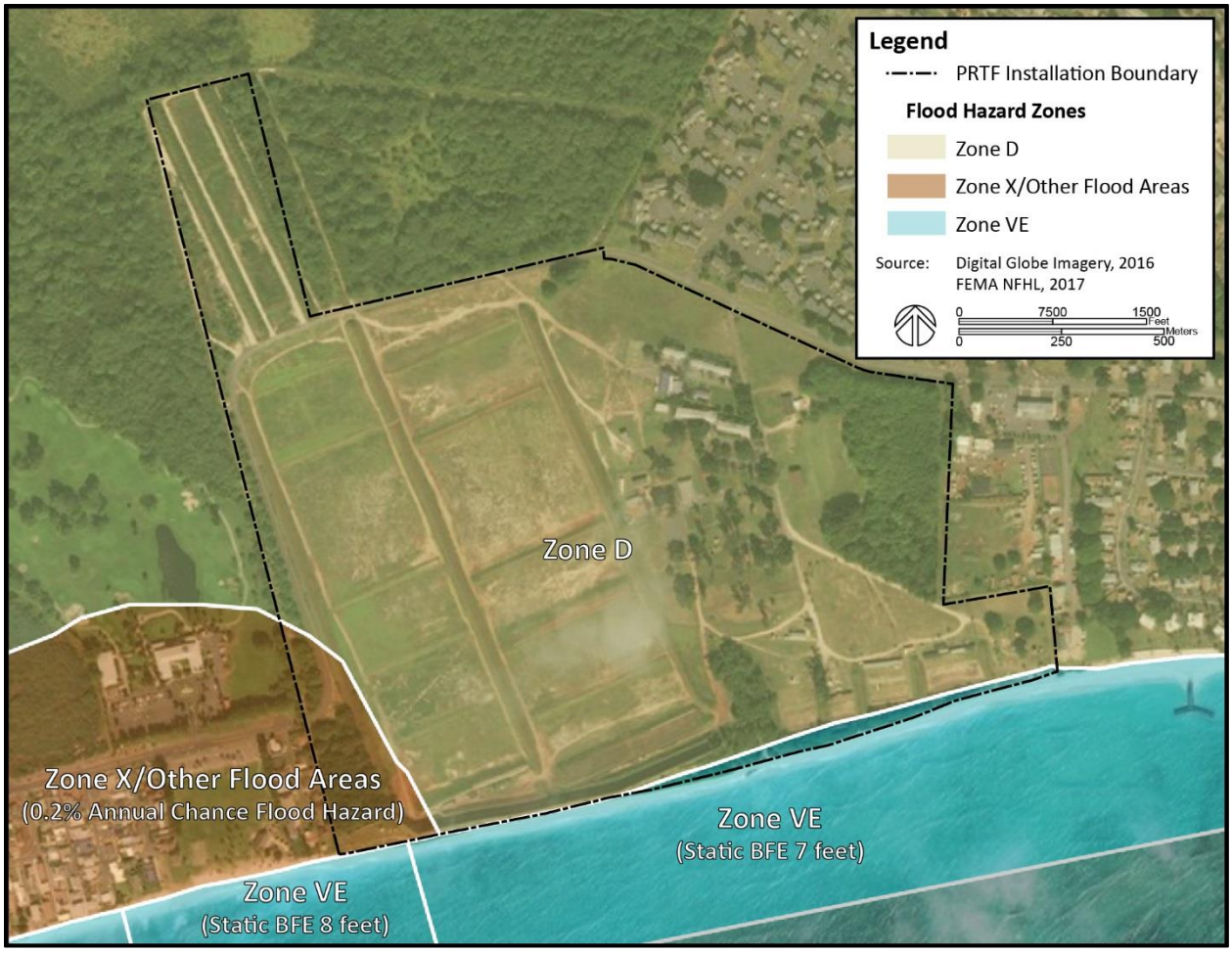


Figure 3-1 Flood Zones

3.2.3 Environmental Consequences

This analysis focuses on water resources that are important to supporting habitat for wildlife or vegetation or are protected under federal or state law or statute.

3.2.3.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur and there would be no change to ground water, surface waters, or floodplains. If shoreline erosion were to continue at its current rate, especially at ranges A and B, wave action would likely begin to erode the fast land directly inland from the beach, including the range impact berms. Erosion of the fast land would result in the continual release of terrestrial sediment into the nearshore environment and would have a negative effect on marine water quality. Therefore, future negative impacts to water resources would likely occur with implementation of the No-Action Alternative.

3.2.3.2 Preferred Alternative: Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

Groundwater

Implementation of the Preferred Alternative would not introduce new sources of pollutants or contaminants into pathways that may migrate to groundwater sources. During the construction period, proper storage and handling of hazardous materials (such as fuel for construction equipment) and immediate cleanup of leaks or spills would be implemented to prevent contamination of groundwater resources.

Surface and Marine Waters

Retreat of the short-distance ranges and installation of the sheet pile would require the creation and use of construction staging areas and would involve significant ground disturbance during construction. These ground disturbing activities have the potential to result in temporary impacts such as sediments or pollutants being transported to nearshore marine waters. Because more than one acre of land is anticipated to be disturbed for construction, an NPDES permit would be required for the construction activities, including a SWPPP. Construction period BMPs and compliance with the NPDES would avoid or minimize potential short-term impacts to nearshore marine waters. Conditions of the NPDES would be complied with to further reduce the potential for construction period project-related sediments and pollutants to be transported to receiving marine waters.

In the long term, the Preferred Alternative would stabilize the shoreline. The proposed sheet pile along Ranges A & B and shoreline revegetation are expected to slow the erosion process and stabilize the shoreline in order to prevent the erosion of fast land and terrestrial sediment inland from the beach, which would otherwise result in a continual release of sediment to the nearshore waters. By slowing future shoreline erosion and stabilizing the shoreline, the Preferred Alternative would provide a long-term beneficial impact to water quality in the nearshore waters.

Floodplains

The proposed shoreline stabilization improvements would be located on the inland side of the existing beach berm crest (approximately ten feet above MLLW) outside of the coastal flood zone VE, defined as coastal areas with a one percent or greater annual chance of flood and additional hazards associated with storm waves. Most of the proposed shoreline stabilization improvements would be located in Zone D, defined as areas in which flood hazards are undetermined but possible. A small segment of the proposed sheet pile and revegetation at the southwestern boundary of PRTF would be located in flood zone X, defined as other flood areas of 0.2 percent annual chance of flood. However, these improvements would not involve the placement of any permanent above-ground structures, but are instead intended to serve as defensive measures to increase the resilience of PRTF to potential future shoreline erosion. Because the sheet pile would be installed below grade, there would be no adverse direct or indirect effects to the floodplain and no modifications are needed to minimize impacts on the existing floodplain.

Therefore, implementation of the Preferred Alternative would not result in significant impacts to water resources.

3.2.3.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

Alternative 2 would have no significant impacts to water resources similar to the Preferred Alternative.

Groundwater

The implementation of the Alternative 2 would not introduce new sources of pollutants or contaminants into pathways that may migrate to groundwater sources. During the construction period, proper storage and handling of hazardous materials (such as fuel for construction equipment) and immediate cleanup of leaks or spills would be implemented to prevent contamination of groundwater resources.

Surface and Marine Waters

Due to the additional construction and ground disturbance required to install the sheet pile along Ranges C-F, construction period impacts to marine waters could potentially be greater for Alternative 2. However, because more than one-acre of land is anticipated to be disturbed for construction, an NPDES permit would be required for the construction activities, including a SWPPP. Construction period BMPs and compliance with the NPDES would avoid or minimize potential short-term impacts to nearshore marine waters.

In the long term, Alternative 2 would stabilize the shoreline. The proposed sheet pile along Ranges A-F and shoreline revegetation would slow the erosion of fast land and terrestrial sediment inland from the beach, which would otherwise result in a continual release of sediment into the nearshore waters. By mitigating future shoreline erosion along all of the ranges, Alternative 2 would provide a long-term beneficial impact to water quality in the nearshore waters.

Floodplains

Implementation of Alternative 2 could include the installation of sheet pile across Ranges C-F. Similar to the proposed sheet pile location at Ranges A and B, the proposed sheet pile location at Ranges C-F would be at the inland side of the existing beach berm crest (approximately ten feet above MLLW) outside of the coastal flood zone VE, defined as coastal areas with a one percent or greater annual chance of flood and additional hazards associated with storm waves. Because the sheet pile would be installed below grade, there would be no adverse direct or indirect effects to the floodplain and no modifications are needed to minimize impacts on the existing floodplain.

Therefore, implementation of Alternative 2 would not result in significant impacts to water resources.

3.3 Geological Resources

This discussion of geological resources includes the geology, soils, topography, bathymetry, and shoreline of the project area.

3.3.1 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under geological resources at the project area at PRTF.

3.3.1.1 Geology

The Ewa Plain is a relatively flat coastal plain. The south part of the plain, where Puuloa RTF is located, is the limestone of an emerged reef that formed during a period of high sea stands (Marine Corps Base

Hawaii, 2001). The plain is also notable for countless sinkholes caused by chemical weathering (dissolution) of the limestone shelf.

The project area coastline can be typified as a carbonate sand beach sitting atop hard reefal substrate, developed during previous sea-level high stands. The fossil reef substrate extends offshore and creates the foundation upon which the modern reef is growing. Bottom conditions seaward of the existing shoreline consist primarily of a hard limestone (fossilized calcareous reef rock) substrate that underlies the entire project reach. Over the limestone are various combinations of sand deposits, coral rubble and cobbles, and reef rock outcrops. Bottom surface composition is approximately 40% sand, 40% rubble (gravel, cobbles, rocks, debris), and 20% hard limestone reef rock. The rock outcrops have a vertical relief of 1 to 2 feet above the surrounding area. The outcrops generally increase in size and percent of bottom cover from west to east across the project reach, toward the Pearl Harbor channel. Most of the bottom is covered by a thin layer of coral rubble and cobbles, with some patches of sand. Sand patch thickness within the project construction area is less than 1 foot (NAVFAC HI, 2015).

3.3.1.2 Soils

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) classifies the soils within PRTF and much of the Ewa Plain as coral outcrop[1] (CR). Puuloa RTF is situated on an exposed coral reef outcrop, originally formed in shallow ocean water during a period of high sea level. Soils in the district consist of coral or cemented calcareous sand, with 10–20 percent of a thin layer of friable red soil material in crevices and depressions in the coral (Marine Corps Base Hawaii, 2001).

3.3.1.3 Topography, Bathymetry, and Shoreline Processes

The land at PRTF is relatively flat with elevations ranging from sea level (zero) to ten feet above MSL. The ranges are enclosed by ten to twenty foot high earthen safety berms, with approximately 1 vertical unit: 3 horizontal units (1V:3H) slope. One exception is the impact berm for the long distance ranges (Ranges A and B) which rises thirty feet above MSL (1V:1H slope) and has a fifteen foot concrete wall on top. The shoreline is located on the south side of the range impact berms. The beach has a relatively steep slope for a south facing Hawaiian shoreline and has a narrow overwash berm. A typical beach profiles for the project area is provided in Figure 3-2.

[1] NRCS Web Soil Survey National Cooperative Soil Survey (accessed December 2015)

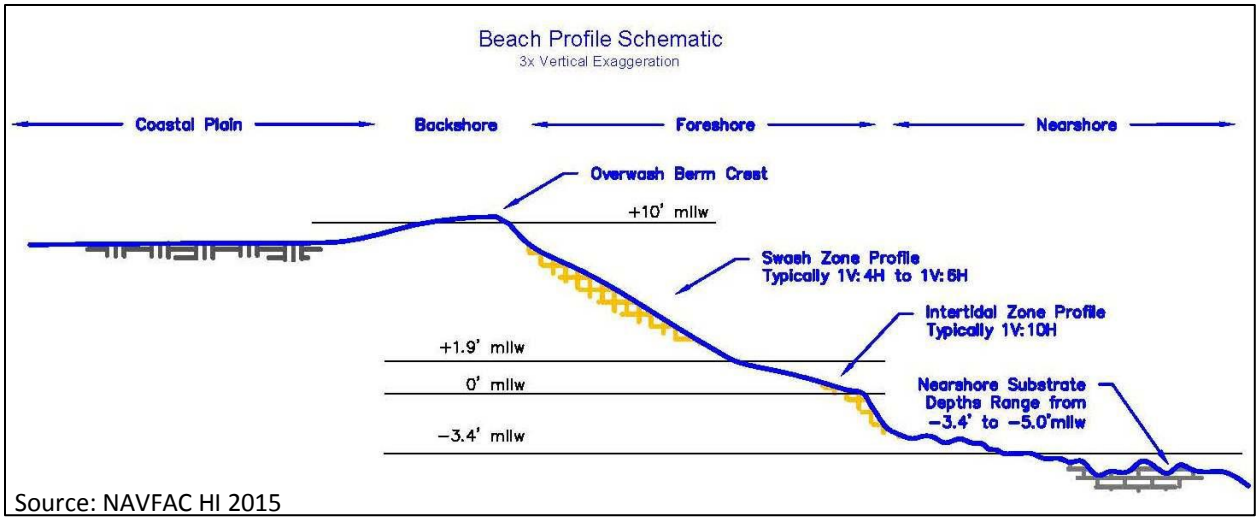


Figure 3-2 Beach Profile Schematic

The shoreline is fronted by a wide and shallow fringing reef. Water depths less than about 5 feet extend over 1,000 feet from the shore, with the 12-foot depth contour about 2,200 feet offshore, and the 18-foot depth contour more than 6,000 feet offshore (NAVFAC HI, 2015). Approximately one mile to the east of the project site is the 1,000-foot wide and 50-foot-plus deep Pearl Harbor entrance channel. In 2003, the National Oceanic and Atmospheric Administration (NOAA) sponsored a benthic mapping study of the Hawaiian Islands. The study identifies the benthic structure of the nearshore area directly off of the PRTF coastline as mostly coral reef or hardbottom, with some pockets of sand (Figure 3-3) (Coyne, et al., 2003).

The PRTF shoreline is directly exposed to southern swell, refracted trade wind waves, Kona storm waves, and the infrequent hurricane. The morphology, orientation, and exposure of the beach fronting the firing range is similar to, and connected with, the beach system fronting the Ewa Beach residential neighborhood (NAVFAC HI, 2015). In 2015, NAVFAC HI completed the Puuloa Shoreline Erosion Study which provides a comprehensive analysis of recent historical shoreline trends and potential future shoreline changes at PRTF. The following description of shoreline conditions at PRTF summarizes the salient findings from the 2015 study.

A series of shoreline profiles (Figure 3-4) were surveyed beginning in 2003 for the Iroquois Point beach nourishment project. Three of these profiles are located along the PRTF shoreline: the west PRTF boundary, Range B/C boundary, and the east PRTF boundary. Profiles were surveyed in December 2003 and August 2006. These same locations and others along the PRTF shoreline were resurveyed prior to and after construction of the Iroquois Point groins in 2013 and 2014 respectively. Four of these locations (Range A, Range B/C boundary, Range E/F boundary, and the west side of the rock groin) were surveyed six times within the four years after construction (2014 - 2017). The shoreline surveys provide a 14 year quantitative record of shoreline change. A summary of the monitoring data for all of the beach profiles is provided in Table 3-1.

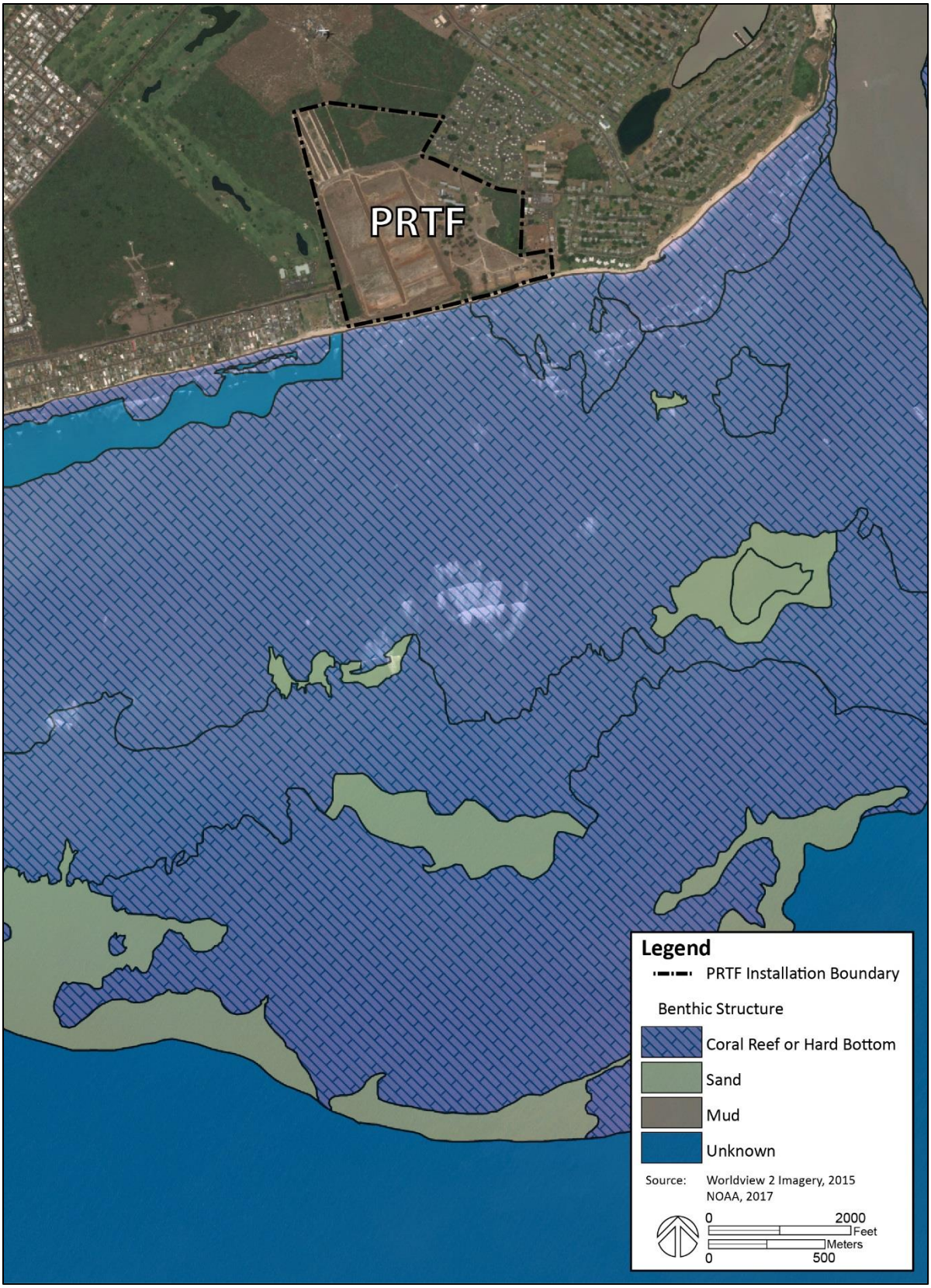


Figure 3-3 Benthic Structure in the PRTF Nearshore

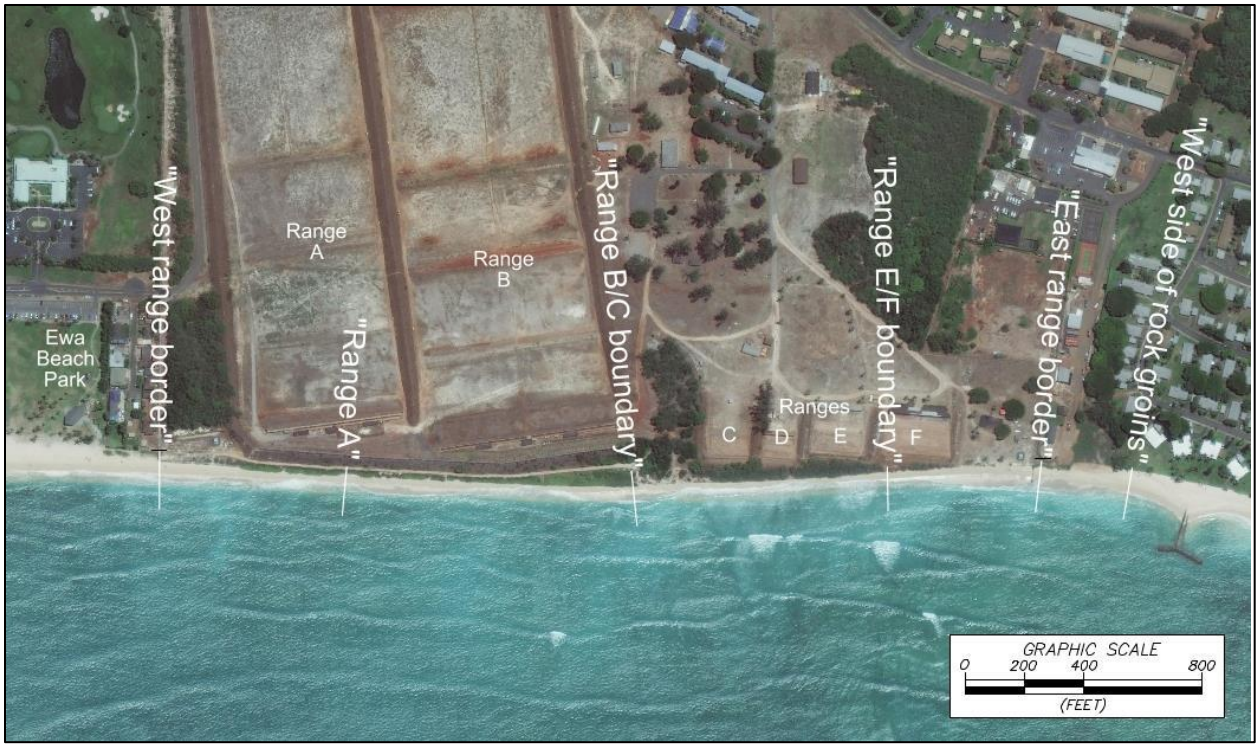


Figure 3-4 Shoreline Profile Locations

Table 3-1 Summary of Shoreline Profile changes from 2003 to 2017

Shoreline profile location	*Years surveyed*	*Description of shoreline profile change*
West range boundary	2003, 2006, & 2014	25-foot seaward movement of the beach crest between 2003 and 2006, then no significant change in the beach from 2006 to 2014
Range A	2013 – 2017, & 2019	28-foot landward retreat in the first two years post-construction, but remained nearly unchanged for years three and four (2016 and 2017). In 2019, the beach crest had moved five feet seaward of its 2017 location.
Range B/C boundary	2003, 2006, 2013 – 2017, & 2019	No significant change over the 11 year period from 2003 to 2017. In 2019, the beach crest had moved five feet seaward of its 2017 location.
Range E/F boundary	2013 – 2017, & 2019	Small seaward movement of the beach face below the 8+ foot elevation during the year following the Iroquois Point beach project construction; the shoreline profile moved 25 feet seaward by 2016, and then lost 10 feet of this gain by 2019. Net 15 foot seaward accretion of sand from 2013 to 2019.
East range boundary	2003, 2006, & 2014	Small landward recession of the beach crest above the +8 foot elevation between 2006 and 2014, no change in the beach face below the +8 foot elevation.
West side of rock groin	2013 – 2017, & 2019	Significant seaward movement of the beach crest (50 feet) by 2016. During an erosion event prior to the 2017 survey the beach receded about 25 feet, but at the time of the 2019 survey the beach had recovered from this erosion event.

Source: NAVFAC HI, 2015, & Sea Engineering Inc., 2017

The profile immediately west of the new rock groin and the profile at the Range E/F boundary showed significant accretion and seaward movement of the beach over the three-year post construction period, indicating that the rock groin had been trapping sand and thus benefiting the PRTF eastern shoreline by preventing sand loss to the east. During an erosion event prior to the 2017 survey the beach receded about 25 feet, but at the time of the 2019 survey the beach had recovered from this erosion event. The shoreline profile fronting Range A showed significant shoreline retreat in the two years after construction of the Iroquois Point groins, but surveys showed little change in the following two years (2016 and 2017) By 2019 the surveys showed the beach crest had moved five feet seaward from its 2017 location.

In addition to analyzing recent shoreline changes at PRTF, the Puuloa Shoreline Erosion Study also modeled potential future shoreline changes due to rising sea levels. Sea level rise is expected to result in shoreline changes, shifting the shoreline profile higher and likely landward. The study modeled potential future shoreline changes over a 50-year period based on three sea level rise scenarios. The results of their model are provided in Table 3-2. While the results have a significant range, they all suggest that the shoreline is likely to retreat as sea levels rise (NAVFAC HI, 2015).

Table 3-2 Projected Shoreline Profile Change Due to Sea Level Rise (Year 2050)

Sea Level Rise Scenario	*Projected Sea Level Rise (feet)*	*Projected Inshore Shift of the Beach Crest (feet)*			
		West Range	*Range A*	*Range B/C*	*Range E/F*
USACE low scenario	0.25	2.0	1.8	2.1	1.4
USACE medium scenario	0.68	6.5	4.2	5.1	4.0
USACE high scenario	2.03	19.0	13.1	16.3	11.8

Source: NAVFAC Hawaii 2015

3.3.2 Environmental Consequences

This analysis focuses on unique geological resources or landmarks and the continuation of soils suitability for current and planned land uses within the project area.

3.3.2.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur and shoreline erosion would not be addressed at PRTF. If shoreline erosion were to continue at its current rate, especially at ranges A and B, wave action would likely begin to erode the fast land directly inland from the beach, including the range impact berms. Erosion of the fast land could eventually undermine and destabilize the range impact berms. Therefore, future negative impacts to geological resources would likely occur under the No-Action Alternative.

3.3.2.2 Preferred Alternative: Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

The study area encompasses the proposed construction and ground disturbance areas related to the Preferred Alternative. During the design phase, geotechnical borings would be taken along the route of the proposed sheet pile to determine the soil profile. The results of the geotechnical investigation would aid in determining the method used to install the sheet piles. For instance, vibratory drivers would not be used for installation if the investigations find that the soils have a high potential for liquefaction. If

the investigations find primarily coral deposits along the proposed sheet pile route, predrilling may be required prior to installation.

During site preparation, surface vegetation in the areas to be disturbed would be cleared and grubbed (i.e., roots and stumps extracted). Along the proposed sheet pile route, grading would be required to allow access and provide a work area for the construction equipment. The sheet pile would be installed at the ocean-side toe of the impact berm, between the berm and the existing unpaved access road. The unpaved road would allow access for the installation equipment and would minimize the amount of grading required. In areas where shoreline erosion is already impacting the access roadway, additional grading may be required to ensure safe access and work areas for construction. BMPs would be utilized to mitigate potential impacts from the grading and site preparation activities.

Ground disturbance during construction would include the relocation of range components, support facilities, and utilities associated with range retreat; installation of the sheet pile; ground preparation for vegetation restoration; and miscellaneous site projects (i.e., protective fencing, access roads, and laydown areas). For the relocation of loadbearing foundations associated with range retreat, the ground would be excavated and compacted at the proposed locations. To the maximum extent practicable, the earthen materials that comprise the existing range berms would be moved and reused to form the new berms for the retreated ranges, but additional soils and/or fill may be required to ensure that the relocated range berms provide the necessary coverage of the retreated ranges. To the extent possible, earthwork would be balanced to maintain existing drainage patterns. Ground-altering construction activities would comply with all applicable regulatory requirements. An NPDES Permit, as required, would be obtained from the Hawaii Department of Health, and BMPs would be implemented to control soil erosion and sedimentation during construction activities.

To mitigate any potential negative impacts from the construction process, shoreline vegetation restoration and landscape repair – utilizing native species to the maximum extent practicable - would be conducted in any areas damaged by the sheet pile construction, including an area extending at least 15 to 20 feet on either side of the proposed sheet pile if space allows. Vegetation restoration would extend along the entire PRTF shoreline, beyond the limits of the proposed sheet pile. Vegetation restoration would include ground preparation, planting, temporary irrigation, and maintenance. Restored vegetation would be installed over a bio-degradable erosion-control fabric. Vegetation restoration would mitigate potential negative impacts from the construction process, and would positively impact geological resources by protecting the PRTF shoreline against potential future erosion. To minimize manmade erosion over time at the training facility, the Preferred Alternative also includes landscape treatment consisting of planting, protective fencing, and walkways. These solutions would establish foot-traffic control for beach users and discourage further development of informal paths which contribute to erosion. These improvements have been designed to enhance the PRTF shorelines' natural defense mechanisms against erosion. However, if the PRTF shoreline erodes in the future in spite of the above efforts, the proposed sheet pile would serve as the last line of defense to protect the PRTF ranges.

Should future shoreline erosion at PRTF extend to the proposed sheet pile, Ranges A & B would be protected from this erosion, but the beach fronting the sheet pile could slowly be lost to scour and sand migration if the shoreline erosion encroached further inland. To avoid an abrupt end of the proposed sheet pile, it would be angled away from the shoreline at both the west and east ends (Figure 2-1). This "rounding off" of the proposed sheet pile would be intended to minimize potential impacts to adjacent shorelines, and would protect the sheet pile from erosion working its way back behind the structure.

The west end of the proposed sheet pile would end approximately 230 feet from the west installation boundary. This buffer area would further serve to mitigate any potential future impacts to adjacent property owners along the shoreline.

Numerical modeling conducted during the design of the Iroquois Point Beach Nourishment and Stabilization Project suggests that the predominant longshore transport is to the east toward the Pearl Harbor entrance channel, and that the sand was previously being transported into the channel and being lost to the system. Since the completion of the Iroquois Point Project, the sandy shoreline has been rapidly accreting along the west side of the westernmost groin (at PRTF's east end), which would appear to confirm that the groin is catching sand from this predominant west to east longshore sand transport. This west to east longshore transport, coupled with the buffer at the west end of PRTF, suggests that even if shoreline erosion extends to the proposed sheet pile, the sheet pile would not contribute to shoreline erosion of the public shoreline to the west of the PRTF boundary. Future shoreline erosion associated with sea level rise and other natural shoreline processes could very well impact the PRTF and adjacent shorelines, but the Preferred Alternative is not expected to significantly contribute to shoreline erosion or beach loss outside of the PRTF installation boundary.

Therefore, implementation of the Preferred Alternative would not result in significant impacts to geological resources.

3.3.2.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

The study area encompasses the proposed construction and ground disturbance areas related to Alternative 2. Alternative 2 would have similar no significant impacts to water resources similar the Preferred Alternative.

Due to the additional construction required to install the sheet pile along Ranges C-F, grading and ground disturbance associated with Alternative 2 would be greater than the Preferred Alternative. For Ranges C-F, there is no existing access road on the ocean side of the berms. Therefore, grading would be required to provide access for construction vehicles to install the sheet pile. At Ranges C and D, there is sufficient width of fast land between the shoreline and the toe of the existing impact berms to grade a construction access way, so the installation of the sheet pile could be completed with or without the retreat of the ranges. At Ranges E and F, there is no longer sufficient width of fast land between the shoreline and the toe of the existing impact berm to allow for grading of a construction access way. Therefore, at this location installation of the sheet pile would be dependent on the retreat of Ranges E and F to create sufficient space between the shoreline and the toe of the new impact berms. BMPs would be utilized to mitigate potential impacts from the grading and site preparation activities.

Should future shoreline erosion at PRTF extend to the proposed sheet pile, Ranges A - F would be protected from this erosion, but the beach fronting the sheet pile could slowly be lost to scour and sand migration if the shoreline erosion encroached further inland. To avoid an abrupt end of the proposed sheet pile, it would be angled away from the shoreline at both the west and east ends (Figure 2-1). This "rounding off" of the proposed sheet pile would be intended to minimize potential impacts to adjacent shorelines, and would protect the sheet pile from erosion working its way back behind the structure. Both ends of the proposed sheet pile would end well short of the east and west installation boundaries. At the west, the installation boundary is approximately 230 feet from the west end of the proposed sheet pile. At the east end, the installation boundary is approximately 240 feet from the end of the

proposed sheet pile. These buffer areas would further serve to mitigate any potential future impacts to adjacent shorelines.

Therefore, implementation of Alternative 2 would not result in significant impacts to geological resources.

3.4 Cultural Resources

This discussion of cultural resources includes prehistoric and historic archaeological sites; historic buildings, structures, and districts; and physical entities and human-made or natural features important to a culture, a subculture, or a community for traditional, religious, or other reasons. Cultural resources can be divided into two major categories:

- Archaeological resources (prehistoric and historic) are locations where human activity measurably altered the earth or left deposits of physical remains.
- Architectural resources include standing buildings, structures, landscapes, and other built-environment resources of historic or aesthetic significance.

3.4.1 Regulatory Setting

Cultural resources are governed by federal laws and regulations, including the National Historic Preservation Act (NHPA), Archeological and Historic Preservation Act, American Indian Religious Freedom Act, Archaeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1990. Federal agencies' responsibility for protecting historic properties is defined primarily by sections 106 and 110 of the NHPA. Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties. Section 110 of the NHPA requires federal agencies to establish—in conjunction with the Secretary of the Interior—historic preservation programs for the identification, evaluation, and protection of historic properties. Cultural resources also may be covered by state, local, and territorial laws.

3.4.2 Affected Environment

Cultural resources that are listed or eligible for listing in the National Register of Historic Places (NRHP) are "historic properties" as defined by the NHPA. The list was established under the NHPA and is administered by the National Park Service on behalf of the Secretary of the Interior. The NRHP includes properties on public and private land. Properties can be determined eligible for listing in the NRHP by the Secretary of the Interior or by a federal agency official with concurrence from the applicable State Historic Preservation Officer (SHPO). An NRHP-eligible property has the same protections as a property listed in the NRHP. Historic properties include archaeological and architectural resources.

The area of potential effect (APE) includes the entire length of the PRTF shoreline as well as the area approximately 300 feet inland from the shoreline where the short-distance ranges (Ranges C, D, E, and F) are located.

3.4.2.1 Archaeological Resources

An initial surface survey of PRTF by Tuggle and Wilcox (1998) did not uncover any archaeological sites, nor did additional surveys near the shoreline (Eakin 2012; Fong 2012; and Fong and West 2013). Although no archaeological sites have been identified within the boundaries of Puuloa RTF, a probable filled sinkhole was identified by Tuggle and Wilcox (1998) as "possibly culturally sensitive." The sinkhole is located on the north side of the range training facility and is not within the project APE. The area

around the shoreline as well as the area around the ranges has been extensively disturbed during construction of the ranges. Archaeological monitoring along the shoreline for installation of beach guard houses identified disturbed coralline beach sand with modern materials, such as aluminum cans, plastic, and lumbered wood down to about 50 cm below surface.

Archaeological investigations at Kapilina residential area east of PRTF did not uncover cultural deposits near the range (Magnuson et al. 2002). Examination of the stratigraphy revealed that most of the area consists of fill overlying either clean beach sand or limestone bedrock. Archaeological deposits were uncovered along the coast at Keahi Point, about 1,000 feet east of PRTF. This site, designated Site 5875, consists of a disturbed midden deposit that may be associated with 19th century historic structures that once stood along the coast.

3.4.2.2 Architectural Resources

The area that was to become PRTF was acquired by the Army between 1904 and 1905 as part of the Coastal Defense System of Oahu. By the end of 1915, the Marine Corps had established a 40-target rifle range at distances from 200 to 1,000 yards, as well as an 80-target pistol range, an officer and enlisted tent camp, and messing areas (Sobieranski, 1999). It was transferred to the Navy between 1915 and 1916 and became known as Puuloa Military Reservation. The Navy developed this area into a small arms range. By 1927, Puuloa Naval Reservation became known as Navy Rifle Range. It was maintained by the Marine Corps for rifle and pistol practice. By 1934, the range was known as the Marine Corps Rifle Range. During the 1930s, the range included a main rifle and machine-gun range (Range A), a secondary rifle range (Range B), a range for "free machine gunnery," a pistol range, a .22 caliber range, and a grenade court (U.S. Army Corps of Engineers 2001 in Will Chee and Mason Architects 2009:66). A pistol range (Range C) was added to the eastern portion of the range in 1941. Additional improvements to the ranges began in 1947 in order to support the use by the Marine Corps, Navy, and Army. Then, during the Vietnam era, Marine training intensified and a sniper school was established. The instructors developed the science of sniping, and men were taught to use telescopic sights and night-sighting equipment. The 1000 yard range supported the sniper school until 1979 when the school was transferred to Marine Corps Air Station, Kaneohe Bay (now called Marine Corps Base Hawaii).

Three World War II concrete bunkers are located along the southwestern side of the shoreline north of the unimproved access lane. These bunkers (no facility numbers) are near the project APE. The Proposed Action would avoid these features so that they would not be impacted. These bunkers are eligible for listing on the National Register of Historic Places. Although little is known about these bunkers since they do not appear on installation plans (defensive structures from World War II area are rarely found on wartime facilities maps), the bunkers were part of an island-wide coastal defense development construction program undertaken in Hawaii directly following the 7 December 1941 attack and are associated with the U.S. response to that attack, which included preparation for possible future strikes.

The project APE includes Ranges C, D, E, and F. These ranges were constructed between 1960 and 1962 and have been determined not eligible for listing on the National Register of Historic Places (NRHP) because they are not distinctive and do not have any Cold War significance (Mason Architects et al, 2014). Several facilities associated with these ranges include Facilities 19, 175, 177, 179, 629, and 630. These facilities also have been determined not eligible for listing on the NRHP. In addition to these facilities, there are several modern tension-fabric structures for holding targets and wooden personnel pavilions that do not have facility numbers. These facilities are not eligible for listing on the

NRHP because they fail to meet the criteria of being distinctive, having historic significance, or being more than 50 years of age. The Beach Guard Bunkers on the east (B629) and west (B630) sides of the range will remain; the other buildings (Facilities 19, 175, 177, and 179) will likely need to be demolished and rebuilt.

3.4.2.3 Cultural Gathering Rights

PRTF lies along the central coast of the traditional land area or *ʻili* of Puuloa in the *ahupuaʻa* of Honouliuli, the largest and westernmost *ahupuaʻa* in the traditional district of Ewa. PRTF is located to the west of Keahi Point, which was known as a location where the valued resources of, *lipoa*, seaweed and *ʻōʻio,* fish, could be collected (Kelly, 1991). This suggests that it would have been a likely location for fishing camps, as well as possible late pre-Contact permanent settlement (Marine Corps Base Hawaii, 2014). By the mid nineteenth century, the major land use in the *ʻili* of Puuloa was the *Puuloa Salt Works,* with salt ponds located to the northeast of PRTF in the area currently occupied by the Kapilina residential area. By 1915, the USMC had established a Marine Corps 40-target rifle range at distances from 200 to 1,000 yards, as well as an 80-target pistol range, and support facilities. PRTF site has served as a military training range ever since, and public access to PRTF, including the shoreline and the nearshore waters, has been restricted. Currently, no Native Hawaiian or other ethnic group's cultural customs and traditions exercised for subsistence, cultural or religious purposes are known to be practiced within the project area.

3.4.3 Environmental Consequences

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may be the result of physically altering, damaging, or destroying all or part of a resource, altering characteristics of the surrounding environment that contribute to the importance of the resource, introducing visual, atmospheric, or audible elements that are out of character for the period the resource represents (thereby altering the setting), or neglecting the resource to the extent that it deteriorates or is destroyed. Indirect impacts are those impacts caused by the action but are later in time or farther removed in distance, or that may be induced by changes caused by the action.

3.4.3.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur and there would be no change to cultural resources. Therefore, no impacts to cultural resources would occur with implementation of the No-Action Alternative.

3.4.3.2 Preferred Alternative: Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

In accordance with Section 106 of the NHPA, the USMC consulted with the Hawaii SHPO, the Office of Hawaiian Affairs, the Oahu Island Burial Council, the Temple of Lono, and the Historic Hawaii Foundation (see correspondence in Appendix B). The USMC determined that the Preferred Alternative would result in no historic properties affected in accordance with Section 106 Implementing Regulations at 36 CFR 800.4(d)(1) based on the following: 1) the area along the shoreline, including the access lane was previously disturbed during initial base construction and during road improvements and impact wall construction in 1997; 2) the area within and around Ranges C, D, E, and F was disturbed during construction activities in the 1960s; 3) no archaeological sites or deposits have been identified along the shoreline of Puuloa RTF; 4) the sand along the shoreline migrates seasonally; 5) the World War II

bunkers located along the shoreline would not be impacted by the shoreline improvement project; and 6) in the unlikely event that Native American Graves Protection and Repatriation Act (NAGPRA) cultural items (including human skeletal materials) are discovered, all work in the vicinity would stop and the items would be stabilized and protected. Treatment would proceed under the authority of NAGPRA. The SHPO concurred with the USMC's determination via letter dated June 30, 2017 (see Section 106 consultation correspondence in Appendix B).

Based on its historical and current land use, there are no Native Hawaiian or other ethnic group's cultural customs and traditions exercised for subsistence, cultural or religious purposes known to be practiced within the project area. The Preferred Alternative would not impact traditional Hawaiian, or other ethnic group's, rights related to gathering, access, or other customary activities exercised for subsistence, cultural and religious purposes because construction activities would take place in PRTF-controlled limited access areas.

Therefore, implementation of the Preferred Alternative would not result in significant impacts to cultural resources.

3.4.3.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

Similar to the Preferred Alternative, Alternative 2 would have insignificant impacts to cultural resources. The full extent of shoreline stabilization improvements proposed under Alternative 2 was included in the USMC's Section 106 consultation. The USMC determined that there would be no historic properties affected historic properties based on the items described in the previous section.

Alternative 2 would have similar insignificant impacts to Native Hawaiian or other ethnic group's cultural customs and traditions exercised for subsistence, cultural or religious purposes as the Preferred Alternative. Alternative 2 would not impact traditional Hawaiian, or other ethnic group's, rights related to gathering, access, or other customary activities exercised for subsistence, cultural and religious purposes because construction activities would take place in PRTF-controlled limited access areas.

Therefore, implementation of Alternative 2 would not result in significant impacts to cultural resources.

3.5 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 three major categories: (1) terrestrial vegetation, (2) terrestrial wildlife, and (3) marine species. Threatened, endangered, and other special status species—if any—are discussed in their respective categories. Table 3-3 lists all special status species that are potentially present.

3.5.1 Regulatory Setting

Special-status species, which for the purposes of this EA are those species listed as threatened or endangered under the Endangered Species Act (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 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 Integrated Natural Resources Management Plan 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.

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 include a requirement that the Armed Forces must confer with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate adverse effects of the Proposed Action if the action will have a significant negative effect on the sustainability of a population of a migratory bird species.

The Magnuson-Stevens Fishery Conservation and Management Act provides for the conservation and management of the fisheries. Under the Magnuson-Stevens Fishery Conservation and Management Act, essential fish habitat consists of the waters and substrate needed by fish to spawn, breed, feed, or grow to maturity.

The CZMA establishes a federal-state partnership to provide for the comprehensive management of coastal resources. Coastal states and territories develop management programs based on enforceable policies and mechanisms to balance resource protection and coastal development needs. Actions implemented on federal lands must ensure consistency with these plans and programs to the maximum extent practicable.

3.5.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under biological resources at the project area at PRTF.

3.5.2.1 Terrestrial Vegetation

Puuloa Training Facility is an entirely built or modified landscape with no notable ecological communities on or adjacent to the property. Historically, the area was cleared with heavy equipment, and lacks native vegetation cover. There are a few scattered native species on the beach, and landscaping consists of non-native trees, shrubs and grasses that are irrigated and maintained in developed areas. Vegetation characteristic of this general area is open tropical dry forest. Observed native shoreline vegetation includes *naupaka* (*scaevola taccada*), *pōhuehue* (*impomea pres-caprae*) ‘*aki*‘*aki* grass (*Sporobolus virginicus*), *kou* (*Cordia subcordata*), and *milo* (*Thespesia populnea*). Non-native vegetation generally consists of scattered *kiawe* (*Prosopis pallida*), *koa haole* (*Leucaena leucocephala*), pickleweed (*Batis maritima*), buffel grass (*cenchrus ciliaris*) and fingergrass (*Chloris spp.*).

3.5.2.2 Terrestrial Wildlife

A variety of non-native mammals, reptiles, and birds occur at PRTF including feral cats (*Felis catus*), roof rats (*Rattus rattus*), cane toads (*Bufo marinus*), and cattle egrets (*Bubulcus ibis*). Several indigenous migratory shorebirds can frequently be seen on the grassy area and the shoreline, including wandering tattler, *ʻulili* (*Tringa incana*); ruddy turnstone, *ʻakekeke* (*Arenaria interpres*); pacific golden plover, *kōlea* (*Pluvialis fulva*); and sanderling, *hunakai* (*Calidris alba*). All of these species are protected by the Migratory Bird Treaty Act (MBTA). The Hawaiian endemic short-eared owl, *pueo* (*Asio flammeus sandwichensis*), listed as endangered by the State of Hawaii for the island of Oahu, may occasionally use the open portions of the training area for hunting and loafing. No habitat measures are required for the wildlife species on the property.

3.5.2.3 Marine Species

The project site and the nearshore waters off of PRTF are not designated as critical habitat by the Federal Government or the State of Hawaii for endangered species. However, ESA-listed species have been known to occur in the area (Table 3-3). Hawaiian monk seals have been infrequently reported as hauling out along the shoreline of PRTF. Protection zones are established and signage is posted around seals that have hauled out in order to limit interactions with humans. The Hawaiian monk seal (*Monachus schauinslandi*) is the only pinniped found in Hawaii and is endemic to Hawaii. The federally-endangered hawksbill sea turtle (*Eretmochelys imbricata*), and the federally-threatened green sea turtle (*Chelonia mydas*) are known to occur in the nearshore waters off of PRTF and Iroquois Point (Joint Base Pearl Harbor-Hickam, 2011).

Marine biological surveys were conducted for the Iroquois Point Beach Stabilization and Nourishment EA in 2005, including one transect that was located directly offshore from the east boundary of PRTF. Along this transect, 22 of the 24 species recorded were algae, which were all found on limestone outcrops. The other two species encountered included a sea cucumber and a cone shell (Joint Base Pearl Harbor-Hickam, 2011).

Table 3-3 Threatened and Endangered Species Known to Occur or Potentially Occurring in the Study Area and Critical Habitat Present in Study Area

Common Name	*Scientific Name*	*Federal Listing Status*	*State Listing Status*	*Critical Habitat Present?*
Hawaiian short-eared owl	*Asio flammeus sandwichensis*	NL	SE	no
Hawaiian monk seal	*Monachus schauinslandi*	FE		no
Hawksbill sea turtle	*Eretmochelys imbricata*	FE	SE	no
Green sea turtle	*Chelonia mydas*	FT	ST	no

Selections for Listing Status Column include: C = candidate species for federal ESA listing; FE = federal endangered; FT = federal threatened NL = not listed; SE = State endangered SSC = Species of Special Concern (State designation); ST = State threatened; SAT = Listed due to similarity of appearance to threatened species (These species are not biologically threatened or endangered and are not subject to ESA section 7 consultation.); X = present.

Hawaiian Monk Seal

The endangered Hawaiian monk seal occurs in low densities in the main Hawaiian Islands year-round. They feed on a variety of prey on or near the seafloor. Tagging studies have found that seals in the main Hawaiian Islands dive up to 489m (1,604 ft); however, most dives occur at depths shallower than 200 m (656 ft; NOAA, 2014). Adults may reach lengths of 2.3 m (7.5 ft), weighing up to 273 kilograms (kg) (600 pounds).

At Iroquois Point, immediately adjacent to the PRTF on the east, there have been 76 documented seal sightings between 1993 and 2009 (Joint Base Pearl Harbor-Hickam, 2011). A NMFS Pacific Islands Fisheries Science Center (PIFSC) internal report summarized "Hawaiian Monk Seal Use of Pearl Harbor and the Surrounding Area from 2003- 2012," listing 473 sightings of Hawaiian Monk Seals between Ewa Beach and Hickam Air Force Base; three quarters of these sightings were attributed to seventeen individual seals, and the greatest number of sightings was between Iroquois Point and Ewa Beach (Wurth, 2013). A 2013-2015 NAVFAC study did not document monk seal sightings during 90 hours of effort for both beach and shore survey work at various locations around Pearl Harbor, including a shore survey site adjacent to PRTF (Richie et al., 2016). On the adjacent Iroquois Point Beach, NOAA volunteers documented a total of twenty Hawaiian monk seal haul outs in the year 2016; all identified seals were the same seal, an adult female named "Rocky" (Johanos, 2017). "Rocky" has also been documented near the Puuloa Underwater Range waters on more than one occasion (Aschettino et al., 2013).

Hawksbill Sea Turtle

The endangered hawksbill sea turtle is a medium-sized turtle which ranges between 25 and 35 inches in carapace length. Hawksbills feed primarily on sponges in coral reef habitats. The animals occur in very low numbers in the Hawaiian Islands, and nesting in the islands occurs mainly on the Big Island of Hawaii (NMFS, 2018).

Hawksbills are rare in Oahu waters, and nesting activity would not be expected in PRTF. Hawksbill presence in the water would be rare. Sea turtle stranding data supports the low occurrence of this species in the area. Of all known sea turtle strandings reported to the Marine Turtle Research Program of NMFS PIFSC between 1982 and 2014 for the greater Pearl Harbor area, only one hawksbill stranded in the area, but it was not at PRTF (the turtle stranded at Ford Island) (NMFS, 2014).

Green Sea Turtle

Green sea turtles are found regularly in nearshore waters around the main Hawaiian Islands, and feed mainly on seagrasses and algae. Mean carapace length in the MHI is estimated for nesting females to be 89.21–91.69 cm (2.9-3 ft; Piacenza et al., 2016). Green sea turtle nest-laying and hatchling emergence activities often occur at night. Green sea turtles nest mainly in the Northwestern Hawaiian Islands, but have been increasingly nesting in the main Hawaiian Islands.

Shore and vessel-based studies from 2013-2015 documented a higher number of sea turtles at the mouth of Pearl Harbor, with fewer numbers noted at survey stations toward the west near PRTF. PRTF was not specifically included in this study, but is visible from some of the survey area. The data may support a year-round presence of green and unidentified sea turtles (which may have been green sea turtles) in Pearl Harbor, with potential peaks in winter, and a decline in numbers in the spring. Some evidence for site fidelity among individual turtles was also noted (Richie et al., 2016). Stranding data supports that, while green sea turtles may be found in higher numbers near the mouth of Pearl Harbor, fewer may be present in the vicinity of PRTF (NMFS, 2014). A green sea turtle nest was documented in 2017 west of the PRTF on Ewa Beach, however, it has been noted that this was an unusual event for Ewa Beach. The eggs did not hatch, possibly due to inundation of the nest in the local tides. Of all strandings reported to the Marine Turtle Research Program of NMFS PIFSC between 1982 and 2014 for the Pearl Harbor area, only one green sea turtle was noted as stranding on the beach fronting PRTF, while there were various strandings of green sea turtles in the adjacent Iroquois Point area during this time. This could also be due to the lack of frequent human presence on the beach when compared to recreational beaches, however, the beach is routinely assessed prior to commencing activities at the range to ensure that no one will be present, and sea turtles on the beach would be recorded.

Essential Fish Habitat

The Western Pacific Regional Fishery Management Council (WPRFMC) has approved a Fisheries Management Plan (FMP) for Hawaii that designates all the ocean waters surrounding Oahu, from the shore to depths of over 100 feet, including waters fronting PRTF, as “Essential Fish Habitat” (EFH). The WPRFMC has also identified “Habitat Areas of Particular Concern” (HAPC). Waters off PRTF are not within a HAPC.

The PRTF shoreline is directly exposed to southern swell, refracted trade wind waves, Kona storm waves, and the infrequent hurricane. The morphology, orientation, and exposure of the beach the firing range is similar to the beach system fronting the Ewa Beach residential neighborhood (NAVFAC HI, 2015). The nearshore environment of PRTF is not conducive to successful coral recruitment, due primarily to the movement of sand. The shoreline is fronted by a wide and shallow fringing reef. Water depths less than about 5 feet extend over 1,000 feet from the shore, with the 12-foot depth contour about 2,200 feet offshore, and the 5-foot depth contour more than 6,000 feet offshore. Sediment transport in the area occurs primarily by a west to east longshore current (NAVFAC HI, 2015). Approximately one mile to the east of the project site is the 1,000-foot-wide and 50-foot-plus-deep Pearl Harbor entrance channel.

A study conducted in the direct footprint of the adjacent Iroquois Point groin area found that coral cover was less than 0.03% across the area, and consisted mainly of *Pocillopora damicornis*, a hardy coral common to the nearshore waters of Hawaii. The average size of the corals found were 5.9 in2. Given that coral cover was less than 1/10th of one percent, the small size of the colonies, and the scattered distribution, the corals were not determined to be functioning ecologically as a coral reef. In addition,

the corals present were very common species, and none of the colonies are remarkable, based upon their size and growth patterns. Few fish were observed; the most well represented fish families at Iroquois Point were the surgeon fishes (*Acanthuridae*) with nine taxa, the butterfly fishes (*Chaetodontidae*) with six taxa, and the wrasses (*Labridae*) with five taxa (Joint Base Pearl Harbor-Hickam, 2011).

A shoreline erosion engineering study at PRTF found that bottom conditions seaward of the existing shoreline consist primarily of a hard limestone (fossil calcareous reef rock) substrate that underlies the entire project reach. Over the limestone are various combinations of sand deposits, coral rubble and cobbles, and reef rock outcrops. Bottom surface composition is approximately 40% sand, 40% rubble (gravel, cobbles, rocks, debris), and 20% hard limestone reef rock. The sand is typically a light sand veneer, but also fills depressions in the hard substrate. No living corals were observed along a profile swim, which extended approximately 150 feet from the shore. Sessile growth observed was comprised mainly of soft algae on the fossil reef complex (NAVFAC HI, 2015). Surveys for nearshore marine biological resources in the western portion of the Iroquois Point area, immediately east of PRTF, documented a "wave scoured sand bottom with sparsely distributed small limestone outcrops covered by algal growth but with few other organisms present" in the portions of the area that are adjacent to PRTF, and no fish were observed (Joint Base Pearl Harbor-Hickam, 2011).

3.5.3 Environmental Consequences

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

3.5.3.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur and the shoreline would remain vulnerable to potential future shoreline erosion. If shoreline erosion were to continue at its current rate, especially at ranges A and B, wave action would likely begin to erode the fast land directly inland from the beach, including the range impact berms. Erosion of the fast land would decrease water quality in the nearshore environment and result in negative impacts to biological resources.

3.5.3.2 Preferred Alternative: Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

The study area for the analysis of effects to biological resources associated with the Preferred Alternative includes the project area of the proposed shoreline stabilization improvements and the nearshore waters off of PRTF.

Vegetation

Existing vegetation in the project area consist of mostly non-native shrubs and grasses. Site preparation and construction activities would involve the clearing of existing vegetation. However, these short-term negative impacts to vegetation would be temporary in duration. The Preferred Alternative also includes the revegetation of the shoreline area including any areas that are cleared during the construction process.

Vegetation restoration would include ground preparation, planting, temporary irrigation, and maintenance. Restored vegetation would be installed over a bio-degradable erosion-control fabric, and would incorporate native plant species to the maximum extent practicable. To prevent manmade erosion over time at the training facility, the Preferred Alternative also includes landscape treatment

consisting of planting, protective fencing, and walkways. The vegetation restoration and landscape repair included in the Preferred Alternative would result in beneficial impacts to vegetation in the project area.

Terrestrial Wildlife

The construction of the Preferred Alternative would include the clearing of vegetation, which would disturb wildlife residing on the project site. However, the Preferred Alternative site does not provide unique or sensitive habitat and wildlife that may be disturbed during construction could easily relocate to similar habitat in adjacent areas. Once the shoreline stabilization measures have been implemented, the vegetation restoration would repair any areas damaged by the construction process, and there would be no net loss of habitat for wildlife.

Marine Species

Relocation of the short-distance ranges would have beneficial long term impacts, since it would move the currently-existing berms further from potential future sea level rise, and prevent degradation to the berms and reflection of wave energy which could impact the shoreline. The revegetation component of the Preferred Alternative would reduce erosion, and assist in shoreline stabilization.

The Preferred Alternative would also involve the installation of sheet pile along the two long-distance ranges. A consequence of the sheet pile installation could be scouring of the beach due to the reflective wave activity; this would only begin to occur if the active wave zone reaches the sheet pile, and the sheet pile is proposed to be installed behind an existing fast land, elevated (and unpaved) access road. Studies from the University of Hawaii found that hardening the shoreline of Oahu where there is chronic coastal erosion causes narrowing and loss of the beach (Fletcher, Mullane, & Richmond, 1997). While erosion and accretion rates along the shoreline of PRTF have been variable over time, continued sea level rise noted in the area could eventually bring the water level to the current location of the range impact berms, regardless of current trends of erosion/accretion at various portions of the range, at which time the impact berms and their contents (e.g., dirt, lead) would begin eroding into the sea, compromising the range use, and negatively impacting water quality in the area.

ESA-listed Species

In accordance with ESA Section 7, the USMC conducted informal consultation with USFWS and NMFS regarding potential effects on the green sea turtle, the hawksbill sea turtle, and the Hawaiian monk seal. Due to the low likelihood of occurrence of hawksbill sea turtles in the vicinity of the project area, the USMC determined and NMFS concurred that potential impacts from the project are discountable, resulting in no effect to hawksbills. The potential impacts from the Preferred Alternative on monk seals and green sea turtles species are determined by the stressors that they may be exposed to as a result of the implementation of the Preferred Alternative. Potential stressors for marine ESA species include acoustic disturbance from construction activities; visual disturbance from construction activities; exposure to sedimentation, waste, and discharge during construction; and habitat loss stemming from shoreline changes. In consultation with the USFWS and NMFS, the USMC developed a range of BMPs to address these potential stressors and avoid or minimize potential effects on green sea turtles and Hawaiian monk seals (Table 3-4).

Table 3-4 Biological Resources BMPs

#	*Species*	*Potential Stressors Addressed*
1	During all construction activities, surveys shall be made prior to the start of work each day, and prior to resumption of work following any break of more than one half hour, checking for protected species presence, and also disturbance to the beach indicative of nighttime sea turtle nesting.	ESA: A, V EFH: NA
2	Personnel shall remain alert for marine mammals and sea turtles before and during construction. Do not commence operations if a marine mammal or sea turtle is observed either hauled out or in nearshore waters within 150 feet (45.5 m) of operations. If a monk seal/pup pair is seen, a minimum 300 foot (91 m) buffer will be observed with no humans approaching them. Wait 30 minutes after the last sighting of the marine protected species on land or in the nearshore water before recommencing activities.	ESA: A, V EFH: NA
3	All work shall be postponed or halted when ESA-listed marine species are within 150 feet (or 300 feet for seal/pup pairs) of the proposed work, and shall only begin/resume after the animals have voluntarily departed the area.	ESA: A, V EFH: NA
4	All personnel will stay more than 150 ft (45.5 m) from monk seals and sea turtles that haul out on the beach.	ESA: A, V EFH: N/A
5	If marine protected species are seen, record information on the species, numbers, behavior, time of observation, location, start and end times of project activity, sex or age class (when possible), and any disturbances (visual or acoustic) by the construction project.	ESA: A, V EFH: NA
6	Personnel will not perform work on the beach if turtle nesting is known or suspected to be occurring.	ESA: A, V EFH:
7	Personnel will not perform work on the beach during the time that a Hawaiian monk seal is hauled out if the work would be so loud as to expose them to 100 dB re 20 micropascals (µPa) in-air.	ESA: A, V EFH: NA
8	Special attention will be given to verify that no ESA-listed marine animals are in the area where equipment or material is expected to contact the substrate before that equipment/material may enter the water.	ESA: A, V EFH: NA
9	Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed marine species.	ESA: A, V EFH:
10	A contingency plan to control toxic materials is required.	ESA: SWD EFH: SWD
11	Appropriate materials to contain and clean potential spills shall be stored at the work site, and be readily available.	ESA: SWD EFH: SWD
12	The project manager and heavy equipment operators shall perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations shall be postponed or halted should a leak be detected, and shall not proceed until the leak is repaired and equipment cleaned.	ESA: SWD EFH: SWD
13	All project-related materials and equipment placed in the water shall be free of pollutants.	ESA: SWD EFH: SWD
14	Fueling of land-based vehicles and equipment shall take place at least 100 ft away from the water, preferably over an impervious surface.	ESA: SWD EFH: SWD
15	Turbidity and siltation from project-related work shall be minimized and contained through the appropriate use of erosion control practices, effective silt containment devices, and the curtailment of work during adverse weather and tidal/flow conditions. If turbidity will result from construction activities, silt curtains shall be used to contain turbidity to the minimum area possible.	ESA: SWD EFH: SWD, ST
16	A plan shall be developed to prevent debris and other wastes from entering or remaining in the marine environment during the project.	ESA: SWD EFH: SWD, ST

Selections for potential stressors column include: A = Acoustic disturbance; NA = Not applicable; V = Visual disturbance; SWD = Sedimentation, waste, and discharge;
ST = Sediment transport

Acoustic Disturbance

Acoustic stressors from construction may affect monk seals or green sea turtles which may be present in nearshore waters (impacts to sea turtles on the beach were evaluated under a separate USFWS consultation). While information regarding Hawaiian monk seal hearing is limited, evidence suggests that they may be less sensitive than that of other pinnipeds (NMFS, 2014). Sea turtles, as a general taxon, are not considered to be acoustically sensitive. This has resulted in fewer mitigation measures being applied to noise-producing operations for sea turtles than for marine mammals. One study documented sea turtles occurring close to impulsive sound sources which are within measured hearing range for sea turtles, with "no obvious behavioral avoidance" (Weir, 2007). Effects to animals occurring below the water are discountable, due to the limited transfer of sound between air and water.

Unweighted noise levels for impact hammers have been measured between 98 and 101 dB at a distance of 50 feet from 72-inch steel piles (Laughlin, 2011). It is not currently known what size the individual units of sheet pile proposed under this action may be, which would influence sounds levels during pile driving, however, a 100 dB re 20 micropascals (µPa) in-air sound mitigation zone will be identified and used as disturbance criteria for hauled out marine protected species or those at the surface in nearshore waters; BMPs as detailed in Section 4 will be employed to prevent disturbance to ESA-listed marine species. Resultantly, responses to acoustic disturbance are expected to be limited to temporary and insignificant behavioral responses, which would not impact individual animal fitness or have population-level effects. Sound levels would not be loud enough to impact nearby critical habitat adjacent to PRTF.

Effects to protected species in water or along the PRTF coastline, if any, would be limited to transient, brief startle responses to acoustic stressors, which would not significantly impact individual or population fitness. BMPs limiting sound exposure of monk seals to levels below 100 dB re 20 µPa in-air will ensure that potential impacts of acoustic stressors are insignificant. The USMC has determined that disturbance from acoustic stressors may affect, but is not likely to adversely affect the Hawaiian monk seals and the Central North Pacific Distinct Population Segment of the green sea turtle, due to effects being insignificant. Sound levels will not adversely modify Hawaiian monk seal habitat in areas adjacent to PRTF.

Visual Disturbance

Level of disturbance experienced may vary from species to species, and can also depend on factors such as an animal's level of habituation, and behavioral context (Smith et al., 2016). Monk seals could potentially return to water if disturbed while hauled out, or could leave the area if startled while in water. In the event that a seal or turtle were to be present in the area, BMPs would serve to reduce visual stressors to the animals (see Table 3-4). Operations would not occur if protected species are within 150 feet of construction. Resultantly, responses to visual disturbance are expected to be limited to temporary and insignificant behavioral responses, which would not impact individual animal fitness or have population-level effects, and visual stressors would not impact adjacent monk seal critical habitat in Ewa Beach.

Due to the use of BMPS, responses from monk seals and green sea turtles to construction activities are likely to be limited to curious inspection, or brief startle responses which would not be significant to the individual. The USMC has determined that visual stressors from the Preferred Alternative may affect, but are not likely to adversely affect Hawaiian monk seals and the Central North Pacific Distinct Population Segment of green sea turtles, due to effects being insignificant. Visual stressors will not adversely modify Hawaiian monk seal critical habitat on the adjacent shoreline.

Exposure to Sedimentation, Waste, and Discharge During Construction

Construction activity could increase storm water runoff and increase the potential for green sea turtles or monk seals to experience impacts from sedimentation, wastes, and discharges from the facility. BMPs will ensure that runoff is contained on-site during construction to protect water quality in nearshore waters adjacent to the PRTF shoreline. Also, any accidental hazardous waste spills will be contained and prevented from entering the marine environment. During construction the waterfront will be protected by silt fences and/or erosion control to prevent runoff during rainfall. After installation of the sheet piles and relocation of the short-distance ranges from the shoreline, the shoreline will be revegetated to prevent further shoreline erosion. Specific trails to access the shoreline will be established but the entire beach front will be vegetated. Patrol and facility vehicles will be restricted to the established vehicle path to prevent further erosion.

Due to the requirement for BMPs, exposure to increased runoff carrying sediment, waste, and discharge during construction may affect, but is not likely to adversely affect Hawaiian monk seals and green sea turtles because effects would be insignificant.

Habitat Loss Stemming from Shoreline Changes

The potential loss of approximately 1,500 feet of lateral shoreline (attributed to sea level rise, erosion, and impacts from sheet pile presence) is anticipated to result in only minor negative impacts to monk seals that would haul out in the area, and the action would not impact seals and sea turtles present in the nearshore waters. Displacement from the greater area is not expected to occur, since the shoreline of PRTF is currently only occasionally used as haulout for ESA-listed species. The shoreline of PRTF is narrow and offers little space for haulout due to shoreline erosion, the presence of the impact berms, and dense, thorny vegetation. The short-distance ranges front about 900 feet of shoreline. Relocating these ranges further from the shoreline can serve to benefit that amount of shoreline, allowing natural self-replenishment of the beach, and/or allowing further migration landward of the beach as sea levels rise, offsetting some of the potential negative impacts from the sheet pile armoring of shoreline in front of the long-distance ranges. In addition, the revegetation component of the Preferred Alternative will increase sand retention and reduce erosion rates across the entire range, which is about 3,000 feet. To avoid an abrupt end of the proposed sheet pile, it would be angled away from the shoreline at both the west and east ends. This “rounding off” of the proposed sheet pile would minimize potential impacts to adjacent shorelines, and would protect the sheet pile from erosion working its way back behind the structure. The end of the proposed sheet pile would end well short of the west installation boundary (approximately 230 feet from the west end of the proposed sheet pile). This buffer area would further serve to mitigate any potential future impacts to adjacent shoreline. Potential effects to Hawaiian monk seal critical habitat present outside of PRTF will thus be discountable, and no destruction or adverse modification of Hawaiian monk seal critical habitat will occur as a result of the Preferred Alternative.

The USMC has determined that habitat loss stemming from shoreline changes from the Preferred Alternative may affect, but is not likely to adversely affect ESA-listed species, because the impacts to listed species would be insignificant. Destruction or adverse modification of Hawaiian monk seal critical habitat is not likely to occur; the shoreline and waters off PRTF are not designated as critical habitat, and there is a discountable chance of impacts to critical habitat outside the boundaries of PRTF.

ESA Determinations Summary

Potential stressors to ESA-listed species from implementing the Preferred Alternative include acoustic disturbance; visual disturbance; exposure to sedimentation, waste, and discharge during construction; and habitat loss stemming from shoreline changes. In accordance with Section 7 of the Endangered Species Act (ESA) the USMC conducted informal consultation with NMFS and determined that the Preferred Alternative may affect, but is not likely to adversely affect species which could potentially encounter a stressor, as listed in Table 3-5, and that there will be no destruction or adverse modification of critical habitat. The USMC notified NMFS of its determination via letter dated March 29, 2019, and NMFS concurred with the USMC's determination via letter dated May 2, 2019 (see Appendix A).

Table 3-5 Summary of ESA Determinations of Effect

Species	***Acoustic Disturbance***	***Visual Disturbance***	***Habitat Loss Stemming from Shoreline Changes***	***Exposure to Sedimentation, Waste, and Discharge During Construction***
Hawaiian monk seal	NLAA	NLAA	NLAA	NLAA
Hawksbill sea turtle	NE	NE	NE	NE
Green sea turtle	NLAA	NLAA	NLAA	NLAA

Selections for determinations of effects columns include: NLAA = May affect, but not likely to adversely affect, NE = No effect

The USFWS and NMFS have joint jurisdiction for green turtles, with NMFS having the lead in the marine environment and USFWS having the lead on the nesting beaches. Therefore, the USMC also conducted an informal ESA Section 7 consultation with USFWS regarding potential impacts to the green sea turtle nesting on the beach fronting the Preferred Alternative. The USMC determined that the Preferred Alternative may affect, but is not likely to adversely affect the green sea turtle. The USMC notified USFWS of its determination via letter dated August 3, 2018, and USFWS concurred with the USMC's determination via letter dated September 24, 2018 (see Appendix A).

Esential Fish Habitat

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act (16 USC § 1801 et seq.), the USMC conducted informal consultation with NMFS to fulfill its requirements to consider the impacts of its actions on EFH. Potential stressors to EFH from the Preferred Alternative include effects from water quality changes, sediment transport into the water resulting in turbidity and siltation, and exposure to waste and discharge during construction. In consultation with the NMFS, the USMC developed a range of BMPs to avoid or minimize potential effects essential fish habitat (Table 3-4).

Water Quality Changes

Two components of the Preferred Alternative, relocation of the short-distance ranges, and revegetation of the PRTF shoreline, would have beneficial impacts to water quality. Installation of the sheet pile may exacerbate erosion and lead to loss of the beach fronting the long-distance ranges when coupled with the effects of sea level rise and erosion, however, the sheet pile would prevent a significant negative impact to water quality that would result from the earthen berms washing into the sea when the active wave zone reaches them. The USMC has determined that the Preferred Alternative may adversely affect water quality and EFH, but the beneficial impacts of short-distance range relocation and revegetation,

and adaptive management proposed, would allow the effects to be managed and mitigated and would resultantly be minimal and insignificant.

Sediment Transport

Two components of the Preferred Alternative, revegetation of land fronting and adjacent to the ranges, and relocation of the short-distance ranges, could improve sand retention in the area, and reduce erosion rates. Sediment transport in the area occurs primarily by a west to east longshore current. Revegetation increases sand retention rates, while relocating the short distance berms back from the shoreline is expected to remove them from the active wave zone in the event of future expected sea level rise of 3.2 feet by the mid to latter half of the century. Sheet pile is proposed for installation in front of the two long-distance range berms, which is currently fast land. In the event that future erosion or sea rise brings the active wave zone to the sheet pile, the structure could potentially exacerbate erosion, and when coupled with flooding from sea level rise, lead to increased sedimentation as the sand scours from the base of the structure. However, in the absence of the sheet pile, the impact berms present would exhibit similar drawbacks, and also contribute to increased sediment transport from the berms and into the marine environment, along with any contaminants which may be present in the berms. Adaptive management is proposed to monitor and adapt to future changes along this dynamic shoreline. This would involve continued shoreline monitoring and continued discussions between USMC and NMFS to address and manage potential shoreline erosion.

Most corals can withstand mild sedimentation by trapping it in mucus and carrying it off by cilia, however, sedimentation in excess can impact corals if it settles atop corals, resulting in shading of the coral, and potential blockage of coral feeding structures. If coral contains photosynthetic zooxanthellae, shading can reduce photosynthesis which occurs, thereby reducing metabolic functions of the coral (Nybakken, 2001). However, no living corals were observed along a profile swim, which extended approximately 150 feet from the shoreline at PRTF. Sessile growth observed was comprised mainly of soft algae on the fossil reef complex, and no fish were observed (NAVFAC HI, 2015).

Due to the lack of biota such as coral and fish in the area, and the use of BMPs in order to reduce potential impacts, the USMC has determined that sediment transport as a result of the Preferred Alternative will not significantly impact EFH. Relocation of short distance ranges will benefit 900 feet of shoreline, and revegetation of the entire shoreline (3,000 feet) will result in less sediment transport into the water, which may counteract negative impacts from erosion/sediment transport as a result of the sheet pile presence fronting 1,500 feet of shoreline fronting the two long-distance ranges; adaptive management may also serve to reduce the likelihood of adverse impacts from the wave action when it may begin contacting the sheet pile.

Exposure to Sedimentation, Waste, and Discharge During Construction

Construction activities could adversely impact EFH if sedimentation, waste or discharge were to enter the ocean during construction. Heavy rains could result in discharge of materials into the water. However, BMPs requiring the use of containment devices would be employed in order to contain construction materials on site, and a plan would be developed to prevent water or debris from entering or remaining in the marine environment. Mandatory assessments of machinery to be used would reduce potential for contaminants to be released into the marine environment. Additionally, fueling of vehicles would occur at least 100 feet from the water, preferably over an impervious surface.

The USMC has determined that exposure to sedimentation, waste, and discharge during construction activities in the Preferred Alternative may adversely affect EFH, however, BMPs will be employed to reduce potential impacts from the stressor, and effects will be consequently insignificant.

EFH Determinations Summary

Based on the Preferred Alternative, the quality and quantity of the EFH in the area, the incorporation of BMPs, and adaptive management, the USMC determined that the Preferred Alternative may adversely affect designated EFH, but that the effects would be minimal and insignificant. The USMC notified NMFS of their determination via letter dated March 29, 2019. Following NMFS receipt of the determination letter, NMFS requested and the USMC provided additional information about the project. NMFS then suggested two additional conservation recommendations to address potential effects to EFH (see Table 3-6). The USMC responded to NMFS' recommendations via letter dated May 30, 2019, and NMFS accepted the USMC's responses via email dated June 17, 2019.

Table 3-6 NMFS EFH Conservation Recommendations

#	*Conservation Recommendation*	*USMC Response*
1	During sheet pile drilling, pre-drill sheet piles and use vibratory hammering as much as possible before using impact hammering methods.	Geotechnical investigations will evaluate site suitability for pre-drilling and vibratory vs. impact hammer methods. Pre-drilling sheet piles, and the use of vibratory versus impact hammering methods will be considered.
2	Develop, implement, and share with NMFS a long-term plan to monitor how the sheet pile armor may alter EFH in nearshore waters as sea level rises. This would help to identify and adaptively manage potential future adverse effects to EFH due to the sheet pile armor. NMFS is ready and willing to assist with such a plan.	A Draft EFH Monitoring plan is currently in development. The methods for monitoring EFH may consist of, but are not limited to, the methods listed in the current draft plan. In agreement with Conservation Recommendation 2, the USMC will implement and share the final plan with NMFS, once it is available. USMC would also welcome continued cooperation and subject matter technical expertise offered by NMFS in the development of the plan as a part of adaptive management.

3.5.3.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

Similar to the Preferred Alternative, Alternative 2 would have insignificant impacts to terrestrial vegetation and wildlife.

Alternative 2 would likely have greater potential impacts to marine species associated with the installation of an additional 1,000 feet of sheet pile to protect the short-distance ranges. During the construction period, this additional sheet pile installation would require the staging and construction along and additional 1,000 feet of shoreline, which would increase the potential for inadvertent impacts to the marine environment. However, potential impacts could still be avoided or minimized through the implementation of BMPs identified in Table 3-4. In the long term, this additional 1,000 feet of sheet pile could contribute to the potential loss of an additional 1,000 feet of lateral shoreline fronting PRTF in an area where Hawaiian monk seals are known to haul out. It is not anticipated that Alternative 2 would

result in significant impacts to green sea turtles or monk seals, but its impact would be greater than the Preferred Alternative. For these reasons, Alternative 2 was not included in the ESA Section 7 and EFH consultations with USFWS and NMFS.

Therefore, implementation of Alternative 2 is not likely to result in significant impacts to biological resources. However, should Alternative 2 be considered further for implementation, a supplemental consultation with USFWS and NMFS would be required to comply with ESA Section 7 and the Magnuson-Stevens Act.

3.6 Recreational Resources

3.6.1 Affected Environment

The PRTF shoreline is flanked by publically accessible shorelines on both sides. To the west of PRTF, a publicly accessible sandy beach extends approximately 1.4 miles along the residential community of Ewa Beach, and Puuloa Beach Park is located approximately 200 feet west of the PRTF fence line. Fishing and other ocean recreation activities are popular along this stretch of sandy coastline, especially in the vicinity of Puuloa Beach and the public beach access rights of way. To the east of PRTF, the sandy shoreline extends approximately 0.9 miles to the northeast toward the Pearl Harbor Entrance Channel. This beach was recently stabilized with the construction of nine "T-head" groins as part of the Iroquois Point Beach Nourishment and Stabilization Project. The shoreline fronts the Kapilina residential area, which is a gated community. However, a limited number of parking passes are available for the general public on a daily basis from sunrise to sundown. Recreational fishing is allowed from the east end (adjacent to the Pearl Harbor Entrance Channel) and west end (adjacent to PRTF) of the Kapilina/Iroquois Point Beach. Fishing is restricted to these two areas to prevent over-fishing (JBPHH 2011). With publically accessible beaches adjacent to the PRTF shoreline on both sides, civilians are occasionally known to walk or swim around the fences especially at low tide in spite of the posted restrictions. However, the shoreline is actively secured during range operations, and any unauthorized persons along the shoreline are promptly escorted off-base.

The waters off shore from the project area are located within the Pearl Harbor Naval Defensive Sea Area (PHNDSA), and Joint Base Pearl Harbor-Hickam (JBPHH) regulates public access to these waters. Navigation in the waters adjacent to PRTF is restricted from 6:00 a.m. to 5:00 p.m. daily (including Saturdays and Sundays), and at other times upon notification (NOAA, 2015). The waters to the west of PRTF are publicly accessible of the State of Hawaii. The near shore area is popular for a number of ocean recreational activities, including fishing, surfing, and outrigger canoe paddling. The Ewa Puuloa Outrigger Canoe club launches their canoes at Puuloa Beach Park, approximately 300 feet west of PRTF.

3.6.2 Environmental Consequences

This analysis focuses on recreation resources and activities that occur within the vicinity of the Proposed Action.

3.6.2.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur and there would be no change to recreational resources. Therefore, no significant impacts would occur with implementation of the No-Action Alternative.

3.6.2.2 Preferred Alternative: Range Retreat, Sheet Pile Construction, and Revegetation

While civilians occasionally access the PRTF shoreline despite the warning signs and fencing, the entire PRTF installation, including the shoreline and off-shore waters is restricted from public access for safety reasons. The Preferred Alternative would not change the restrictions that are currently in place, and therefore would not impact public access or associated recreational activities in the project area. The publically accessible beaches to the east and west of the project area support a significant amount of recreational activities. The implementation of the Preferred Alternative would not have an impact on recreational activities that take place in these adjacent areas as access to the PRTF shoreline is already restricted and that status would not change.

Therefore, implementation of the Preferred Alternative would not result in significant impacts to recreational resources.

3.6.2.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

Similar to the Preferred Alternative, Alternative 2 would have insignificant impacts to recreational resources. Alternative 2 would not change the restrictions that are currently in place, and therefore would not impact public access or associated recreational activities in the project area. The publically accessible beaches to the east and west of the project area support a significant amount of recreational activities. The implementation of the Alternative 2 would not have an impact on recreational activities that take place in these adjacent areas as access to the PRTF shoreline is already restricted and that status would not change.

Therefore, implementation of the Alternative 2 would not result in significant impacts to recreational resources.

3.7 Land Use

This discussion of land use includes current and planned uses and the regulations, policies, or zoning that may control the proposed land use. The term land use refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. However, there is no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

3.7.1 Regulatory Setting

The PRTF Area Development Plan (ADP), part of the larger MCBH Installation Master Plan, serves as guide for land use planning at the installation. The intent of this ADP is to articulate the vision and strategy for future land use and development at Puuloa RTF over the next 20 years by following the master planning strategies, requirements, and report structure set forth in Marine Corps Order (MCO) 11000.12 (September 2014) and Unified Facilities Criteria (UFC) 2-100-01, Installation Master Planning (May 2012) to the extent the guidance is applicable to the installation.

The Coastal Zone Management Act provides states and territories, with federally approved coastal management programs, the authority to review federal activities that have a reasonably foreseeable effect on land use, water use, or natural resource of the coastal zone. Federal agencies provide a consistency determination for proposed federal agency activities. Federal activities are reviewed for consistency with enforceable policies of state or territorial management programs and states or territories either concur with or object to the activity. If a state or territory objects to a federal agency activity, the federal agency may not proceed unless it determines it is prohibited from full consistency due to requirements of federal law.

3.7.2 Affected Environment

Puuloa Training Facility is a 137-acre facility, located on the leeward Oahu coast near Pearl Harbor at the eastern edge of the Ewa Plain. It is an active training facility used for small arms practice. The facility is located in an urbanized area, just east of the town of Ewa Beach, which had a population of 14,955 persons in the 2010 census. The northern border of the Puuloa Training Facility adjoins a Federal Aviation Administration Transmitter Facility site that is relatively undeveloped. Land to the east of the facility is primarily owned by the Navy and include the Kapilina residential area. To the east of the housing area, the Iroquois Point Elementary School is located on lands owned by the City and County of Honolulu. The western border of PRTF adjoins private property, portions of which have been developed into single-family housing. Directly adjacent to the western edge of this residential area (approximately 300 feet from Puuloa Training Facility) is Puuloa Beach Park, a public recreation area owned by the City and County of Honolulu.

Existing PRTF land uses in the project area include the ranges, an access road along the ocean side of the impact berms for Ranges A and B, and two guard shacks (one at the east shoreline boundary of the range, and one at the west shoreline boundary). The recently completed 2016 PRTF ADP provides the overall long-term development plan for PRTF and addresses future land use, circulation and parking, and facility and utility infrastructure development. The ADP regulating plan identifies the majority of the project area as “open space.” The one exception is the area along the eastern shoreline of PRTF between Range F and the east installation boundary. This area is identified as parks and recreation areas. The ADP does not propose any new buildings or development in the project area.

The ocean area directly off shore and extending up to the high water mark of the PRTF shoreline is located within the PHNDSA. The PHNDSA was established by Presidential Executive Order (EO) 8143, and the federal jurisdiction of these waters preempts State and County land use permits, policies, and regulations.

3.7.3 Environmental Consequences

The location and extent of a Proposed Action needs to be evaluated for its potential effects on a project site and adjacent land uses. The foremost factor affecting a Proposed Action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a Proposed Action, the duration of a proposed activity, and its permanence.

3.7.3.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur and there would be no change to land use. Therefore, no significant impacts would occur with implementation of the No-Action Alternative.

3.7.3.2 Preferred Alternative: Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

The study area for land use for the Preferred Alternative includes the PRTF installation and the adjacent land uses.

The proposed shoreline stabilization improvements would be located entirely within the PRTF installation, and would not impact the existing land uses on properties adjacent to PRTF. Within PRTF, the proposed improvements would have minor, insignificant impacts on land use at PRTF. The proposed retreat of the short distance ranges could relocate the ranges and their supporting infrastructure up to 100 feet inland from their current location. The ADP identifies the area where the ranges are proposed to be relocated as "open space," and there are no other future projects proposed in the vicinity of the existing or relocated ranges (MCBH, 2016). During the conceptual design of the proposed improvements, PRTF training administrators and installation engineers were consulted and concurred that the proposed range relocation area was acceptable.

Therefore, implementation of the Preferred Alternative would not result in significant impacts to land use.

3.7.3.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

The study area for land use for the Preferred Alternative includes the PRTF installation and the adjacent land uses. Similar to the Preferred Alternative, Alternative 2 would have insignificant impacts to land use.

The proposed shoreline stabilization improvements would be located entirely within the PRTF installation, and would not impact the existing land uses on properties adjacent to PRTF. Within PRTF, the proposed improvements would have minor, insignificant impacts on land use at PRTF. The proposed sheet pile installation could include the construction of an unpaved access road along the shoreline behind the short-distance ranges. However, the access road would be located in an existing undeveloped area and would bolster the ADP's recommended improvements to enhance security along the shoreline.

Therefore, implementation of Alternative 2 would not result in significant impacts to land use.

3.8 Visual Resources

3.8.1 Regulatory Setting

The Hawaii Coastal Zone Management Program sets forth objectives and policies for scenic and open space resources that are intended to protect, preserve, and improve the quality of coastal scenic and open space resources as well as ensure that new development is compatible with its visual environment and that development minimizes alterations to natural landforms and existing public views to and along the shoreline.

As a general policy, the Ewa Development Plan (City and County of Honolulu, 2013) dictates that open space be used to protect scenic views and natural, cultural, and historic resources. The plan specifically identifies a number of significant views and vistas to be retained, whenever possible. These views include:

- Distant vistas of the shoreline from the H-1 Freeway above the Ewa Plain;
- Views of the ocean from Farrington Highway between Kahe Point and the boundary of the Waianae Development Plan Area;
- Views of the Waianae Range from H-1 Freeway between Kunia Road and Kaloi Gulch and from Kunia Road;
- Views of Na Puu at Kapolei, Palailai, and Makakilo;
- Mauka and makai views; and
- Views of central Honolulu and Diamond Head, particularly from Puu O Kapolei, Puu Palailai, and Puu Makakilo.

3.8.2 Affected Environment

The proposed shoreline stabilization improvements are located entirely within DoD property, however, the project area would be visible from the adjacent public beach areas to the east (Iroquois Point/Kapilina Residential Area) and to the west (Ewa Beach/Puuloa Beach Park). From the east, existing views of the PRTF shoreline area characterized by a continuation of the sandy beach, an open grassy area with the existing guard house, and the start of the short-distance range side and impact berms (Figure 3-5). From the west existing views into the site are characterized by a continuation of the sandy beach, a small open area with the existing guardhouse and some remnant concrete structures, and the start of the long-distance range impact berms (Figure 3-6). All public views into the site are partially obstructed by the chain link security fence that encloses the PRTF perimeter.

There are no significant views from within PRTF. In general, the ranges block potential views of the ocean from the developed portion of PRTF.

Figure 3-5 View along PRTF Shoreline from the east end of PRTF

Figure 3-6 View along PRTF shoreline from the west end of PRTF

3.8.3 Environmental Consequences

The evaluation of visual resources in the context of environmental analysis typically addresses the contrast between visible landscape elements. Collectively, these elements comprise the aesthetic environment, or landscape character. The landscape character is compared to the Proposed Action's visual qualities to determine the compatibility or contrast resulting from the buildout and demolition activities associated with the Proposed Action.

3.8.3.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur and there would be no change to visual resources. Therefore, no significant impacts would occur with implementation of the No-Action Alternative.

3.8.3.2 Preferred Alternative: Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

The site of the proposed shoreline stabilization improvements and the adjacent lands define the study area for visual resources analyses. The proposed shoreline stabilization improvements would not impact any of the significant views identified in the Ewa Development Plan.

During construction, the Preferred Alternative would affect views along the shoreline. Site preparation, construction equipment, and the construction process itself would create temporary impacts to views into the site from the adjacent beach areas. However, these impacts would be temporary, and any areas

damaged by the construction process would be revegetated to mitigate any potential lasting effects from the construction process.

Once the proposed shoreline stabilization improvements are completed, there would be only minor effects on the visual environment. The installed sheet pile is intended to be below grade with the top of the sheet pile matching existing grade and/or being no higher the toe of the adjacent range impact berm. Any portion of the installed sheet pile that would initially be exposed would be very low lying and would not create a significant impact. The retreat of the short-distance ranges would alter the existing view into PRTF from the east (Iroquois Point/Kapilina Residential Area). The retreat of the ranges would create a buffer between the range impact berms and the existing shoreline, which would likely have beneficial impact on visual resources as it would allow longer views along the shoreline.

In the long-term, the installation of the proposed sheet pile along Ranges A and B coupled with potential shoreline erosion could alter views along the coastline. If the shoreline continues to erode, eventually, the sheet pile would become more and more exposed as the beach retreats. The exposure of the sheet pile could affect future views along the shoreline, but there are some important details to consider when assessing these potential effects. First, existing views into the PRTF shoreline from either adjacent public beach area are already partially obstructed by the existing security fence line. The existing range berms, guard houses, and remnant concrete structures also contribute to the visual nature of the shoreline existing shoreline development at PRTF. The existing views into the PRTF shoreline are characterized by man-made features, and these features are necessary for operations, security, and public safety at PRTF. If future shoreline erosion were to expose the proposed sheet pile, it would be consistent with the existing man-made development along the PRTF shoreline. Second, there are existing buffer areas at both ends of the PRTF shoreline. At the west end, the installation boundary is approximately 230 feet from the proposed start of the sheet pile at Range A. At the east end, the installation boundary is approximately 1,300 feet from the start of the proposed sheet piles at Range B. These buffer areas would dampen any potential negative visual effects of the sheet pile becoming exposed from shoreline erosion, and the exposure of the sheet pile would not affect any of the significant views identified in the Ewa Development Plan.

Therefore, implementation of the Preferred Alternative would not result in significant impacts to visual resources.

3.8.3.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

Similar to the Preferred Alternative, Alternative 2 would have insignificant impacts to land use. The site of the proposed shoreline stabilization improvements and the adjacent lands define the study area for visual resources analyses. The proposed shoreline stabilization improvements would not impact any of the significant views identified in the Ewa Development Plan.

The construction of Alternative 2 would temporarily effect the views along the shoreline at PRTF. These temporary effects would be similar to those described above for the Preferred Alternative, but they would be longer in duration due to the additional construction required to install the sheet pile along Ranges C-F. Still, these impacts would be temporary, and any areas damaged by the construction process would be revegetated to mitigate any potential lasting effects from the construction process.

In the long-term, the installation of the proposed sheet pile coupled with potential shoreline erosion could alter views along the coastline. If the shoreline continues to erode, eventually, the sheet pile

would become more and more exposed as the beach retreats. The additional proposed sheet pile along Ranges C-F would be closer to and more visible from the eastern installation boundary. However, the proposed sheet pile would still be approximately 240 feet from the east installation boundary fence. This buffer area would dampen any potential negative visual effects of the sheet pile becoming exposed from shoreline erosion, and the exposure of the sheet pile would not affect any of the significant views identified in the Ewa Development Plan.

Therefore, implementation of Alternative 2 would not result in significant impacts to visual resources.

3.9 Noise

This discussion of noise includes the types or sources of noise and the associated sensitive receptors in the human environment. Noise in relation to biological resources and wildlife species is discussed in the Biological Resources section.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Sound is all around us. The perception and evaluation of sound involves three basic physical characteristics:

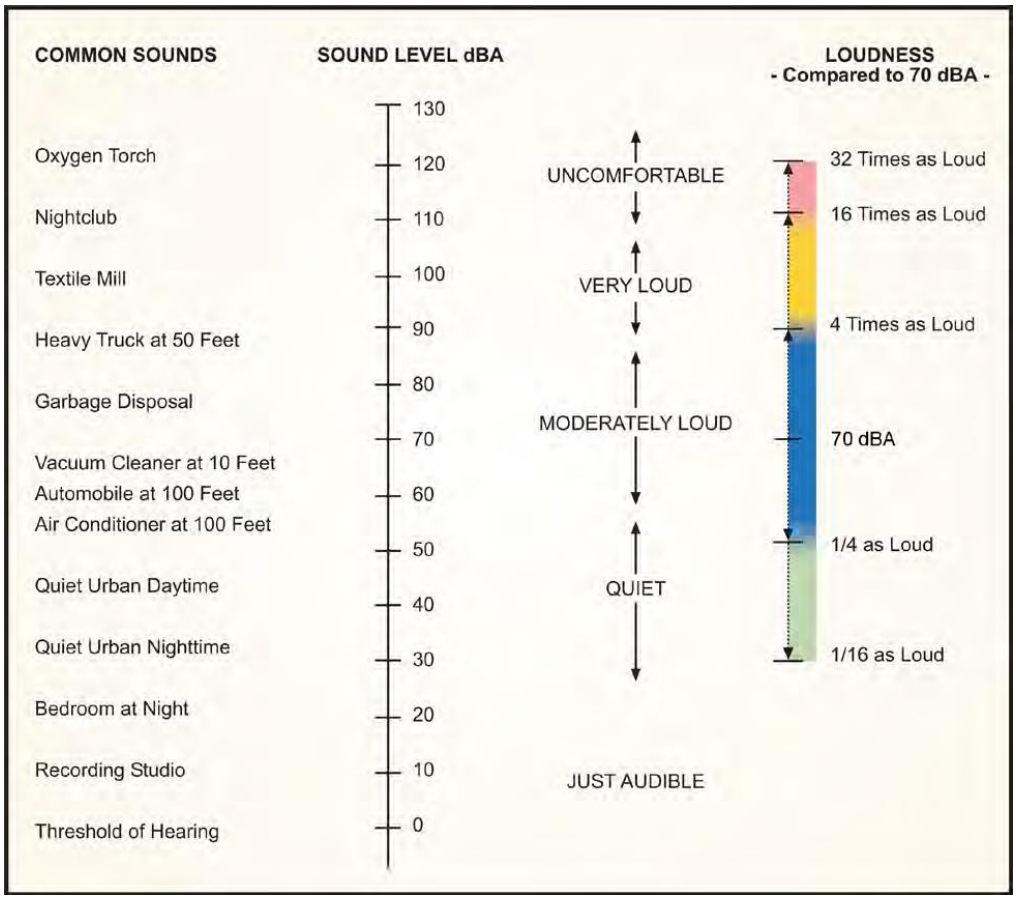
- Intensity – the acoustic energy, which is expressed in terms of sound pressure, in decibels (dB)
- Frequency – the number of cycles per second the air vibrates, in Hertz (Hz)
- Duration – the length of time the sound can be detected

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual.

3.9.1 Basics of Sound and A-weighted Sound Level

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. This vast range means that using a linear scale to represent sound intensity is not feasible. The dB is a logarithmic unit used to represent the intensity of a sound, also referred to as the sound level. All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second or Hz. To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements are usually on an "A-weighted" scale that filters out very low and very high frequencies in order to replicate human sensitivity. It is common to add the "A" to the measurement unit in order to identify that the measurement has been made with this filtering process (dBA). In this document, the dB unit refers to A-weighted sound levels.

Figure 3-7 provides a chart of A-weighted sound levels from typical noise sources. Some noise sources (e.g., air conditioner, vacuum cleaner) are continuous sounds that maintain a constant sound level for some period of time. Other sources (e.g., automobile, heavy truck) are the maximum sound produced during an event like a vehicle pass-by. Other sounds (e.g., urban daytime, urban nighttime) are averages taken over extended periods of time.



Sources: Derived from Harris (1979) and Federal Interagency Committee on Aviation Noise (1997).

Figure 3-7 A-Weighted Sound Levels from Typical Sources

3.9.2 Affected Environment

Many components may generate noise and warrant analysis as contributors to the total noise impact. The predominant noise sources in the project area consist of small arms fire on the PRTF training ranges and aircraft traffic using Honolulu International Airport (HIA) and Hickam Field. In compliance with the Aviation Safety and Noise Abatement Act, the State of Hawaii Department of Transportation has submitted noise exposure maps that identify noise exposure contours from aircraft traffic associated with HIA. The 55 dB noise contour intersects the northern portion of PRTF, and the shoreline area including the adjacent residential areas are shown as having noise exposure below 55 dB from HIA air traffic. Uses such as small arms ranges are considered compatible with this level of noise exposure. The federal government supports conditions free from noise that threaten human health and welfare and the environment. Response to noise varies, depending on the type and characteristics of the noise, distance between the noise source and whoever hears it (the receptor), receptor sensitivity, and time of day. A noise sensitive receptor is defined as a land use where people involved in indoor or outdoor activities may be subject to stress or considerable interference from noise.

For the Preferred Alternative, the nearest sensitive receptors are single family residential homes in Ewa Beach directly adjacent to west boundary of PRTF (approximately 230 feet from the west end of the proposed sheet pile installation), and single family homes in the Kapilina residential area adjacent to the east boundary of PRTF (approximately 1,550 feet from the east end of the proposed sheet pile

installation for the Preferred Alternative at Range B and approximately 550 feet from the east end of the proposed sheet pile installation for Alternative 2 at Range F).

Another noise sensitive receptor project vicinity, Iroquois Point Elementary school, is located to the north of PRTF approximately 1,800 feet from the east end of the proposed sheet pile installation for the Preferred Alternative (Range B) and approximately 1,300 feet from the east end of the proposed sheet pile installation for Alternative 2 (Range F).

3.9.3 Environmental Consequences

Analysis of potential noise impacts includes estimating likely noise levels from the Proposed Action and determining potential effects to the nearest sensitive receptor sites.

3.9.3.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur and there would be no change to baseline noise levels. Therefore, no impacts to the noise environment would occur with the implementation of the No-Action Alternative.

3.9.3.2 Preferred Alternative: Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

The study area for noise for the Preferred Alternative includes areas in the vicinity of the Preferred Alternative that include noise sensitive receptors such as residential uses and educational facilities. This includes the residential areas adjacent to the west (Ewa Beach) and east (Kapilina residential area) boundaries of PRTF, and Iroquois Point Elementary School.

During project construction, there would be short-term, temporary noise impacts to noise-sensitive receptors. The greatest noise impacts would be to residential dwellings on Popoi Place directly adjacent to the west boundary of PRTF, where there are 12 single family homes. Temporary noise impacts could also affect single family homes in the Kapilina residential area to the east of PRTF, however, these homes would be located at a greater distance from the proposed sheet pile installation than the Popoi Place homes.

A planning level assessment of construction noise impacts was conducted for the Preferred Alternative to estimate impacts to residences on Popoi Place. The dominant noise sources during construction in this area would be from the pile driving associated with installing the proposed sheet pile. The pile driving activity is expected to occur over a period of several months. The pile driving location would gradually progress along the length of the shoreline. The sheet pile installation work is expected to be conducted Monday through Friday during normal daytime working hours.

Sheet piles can be installed by either impact or vibratory drivers. Vibratory drivers typically create less noise during installation when compared with impact drivers. However, the specific method of sheet pile installation for the Preferred Alternative would not be known until the design phase when geotechnical studies would be performed to provide a clear picture of the substrate in the project area. For the purposes of this noise analysis, installation by an impact driver will be assumed to serve as a worst-case scenario.

Typical noise emission levels of impact pile drivers are reported in Federal Highways Administration construction noise level guidance at 101 dBA at a reference distance of 50 feet (U.S. DOT 2006, Table 12-1). For each doubling of distance from the source, there is a 6 dB decrease in sound level. A calculation

of the reduction in atmospheric sound level from reference distance to the nearest noise sensitive receptors indicated that noise from the pile driving would be attenuated to about 88 dB at the single family home on Popoi Place nearest the westernmost pile driving location at Range A (approximately 230 feet). (Note: The following formula was used in the sound loss calculation $L^2 = L^1 - (20\text{Log}(r^2/r^1))$; where L^1= sound level in dB at reference distance, L^2= sound level at received distance, r^1=reference distance, r^2=received distance.) Although construction activities would occur during daytime hours, as shown in Figure 3-7, this noise level is generally perceived as "moderately loud" to "very loud." Typical sound level reductions of buildings are estimated at 24 dB in warm climates with closed windows (USEPA 1978). Using the USEPA typical sound level reductions of buildings (i.e., 24 dB), the pile driving noise levels would be reduced to about 64 dB at the nearest single family home on Popoi Place, which could be perceived as "moderately loud."

To the east of PRTF, the nearest noise sensitive receptor is a single family home in the Kapilina residential area located at the southwest corner of Edgewater Drive. This home is located approximately 1,550 feet from the eastern edge of the proposed sheet pile installation at Range B. At this distance, pile driving noise levels are estimated to be about 71 dB. Using the USEPA typical sound level reductions of buildings (i.e., 24 dB), the pile driving noise levels would be reduced to about 47 dB at the nearest single family home on Edgewater Drive, which, according to Figure 3-7, could be perceived as "quiet."

In compliance with Hawaii Administrative Rules (HAR) 11-46, a Construction Noise Permit would be obtained from the State of Hawaii Department of Health (DOH) for project implementation, which would include project specific conditions and requirements. The contractor would comply with provisions of the Construction Noise Permit, including any mitigation and scheduling requirements.

Once the proposed shoreline stabilization improvements have been implemented, range operations would continue as normal and the range would continue to generate noise at existing levels. Therefore, implementation of the Preferred Alternative would not result in significant impacts to the noise environment.

3.9.3.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

The study area for noise for the Preferred Alternative includes areas in the vicinity of the Preferred Alternative that include noise sensitive receptors such as residential uses and educational facilities. This includes the residential areas adjacent to the west (Ewa Beach) and east (Kapilina residential area) boundaries of PRTF, and Iroquois Point Elementary School.

During project construction, there would be short-term, temporary noise impacts to noise-sensitive receptors. Potential construction noise impacts for Alternative 2 would be similar to those of the Preferred Alternative along the western boundary of PRTF. Along the eastern boundary of PRTF, Alternative 2 would result in elevated construction noise impacts due to the installation of sheet pile along Ranges C-F which would be closer to the noise sensitive receptors in the Kapilina residential area. The nearest noise sensitive receptor is a single family home in the Kapilina residential area located at the southwest corner of Edgewater Drive. This home is located approximately 550 feet from the eastern edge of the proposed sheet pile installation at Range F. At this distance, pile driving noise levels are estimated to be about 80 dB. Using the USEPA typical sound level reductions of buildings (i.e., 24 dB), the pile driving noise levels would be reduced to about 56 dB at the nearest single family home on Edgewater Drive, which, according to Figure 3-7, could be perceived as "quiet" to "moderately loud."

Once the proposed shoreline stabilization improvements have been implemented, range operations would continue as normal and the range would continue to generate noise at existing levels. Therefore, implementation of the Preferred Alternative would not result in significant impacts to the noise environment.

3.10 Infrastructure

This discussion of infrastructure focuses on electrical power, communications, and water. Wastewater and storm drainage systems are not provided in the project area, and the Proposed Action would have only minor construction period impacts on solid waste disposal.

3.10.1 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under infrastructure at PRTF.

3.10.1.1 Electrical Power

The electrical system at PRTF is owned and maintained by the Navy. The 12 kV incoming line from Hawaiian Electric is stepped down to 2.4 kV by a 4.5 kVA transformer housed in a substation near the eastern boundary. The present system has adequate capacity to meet existing demand; however, further development at Puuloa RTF may require a utility assessment to evaluate the capacity and quality of electrical power.

Overhead electrical service is provided to each of the ranges to support the communications/speaker system and to power the target systems. The electrical service connection point at each of the short-distance ranges is generally at the firing line/shooting house with a below grade conduit running the length of the range to serve the target systems.

3.10.1.2 Communications

Communications infrastructure provided in the vicinity of the Proposed Action includes service to the pole-mounted “big voice” public address speakers located along the shoreline. There is currently one speaker located at the west end of the PRTF shoreline, one between Ranges B and C, and one at the east end of the shoreline. Ranges E and F each have their own stand-alone speaker systems that are utilized during training exercises, but no exterior communications service is provided to any of the short-distance ranges.

3.10.1.3 Water

The water distribution system at Puuloa RTF is part of the Pearl Harbor Complex system that is owned and maintained by the Navy. The system has three sources of water, including the primary source at Waiawa and two supplemental sources at Red Hill and Halawa, all of which are interconnected (Department of the Navy, 2006). In the vicinity of the Proposed Action project area, existing water service is provided to ranges E and F which have one water fountain and one sink each.

Water service for irrigation is provided to the ranges mainly to wet the impact berms and suppress dust during training exercises. The existing irrigation system consists of hose bibs located at the respective range shooting house, with a long hose and sprinkler used to wet the impact berms. Currently, no underground irrigation system is provided at any of the ranges. Other temporary irrigation systems were previously installed along the shoreline as part of earlier shoreline revegetation efforts. However, these irrigation systems are no longer operable, as they have been exposed by the erosion of the shoreline.

3.10.2 Environmental Consequences

This section analyzes the magnitude of anticipated increases or decreases in public works infrastructure demands considering historic levels, existing management practices, and storage capacity, and evaluates potential impacts to public works infrastructure associated with implementation of the alternatives. Impacts are evaluated by whether they would result in the use of a substantial proportion of the remaining system capacity, reach or exceed the current capacity of the system, or require development of facilities and sources beyond those existing or currently planned.

3.10.2.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur and there would be no change to the existing infrastructure of PRTF. Therefore, no significant impacts to transportation, utilities, or facilities would occur with implementation of the No-Action Alternative.

3.10.2.2 Preferred Alternative: Range Retreat, Sheet Pile Construction, and Revegetation

The study area for infrastructure includes the infrastructure systems that serve the project site.

Electrical Power

The proposed shoreline stabilization improvements would not increase the demand for power at PRTF. The installation of the sheet pile could potentially impact underground electrical service lines that service the guard house at the west end of the PRTF shoreline, as well as underground electrical service lines that serve the public address system speakers along the shoreline between Ranges B and C. However, any potential impacts to electrical service would be mitigated during the detailed design of the Preferred Alternative, and the installation would avoid disruption in electrical service to either of these critical assets.

Retreat of the short-distance ranges would include the retreat of all range components and the infrastructure connections that support them. There are several utility poles located in the proposed range retreat area that would need to be relocated if the ranges are retreated. Relocation of the utility poles and the associated overhead utility lines would be addressed during the detailed design of the Preferred Alternative. After completion of the range retreat, the retreated ranges would continue to operate at existing levels and would not change the demand for power from the PRTF grid.

Communications

Installation of the proposed sheet pile and the associated shoreline revegetation would take place in the vicinity of the three pole-mounted “big voice” public address speakers. These speakers are critically important for public safety and security so that PRTF can secure the shoreline, especially during training exercises. Any potential impacts to the public address system would be mitigated or avoided during the design of the proposed shoreline stabilization improvements. Once the proposed shoreline improvements have been implemented, they would not affect the demand placed on the communications systems at PRTF.

Water Service

Retreat of the short-distance ranges would include the retreat of all range components and the infrastructure connections that support them, including the existing water service. During the retreat of the short-distance ranges, water service infrastructure would be redesigned to service the relocated

ranges. After completion of the range retreat, the ranges would continue to operate at existing levels and would not change the demand for water.

Therefore, implementation of the Preferred Alternative would not result in significant impacts to infrastructure.

3.10.2.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

The study area for infrastructure includes the infrastructure systems that serve the project site. The potential impacts to infrastructure described for the Preferred Alternative would be the same for Alternative 2, and there would be no additional potential impacts associated with the proposed sheet pile installation along Ranges C-F.

Therefore, implementation of Alternative 2 would not result in significant impacts to infrastructure.

3.11 Public Health and Safety

This discussion of public health and safety includes consideration for any activities, occurrences, or operations that have the potential to affect the safety, well-being, or health of members of the public. The primary goal is to identify and prevent potential accidents or impacts on the general public.

A safe environment is one in which there is no, or optimally reduced, potential for death, serious bodily injury or illness, or property damage. Human health and safety addresses public safety during construction, demolition, and renovation activities; and during subsequent operations of those facilities. Various stressors in the environment can adversely affect human health and safety. Identification and control or elimination of these stressors can reduce risks to health and safety to acceptable levels or eliminate risk entirely.

Emergency services are organizations which ensure public safety and health by addressing different emergencies. The three main emergency service functions include police, fire and rescue service, and emergency medical service.

Environmental health and safety risks to children are defined as those that are attributable to products or substances a child is likely to come into contact with or ingest, such as air, food, water, soil, and products that children use or to which they are exposed.

3.11.1 Regulatory Setting

Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires federal agencies to "make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children and shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

3.11.2 Affected Environment

Puuloa RTF is surrounded on three sides by civilian land uses and to the south by the Pacific Ocean and the Pearl Harbor Naval Defensive Sea Area. Physical security measures include perimeter security fencing, intrusion detection systems, and guardhouses. The installation fence lines on the east and west sides of PRTF end short of the low water line on and civilians frequently access the shoreline in front of

the ranges. Guardhouses on both sides also lack a line of sight to the low waterline making enforcement difficult.

Manmade hazards within the district are associated with the use of the live-fire training ranges and ammunition storage. Weapon firing is conducted toward the ocean to minimize the amount of land encumbered by surface danger zones (SDZ) during range activity. An SDZ is defined as, "that portion of the earth and the air above in which personnel and/or equipment may be endangered by ground weapons firing or demolition activities (DA PAM 383-65)." At PRTF, most of the SDZs extend offshore and within the PHNDSA, established by EO 8143. By federal law, the general public is not allowed entry into this area without specific permission. Additional range safety measures[2] include the following.

- Enclosing the ranges with earthen berms
- Establishing an area-wide Notice to Airmen to notify all pilots of the hours and dangers associated with active ranges
- Hoisting red warning flags prior to firing
- Clearing the SDZ of all personnel prior to firing
- Manning the guardhouses at the shoreline to monitor and prevent beachgoers and small craft from entering the SDZ (a cease fire is called whenever an incursion is made).
- Restricting firing to between 0700 and 1700
- Limiting usage of Range A to reduce noise impacts and the SDZ

The small arms ammunition storage magazine (Building 624) generates a 100-ft explosives safety quantity distance arc based on the unlimited storage of Class 1, Division 4 material (Department of the Navy, 2006).

PRTF is a training range, and does not have any facilities that accommodate children within the installation boundary. However, the neighboring residential area of Ewa Beach to the west, Kapilina residential area to the north and east, and Iroquois Point Elementary School to the northeast all represent adjacent land uses that accommodate children.

3.11.3 Environmental Consequences

The safety and environmental health analysis contained in the respective sections addresses issues related to the health and well-being of military personnel and civilians living on or in the vicinity of the project area. Specifically, this section provides information on hazards associated with the installation and operation of the proposed shoreline stabilization improvements. Additionally, this section addresses the environmental health and safety risks to children.

3.11.3.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur and there would be no change to public health and safety. Therefore, no significant impacts would occur with implementation of the No-Action Alternative.

[2] Range safety measures as identified in the 2016 PRTF Area Development Plan

3.11.3.2 Preferred Alternative: Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

The public health and safety study area for the Preferred Alternative is the footprint of the proposed shoreline stabilization improvements. Public access to PRTF, including its shoreline, is restricted. However, the security fences at either end of the PRTF shoreline end short of the low water line, and members of the public are known to walk or swim around the fences to access the PRTF shoreline. The implementation of the Preferred Alternative would not change public access to PRTF or along the PRTF shoreline.

The retreat of the short-distance ranges would include the retreat of the SDZs associated with those ranges. The maximum extent of the SDZ for Range F would move closer to the east installation boundary, but it would not extend beyond the installation boundary. The SDZ for all short-distance ranges would continue to extend into the PHNDSA restricted area. Also, after retreat, the SDZs for short-distance ranges would still be mitigated by the associated side and impact berms for each range.

Executive Order 13045 (April 21, 1997) and its policies, programs, activities, and standards requires federal agencies to make it a high priority to identify and address disproportionate risks to children that result from environmental health or safety risks. During construction, access to the staging areas and construction sites would be restricted to authorized personnel. Temporary fences and other access control measures would be utilized to prevent accidental entry by children or other individuals who reside or work in the area. After completion, the proposed shoreline stabilization improvements would not present any additional public health and safety effects. The Preferred Alternative is not expected to generate disproportionate environmental health or safety risks for children living near PRTF.

Therefore, implementation of the Preferred Alternative would not result in significant impacts to public health and safety.

3.11.3.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

The study area for public health and safety is the footprint of the proposed shoreline stabilization improvements. The potential impacts to public health and safety described for the Preferred Alternative would be the same for Alternative 2, and there would be no additional potential impacts associated with the proposed sheet pile installation along Ranges C-F.

Therefore, implementation of Alternative 2 would not result in significant impacts to public health and safety.

3.12 Hazardous Materials and Wastes

This section discusses hazardous materials, hazardous waste, toxic substances, and contaminated sites.

3.12.1 Regulatory Setting

Hazardous materials are defined by 49 CFR section 171.8 as “hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table, and materials that meet the defining criteria for hazard classes and divisions” in 49 CFR part 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations.

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments, as: "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR part 273. Four types of waste are currently covered under the universal wastes regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include asbestos-containing material , polychlorinated biphenyls , and lead-based paint. The USEPA is given authority to regulate special hazard substances by the Toxic Substances Control Act. Asbestos is also regulated by USEPA under the Clean Air Act, and the Comprehensive Environmental Response, Compensation, and Liability Act.

3.12.2 Affected Environment

The USMC has implemented a strict Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program for all activities. The USMC continuously monitors its operations to find ways to minimize the use of hazardous materials and to reduce the generation of hazardous wastes. The PRTF range impact berms are regularly cleaned of spent lead.

The Installation Restoration Program (IRP) is a DoD initiative that identifies, investigates, and cleans up former waste disposal sites. There are no identified Installation Restoration Program sites within the inland boundaries of the PRTF installation. However, the PHNDSA, including the nearshore area directly adjacent to the PRTF and JBPHH, has been identified as a Military Munitions Response Program (MMRP) site associated with the historical shoreline batteries and disposal practices. In September 2010, the Navy completed the MMRP Preliminary Assessment – Underwater Munitions, PHNDSA, Hawaii and recommended further inspection with a Site Inspection. In accordance with 32 CFR Part 179 Munitions Response Site Prioritization Protocol, the site was assessed to have priority "3" rank. The rank is used to ensure higher priority and risk sites are sequenced with funding first. The 3 rank is the highest priority for MMRP sites in the Navy's Pearl Harbor inventory.

3.12.3 Environmental Consequences

The hazardous materials and wastes analysis contained in the respective sections addresses issues related to the use and management of hazardous materials and wastes as well as the presence and management of specific cleanup sites at PRTF.

3.12.3.1 No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur and there would be no change associated with hazardous materials and wastes. Therefore, no impacts would occur with implementation of the No-Action Alternative.

3.12.3.2 Preferred Alternative: Sheet Pile Construction (Ranges A&B), Range Retreat (Ranges C-F), and Revegetation

The hazardous materials and wastes study area for the Preferred Alternative is the footprint of the proposed shoreline stabilization improvements.

During the construction phase, the contractor shall be responsible for ensuring that temporary, secondary containment measures are employed, to ensure that any accidental releases of hazardous substances (e.g., spent lead, anti-freeze, petroleum, oils, and lubricants) are prevented or limited in scope. Portable catch basins, portable containment berms, and other similar measures would be used for refueling equipment. The construction contractor would ensure that spill kits are kept on site to ensure that response and cleanup actions are promptly undertaken should a spill occur. Construction workers would be trained on spill prevention and notification measures in accordance with DoD pollution control requirements to reduce the potential for accidental spills.

Retreat of the short-distance ranges would include the relocation of the existing range impact berms. These impact berms are regularly cleaned of spent lead, and they would be cleaned prior to the start of construction. However, there is the potential for lead to be uncovered during the process of relocation. Any spent lead that is uncovered would be dealt with in the same manner as the lead that is uncovered during the cleaning process, and would be disposed of in compliance with all applicable regulatory requirements. BMPs to prevent sedimentation and soil erosion during construction would also help to avoid potential impacts from lead contaminated soils or runoff reaching the nearshore waters.

The proposed sheet pile installation would be completed well above mean sea level at approximately elevation +10 feet and would not be located within the PHNDSA MMRP site. However, if munitions are found at any time in the project area, a complete Explosive Safety Submission (ESS) is required with approval from NOSSA and Department of Defense Explosive Safety Board. The ESS would provide, but not be limited to explosive safety procedures for intrusive work, munitions clearance requirements, maximum munitions size expected to be encountered, armoring of mechanical equipment, exclusions zones and UXO contractor quality assurance oversight.

Therefore, implementation of the Preferred Alternative would not result in significant impacts to public health and safety.

3.12.3.3 Alternative 2: Sheet Pile Construction (Ranges A&B), Sheet Pile Construction and Range Retreat (Ranges C-F), and Revegetation

The hazardous materials and wastes study area for Alternative 2 is the footprint of the proposed shoreline stabilization improvements. Similar to the Preferred Alternative, Alternative 2 would have insignificant impacts to hazardous materials and wastes. The duration of construction for the implantation of Alternative 2 would be longer than that of the Preferred Alternative due to the additional proposed sheet pile along Ranges C-F. This could increase the potential for construction related spills or pollution. However, the contractor shall be responsible for ensuring that the BMPs described above are followed to ensure that any accidental releases of hazardous substances (e.g., spent lead, anti-freeze, petroleum, oils, and lubricants) are prevented or limited in scope.

Therefore, implementation of Alternative 2 would not result in significant impacts to hazardous materials and wastes.

3.13 Summary of Potential Impacts to Resources and Impact Avoidance and Minimization

A summary of the potential impacts associated with the Preferred Alternative, Alternative 2, and the No-Action Alternative is presented in Table 3-7. Table 3-8 provides a comprehensive list of all avoidance and minimization measures for the Preferred Alternative.

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Table 3-7 Summary of Potential Impacts to Environmental Components

Environmental Component	*No-Action Alternative*	*Alternative 1 (Preferred Alternative): Sheet Pile Construction, (Ranges A&B); Range Retreat (Ranges C-F); Revegetation*	*Alternative 2: Sheet Pile Construction (Ranges A&B); Range Retreat and Sheet Pile Construction (Ranges C-F); Revegetation*
Air Quality	No impact	No significant construction period impacts. No long-term impacts to air quality.	Less than significant impacts. Impacts would similar to the Preferred Alternative.
Water Resources	No short-term impacts. The long-term impacts could include the continual shoreline erosion and release of terrestrial sediment into nearshore marine waters thereby negatively impacting marine water quality.	No significant construction period impacts due to ground disturbance and the potential for sediment and pollutant transport to nearshore marine waters. These potential short-terms impacts would be avoided or mitigated by BMPs associated with the required NPDES Permit. No impacts to the floodplain. The Preferred Alternative could result in long-term beneficial impacts to marine water quality due to the protection of the PRTF shoreline from erosion of the fast land which could otherwise contribute to a reduction in future marine water quality.	No significant impacts. Impacts would be similar to the Preferred Alternative except, the installation of the additional sheet pile along Ranges C-F could result in additional construction-period impacts due to a larger ground disturbance footprint and a proportional increase in potential for sediment and pollutant transport to the nearshore environment.

Table 3-7 Summary of Potential Impacts to Environmental Components

Environmental Component	*No-Action Alternative*	*Alternative 1 (Preferred Alternative): Sheet Pile Construction, (Ranges A&B); Range Retreat (Ranges C-F); Revegetation*	*Alternative 2: Sheet Pile Construction (Ranges A&B); Range Retreat and Sheet Pile Construction (Ranges C-F); Revegetation*
Geological Resources	No short-term impacts. In the long-term, potential shoreline erosion could result in negative impacts. Erosion of the fast land, inland from the beach, could undermine the range impact berms.	No significant construction period impacts due to site preparations and ground disturbing construction activities. Potential impacts to geological resources would be avoided, minimized, or mitigated through the implementation of BMPs required by the NPDES permit, and the project area topography would be returned to its pre-construction state to the maximum extent practicable. In the long-term, the proposed sheet pile bulkhead would protect Ranges A-B from future erosion, but it could result in the eventual loss of the sandy beach fronting the sheet pile. No significant impacts are expected to adjacent shoreline areas due to the predominant west to east longshore sand transport, the buffer areas provided at either end of the proposed sheet pile, and the design elements of the proposed sheet pile which would minimize impacts from end scour.	No significant impacts. Impacts would be similar to the Preferred alternative except, the installation of the additional sheet pile along Ranges C-F could result in additional construction-period impacts due to a larger site and associated ground disturbing footprint. However, potential impacts to geological resources would be avoided or minimized through the implementation of BMPs. In the long-term, the installation of additional sheet pile along Ranges C-F could result in the loss of additional sandy beach fronting that area. Still, no significant impacts are expected to adjacent shoreline areas due to the predominant west to east longshore sand transport, the buffer areas provided at either end of the proposed sheet pile, and the design elements of the proposed sheet pile which would minimize impacts from end scour.
Cultural Resources	No impact	No impact. The Preferred Alternative would result in no historic properties affected and would not impact traditional Hawaiian (or other ethnic group's) rights related to gathering, access, or other customary activities exercised for subsistence, cultural, and religious purposes.	No impact, similar to the Preferred Alternative.

Table 3-7 Summary of Potential Impacts to Environmental Components

Environmental Component	*No-Action Alternative*	*Alternative 1 (Preferred Alternative): Sheet Pile Construction, (Ranges A&B); Range Retreat (Ranges C-F); Revegetation*	*Alternative 2: Sheet Pile Construction (Ranges A&B); Range Retreat and Sheet Pile Construction (Ranges C-F); Revegetation*
Biological Resources	No short-term impacts. In the long-term, potential future shoreline erosion could result in the continual release of terrestrial sediment into nearshore marine waters, which would have a negative impact on marine biological resources	No significant construction period impacts to terrestrial vegetation, terrestrial wildlife, or marine species. The implementation of BMPs would eliminate or minimize potential construction period impacts associated with siltation, turbidity, spills, noise, and direct physical impacts. The Preferred Alternative may affect, but is not likely to affect endangered species in the project area (Green sea turtles, and Hawaiian Monk Seals). The Preferred Alternative may adversely affect designated EFH, but effects would be minimal and insignificant.	No significant impacts. Impacts would be similar to the Preferred Alternative except, the installation of additional sheet pile along Ranges C-F could create greater potential impacts to ESA-listed species (Green sea turtles, and Hawaiian monk seals) and EFH. Alternative 2 was not included in the consultations with the USFWS and NMFS. Should the implementation of Alternative 2 be required due to future changes in shoreline erosion at PRTF, the USMC would reinitiate consultation with USFWS and NMFS to determine the potential impacts to threatened and endangered species and EFH.
Recreational Resources	No Impact	No impacts to recreational resources. Implementation of the Preferred Alternative would not change existing public access at PRTF, and therefore would not impact public access or associated recreational activities in the project area.	No impacts, similar to the Preferred Alternative.
Land Use	No Impact	No impact to land use. Implementation of the Preferred Alternative is compatible with the PRTF Area Development Plan, and would not impact land use outside of the PRTF installation.	No impacts, similar to the Preferred Alternative.

Table 3-7 Summary of Potential Impacts to Environmental Components

Environmental Component	*No-Action Alternative*	*Alternative 1 (Preferred Alternative): Sheet Pile Construction, (Ranges A&B); Range Retreat (Ranges C-F); Revegetation*	*Alternative 2: Sheet Pile Construction (Ranges A&B); Range Retreat and Sheet Pile Construction (Ranges C-F); Revegetation*
Visual Resources	No Impact	No significant construction period impacts due to the presence of a construction site along the shoreline. The retreat of the short-distance ranges would improve longshore views from the publicly accessible beach to the east of PRTF. Vegetation restoration and landscaping would eventually improve the visual aesthetic of the PRTF shoreline. No significant long-term impacts. Buffer areas would dampen any potential negative visual effects of the sheet pile becoming exposed from shoreline erosion, and the exposure of the sheet pile would not affect any of the significant views identified in the Ewa Development Plan.	No significant impacts, similar to the Preferred Alternative.
Noise	No impact	No significant impacts to noise-sensitive receptors during the construction period. No long-term impacts.	No significant impacts, similar to the Preferred Alternative.
Infrastructure	No impact	No impacts to public infrastructure systems. During construction period, the installation of the proposed sheet pile and utility relocation for the retreat of the short-distance ranges could result in potential disruptions to electrical, communications, and water service at PRTF, but the impacts would be limited to the installation and would not impact critical functions such as the PRTF “big voice” public notification system.	No impacts, similar to the Preferred Alternative.

Table 3-7 Summary of Potential Impacts to Environmental Components

Environmental Component	*No-Action Alternative*	*Alternative 1 (Preferred Alternative): Sheet Pile Construction, (Ranges A&B); Range Retreat (Ranges C-F); Revegetation*	*Alternative 2: Sheet Pile Construction (Ranges A&B); Range Retreat and Sheet Pile Construction (Ranges C-F); Revegetation*
Public Health and Safety	No impact	No impacts are expected to public health and safety because public access to the PRTF installation would continue to be restricted. The Preferred Alternative would not generate disproportionate environmental health or safety risks for children living near PRTF.	No impacts, similar to the Preferred Alternative.
Hazardous Materials and Wastes	No impact	No significant impacts are expected from hazardous materials and waste. Temporary secondary containment measures would be employed to ensure that potential accidental releases of hazardous substances (e.g., spent lead, anti-freeze, petroleum, oils, and lubricants) are prevented or limited in scope. Any lead uncovered during the retreat of the short-distance range impact berms would be disposed of in accordance with all applicable regulatory requirements.	No significant impacts, similar to the Preferred Alternative.

Table 3-8 Impact Avoidance and Minimization Measures for the Proposed Action

Avoidance/Minimization Measure	*Anticipated Benefit*	*Environmental Component Affected*
Implement construction period air emissions BMPs; compliance with HAR 11-60.1-33 (Fugitive Dust)	Reduce fugitive dust and other particulate emissions	Air Quality
Implement construction period storm water quality and soil erosion BMPs, SWPPP, USACE, and NPDES permit conditions	Avoid and minimize storm water transport of sediments and pollutants to receiving waters	Water Resources, Geological Resources, Cultural Resources,
Implement BMPs for site clearing and cut/fill operations	Minimize impacts to topography, soils, and the shoreline	Geological resources
Implement shoreline restoration and landscape repair post-construction	Mitigate potential impacts to shoreline vegetation and minimize future man made erosion impacts along the shoreline	Geological Resources, Biological Resources, Visual Resources
SOPs for inadvertent discoveries of cultural resources	Minimize adverse impacts to cultural resources	Cultural Resources
During all construction activities, surveys shall be made prior to the start of work each day, and prior to resumption of work following any break of more than one half hour, checking for protected species presence, and also disturbance to the beach indicative of nighttime sea turtle nesting.	Avoid and minimize potential impacts to protected species	Biological Resources
Personnel shall remain alert for marine mammals and sea turtles before and during construction. Do not commence operations if a marine mammal or sea turtle is observed either hauled out or in nearshore waters within 150 feet (45.5 m) of operations. If a monk seal/pup pair is seen, a minimum 300 foot (91 m) buffer will be observed with no humans approaching them. Wait 30 minutes after the last sighting of the marine protected species on land or in the nearshore water before recommencing activities.	Avoid and minimize potential impacts to protected species	Biological Resources

Table 3-8 Impact Avoidance and Minimization Measures for the Proposed Action

Avoidance/Minimization Measure	*Anticipated Benefit*	*Environmental Component Affected*
All work shall be postponed or halted when ESA-listed marine species are within 150 feet (or 300 feet for seal/pup pairs) of the proposed work, and shall only begin/resume after the animals have voluntarily departed the area.	Avoid and minimize potential impacts to protected species	Biological Resources
All personnel will stay more than 150 ft (45.5 m) from monk seals and sea turtles that haul out on the beach.	Avoid and minimize potential impacts to protected species	Biological Resources
If marine protected species are seen, record information on the species, numbers, behavior, time of observation, location, start and end times of project activity, sex or age class (when possible), and any disturbances (visual or acoustic) by the construction project.	Avoid and minimize potential impacts to protected species	Biological Resources
Personnel will not perform work on the beach if turtle nesting is known or suspected to be occurring.	Avoid and minimize potential impacts to protected species	Biological Resources
Personnel will not perform work on the beach during the time that a Hawaiian monk seal is hauled out if the work would be so loud as to expose them to 100 dB re 20 µPa in-air.	Avoid and minimize potential impacts to protected species	Biological Resources
Special attention will be given to verify that no ESA-listed marine animals are in the area where equipment or material is expected to contact the substrate before that equipment/material may enter the water.	Avoid and minimize potential impacts to protected species	Biological Resources
Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed marine species.	Avoid and minimize potential impacts to protected species	Biological Resources

Table 3-8 Impact Avoidance and Minimization Measures for the Proposed Action

Avoidance/Minimization Measure	*Anticipated Benefit*	*Environmental Component Affected*
A contingency plan to control toxic materials is required.	Avoid potential impacts to water resources and biological resources	Biological Resources, Water Resources, and Hazardous Materials and Wastes
Appropriate materials to contain and clean potential spills shall be stored at the work site, and be readily available.	Avoid potential impacts to water resources and biological resources	Biological Resources, Water Resources, and Hazardous Materials and Wastes
The project manager and heavy equipment operators shall perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations shall be postponed or halted should a leak be detected, and shall not proceed until the leak is repaired and equipment cleaned.	Avoid potential impacts to water resources and biological resources	Biological Resources, Water Resources, and Hazardous Materials and Wastes
All project-related materials and equipment placed in the water shall be free of pollutants.	Avoid potential impacts to water resources and biological resources	Biological Resources, Water Resources, and Hazardous Materials and Wastes
Fueling of land-based vehicles and equipment shall take place at least 100 ft away from the water, preferably over an impervious surface.	Avoid potential impacts to water resources and biological resources	Biological Resources, Water Resources, and Hazardous Materials and Wastes
Turbidity and siltation from project-related work shall be minimized and contained through the appropriate use of erosion control practices, effective silt containment devices, and the curtailment of work during adverse weather and tidal/flow conditions. If turbidity will result from construction activities, silt curtains shall be used to contain turbidity to the minimum area possible.	Avoid and minimize potential impacts to water resources and biological resources	Biological Resources and Water Resources
A plan shall be developed to prevent debris and other wastes from entering or remaining in the marine environment during the project.	Avoid and minimize potential impacts to water resources and biological resources	Biological Resources and Water Resources

Table 3-8 Impact Avoidance and Minimization Measures for the Proposed Action

Avoidance/Minimization Measure	*Anticipated Benefit*	*Environmental Component Affected*
Comply with conditions of DOH Construction Noise Permit	Minimize noise impacts to noise-sensitive receptors and uses	Noise
Coordinate the retreat of the ranges with the proposed communications/electrical upgrades	Minimize utility related construction impacts and avoid potential impacts from utility service disruption.	Infrastructure
Comply with relevant federal, state, and county regulations for activities that may affect hazardous or regulated materials and waste	Avoid or minimize worker or public exposure to hazardous materials and wastes	Hazardous Materials and Wastes
Conduct Phase I Environmental Site Assessment (if necessary)	Avoid or minimize worker or public exposure to hazardous materials and wastes	Hazardous Materials and Wastes

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4 Cumulative Impacts

This section (1) defines cumulative impacts, (2) describes past, present, and reasonably foreseeable future actions relevant to cumulative impacts, (3) analyzes the incremental interaction the Proposed Action may have with other actions, and (4) evaluates cumulative impacts potentially resulting from these interactions.

4.1 Definition of Cumulative Impacts

The approach taken in the analysis of cumulative impacts follows the objectives of NEPA, CEQ regulations, and CEQ guidance. Cumulative impacts are defined in 40 CFR section 1508.7 as:

The impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

In addition, CEQ and USEPA have published guidance addressing implementation of cumulative impact analyses—Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ, 2005) and Consideration of Cumulative Impacts in EPA Review of NEPA Documents (USEPA, 1999). CEQ guidance entitled *Considering Cumulative Impacts Under NEPA* (1997) states that cumulative impact analyses should

"…determine the magnitude and significance of the environmental consequences of the Proposed Action in the context of the cumulative impacts of other past, present, and future actions...identify significant cumulative impacts…[and]…focus on truly meaningful impacts."

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.

- Does a relationship exist such that affected environmental components of the Proposed Action might interact with the affected environmental components of past, present, or reasonably foreseeable actions?
- If one or more of the affected environmental components of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by impacts of the other action?
- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

4.2 Scope of Cumulative Impacts Analysis

The scope of the cumulative impacts analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this EA, the study area delimits the geographic extent of the cumulative impacts analysis. In general, the study area includes those areas

previously identified in Chapter 3 for the respective environmental components. The time frame for cumulative impacts centers on the timing of the Proposed Action.

Another factor influencing the scope of cumulative impacts analysis involves identifying other actions to consider. Beyond determining that the geographic scope and time frame for the actions interrelate to the Proposed Action, the analysis employs the measure of "reasonably foreseeable" to include or exclude other actions. For the purposes of this analysis, public documents prepared by federal, state, and local government agencies form the primary sources of information regarding reasonably foreseeable actions. Documents used to identify other actions include notices of intent for EISs and EAs, management plans, land use plans, and other planning related studies.

4.3 Past, Present, and Reasonably Foreseeable Actions

This section will focus on past, present, and reasonably foreseeable future projects at and near the proposed shoreline stabilization improvements. In determining which projects to include in the cumulative impacts analysis, a preliminary determination was made regarding the past, present, or reasonably foreseeable action. Specifically, using the first fundamental question included in Section 4.1, it was determined if a relationship exist such that the affected environmental components of the Proposed Action (included in this EA) might interact with the affected environmental component of a past, present, or reasonably foreseeable action. If no such potential relationship exists, the project was not carried forward into the cumulative impacts analysis. In accordance with CEQ guidance (CEQ 2005), these actions considered but excluded from further cumulative effects analysis are not catalogued here because the intent is to focus the analysis on the meaningful actions relevant to informed decision-making. Projects included in this cumulative impacts analysis are listed in Table 4-1 and briefly described in the following subsections.

Table 4-1 Cumulative Action Evaluation

Action	***Level of NEPA Analysis Completed***
Past Actions	
Iroquois Point Beach Nourishment and Stabilization	EA and FONSI
Present and Reasonably Foreseeable Future Actions	
P-931 Puuloa Range Communications/Electrical & Gate Modernization • Underground communications/electrical upgrades • Gate/guardhouse upgrades • CCTV security cameras for front/back gate, shoreline, and armory/ASP monitoring • Perimeter fence repairs • Vegetation screening	To be completed

4.3.1 Past Actions

The Iroquois Point beach nourishment and stabilization project was implemented to address severe shoreline erosion at the Kapilina residential area (formerly Iroquois Point housing) directly to the east of PRTF. The project consisted of the construction of nine rock rubble mound T-head groins along 4,200 feet of shoreline, and the recovery of 95,000 cubic yards of sand from Pearl Harbor and its placement as beach fill in the cells between the groins. It resulted in a stable beach 30 to 100 feet wide and about 7

acres in area. The project was completed in June 2013, at a design and construction cost of approximately $15 million. The western-most groin, located about 500 feet east of the PRTF boundary, now acts as a terminal groin for the vicinity of the east end of the rifle range, trapping the prevailing west to east longshore transport of sand and preventing its loss from the PRTF shoreline. Shoreline profiles surveyed post-construction indicate accretion and a seaward movement of the shoreline east of PRTF (The profile immediately west of the new rock groin and the profile at the Range E/F boundary showed significant accretion and seaward movement of the beach over the four-year post construction period, indicating that the rock groin had been trapping sand and thus benefiting the PRTF eastern shoreline by preventing sand loss to the east. The shoreline profile fronting Range A showed significant shoreline retreat in the two years after construction of the Iroquois Point groins, but surveys showed little change in the following two years (see Table 3-1) (NAVFAC HI, 2015).

4.3.2 Present and Reasonably Foreseeable Actions

Military construction project P-931 (fiscal year 2019) will construct guard houses and vehicle barrier walls at the front and back gates, place communication and electrical power lines into underground conduits, upgrade the communication systems, and provide video monitoring of the gates, shoreline, armory, and ammunition supply point. The PRTF ADP also recommended that the project scope be modified to include fixing the eastern boundary fence line at the shoreline and planting vegetation along the northern fence line fronting Cormorant Avenue on both sides of the main gate to screen the installation from the adjacent family housing neighborhood (MCBH, 2016).

4.4 Cumulative Impact Analysis

The following analysis of cumulative impacts is organized by environmental component in the same order presented in Chapter 3. Only the environmental components that have the potential to have cumulative impacts resulting from the incremental effects of the Preferred Alternative or Alternative 2 are addressed. Where feasible, the cumulative impacts were assessed using quantifiable data; however, for many of the resources included for analysis, quantifiable data is not available and a qualitative analysis was undertaken. In addition, where an analysis of potential environmental effects for future actions has not been completed, assumptions were made regarding cumulative impacts related to this EA's Proposed Action where possible. The analytical methodology presented in Chapter 3, which was used to determine potential impacts to the various resources analyzed in this document, was also used to determine cumulative impacts. The analyses show that, when considered with relevant past, present and reasonably foreseeable projects, the incremental effects of the Preferred Alternative and Alternative 2 would not contribute to cumulative impacts on pertinent environmental components. Because it would not contribute any incremental effects, the No-Action Alternative would not result in cumulative impacts on the environmental components during the construction or operational periods.

4.4.1 Water Resources

4.4.1.1 Description of Geographic Study Area

The study area for assessing water resources is the nearshore marine environment in the vicinity of the Proposed Action.

4.4.1.2 Relevant Past, Present, and Future Actions

The Proposed Action's effects on near-shore water quality could interact with similar impacts associated with the Iroquois Point Beach Nourishment and Stabilization Project because the two projects are located adjacent to one another on a continuous sandy shoreline.

4.4.1.3 Cumulative Impact Analysis

Short-term cumulative water resources impacts from past, present, and future actions within the study area would be insignificant. The Iroquois Point Beach Stabilization Project has already been completed, and is likely having beneficial impacts on water quality because the project has prevented shoreline erosion and the associated sedimentation and turbidity impacts to water quality that were previously affecting the shoreline. During the construction period, the Preferred Alternative and Alternative 2 could have temporary negative impacts on water quality. However, BMPs associated with the NPDES permit would avoid, mitigate, or minimize any potential negative effects to water resources from construction.

Long-term cumulative water quality improvement would be expected as both the Iroquois Point and PRTF shoreline stabilization projects help to prevent erosion of fast land that would otherwise be contributing to sedimentation and turbidity impacts in the nearshore marine waters. Therefore, implementation of either of the Action Alternatives, combined with the past, present, and reasonably foreseeable future projects, would not result in significant water resources impacts within the study area.

4.4.2 Geological Resources

4.4.2.1 Description of Geographic Study Area

The study area for assessing geological resources impacts include the shoreline and beach in the vicinity of PRTF.

4.4.2.2 Relevant Past, Present, and Future Actions

The Proposed Action's effects on geological resources could interact with similar impacts associated with the Iroquois Point Beach Nourishment and Stabilization Project because the two projects are located adjacent to one another on a continuous sandy shoreline.

4.4.2.3 Cumulative Impact Analysis

Existing monitoring along the PRTF shoreline suggests that the Iroquois Point Project is likely contributing to the accretion of the beach at the east end of PRTF (near the westernmost Iroquois Point groin) as was predicted during the design of the project (Sea Engineering, Inc., 2017). If the proposed PRTF shoreline stabilization improvements are implemented, it is expected that the shoreline would continue to function in its natural state until future shoreline erosion reaches the point where the proposed sheet pile bulkhead is within the actively eroding shoreline. At that point, the ranges would be protected from this erosion, but the beach fronting the sheet pile could slowly be lost to scour and sand migration if the shoreline erosion encroached further inland. Since Alternative 2 includes the installation of an additional 1,000 feet of sheet pile along Ranges C-F, it would have a greater potential impact on beach loss than the Preferred Alternative. Still, this potential beach loss would be limited to the PRTF shoreline.

As discussed previously, the predominant longshore current along this coastline transports sand from west to east. Therefore, the beach loss along the PRTF shoreline associated with shoreline erosion

reaching the proposed sheet pile bulkhead would be expected to contribute to significant sand accretion along the western side of the Iroquois Point groins as the sand migrates from west to east. Beach loss associated with shoreline erosion reaching the proposed sheet pile for either the Preferred Alternative or Alternative 2 is not anticipated to affect the shoreline to the west of PRTF due to the predominant direction of the longshore sand transport.

Therefore, implementation of either of the Action Alternatives combined with the past, present, and reasonably foreseeable future projects, would not result in significant geological resources impacts within the study area.

4.4.3 Biological Resources

4.4.3.1 Description of Geographic Study Area

The study area for cumulative impacts to biological resources is the affected project area and the adjacent nearshore marine waters.

4.4.3.2 Relevant Past, Present, and Future Actions

The Proposed Action's effects on biological resources could interact with similar impacts associated with the Iroquois Point Beach Nourishment and Stabilization Project because the two projects are located adjacent to one another on a continuous sandy shoreline.

4.4.3.3 Cumulative Impact Analysis

The Iroquois Point Beach Stabilization Project has already been completed and is preventing shoreline erosion and the associated sedimentation and turbidity impacts to water quality that were previously affecting the shoreline to the east of PRTF. Therefore, the Iroquois Point Beach Stabilization Project would not contribute additional negative effects to the potential construction period impacts associated with the Action Alternatives.

Long-term cumulative impacts to biological resources in the nearshore environment are expected to be beneficial as both the Iroquois Point and PRTF shoreline stabilization projects would help to prevent erosion of fast land that would otherwise be contributing to sedimentation and turbidity impacts in the nearshore marine waters. Additionally, the USMC has developed an EFH monitoring plan to conduct monitoring of the EFH adjacent to the project site. This would allow the USMC to track potential impacts to EFH and respond accordingly. Therefore, implementation of the Action Alternatives combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts to biological resources within the study area.

4.4.4 Infrastructure

The Proposed Action combined with the past, present, or future projects is not expected to generate significant changes to potable water, wastewater, or storm drainage systems. Therefore, this section focuses on the potential cumulative impacts to electrical power and communications infrastructure.

4.4.4.1 Description of Geographic Study Area

The study area for cumulative impacts to infrastructure includes the electrical power and communications systems that serve the project site.

4.4.4.2 Relevant Past, Present, and Future Actions

The Communications/Electrical & Gate Modernization Project would likely interact with Proposed Action's impacts to electrical and communications infrastructure. The proposed communications and electrical infrastructure upgrades would involve replacing the existing overhead communications and electrical service at PRTF with underground service. The short distance ranges which could be retreated as part of the Proposed Action are currently served by overhead lines. The sequencing and coordination of the two projects would dictate the nature of the interaction.

4.4.4.3 Cumulative Impact Analysis

The communications and electrical upgrades are identified in the ADP as a short-term project to be implemented in one to five years. This timeframe is within the possible construction dates for the Proposed Action; however, actual construction dates would depend heavily on the availability of funding. If the range retreat is constructed first, the existing overhead communications and electrical service to the ranges would be redesigned and reconstructed to service the retreated ranges. The communications and electrical upgrades would then replace these newly installed overhead lines with underground lines. If the communications and electrical upgrades are constructed first, the new underground service provided to the short-distance ranges would likely have to be removed and redesigned during the retreat of the short-distance ranges. A failure to coordinate on the timing of the two projects could lead to replacement of newly constructed equipment and/or temporary disruptions of communications and electrical service. If timing and coordination allows the proposed communications and electrical upgrades for the short-distance ranges could be constructed in unison with the retreat of the ranges. This would minimize the amount of construction required to deliver both of the projects and would reduce the potential for communication and electrical service disruptions during the construction process.

To the maximum extent practicable the proposed communications/electrical upgrades and the proposed shoreline stabilization improvements would be coordinated so that construction efforts could be consolidated when possible. Therefore, implementation of either of the Action Alternatives combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts to infrastructure.

5 Other Considerations Required by NEPA

5.1 Consistency with Other Federal, State, and Local Laws, Plans, Policies, and Regulations

In accordance with 40 Code of Federal Regulations (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 5-1 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 5-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Status of Compliance*
National Environmental Policy Act (NEPA); CEQ NEPA implementing regulations; USMC procedures for implementing NEPA	EA in progress
Clean Air Act	Proposed Action in attainment area
Clean Water Act	NPDES permit to be obtained
Coastal Zone Management Act	CZM *de minimis* acknowledgement received
National Historic Preservation Act	Consultation concluded (SHPO concurrence)
Endangered Species Act	Consultation concluded (USFWS and NMFS concurrence)
Magnuson-Stevens Fishery Conservation and Management Reauthorization Act	Consultation concluded (NMFS concurrence)
Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations	EA conclusion of no significant effects
Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks	EA conclusion of no significant effects

Coastal Zone Management

By the exchange of letters dated June 1, 2009 and July 9, 2009, the Navy/Marine Corps and the State of Hawaii's Department of Business, Economic Development and Tourism, Office of Planning respectively proposed and concurred that those activities listed on the "Navy/Marine Corps De Minimis Activities under CZMA" (De Minimis Activity List) were not subject to further review by the Hawaii CZM Program when such an activity was conducted in compliance with the corresponding "Project Mitigation/General Conditions."

The Proposed Action falls within the four De Minimis Activity List items listed in Table 5-1.

Table 5-2 Relevant De Minimis Activity List Items

Item No.	*Proposed Action*	*Description*
1	New Construction	Construction of new facilities and structures wholly within Navy/Marine Corps controlled areas (including land and water) that is similar to present use and, when completed, the use or operation of which complies with existing regulatory requirements.

The relevant project mitigation/general conditions from the De Minimis Activity List are as follows:

(1) All activities would occur on DoD property.

(3) Turbidity and siltation from project related work shall be minimized and contained to within the vicinity of the site through appropriate use of effective silt containment devices and the curtailment of work during adverse tidal and weather conditions.

(6) No project-related materials would be stockpiled in the water.

(8) No contamination of the adjacent marine/aquatic environments would result from project-related activities.

(9) Fueling of project-related vehicles and equipment would take place away from the water. A contingency plan would be established to control accidental petroleum releases during project construction.

(10) All fill material would be protected from erosion as soon as practicable.

(11) All exposed soil would be protected from erosion and stabilized as soon as practicable.

(13) No species or habitats protected under ESA would be affected by the Proposed Action.

(14) NEPA EA process would be completed.

(16) State CZM office notified on use of *De Minimis* List for an EA.

The State CZM office was advised by e-mail on August 14, 2018 of the USMC's usage of the De Minimis Activity List and the preparation of this EA. The State CZM office acknowledged receipt of the USMC's notification on August 14, 2018 (see Appendix C).

5.2 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.

In the short-term, effects to the human environment with implementation of the Proposed Action would primarily relate to the construction activity itself. Construction period impacts would be avoided minimized, or mitigated to the maximum extent practicable through the use of BMPs. In the long-term, the Proposed Action would make PRTF more resilient to potential future shoreline erosion. This could result in beneficial impacts to marine water quality when compared with the No-Action Alternative. The Proposed Action coupled with future shoreline erosion could result in the gradual loss of the sandy beach fronting the proposed sheet piles, however, impacts from the Proposed Action are not expected to negatively impact adjacent shorelines. The construction of the facility and operation would not significantly impact the long-term natural resource productivity of the area. The Proposed Action would not result in any impacts that would significantly reduce environmental productivity or permanently narrow the range of beneficial uses of the environment.

6 References

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