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HAWAII

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF: OCC: AJR

NSO-DEA

OCT 26 2018

Mr. Scott Glenn, Director
Office of Environmental Quality Control
Department of Health
235 S. Beretania Street, Room 702
Honolulu, HI 96813

SUBJECT: PUBLICATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR NAVAL SPECIAL OPERATIONS TRAINING IN THE STATE OF HAWAII
Various Locations, State of Hawaii
TMK: Various Locations (Upland and Submerged Lands of the State)

Dear Mr. Glenn,

With this letter, the Department of Land and Natural Resources (DLNR) hereby transmits the draft environmental assessment and anticipated finding of no significant impact (DEA-AFONSI) for the Naval Special Operations Training in the State of Hawaii Draft Environmental Assessment in the **November 8, 2018** edition of The Environmental Notice.

Enclosed is a completed OEQC Publication Form, one (1) copy of the DEA-AFONSI, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word. Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office.

If there are any questions please contact Alex J. Roy, M.Sc. at (808) 587-0316 or alex.j.roy@hawaii.gov

Sincerely,

Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

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Attachments: *OEQC Publication Form*
DEA-AFONSI (1 copy)
CD-RW w/ Pub Form, DEA-AFONSI

19-140

APPLICANT
PUBLICATION FORM

Project Name:	Naval Special Operations Training State of Hawaii Draft Environmental Assessment
Project Short Name:	Naval Special Operations Training Hawaii Draft EA
HRS §343-5 Trigger(s):	Propose the use of state or county land, shoreline and waterways.
Island(s):	O'ahu, Kaua'i, Hawai'i, Maui, Moloka'i,, and Lana'i
Judicial District(s):	Multiple
TMK(s):	Multiple
Permit(s)/Approval(s):	U.S. Fish and Wildlife Service, Section 7 Consultation, Endangered Speceis Act National Marine Fisheries Service, Section 7 Consultation, Endangered Speceis Act National Marine Fisheries Service, Essential Fish Habitat Assessment, Magnuson-Stevens Fishery Conservation and Management Act Section 106 Consultation, National Historic Preservation Act Office of Planning, Coastal Zone Management Act Consistency Determination Real Estate/Right of Entry appovals
Approving Agency:	Department of Land and Natural Resources
Contact Name, Email, Telephone, Address	Samuel Lemmo, Office of Conservation and Coastal Lands Administrator Kalanimoku Building 1151 Punchbowl St, Rom 131 Honolulu, HI 96813 Ph: (808) 587-0377 sam.j.lemmo@hawaii.gov
Applicant:	Naval Special Warfare Command
Contact Name, Email, Telephone, Address	Julie M. Zimmerman Senior NEPA Planner (EV21) Naval Facilities Engineering Command, Pacific 258 Makalapa Drive, Ste 100| Pearl Harbor, HI | 96860-3134 NFPAC-Receive@navy.mil
Consultant:	ManTech International Corporation
Contact Name, Email, Telephone, Address	Meagan Ostrem, Meagan.ostrem@mantech.com (808) 824-0334; 420 Stevens Avenue, Suite 300 Solana Beach, California 92075

Status (select one)	**Submittal Requirements**
__X__ DEA-AFNSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
____ FEA-FONSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.
____ FEA-EISPN	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.
____ Act 172-12 EISPN ("Direct to EIS")	Submit 1) the approving agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.
____ DEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication in the Notice.

19-140

____ FEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.
___ FEIS Acceptance Determination	The approving agency simultaneously transmits to both the OEQC and the applicant a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
____ FEIS Statutory Acceptance	The approving agency simultaneously transmits to both the OEQC and the applicant a notice that it did not make a timely determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and therefore the applicant's FEIS is deemed accepted as a matter of law.
____ Supplemental EIS Determination	The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is or is not required; no EA is required and no comment period ensues upon publication in the Notice.
____ Withdrawal	Identify the specific document(s) to withdraw and explain in the project summary section.
____ Other	Contact the OEQC if your action is not one of the above items.

Project Summary

The United States (U.S.) Naval Special Warfare Command is the U.S. Navy's special operations force and maritime component of the U.S. Special Operations Command. The Naval Special Warfare Command has prepared this Environmental Assessment in accordance with the National Environmental Policy Act, as implemented by Council on Environmental Quality, Navy regulations, and Hawaii Revised Statute 343. The Proposed Action supports small unit intermediate and advanced land, maritime, and air-based training activities for naval special operations personnel. Training would occur in the nearshore waters and land-based areas on Oahu, Island of Hawaii, and Kauai, and in nearshore waters (including harbors and bays) of Maui, Molokai, and Lanai.

The public comment period runs November 08, 2018 – December 10, 2018. The EA may be viewed online at https://go.usa.gov/xUnDC and at the following public libraries: Hawaii State Library (Oahu), Waimea Public Library (Kauai), Kailua-Kona Public Library (Hawaii Island), Kahului Public Library (Maui), and Molokai Public Library. Comments may be submitted by email to

NFPAC-Receive@navy.mil, or by mail to:

Naval Facilities Engineering Command Pacific
Attention: Project Manager, EV21.JZ
258 Makalapa Drive, Ste 100
Pearl Harbor, HI 96860-3134

Comments must be postmarked or received by December 10, 2018 for consideration in preparation of the Final EA.

DRAFT ENVIRONMENTAL ASSESSMENT
For
NAVAL SPECIAL OPERATIONS TRAINING

STATE OF HAWAII

NOVEMBER 2018

Abstract

Designation:	Environmental Assessment
Title of Proposed Action:	Naval Special Operations Training
Project Location:	State of Hawaii
Lead Agency for the EA:	Department of the Navy
Cooperating Agency:	None
Affected Region:	State of Hawaii
Action Proponent:	Naval Special Warfare Command
Point of Contact:	Naval Special Warfare Command 2000 Trident Way, Bldg. 624 San Diego, CA 92155-5599 NFPAC-Receive@navy.mil
Date:	November 2018

The United States (U.S.) Naval Special Warfare Command is the U.S. Navy's special operations force and maritime component of the U.S. Special Operations Command. The Naval Special Warfare Command has prepared this Environmental Assessment in accordance with the National Environmental Policy Act, as implemented by the Council on Environmental Quality Regulations, Navy regulations, and Hawaii Revised Statute 343. The Proposed Action supports small unit intermediate and advanced land, maritime, and air-based training activities for naval special operations personnel. Training would occur in the nearshore waters and land-based areas on Oahu, Island of Hawaii, and Kauai, and in nearshore waters (including harbors and bays) of Maui, Molokai, and Lanai. Training would start in 2019. This Environmental Assessment evaluates the potential environmental impacts associated with the No Action Alternative and two action alternatives (Alternatives 1 and 2) on the following resource areas: air quality, land use-recreation, biological resources, cultural resources, noise, and public health and safety.

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EXECUTIVE SUMMARY

ES.1 Proposed Action

The United States (U.S.) Naval Special Warfare Command (NSWC) proposes to conduct small-unit intermediate and advanced land and maritime training activities for naval special operations personnel. U.S. NSWC is the U.S. Department of the Navy's (Navy's) special operations force and the maritime component of the U.S. Special Operations Command (USSOCOM). The proposed training activities consist of training by naval special operations personnel with occasional integration of other USSOCOM components, including U.S. Army Special Operations Command, Marine Corps Special Operations Command, Air Force Special Operations Command, and Joint Special Operations Command. The occasional integration of other USSOCOM components would occur only with NSWC-led training. The proposed training activities broadly fit into three categories: water-based training, land-based training, and air-based training. Water-based training generally includes naval special operations personnel diving/swimming, launching/recovering small vehicles designed to operate underwater (submersible) as discreet activities, or in combination. Water based training may also incorporate inserting and extracting naval special operations personnel or equipment using watercraft as part of a training event and prior to performing a land-based training component. Land-based training would include personnel transiting over the beach on foot, simulating building clearance activities using simulated munitions, in limited areas engaging in high angle climbing, and using observation techniques in a pre-arranged scenario (special reconnaissance operations with military role players). Air-based training would include the use of unmanned aircraft systems (UAS) or aircraft utilizing drop zones or landing zones for parachute or rope suspension training activities. The proposed training would take place in selected coastal nearshore waters and selected shoreline and inland locations throughout the State of Hawaii.

ES.2 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to ensure that special operation forces acquire and master the individual and team skills in the marine, terrestrial, and aviation aspects of naval special operations in order to progress to more advanced training and to be combat-ready when called to conduct special operations in support of Combatant Commanders. Naval special operations personnel must be ready for a variety of military operations—from large-scale conflict to maritime security and humanitarian assistance/disaster relief—to respond to the dynamic, social, political, economic, and environmental issues that may arise. The need of the Proposed Action is to meet requirements under 10 U.S. Code Section 167 for the Commander, USSOCOM to provide combat-ready forces.

ES.3 Alternatives Considered

NSWC considered three training area screening factors (training, safety, and logistics) when identifying an area that could support warm-weather naval special operations training and satisfy the training requirements. NSWC is considering two action alternatives that meet the purpose of and need for the Proposed Action, and a No Action Alternative, the baseline of current use. Under the No Action Alternative, the baseline training activities conducted in Hawaii over the past decades would continue at the same level as approved under event-based Categorical Exclusions, as applicable. To date, four event-based Categorical Exclusions have been approved to support naval special operations training on non-federal land. For the most part, all four Categorical Exclusions approved to date cover in-water training activities including personnel swimming, and the use of small ships, boats and submersibles on a limited

number of sites on Hawaii Island and Oahu. Similar in-water activities have also been approved within the Middle Loch of Pearl Harbor, Joint Base Pearl Harbor Hickam.

Under Alternative 1, proposed training activities would occur within the training study area which includes the nearshore waters and land-based areas on Oahu, the Island of Hawaii, and Kauai, and nearshore waters (including harbors and bays) of Maui, Molokai, and Lanai (no land-based training is proposed on these three islands). Within the training study area, each non-federal property training site would be used for a maximum of six events per year (pending receipt of real estate agreements/right-of-entry permits). The maximum number of events across all non-federal land training sites would not exceed 198 events. Naval special operations personnel would also utilize federal property within the training study area up to 52 events per year to develop skills associated with the training activities.

Alternative 2 is the Preferred Alternative. Alternative 2 includes the same proposed training study area and all activities in Alternative 1; however, there would be an increase in the maximum number of training events conducted per year. Under Alternative 2, each non-federal training site would be used for a maximum of 10 events per year (pending receipt of real estate agreements/right-of-entry permits) within the training study area. The maximum number of events across all non-federal land training sites would not exceed 330 events. For federal property, up to 265 events would occur per year.

For all the alternatives discussed, not every non-Federal site will be used every year. However, for any particular site within a region and alternative, the maximums as described above would not be exceeded. For all alternatives, the total training events proposed on federal property would be distributed throughout the federal property within the training study area.

Additionally, some locations would not be used for training during certain times of the year when weather, currents, scheduled public events, or protected natural resources concerns are present. Other sites may be used intermittently throughout a year while other sites may not be used at all during a given year. All training events on non-federal land would be conducted in accordance with real estate agreements and approvals. NSWC would coordinate with land managers (where applicable), and property owners prior to use of property for training. The size of the study area allows for this flexibility, and also helps to prevent overuse.

ES.4 Summary of Environmental Resources Evaluated in the Environmental Assessment

Council on Environmental Quality regulations, National Environmental Policy Act, and Navy instructions for implementing the National Environmental Policy Act, specify that an Environmental Assessment (EA) should address those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact.

The Navy, on behalf of NSWC, has initiated consultation with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the State Historic Preservation Division (SHPD). Informal consultation with the USFWS under section 7 of the Endangered Species Act (ESA) is in progress to address the potential effects of the Preferred Alternative on ESA-listed terrestrial species and associated designated critical habitat. Informal consultation with NMFS under section 7 of the ESA and the Magnuson-Stevens Fishery Conservation and Management Act is in progress to address the potential effects of the Preferred Alternative on ESA-listed marine species and associated critical habitat and Essential Fish Habitat (EFH), respectively. Consultation under Section 106 of the National Historic Preservation Act (NHPA) is in progress with SHPD to assess the effects of the proposed action on historic properties. The Section 106 consultation includes coordination with Native Hawaiian organizations. The

Navy does not anticipate any adverse effects to historic properties in accordance with the Section 106 Implementing Regulations.

The following resource areas have been addressed in this EA: air quality, land use-recreation, biological resources, cultural resources, noise, and public health and safety. The potential impacts on the following resource areas are considered to be negligible or non-existent, and therefore were not analyzed in detail in this EA:

Water Resources: The Proposed Action would not impound, divert, drain, control, or otherwise modify the waters of any stream or other body of water. The proposed training activities do not involve changes to drainage patterns or introduce pollutants to training study area surface waters or groundwater. Water quality is not expected to undergo a measurable impact due to the Proposed Action.

Geological Resources: The Proposed Action does not include construction on undeveloped lands or ground-disturbing activities in any undisturbed areas.

Visual Resources: The Proposed Action does not include construction or permanent new structures over an undisturbed area and would not alter the visual landscape within the training study area. In addition, any vegetation clearing (only proposed at one location) would not change the overall composition of the landscape.

Airspace: The Proposed Action would not result in a permanent change of airspace designation or restriction in the existing airspace within the training study area or surrounding area. To support the UAS training activities, a Certificate of Authorization would be obtained from the Federal Aviation Administration (FAA) to fly UAS over federal property. The Certificate of Authorization would specify provisions or limitations, if necessary as part of the approval, to ensure the UAS can operate safely with other airspace users. Air-based training involving aircraft would be conducted in accordance with FAA regulations and the Naval Air Training and Operating Procedures Standardization program.

Infrastructure: The Proposed Action does not include changes to infrastructure within the training study area. There would be no disruption or change to existing wastewater, water, or telecommunication services associated with the Proposed Action.

Transportation: The Proposed Action would not change or alter transportation facilities or circulation of traffic patterns within the training study area or surrounding area.

Hazardous Materials and Wastes: The Proposed Action involves minimal use of machinery, equipment, or vehicles; as such, no increases in the amount of hazardous waste produced would be expected. With implementation of best management practices, including compliance with Navy Spill Prevention and Control and Countermeasure plans, hazardous materials and waste would not be released into the environment under the Proposed Action. Military expended material such as flares and pyrotechnics, propellants, and explosives would not be utilized as part of naval special operations training. Hazardous materials and wastes would not be generated or released into the environment under the Proposed Action and expended batteries would be recycled or disposed of properly.

Socioeconomics and Environmental Justice: The Proposed Action would not result in changes to the population demographics, employment, community, or socioeconomic characteristics within the training study area.

ES.5 Summary of Potential Environmental Consequences of the Action Alternatives and Major Mitigating Actions

This EA analyzes the potential impacts of actions associated with naval special operations in Hawaii. A full range of environmental resources were considered for evaluation at the outset of the process.

Table ES-1 provides a summary of the potential impacts on the resources associated with each of the alternative actions analyzed.

ES.6 Public Involvement

NSWC circulated the Draft EA for public review from November 8, 2018 to December 10, 2018. A Notice of Availability of the Draft EA was published for three consecutive days in the Honolulu Star Advertiser, Maui News, and West Hawaii Today, from November 8 through November 10, 2018, and once in the Hawaii Office of Environmental Quality Control bulletin, *The Environmental Notice*, on November 8, 2018. Copies of the EA were placed in the following public libraries:

- Oahu: Hawaii State Library, 478 S. King Street, Honolulu, HI 96813
- Kauai: Waimea Public Library, 9750 Kaumualii Hwy, Waimea, HI 96796
- Hawaii Island: Kailua-Kona Public Library, 75-138 Hualalai Rd, Kailua-Kona, HI 96740
- Maui: Kahului Public Library, 90 School St, Kahului, HI 96732
- Molokai: Molokai Public Library, 15 Ala Malama Ave, Kaunakakai, HI 96748

In addition, a digital copy of the Draft EA was made available for public review on the Naval Facilities Engineering Command, Pacific website at https://go.usa.gov/xUnDC. A Notice of Availability of the Final EA and Finding of No Significant Impact will be published in the same newspapers listed above, and copies of the documents will be available at the same libraries. In addition, digital copies of the documents will available on the Naval Facilities Engineering Command, Pacific website at https://go.usa.gov/xUnDC.

Table ES-1: Summary of Potential Impacts on Resource Areas

Resource Area: Air Quality		
No Action Alternative	***Alternative 1***	***Alternative 2***
Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable. Therefore, no significant impact on air quality or air resources would occur with implementation of the No Action Alternative.	Transportation vehicles, vessels, aircraft and training equipment associated with proposed training activities would generate emissions; however the emissions would not result in a significant change from the environmental baseline and would have negligible impacts on the ambient air quality of the region. In addition, the dispersive nature of the proposed activities would prevent pollutants concentrating in a single location and would not result in a new major source of emissions that could cause the State of Hawaii to exceed NAAQS. The State of Hawaii is designated as being in attainment for all criteria pollutants and therefore does not require a conformity determination. Therefore, no significant impacts on air quality or air resources would occur with implementation of Alternative 1.	Transportation vehicles, vessels, aircraft and training equipment associated with proposed training activities would generate emissions greater than Alternative 1 due to the increase in tempo and would not result in a significant change from the environmental baseline and would have negligible impacts on the ambient air quality of the region. In addition, the dispersive nature of the proposed activities would prevent pollutants concentrating in a single location and would not result in a new major source of emissions that could cause the State of Hawaii to exceed NAAQS. The State of Hawaii is designated as being in attainment for all criteria pollutants and therefore does not require a conformity determination. Therefore, negligible impacts on air quality or air resources would occur with implementation of Alternative 2.
Resource Area: Land Use - Recreation		
No Action Alternative	***Alternative 1***	***Alternative 2***
Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable. Therefore, no significant impacts on land use or recreation would occur with implementation of the No Action Alternative.	The proposed training activities under Alternative 1 would not restrict the ability of individuals to use or access recreational areas and would be limited to no more than six training events annually at a single site. Right-of-entry permits and real estate agreements would be obtained prior to conducting training in areas where consent is needed. Minimization measures employed during training activities would limit encounters with the public during training events. Therefore, no significant impacts on land use or recreation would occur with implementation of Alternative 1.	The proposed training activities under Alternative 2 would not restrict the ability of individuals to use or access recreational areas. The increase in tempo to no more than 10 training events annually at a site would not affect the public's ability to use recreation areas due to training activities being localized, infrequent, and brief in duration. Right-of-entry permits would be obtained prior to conducting training in areas where consent is needed. Minimization measures employed during training activities would limit encounters with the public during training events. Therefore, no significant impacts on land use or recreation would occur with implementation of Alternative 2.

Table ES-1: Summary of Potential Impacts on Resource Areas (continued)

Resource Area: Biological Resources		
No Action Alternative	***Alternative 1***	***Alternative 2***
Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved and event-based Categorical Exclusions, as applicable. Therefore, no significant impacts on biological resources would occur with implementation of the No Action Alternative.	Proposed training activities under Alternative 1 may affect but would not adversely affect five ESA-listed plant species and associated critical habitat for two of the species, the orangeblack damselfly, two yellow-faced bee species, Hawaiian coot, Hawaiian common gallinule, Hawaiian duck, Hawaiian stilt, Hawaiian goose, Hawaiian hawk, band-rumped storm petrel, Hawaiian petrel, Newell's Townsend's shearwater, Hawaiian hoary bat, oceanic whitetip shark, giant manta ray, green turtle, hawksbill turtle, olive ridley turtle, Hawaiian monk seal and associated critical habitat, blue whale (Central North Pacific Stock), Main Hawaiian Islands Insular false killer whale and associated critical habitat, fin whale, sei whale, and sperm whale. Species would likely respond to the physical presence of trainees by temporarily stopping normal activities (e.g., feeding, resting) to move away from the activity. This type of impact is anticipated to be short term (where normal activities would resume after training events cease or move through the area) and minor (where behavioral changes would be insignificant). Potential effects to the species overall would be insignificant, as effects on individuals would be temporary and effects to habitat discountable because of the non-invasive nature and intent to leave no trace during or after a training event. Proposed training activities would have no significant impact on terrestrial wildlife and vegetation under Alternative 1 *(continued on next page)*.	Proposed training activities under Alternative 2 may affect but would not adversely affect five ESA-listed plant species and associated critical habitat for two of the species, orangeblack damselfly, two yellow-faced bee species, Hawaiian coot, Hawaiian common gallinule, Hawaiian duck, Hawaiian stilt, Hawaiian goose, Hawaiian hawk, band-rumped storm petrel, Hawaiian petrel, Newell's Townsend's shearwater, Hawaiian hoary bat, oceanic whitetip shark, giant manta ray, green turtle, hawksbill turtle, olive ridley turtle, Hawaiian monk seal and associated critical habitat, blue whale (Central North Pacific Stock), Main Hawaiian Islands Insular false killer whale and associated critical habitat, fin whale, sei whale, and sperm whale. In accordance with section 7 of the ESA, the Navy is currently conducting informal consultation with the USFWS and NMFS regarding potential effects of Alternative 2 (Preferred Alternative) on ESA-listed species and designated critical habitat. Species would likely respond to the physical presence of trainees by temporarily stopping normal activities (e.g., feeding, resting) to move away from the activity. This type of impact is anticipated to be short term (where normal activities would resume after training events cease or move through the area) and minor (where behavioral changes would be insignificant). Potential effects to the species overall would be insignificant, as effects on individuals would be temporary and effects to habitat discountable because of the non-invasive nature and intent to leave no trace during or after a training event. (*continued on next page*).

Table ES-1: Summary of Potential Impacts on Resource Areas (continued)

Resource Area: Biological Resources (continued)		
No Action Alternative	***Alternative 1***	***Alternative 2***
	Under the MBTA regulations applicable to military readiness activities (50 C.F.R. Part 21), with implementation of the identified aircraft flight restrictions, impacts from proposed training activities under Alternative 1 would not result in a significant adverse effect on migratory bird populations. Implementation of Alternative 1 would not adversely affect EFH within the training study area, and Level A and Level B harassment of marine mammals are not expected to occur. Therefore, no significant impacts on marine biological resources would occur with implementation of Alternative 1 and the proposed action is unlikely to result in take of a marine mammal under the MMPA.	Proposed training activities would have no significant impact on terrestrial wildlife and vegetation under Alternative 2. Although the tempo of proposed training activities on land and in water would increase under Alternative 2 compared to Alternative 1, the same responses would be expected with Alternative 2 Under the MBTA regulations applicable to military readiness activities (50 C.F.R. Part 21), with implementation of the identified aircraft flight restrictions, impacts from proposed training activities under Alternative 2 would not result in a significant adverse effect on migratory bird populations. Alternative 2 would have no adverse effect on EFH within the training study area, and Level A and Level B harassment of marine mammals are not expected to occur. Therefore, no significant impacts on marine biological resources would occur with implementation of Alternative 2 and the proposed action is unlikely to result in take of a marine mammal under the MMPA.

Table ES-1: Summary of Potential Impacts on Resource Areas (continued)

Resource Area: Cultural Resources		
No Action Alternative	***Alternative 1***	***Alternative 2***
Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable. Therefore, no significant impacts on cultural resources would occur with implementation of the No Action Alternative.	The proposed training activities would be non-invasive in nature. Training would also follow the protocols established under existing Programmatic Agreements and Integrated Cultural Resources Management Plans and requirements of landowners, where applicable, to further avoid and minimize the potential for impacts on archeological resources, historic architecture, and traditional cultural properties. Specific minimization and avoidance measures may be added after Section 106 consultation (including coordination with Native Hawaiian organizations) is complete. Therefore, a finding of no historic properties affected would occur with implementation of Alternative 1.	The proposed training activities would be non-invasive in nature. While tempo would increase under Alternative 2, training would follow the protocols established under existing Programmatic Agreements and Integrated Cultural Resources Management Plans and requirements of landowners, where applicable, to further avoid and minimize the potential for impacts on archeological resources, historic architecture, and traditional cultural properties. Specific minimization and avoidance measures may be added after Section 106 consultation (including coordination with Native Hawaiian organizations) is complete. Therefore, a finding of no historic properties affected would occur with implementation of Alternative 2.
Resource Area: Noise		
No Action Alternative	***Alternative 1***	***Alternative 2***
Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable. Therefore, no significant impact on the noise environment would occur with implementation of the No Action Alternative.	Training activities would generally occur away from residentially zoned areas and the operational conditions of land-based activities is to remain undetected and leave no trace of presence during or after the training. In addition, the operational conditions of aviation activities to maintain elevations above 2,000 feet except for short periods (below 500 feet for approximately 10 minutes) associated with proposed training under Alternative 1 avoids and minimizes noise and potential noise impacts. Disturbances are expected to be short term and infrequent and any impacts on points of interest are minimal and short term based on the (1) relatively low intensity of the impacts, (2) localized nature of the impacts, (3) infrequent nature of the impacts, and (4) brief duration of the activities. Therefore, Alternative 1 would not result in significant impacts to the noise environment.	Training activities would generally occur away from residentially zoned areas and the operational conditions of land-based activities is to remain undetected and leave no trace of presence during or after the training. In addition, the operational conditions of aviation activities to maintain elevations above 2,000 feet except for short periods (below 500 feet for approximately 10 minutes) associated with proposed training under Alternative 2 avoids and minimizes noise and potential noise impacts. Disturbances are expected to be short term and infrequent and any impacts on points of interest are minimal and short term based on the (1) relatively low intensity of the impacts, (2) localized nature of the impacts, (3) infrequent nature of the impacts, and (4) brief duration of the activities. Therefore, Alternative 2 would not result in significant impacts to the noise environment.

Table ES-1: Summary of Potential Impacts on Resource Areas (continued)

Resource Area: Public Health and Safety		
No Action Alternative	***Alternative 1***	***Alternative 2***
Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable. Therefore, no significant impacts on public health and safety would occur with implementation of the No Action Alternative.	Navy policy requires that training activities ensure the safety and health of personnel and the public. Under Alternative 1, proposed training would not include use of live-fire weapons; however, in three locations live-fire weapons would be carried overland to reach existing live-fire ranges. The ranges are within federal property and with limited and restricted public access; therefore, public health and safety would not be affected. For other training activities, personnel would travel using existing roads and waterways in compliance with applicable safety regulations. Air-based activities, including the use of aircraft and UAS, would comply with FAA safety regulation, the Department of Defense's memorandum of agreement with the FAA and the Naval Air Training and Operating Procedures Standardization program (Federal Aviation Administration, 2002). All training events on land areas and within state-owned harbors would be conducted in accordance with real estate agreements and approvals. A safety buffer would be established around maritime and land based training areas, and NSWC would have a vehicle dedicated for emergency response during training events. Size and type of safety buffer would vary by training site. NSWC would coordinate with the U.S. Coast Guard to notify mariners on the safety of navigation. Therefore, no significant impacts on public health and safety would occur with implementation of Alternative 1.	Navy policy requires that training activities ensure the safety and health of personnel and the public. Under Alternative 2, proposed training would not include use of live-fire weapons; however, in three locations live-fire weapons would be carried overland to reach existing live-fire ranges. The ranges are within federal property and with limited and restricted public access; therefore, public health and safety would not be affected. For other training activities, personnel would travel using existing roads and waterways in compliance with applicable safety regulations. Air-based activities, including the use of aircraft and UAS, would comply with FAA safety regulation, the Department of Defense's memorandum of agreement with the FAA and the Naval Air Training and Operating Procedures Standardization program (Federal Aviation Administration, 2002). All training events on land areas and within state-owned harbors would be conducted in accordance with real estate agreements and approvals. A safety buffer would be established around maritime- and land-based training areas, and NSWC would have a vehicle dedicated for emergency response during training events. NSWC would coordinate with the U.S. Coast Guard to notify mariners on the safety of navigation. The increase in tempo would not have a substantially greater impact on public health and safety when compared to Alternative 1. Therefore, no significant impacts on public health and safety would occur with implementation of Alternative 2.

Notes: EFH= Essential Fish Habitat, ESA = Endangered Species Act; FAA = Federal Aviation Administration; MBTA= Migratory Bird Treaty Act; MMPA = Marine Mammal Protection Act; NAAQS = National Ambient Air Quality Standards; NSWC = Naval Special Warfare Command; UAS = Unmanned Aircraft System.

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ENVIRONMENTAL ASSESSMENT
NAVAL SPECIAL OPERATIONS HAWAII
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APPENDICES

Appendix A Agency Correspondence

Appendix B Air Quality Calculations

Acronyms and Abbreviations

Acronym	Definition
°F	Degrees Fahrenheit
µg/m^3	micrograms per cubic meter
A.D.	Anno Domini
AGL	Above Ground Level
APE	Area of Potential Effect
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R.	Code of Federal Regulations
CO	Carbon Monoxide
CZMA	Coastal Zone Management Act
DAHP	Department of Archaeology and Historic Preservation
dB	Decibel(s)
dBA	A-Weighted Decibel(s)
dB re 1 µPa	Decibels referenced to 1 micropascal
DLNR	Department of Land and Natural Resources
DNL	Day-Night Level
DoD	Department of Defense
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEP	Fishery Ecosystem Plan
GHG	Greenhouse Gas
HRC	Hawaii Range Complex
HSTT	Hawaii-Southern California Training and Testing
INRMP	Integrated Natural Resources Management Plan
JBPHH	Joint Base Pearl Harbor Hickam
kHz	kilohertz
L_{eq}	Equivalent Sound Level
L_{max}	Maximum A-Weighted Sound Level
MCBH	Marine Corps Base Hawaii
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSAT	Mobile Source Air Toxic
NAAQS	National Ambient Air Quality Standards
Navy	United States Department of the Navy
NEPA	National Environmental Policy Act
NGA	National Geospatial-Intelligence Agency
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NIPTS	Noise Induced Permanent Threshold Shift
NMFS	National Marine Fisheries Service
NOTAM	Notice to Airmen
NOTMAR	Notice to Mariners
NO_x	Nitrogen Oxide
NRHP	National Register of Historic Places
NSWC	Naval Special Warfare Command
OEIS	Overseas Environmental Impact Statement

Acronym	Definition
OPAREA	Operating Area
OPNAVINST	Chief of Naval Operations Instruction
PCE	Primary Constituent Element
$PM_{2.5}$	Particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	Particulate matter less than or equal to 10 microns in diameter
PMAP	Protective Measures Assessment Protocol
PMRF	Pacific Missile Range Facility
ppb	Parts Per Billion
ppm	Parts Per Million
PSD	Prevention of Significant Deterioration
ROV	Remotely Operated Vehicle
SCUBA	Self-Contained Underwater Breathing Apparatus
SEL	Sound Exposure Level
SHPD	State Historic Preservation Division
SHPO	State Historic Preservation Officer
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedures
tpy	Tons per year
U.S.	United States
U.S.C.	United States Code
UAS	Unmanned Aircraft System
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USSOCOM	U.S. Special Operations Command
UUV	Unmanned Underwater Vehicle
VOC	Volatile Organic Compounds
WMA	Wildlife Management Area
WPRFMC	Western Pacific Regional Fishery Management Council

1 Purpose of and Need for the Proposed Action

1.1 Introduction

The United States (U.S.) Naval Special Warfare Command (NSWC) proposes to conduct small-unit intermediate and advanced land, maritime, and air-based training activities for naval special operations personnel. NSWC is the U.S. Department of the Navy's (Navy's) special operations force and the maritime component of the U.S. Special Operations Command (USSOCOM). The proposed training activities consist of training by naval special operations personnel with occasional integration of other USSOCOM components, including U.S. Army Special Operations Command, Marine Corps Special Operations Command, Air Force Special Operations Command and Joint Special Operations Command. The occasional integration of other USSOCOM components would occur only with NSWC-led training. The proposed training would take place in selected coastal nearshore waters and selected land-based areas throughout the State of Hawaii. NSWC has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), as implemented by Council on Environmental Quality (CEQ), Navy regulations, and Hawaii Revised Statute 343.

The purpose of the Proposed Action is to ensure that special operation forces acquire and master the individual and team skills in the marine, terrestrial, and aviation aspects of naval special operations in order to progress to more advanced training and to be combat-ready when called to conduct special operations in support of Combatant Commanders. Naval special operations personnel must be ready for a variety of military operations—from large-scale conflict to maritime security and humanitarian assistance/disaster relief—to respond to the dynamic, social, political, economic, and environmental issues that may arise. The need of the Proposed Action is to meet requirements under 10 United States Code (U.S.C.) section 167 for the Commander, USSOCOM to provide combat ready forces. As part of the training, the trainees learn skills needed to avoid detection along with the goal of leaving no trace of their presence during or after training activities.

The proposed training activities broadly fit into three categories: water-based training, land-based training, and air-based training. Water-based training generally includes naval special operations personnel diving/swimming, launching/recovering small vehicles designed to operate underwater (submersible) as discreet activities, or in combination. Water-based training may also incorporate inserting and extracting naval special operations personnel or equipment using watercraft as part of a training event and prior to performing a land-based training component. Land-based training would include personnel transiting over the beach on foot, simulating building clearance activities using simulated munitions, in limited areas engaging in high angle climbing, and using observation techniques in a pre-arranged scenario (special reconnaissance operations with military role players). Air-based training would include the use of unmanned aircraft systems (UASs) or aircraft utilizing drop zones or landing zones for parachute or rope suspension training activities. Training activities in the water, on the land, or in the air could occur as a single or separate event, or in many cases would be combined together to be performed sequentially to meet the training objectives. Section 2.1.1 (Training Activities) of this EA provides greater detail on proposed training activities. The Proposed Action does not include the use of explosive demolitions, off-road driving, digging, tree climbing, camp fires, or infrastructure. There would be no vegetation removal or cutting, with the exception of at one federal property location. The proposed training does not include the use of live-fire; however, live-fire weapons would be carried over federal land to reach existing live-fire ranges on federal property where live-fire activities would take place.

Training would occur on both federal and non-federal properties within the State of Hawaii (Figure 1-1 and Figure 1-2 through Figure 1-12). Within the training study area, federally owned sites would be used up to 265 events annually, depending on the alternative selected. Within the training study area, non-federally owned sites would be used on an as-needed basis up to 10 events (2–72 hours) a year, depending on the alternative selected. As the trainees progress in their training, subsequent training requirements are identified and scheduled. Sites included in this EA would be selected based on the type of training to be conducted, ability of a site to support and facilitate the training, and receipt of real estate agreements/right-of-entry permits. For example, some locations would not be used for training during certain times of the year when scheduled public events, protected natural resources considerations, large surf, or dangerous currents are present. Other sites may be used intermittently throughout a year while, other sites may not be used at all during a given year. The size of the study area allows for this flexibility, which also helps to prevent overuse. Site selection is also based on the availability of a site at the time the training would be scheduled to occur. Safety support staff would typically visit a site prior to the training event. If members of the public are present, the staff will assess the situation and, based upon safety considerations, will either (1) not start the training, (2) continue the training, (3) temporarily suspend the training, (4) completely stop the training, or (5) relocate the training to another approved training site. Air-based training utilizing UAS would be restricted to federal property on Oahu and Kauai within authorized airspace including restricted areas and warning areas. Any use of UAS occurring outside of designated special use airspace (restricted area or warning area) is dependent on NSWC obtaining a Certificate of Authorization from the Federal Aviation Administration (FAA). Air-based training utilizing fixed-wing, helicopters, or MV-22 aircraft would be operated and conducted in compliance with required training/operation manuals, FAA regulations, and the Naval Air Training and Operating Procedures Standardization program.

This EA also supports Commander Navy Region Hawaii procurement of appropriate real-estate agreements or right-of-entry permits, on behalf of NSWC, for proposed training areas located off federal property. No training would occur on non-federal property until the required real estate agreements or right-of-entry permits are obtained. For safety and coordination purposes, land managers of public property and owners of private property, where training has been authorized, would be contacted in accordance with right-of-entry agreements, at a minimum of 24 hours in advance of training. Local law enforcement personnel would also be contacted on an as-needed basis. Within the training study area, a number of non-federal land areas were reviewed and analyzed for impacts and based on the analysis, it was determined the Proposed Action would not have significant impacts (see Chapter 3). For the purposes of the real estate agreements, the requirements of NEPA are met by this EA.

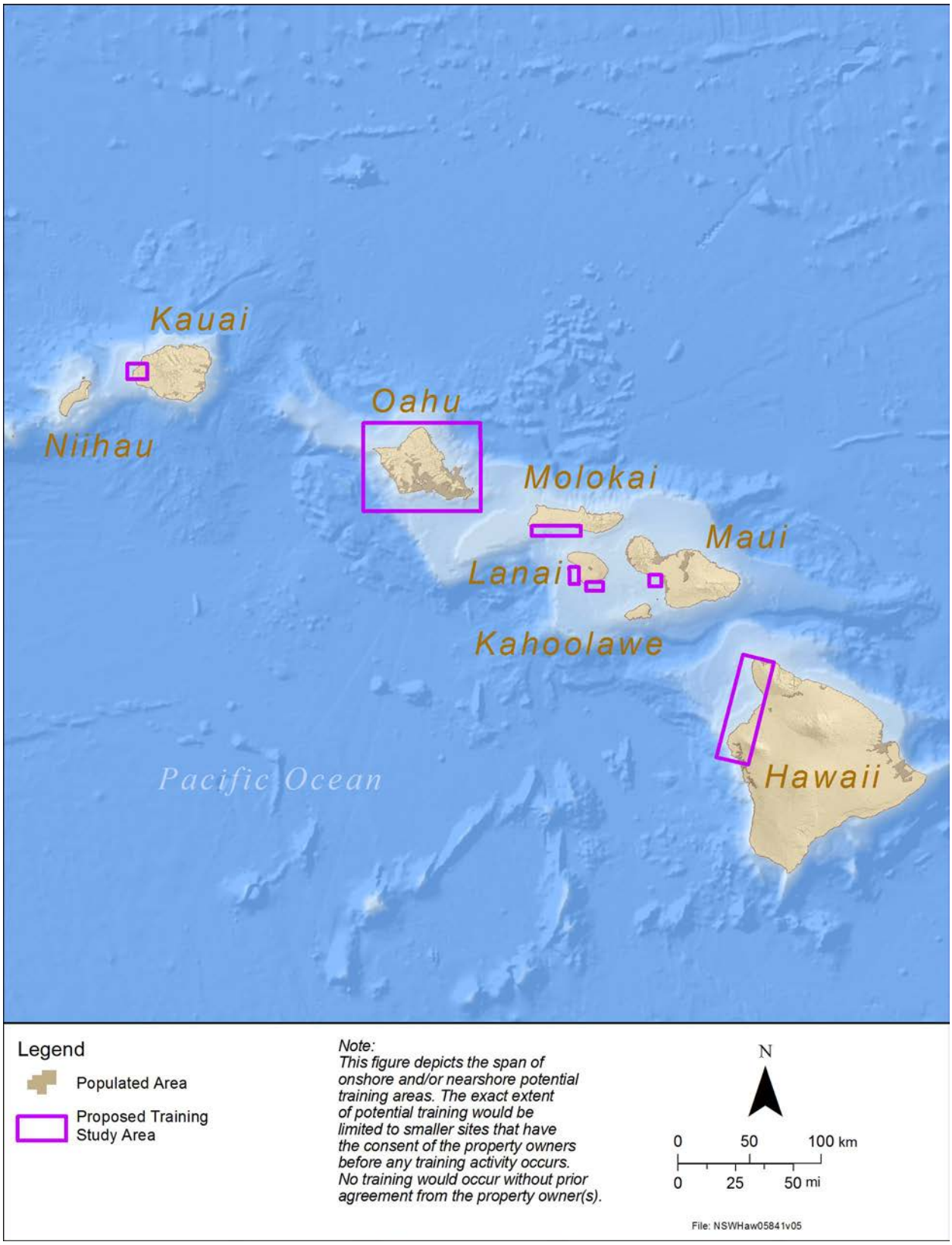

Figure 1-1: Location Overview – Proposed Training Study Area Background

Naval special operations personnel have been training in certain areas of Hawaii for decades. NSWC considers Hawaii an important training location due to the temperate weather and ocean conditions that allow trainees to develop required skills before transferring to more challenging environments. Hawaii offers readily accessible, diverse and complex hydrography and bathymetry while enabling the highest degree of safety due to the close proximity of existing Hawaii military facilities. It also offers an ocean environment where civil, commercial and military training activities may co-exist with minimal interaction. The co-location of other Navy forces in Hawaii affords superior logistics to support and secure the necessary staff and equipment employed during training activities.

The potential environmental impacts of water-based naval special operations training activities (e.g., swimmer/diver and insertion/extraction training) conducted within coastal and federal waters have been evaluated in the *Hawaii-Southern California Training and Testing (HSTT) Final Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS),* dated August 2013, and summarized in the Record of Decision (signed on December 20, 2013). These water-based training activities, which do not have a land-based component and occur in areas that do not require permission or permit to utilize, were consulted on under the Endangered Species Act (ESA) in 2013. The Navy is currently in the process of preparing environmental planning documentation to support the continuation of at-sea training, including water-based NSWC activities.

The training proposed under this EA includes land-based training, which requires real estate agreements/right-of-entry permits for access to non-federal property sites and entry into harbors and bays. Current naval special operations training on Oahu and the Island of Hawaii (Big Island) have been limited to individual events at a restricted number of sites. These sites were reviewed under NEPA and were determined to qualify for approved Categorical Exclusions.

The current limited number of sites available to trainees results in repeated use of sites and undue familiarity with the training scenarios, thus limiting the quality of the training. The restricted number of sites are not considered sufficiently varied and diverse to support persistent long-term training requirements. Training must be varied and diverse, and as realistic as possible, to prepare U.S. service members to achieve their mission and ensure their success and survival when deploying on missions. When trainees repeatedly use the same site for training, site familiarity negates the quality and value of the training. NSWC recognizes the need for relevant training and experience to adequately prepare personnel for worldwide deployments. This includes training in realistic environments. Facilities and topography on military bases/federal land is often different than that found at off-base locations. Because the nature of naval special operations requires them to operate worldwide, often times off military installations, it is imperative that their training provides this diversity and replicates real world environments; therefore, the use of non-federal land is imperative for training purposes.

1.2 Proposed Training Locations

To facilitate naval special operations training in a variety of ocean conditions, proposed training sites have been identified on or near six of the main Hawaiian Islands. The training study area includes five regions on Oahu (Figure 1-2): (1) Joint Base Pearl Harbor-Hickam (JBPHH) (Figure 1-3), (2) South (Figure 1-4), (3) Windward (Figure 1-5), (4) North (Figure 1-6), and (5) West Oahu (Figure 1-7). The training study area also includes sites on or near the Island of Hawaii (Figure 1-8), Kauai (Figure 1-9), Maui (Figure 1-10), Lanai (Figure 1-11), and Molokai (Figure 1-12). Training activities would occur on federal and non-federal property pending appropriate approvals.

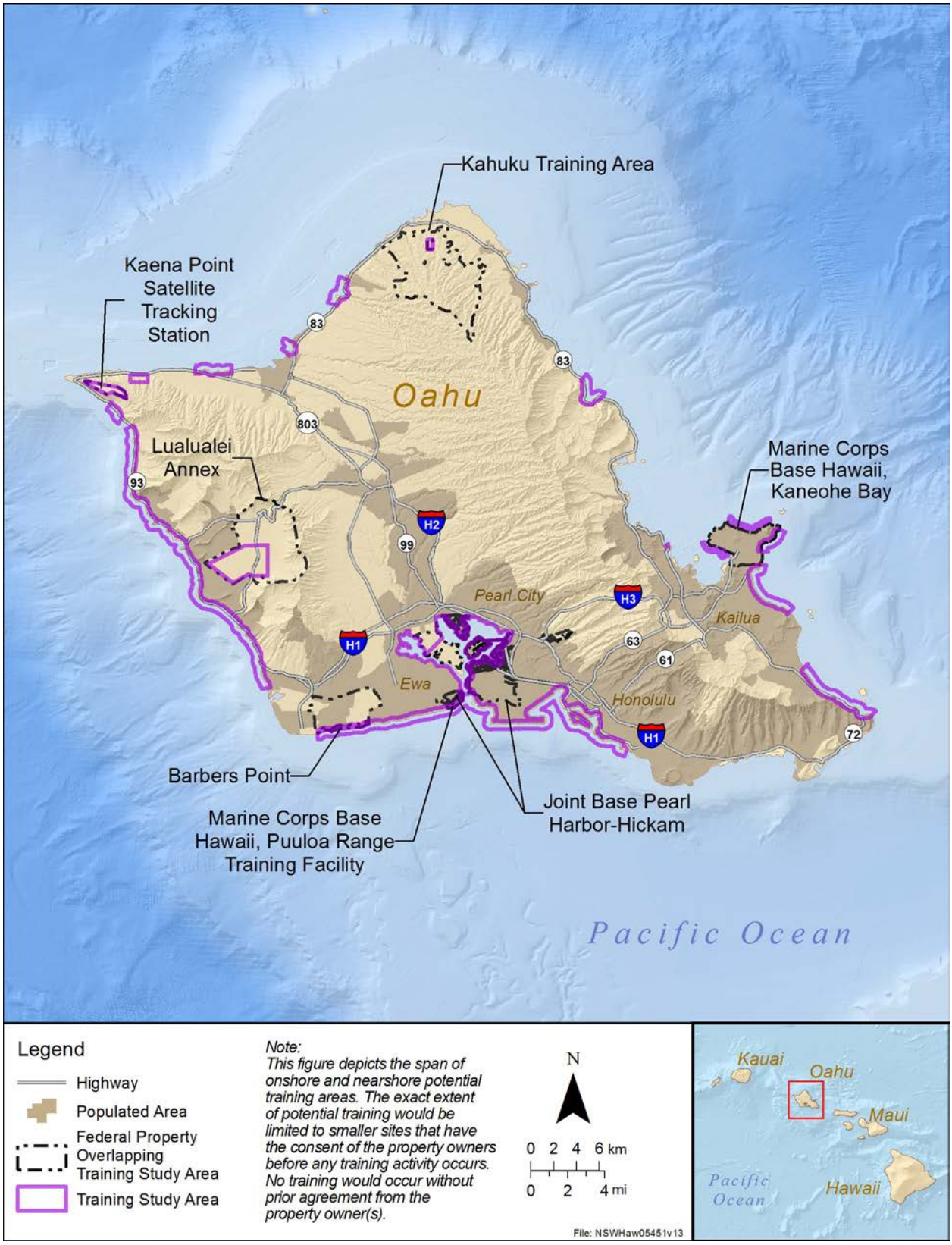

Figure 1-2: Oahu Island Training Study Area

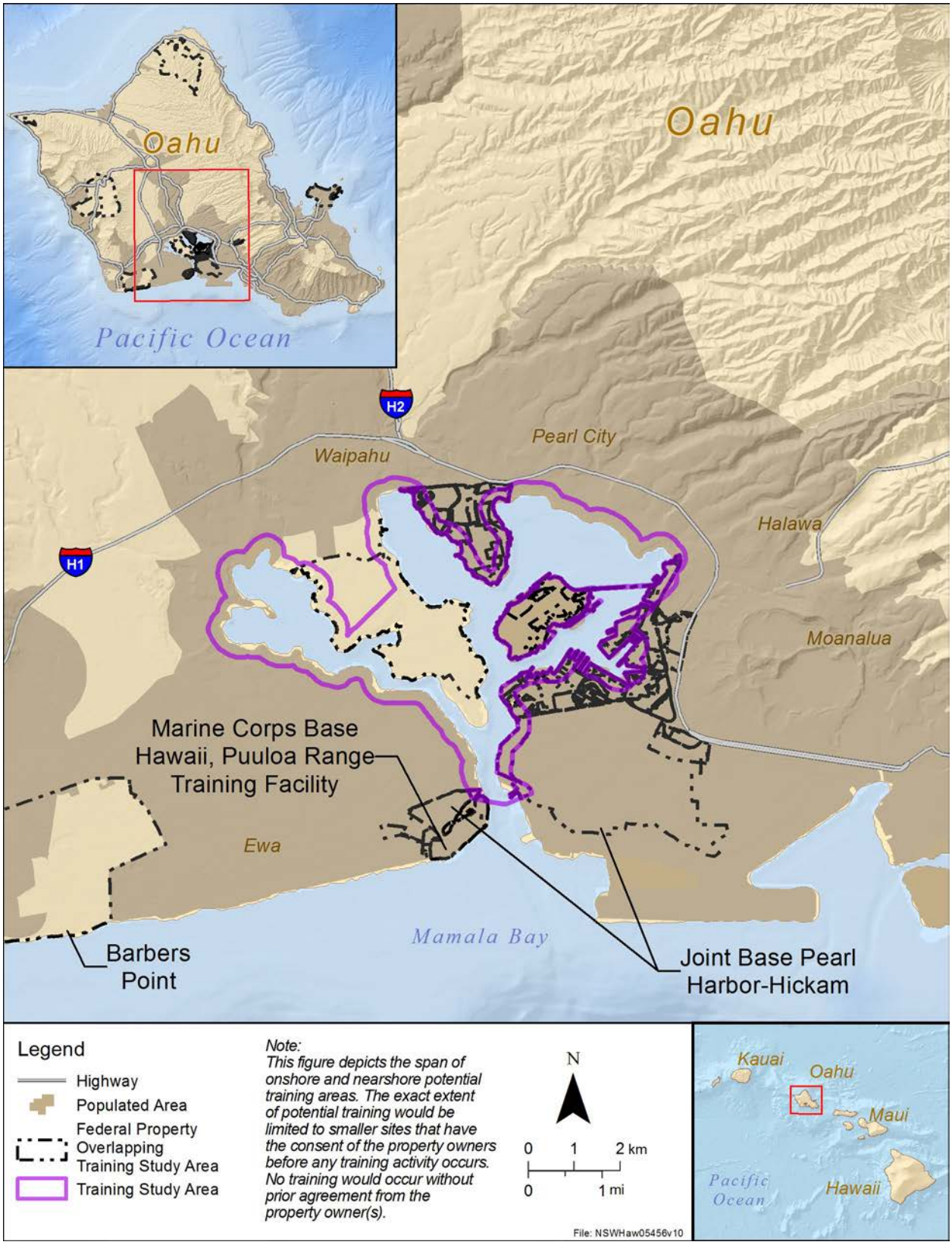

Figure 1-3: Oahu Joint Base Pearl Harbor-Hickam Training Study Area

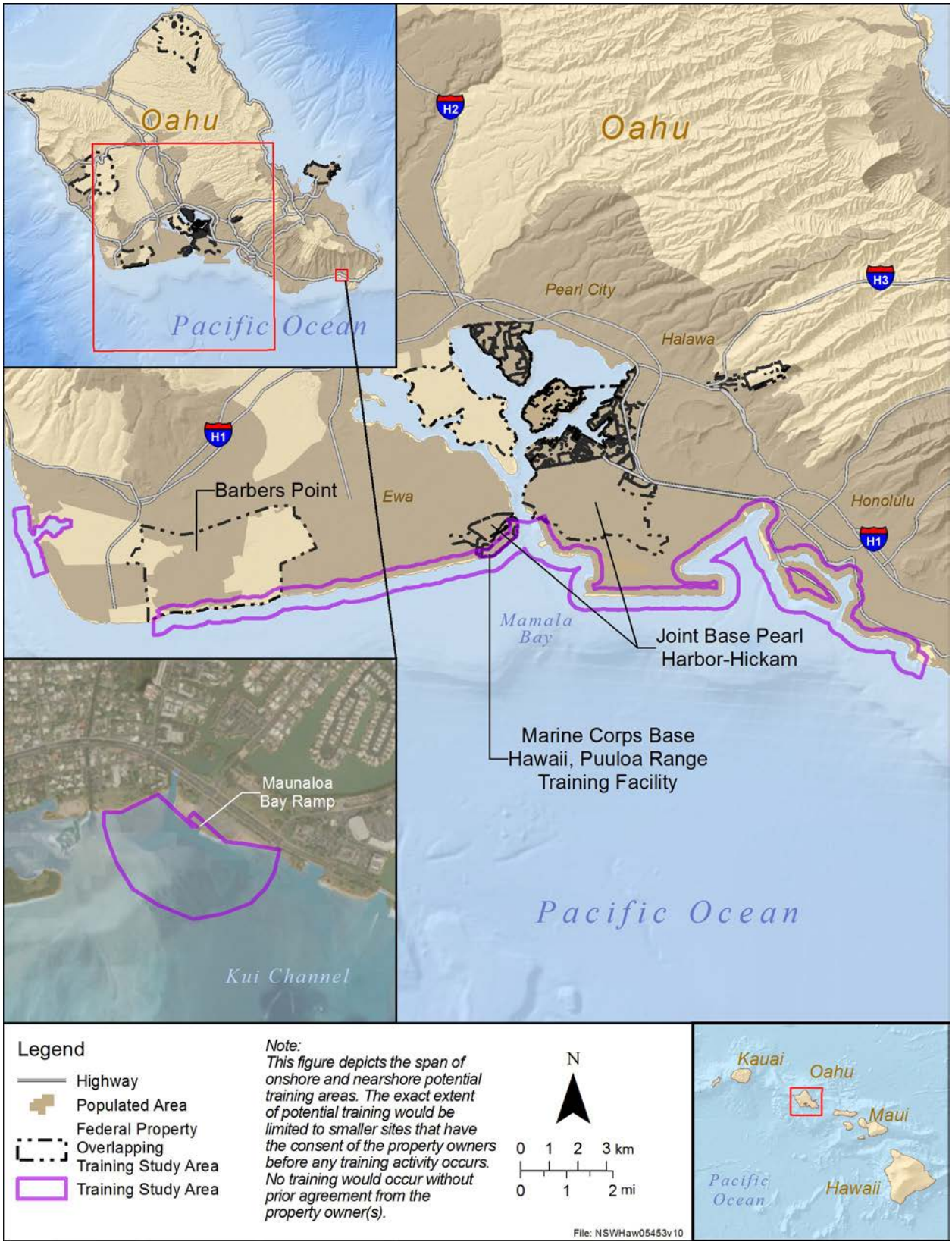

Figure 1-4: Oahu South Region Training Study Area

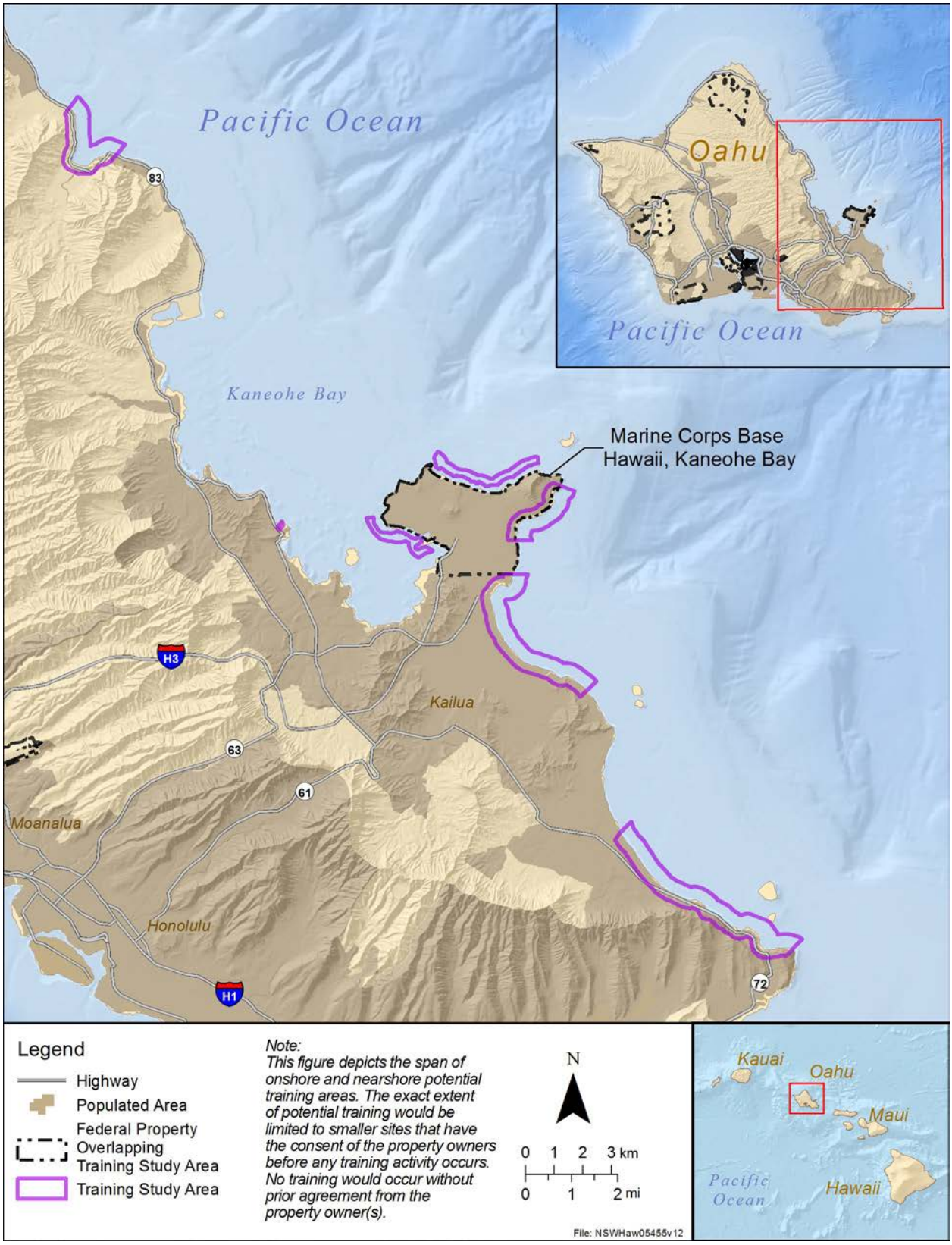

Figure 1-5: Oahu Windward Region Training Study Area

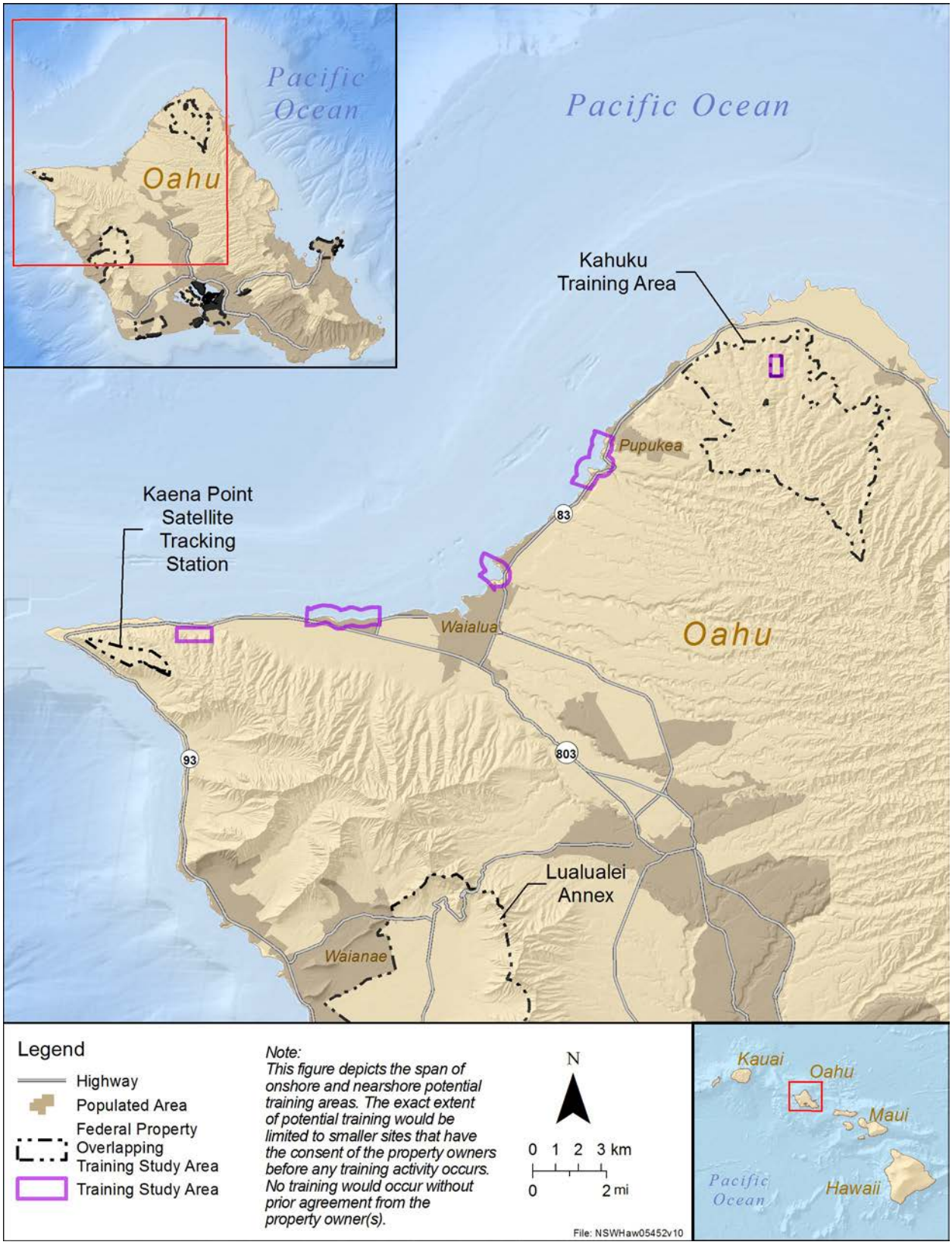

Figure 1-6: Oahu North Region Training Study Area

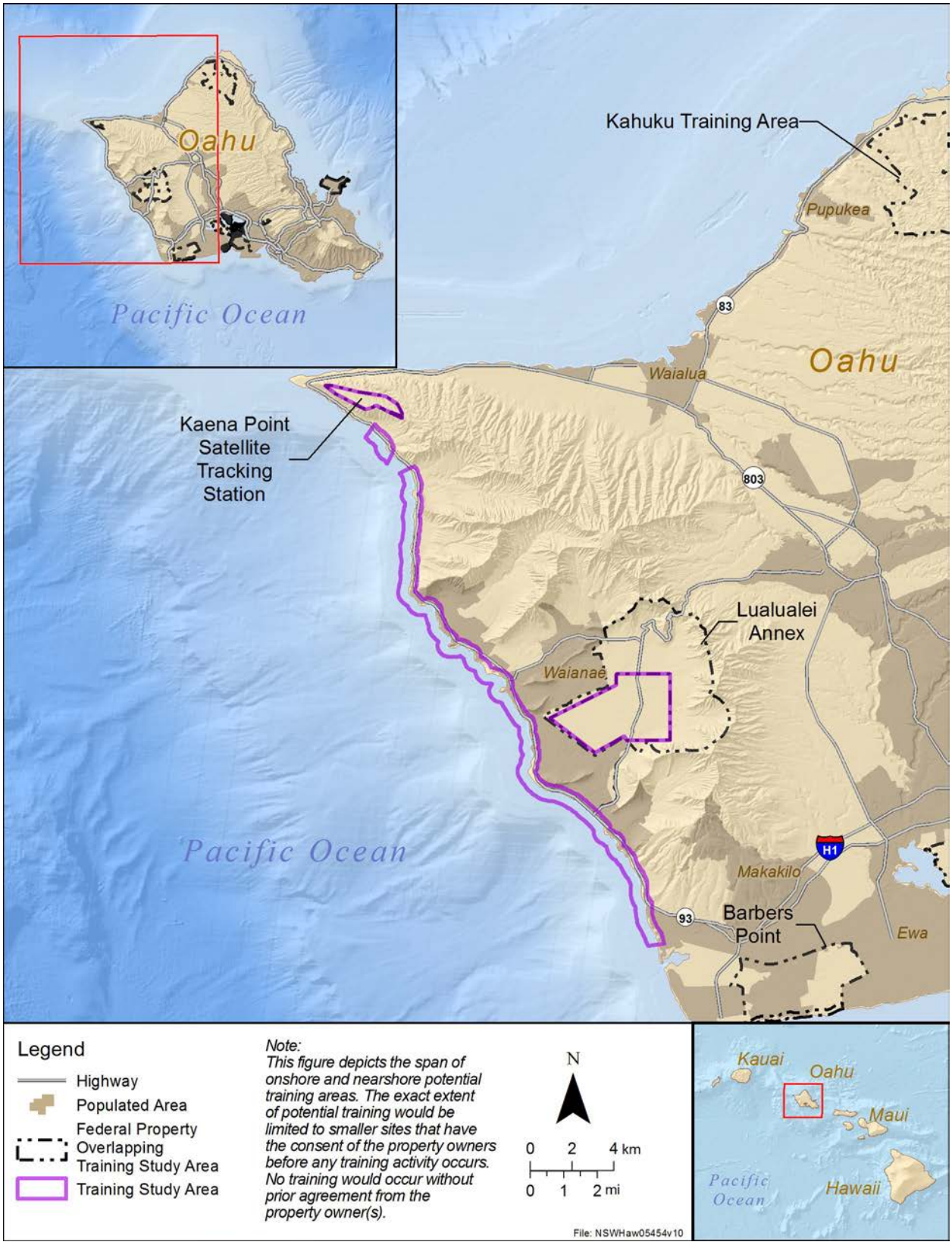

Figure 1-7: Oahu West Region Training Study Area

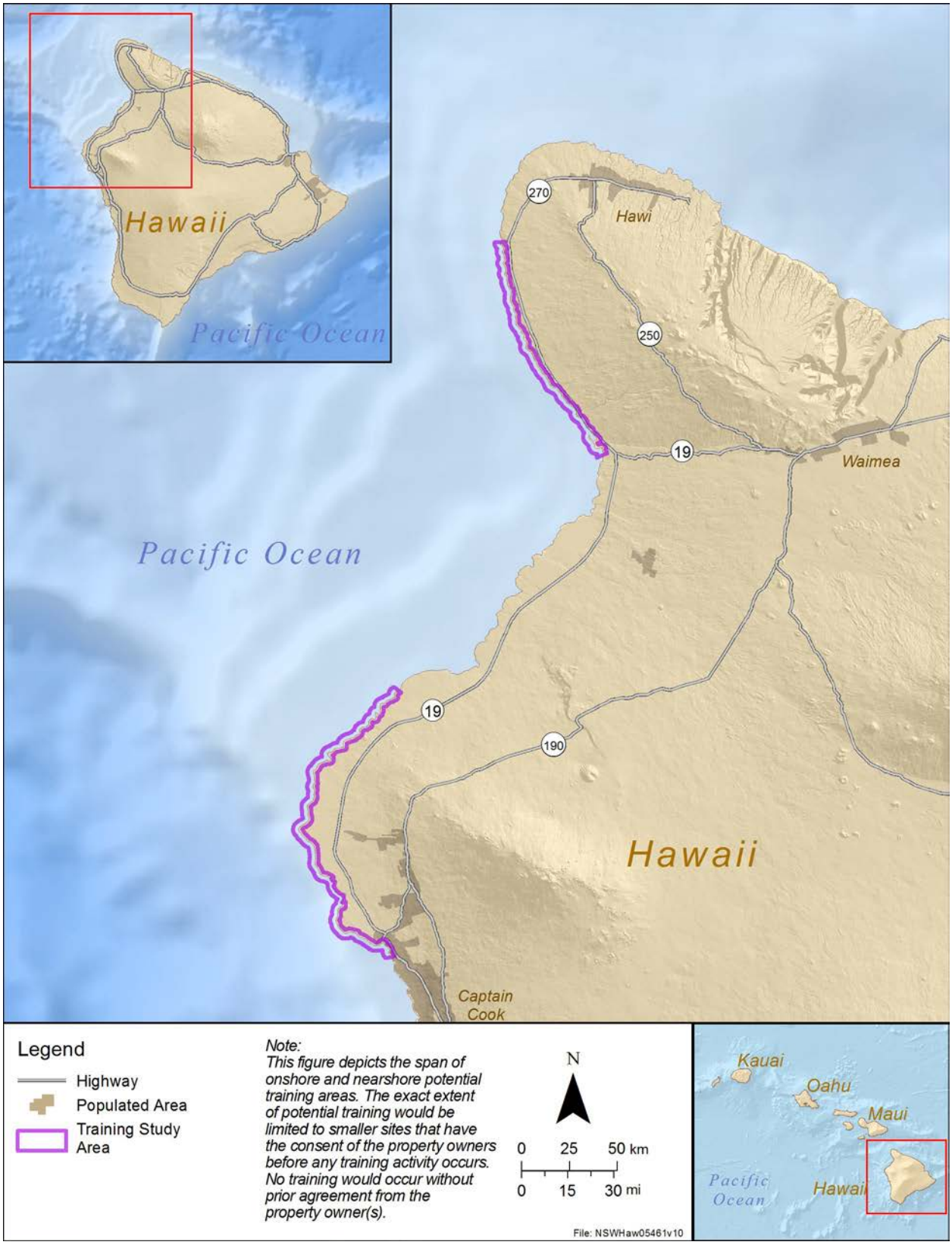

Figure 1-8: Island of Hawaii Training Study Area

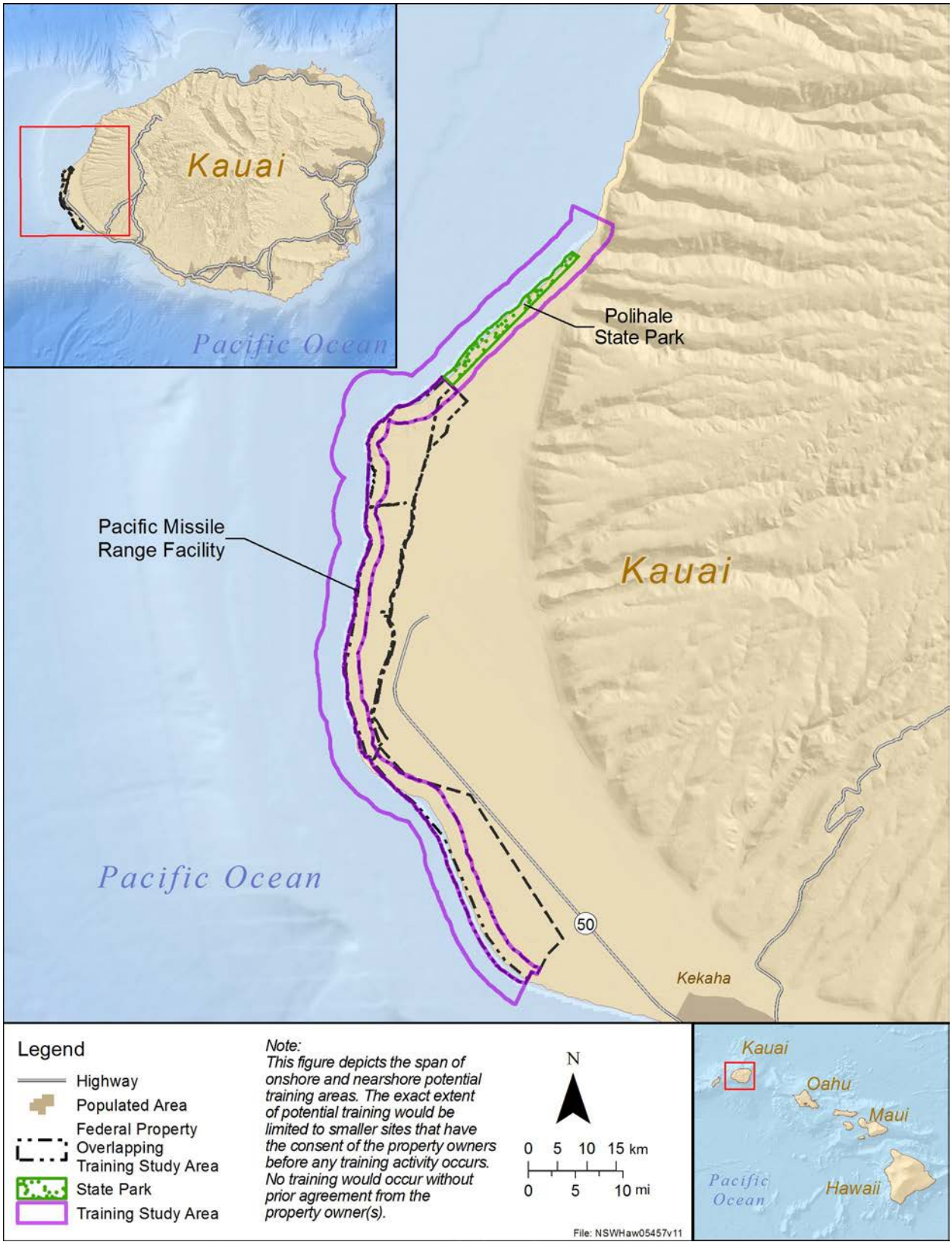

Figure 1-9: Kauai Training Study Area

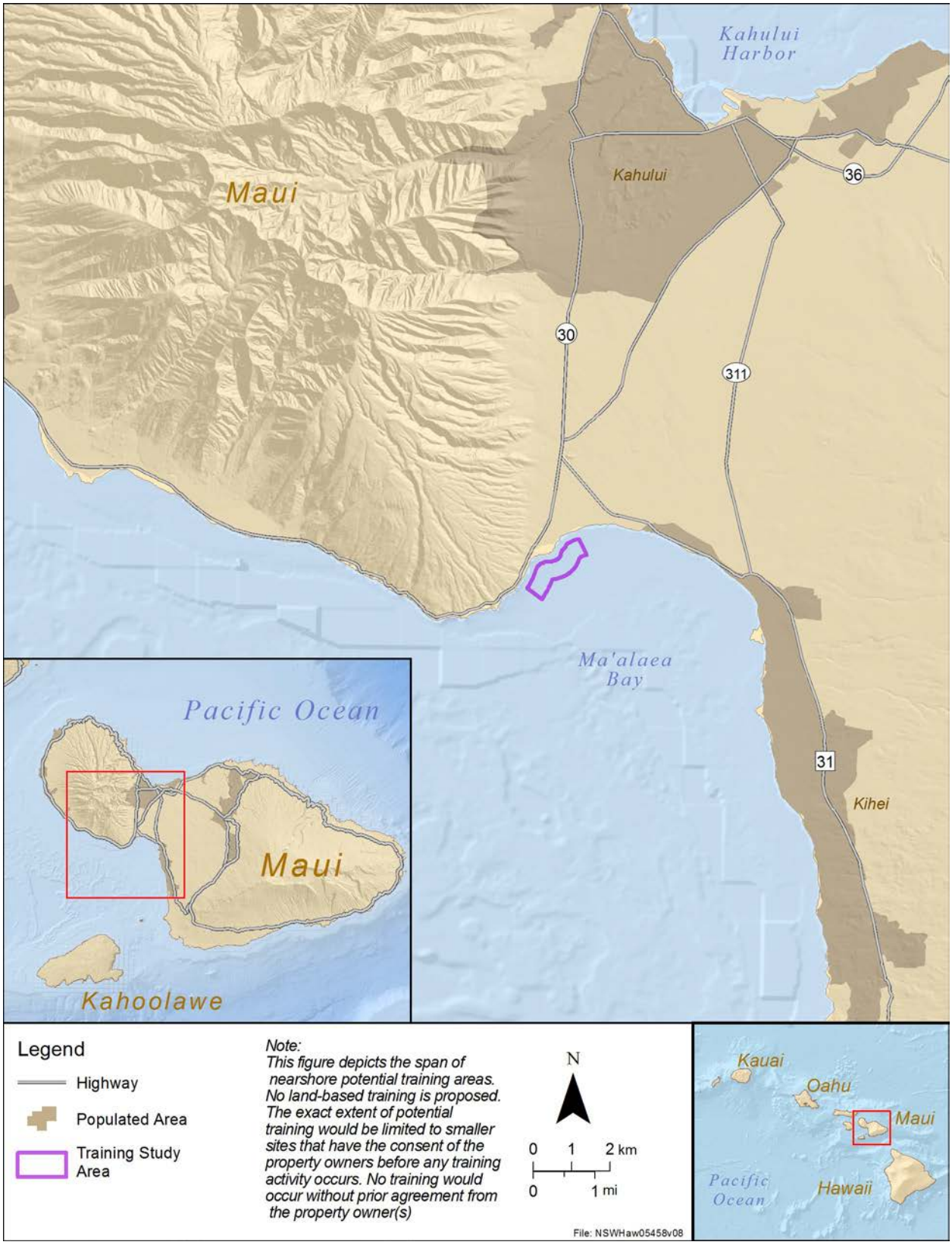

Figure 1-10: Maui Training Study Area

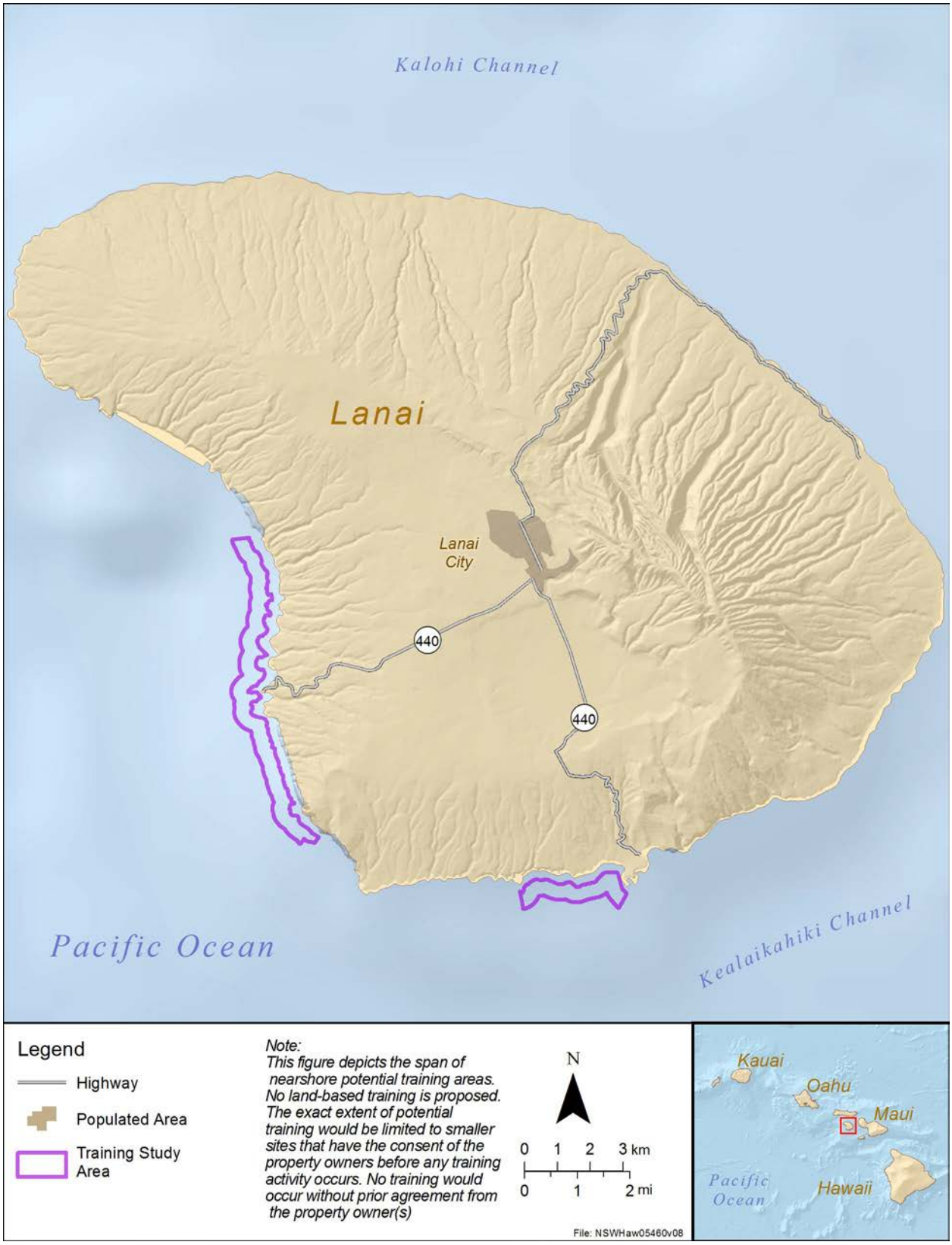

Figure 1-11: Lanai Training Study Area

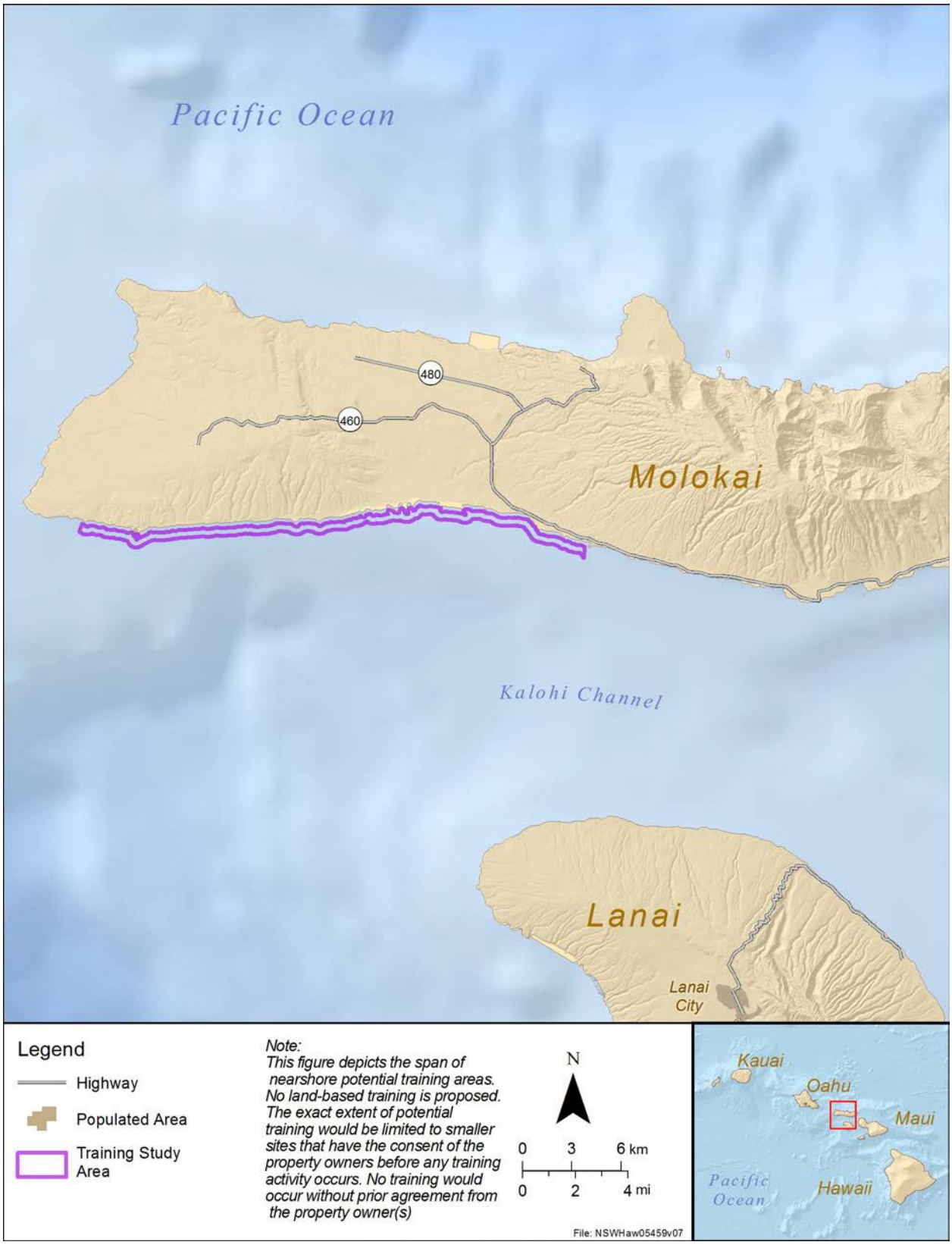

Figure 1-12: Molokai Training Study Area

Training locations will vary due to seasonal weather conditions, public presence at sites, protected natural resources considerations, training qualifications to be satisfied, and training requirements. If a particular non-federal site is selected for a potential training event, communication with individual public property managers and private property owners would be conducted to establish or confirm real estate agreements to allow for training activities to be conducted.

Air-based training would utilize the airspace above federal property during training. Airspace is an area of defined dimensions where air traffic control service controls flights in accordance with airspace classification. The National Airspace System is under the control of the FAA through the Federal Aviation Act of 1958. The FAA is responsible for the safe and efficient use of U.S. airspace by military and civilian aircraft and for supporting national defense requirements.

Airspace is divided into two major categories: controlled and uncontrolled (U.S. Department of Transportation Federal Aviation Administration, 2017). In controlled airspace, all aircraft operators are subject to certain pilot qualifications, operating rules, and equipment requirements. Air-based training proposed under this EA utilizing AC-130, C-17, helicopters, MV-22, or other similar aircraft would be operated in accordance with the Naval Air Training and Operating Procedures Standardization program, which prescribes general flight and operating instructions and procedures applicable to the operation of all U.S. naval aircraft and related activities.

The training study area supports specialized skill set requirements, and a variety of training and training transitions from one site to the next to achieve each level of training. Having a varied selection of sites in an expansive area provides trainers with flexibility in their choice of challenges required for training purposes.

1.3 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to ensure that special operation forces acquire and master the individual and team skills in the marine, terrestrial, and aviation aspects of naval special operations in order to progress to more advanced training and to be combat-ready when called to conduct special operations in support of Combatant Commanders. Naval special operations personnel must be ready for a variety of military operations—from large-scale conflict to maritime security and humanitarian assistance/disaster relief—to respond to the dynamic, social, political, economic, and environmental issues that may arise. The need of the Proposed Action is to meet requirements under 10 U.S.C. section 167 for the Commander, USSOCOM to provide combat ready forces.

Title 10, U.S.C. section 167 assigns USSOCOM, a unified combatant command, responsibility to prepare combat-ready, forward-deployed special operations forces to carry out assigned missions. Per USSOCOM Directive 10-1cc, USSOCOM has designated Commander, NSWC, the Navy component command of USSOCOM, as the Lead Component for maritime training. Per Chief of Naval Operations Instruction (OPNAVINST) 5450.221D, the mission of Navy Special Warfare Command is to "organize, train, man, equip, educate, sustain, maintain combat readiness, and deploy" special operations forces. The Proposed Action meets the requirements of 10 U.S.C. section 167 and NSWC's mission of providing combat-ready special operations forces.

The skills needed to achieve peak military readiness for special operations are challenging to master and difficult to maintain without constant practice. Therefore, training must be diverse, and as realistic as possible in order to prepare U.S. service members to achieve any potential future missions and ensure their success and survival. Current naval special operations training in Hawaii's warm weather maritime climate does not

provide sufficient varied and diverse training locations or physical environmental features, and lacks elements of unpredictability and unfamiliarity, both of which are essential to prepare personnel for more advanced training environments and military operations in support of U.S. interests.

The progressive nature of naval special operations training requires personnel to successfully complete beginning/intermediate levels of training in Hawaii's warm weather maritime climate prior to advancing to more challenging (colder weather) environments. The progressive training process provides personnel with an in-depth understanding of their individual limitations and capabilities, and their equipment, prior to advancing to more high stress and remote environments. NSWC must conduct warm water training in Hawaii due to limits with personnel availability caused by a high operational tempo, and the following requirements, including submarine force concentration, military logistical support, military security, and bathymetry and warm water.

Having a varied selection of sites in an expansive area provides trainers with diversity in their choice of challenges required for training purposes and supports unique training environment requirements. A wider selection of federal, state, and private property training sites across Hawaii would ensure that training would be sustained both for diversity and flexibility in the event that a selected site is not available at the time training is scheduled (i.e., due to ocean conditions, large public presence in the area, or protected natural resources considerations). The ability to select from a diverse set of non-federal sites would introduce the critical elements of unpredictability and unfamiliarity, helping to further prepare naval special operations trainees for real-world combat scenarios.

1.4 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 resource areas analyzed in this EA include air quality, land use-recreation, biological resources, cultural resources, noise, and public health and safety. The study area for each resource analyzed may differ due to how the Proposed Action interacts with or potentially impacts the resource.

1.5 Key Documents

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

- *Hawaii Range Complex Final Environmental Impact Statement/Overseas Environmental Impact Statement, May 2008*. The Hawaii Range Complex (HRC) EIS/OEIS detailed actions to support current, emerging, and future training; research, development, testing, and evaluation activities; and associated range capabilities within the HRC. The HRC EIS/OEIS evaluated the potential environmental effects of water-based and land-based training activities and supported Marine Mammal Protection Act (MMPA) permits and ESA consultations for Navy training activities.
- Hawaii-Southern California Training and Testing Activities Final Environmental Impact Statement/Overseas Environmental Impact Statement, August 2013. The Navy's Proposed Action was to conduct training and testing activities (including the use of active sonar and explosives) primarily within existing range complexes and operating areas (OPAREAs) located along the coast of Southern California and around the Hawaiian Islands. Navy OPAREAs include designated ocean areas near fleet homeports. The HSTT EIS/OEIS supported renewal of the

MMPA permit and ESA consultation obtained as a result of the HRC EIS/OEIS. The HSTT EIS/OEIS incorporated a full range of training and testing activities, focusing on the water-based activities.

- Hawaii-Southern California Training and Testing Activities Draft Environmental Impact Statement/Overseas Environmental Impact Statement, August 2017. The third phase of the Navy's environmental compliance planning is in progress and covers the same types of activities within the same study areas as previously analyzed in the 2013 HSTT EIS/OEIS. The Navy is re-evaluating impacts from these ongoing activities in existing ranges and OPAREAS, including activities that occur during transit between these range complexes and OPAREAs, to analyze new or changing training and testing activities based on evolving operational requirements, including those associated with new platforms and systems not previously analyzed. Additionally, the Navy is conducting analysis thorough a review of the best available science to ensure the most applicable science is incorporated. The new analysis will be used to support environmental compliance with applicable environmental laws, such as the MMPA and ESA, into the reasonably foreseeable future.

1.6 Relevant Laws and Regulations

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

- NEPA (42 U.S.C. sections 4321–4370h), which requires an environmental analysis for major federal actions that have the potential to significantly impact the quality of the human environment
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [C.F.R.] parts 1500–1508)
- Navy regulations for implementing NEPA (32 C.F.R. part 775), which provides Navy policy for implementing CEQ regulations and NEPA
- Chapter 343, Hawaii Revised Statutes, State EIS Law
- Clean Air Act (CAA) (42 U.S.C. section 7401 et seq.)
- Clean Water Act (33 U.S.C. section 1251 et seq.)
- Rivers and Harbors Act (33 U.S.C. section 407)
- Coastal Zone Management Act (CZMA) (16 U.S.C. section 1451 et seq.)
- Archeological and Historic Data Preservation Act (54 U.S.C. Ch. 3125)
- Archaeological Resources Protection Act (54 U.S.C. section 100101)
- National Historic Preservation Act (NHPA) (54 U.S.C. section 306108 et seq.)
- Native American Graves Protection and Repatriation Act (25 U.S.C. 3001 et seq.)
- National Maritime Heritage Act, as amended (54 U.S.C. 308701–1356b)
- Submerged Lands Act of 1953 (43 U.S.C. section 1301 et seq.)
- Abandoned Shipwreck Act, as amended (43 U.S.C. 2101–2106)
- Sunken Military Craft Act (10 U.S.C. 113 Note)
- Hawaii Revised Statutes, section 6E-8
- Hawaii Revised Statutes, sections 183D-1–66
- Hawaii Administrative Rule, Chapter 13-124, Exhibit 2 and Hawaii Revised Statutes, section 195D

- Hawaii Administrative Rule, Chapter 13-275
- Hawaii Administrative Rule, Chapter 13-107
- Hawaii Administrative Rules, Title 11, Chapter 59
- ESA (16 U.S.C. section 1531 et seq.)
- Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (16 U.S.C. section 1801 et seq.)
- MMPA (16 U.S.C. section 1361 et seq.)
- Migratory Bird Treaty Act (MBTA) (16 U.S.C. section 703–712)
- Comprehensive Environmental Response and Liability Act (42 U.S.C. section 9601 et seq.)
- Executive Order (EO) 11988, Floodplain Management
- EO 12088, Federal Compliance with Pollution Control Standards
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations
- EO 13045, Protection of Children from Environmental Health Risks and Safety Risks
- EO 13089, Coral Reef Protection
- OPNAVINST 5090

A description of the Proposed Action's consistency with these laws, policies and regulations, as well as the names of regulatory agencies responsible for their implementation, is cited in Chapter 3 as necessary and presented in Chapter 5 (Other Considerations Required by NEPA, Table 5-1).

1.7 Public and Agency Participation and Intergovernmental Coordination

The CEQ regulations implementing NEPA (40 C.F.R. part 1506.6) direct agencies to involve the public in preparing and implementing their NEPA procedures. NSWC published a Notice of Availability of the Draft EA for three consecutive days in the Honolulu Star Advertiser, Maui News and West Hawaii Today, from November 8 through November 10, 2018, and once in the Hawaii Office of Environmental Quality Control bulletin, The Environmental Notice, on November 8, 2018. The notice described the Proposed Action, solicited public comments on the Draft EA, provided dates of the public comment period, and announced that a copy of the EA would be available for a 30-day review (November 8, 2018 through December 10, 2018). Copies of the EA were placed in the following public libraries:

- Oahu: Hawaii State Library, 478 S. King Street, Honolulu, HI 96813
- Kauai: Waimea Public Library, 9750 Kaumualii Hwy, Waimea, HI 96796
- Hawaii Island: Kailua-Kona Public Library, 75-138 Hualalai Rd, Kailua-Kona, HI 96740
- Maui: Kahului Public Library, 90 School St, Kahului, HI 96732
- Molokai: Molokai Public Library, 15 Ala Malama Ave, Kaunakakai, HI 96748

In addition, a digital copy of the Draft EA was made available for public review on the Naval Facilities Engineering Command Pacific website at https://go.usa.gov/xUnDC.

The Navy, on behalf of NSWC, is consulting with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), State Office of Coastal Zone Management, and the State Historic Preservation Division (SHPD) on the Preferred Alternative (Alternative 2). Informal consultation with USFWS under section 7 of the ESA is in progress to address the potential effects of proposed action on

species listed as endangered or threatened under the ESA and associated designated critical habitat under the jurisdiction of the USFWS. Informal consultation with NMFS under section 7 of the ESA and the Magnuson-Stevens Fishery Conservation and Management Act is in progress to assess potential impacts to ESA-listed species and Essential Fish Habitat (EFH), respectively, from the proposed training (Appendix A). Agency correspondence is available in Appendix A. Consultation under the NHPA Section 106 is in progress with SHPD to assess the effects of the proposed action on historic properties The Navy does not anticipate any adverse effects to historic properties in accordance with the Section 106 Implementing Regulations.

2 Proposed Action and Alternatives

2.1 Proposed Action

NSWC proposes to conduct small unit intermediate and advanced water, land, and air-based training activities for naval special operations personnel in the coastal nearshore waters and selected shoreline and inland locations throughout the State of Hawaii. Table 2-1 lists the proposed training elements.

Table 2-1: Proposed Training Elements

Water-Based Training
Diving/swimming
Inserting and extracting trainees or equipment using watercraft (including submersible craft)
Launching and recovering watercraft (including submersible craft)
Using unmanned underwater vehicles/remotely operated vehicles
Land-Based Training
Moving on foot over the beach
Clearing areas/structures using paint pellets as simulated munitions (used only in limited locations) as part of simulated building clearance training
Hiking to an observation point and using observation techniques while remaining hidden (special reconnaissance operations)
Conducting high angle climbing (negotiating cliffs, rock faces, and other vertical challenges)
Air-Based Training
Utilizing drop zones
Using helicopter landing zones
Utilizing small unmanned aircraft systems

Systems used during training may include UAS, submersible craft such as manned or unmanned underwater vehicles (UUV), and other personal underwater propulsion devices. Trainees may also utilize equipment such as remotely operated vehicles (ROVs), which provide the operator with real-time feedback of underwater conditions. Vessels such as small ships, jet skis, or small boats may be used in conjunction with training systems during certain training scenarios, and for safety and training support. Aircraft assets such as AC-130, C-17, helicopters, and MV-22 would be used to facilitate drop zone and landing zone training activities. See Table 2-2 for aircraft descriptions. Not all training elements would occur at all training sites. A number of sites are required to ensure the full range of training is provided.

The purpose of the proposed training is to build trainees' skills, experience, and confidence by challenging them in a variety of locations with dynamic ocean conditions and land types in a warm-weather environment. As part of the training, the trainees learn skills needed to avoid detection along with the goal of leaving no trace of their presence during or after training activities. To support the intent of the training, there is no use of live-fire ammunition, explosives, off-road driving, digging, tree climbing, construction, or the building of camp fires or infrastructure. However, as part of this proposed action, activities may be combined with other actions occurring on federal lands under other

authorizations. For example, the Proposed Action does not include the use of live fire; however, in three locations (Puuloa Range Training Facility, Pearl City Peninsula, and Marine Corps Base Hawaii [MCBH] - Kaneohe Bay Range Training Facility), live-fire weapons would be carried over federal land to reach existing live-fire ranges on federal property where authorized live-fire training activities would take place. The training in and around existing military facilities or other facilities designated for simulated building clearance training activities would include the use of simulated weapons that use water-soluble paint pellets (approximately the circumference of a dime). There is no requirement to assemble training devices or structures at any site. Vegetation clearing is limited to one proposed location on federal property (Waipio Peninsula in the JBPHH Region) to support a drop zone training area.

A training event may consist of one or multiple training activities (e.g., launch and recovery, diver/swimmer, over the beach). During a typical training event, there would be up to 20 trainees and up to 26 support personnel (or up to 46 people in total) at a training site within the training study area. In a few instances, there could be up to 24 trainees; however, total personnel would not exceed 46. Support personnel would be divided up to assist both the in-water training activity and the on-land training activity. It is assumed for purposes of analysis that not all 26 support personnel would be in the water or on land at any given time because they would be dispersed between the two areas.

Training events are progressive in nature and would range between 2 and 72 hours depending on the activity. As training activities are scheduled, compatible sites within the training study area would be selected to support each training objective. To sustain the highest level of training value and avoid trainee familiarity with specific sites, site selections are made to create the most challenges for the trainees and be responsive to training requirements and training qualifications. Not all sites within the training study area would be utilized over a one-year period. Site selection would also consider seasonal conditions (high surf, strong currents, or high winds) and site conditions (scheduled public events or protected natural resources considerations).

The travel of personnel and equipment from the staging area located at JBPHH to the individual training sites is incorporated into the overall training scenario and would utilize government and public waterways and roads. This minimal travel may include military support vehicles towing small boats and safety and maintenance equipment. It could also include transportation of military personnel involved in the safety and training phases of the event. Waterborne transportation would similarly include the movement of training vessels (such as small surface support vessels, jet skis, or small boats), safety equipment, and military personnel from the staging base to the event location. Typically, submersibles are launched from boat ramps near the site where training activities are scheduled.

2.1.1 Training Activities

The training activities associated with the Proposed Action are described in detail below and broadly fit into three categories: water-based training, land-based training, and air-based training. To meet training objectives, training activities may be single distinct events or they may be combined together sequentially. A generic example would be launching a submersible or small boat from a boat ramp (launch and recovery), the vessels would travel to the training locations (the insertion part of insertion/extraction), trainees would exit the vessel and swim to the objective area (diver/swimmer); trainees observing the surrounding area, and, when conditions are met, proceed ashore (over-the-beach). Once onshore, trainees would focus on observing a specific site or a specific individual who is a part of the exercise (special reconnaissance) and, upon completion of the on-land training objectives, trainees would reenter the water, swim to the extraction point (diver/swimmer), and be extracted from

the water (the extraction part of insertion/extraction). The vessel would then return to the boat ramp and be placed on a trailer to go back to JBPHH (recovery portion of launch and recovery).

A broad example incorporating the air-based component of training would be inserting trainees to a designated landing zone via helicopter using a rope suspension method or parachute. Following completion of the training objectives, trainees would be extracted via helicopter or other land- or water-based method depending on the training scenario and location. Air-based training activities would be conducted in conjunction with other Department of Defense (DoD) aircraft assets (such as AC-130, C-17, helicopters and MV-22 aircraft). The complete event would be conducted in a secure and safely controlled manner, the result of extensive advanced planning, with specific training standards and success criteria. Trainees may also utilize UAS over federal property within an authorized training area as prescribed by the DoD and the FAA to provide local surveillance over the training objective prior to and during a training action. The UAS would be retrieved as part of the activity.

2.1.2 Water-Based Training

Water-based training activities are identified as diver/swimmer, insertion/extraction, UUV training, and launch and recovery (the process of placing a vessel into the water and recovering it). In general, water-based training activities would include trainees, a training supervisor, and safety support personnel for the submersible craft or watercraft operation phases of the event. Support personnel are assigned to supervise water-based training (typically from a boat) and provide medical support if required. Supervisor and safety support personnel would focus on maintaining a safety buffer consistent with U.S. Coast Guard (USCG) regulations, namely the USCG Navigation Rules and Regulations Handbook, as the site conditions and surrounding environment dictate. For example, navigation lights on a dive boat (i.e. red over white over red) or a diver down flag indicate that a dive is in progress and oncoming vessel traffic needs to keep well clear at slow speed. Dive site locations would avoid locations that experience heavy traffic patterns, such as main shipping routes or areas with heavy fishing activities. In the event maritime vessels approach an active dive site, safety personnel would utilize Channel 16 (intended for international distress, safety, and calling) to contact vessels as needed. If an oncoming vessel does not respond, a safety boat would approach the vessel and, depending on the situation, ask it to (1) hold its position, (2) go around the dive site, (3) if necessary be escorted by the safety boat around the dive site, or (4) divers would be recalled out of the water. During water-based training activities, vessels would avoid contact with hard surfaces, vessels and personnel would avoid marine mammals, and vessels would remain on the water surface or within the water column (with the exception of small inflatable boats, which could be carried ashore). A crewman would act as a lookout during training evolutions on boats and support vessels to avoid marine mammals that may enter the area during training activities. If a marine mammal was observed in the vicinity of the training area, the support vessel would signal the submersible for recall. Safety buffers ensure the safety for the trainees, training vessels, and any commercial or civilian craft transiting near the event location. Other responsibilities for safety support personnel include looking out for hazards to navigation that could affect the safety of the trainees, and recalling swimmers and divers, or the small submersible, to the surface if required. If the public enters the training area, the safety support personnel assess the situation and, based upon safety considerations, will either continue the training, temporarily suspend the training, completely stop the training, or relocate the training to another approved training site.

Water-based training activities would use existing government and public boat ramps near the selected training location to launch the training platform (small submersible vehicle, surface support craft, or small inflatable boat) into the waterway. However, some training scenarios require an ocean launch

using a small ship. A ship launch may also occur during training activities in locations that are not served by an existing boat ramp (specific offshore locations of Oahu, Maui, the Island of Hawaii, Kauai, Lanai, and Molokai) or if weather or tidal conditions result in a safety concern regarding a boat ramp launch.

2.1.2.1 Diver/Swimmer Training Activities

During diver/swimmer training events, trainees would swim or dive to an objective area (e.g., harbor, beach, moored vessel) for up to six hours. During night training, the trainees would use buoys marked with a glow stick (Chemlight) to identify their location to the support staff. Rubber replica weapons could be carried by trainees to reproduce the bulk and weight of the gear the trainee would carry during an actual mission.

2.1.2.2 Insertion and Extraction Training Activities

During insertion/extraction training events, trainees would be trained to approach or depart an objective area using submersible craft, to include UUV and ROVs, or watercraft (such as jet skis, waverunners, or small boats). This activity trains personnel to effectively insert and extract people and equipment during the day or night. Submersible and surface crafts would have lighting for night training. Insertion/extraction training events utilizing submersible craft would operate along the shoreline to conduct water-based training.

2.1.2.3 Launch and Recovery Training Activities

During launch and recovery training events, training would be conducted in water areas and consist of launching and recovering submersibles or surface craft, or a combination of both, from a boat ramp, water platform, or via a crane located on a ship or a barge (not on federal property). Trainees would also practice operating and maneuvering small personal watercraft (such as jet skis or waverunners) to obtain safety qualifications and certifications.

2.1.2.4 Unmanned Underwater Vehicle Activities

A subset of water-based training would involve the use of a UUV and, on occasion, an ROV (herein both described as UUVs). A UUV is a small, battery-powered, unmanned submersible that is hand-launched from a host vessel and used to conduct bathymetric, oceanographic, and other geographic underwater surveys. The UUVs operate within the water column and would not be set on the floor of the ocean. UUVs operate under the same navigational rules as any water vessel and would be operated to avoid other vessels. Training activities requiring a UUV would occur concurrently approximately 30 percent of the time when diver/swimmer training activities are taking place. The launch and recovery of the UUV would be conducted in water areas only and consist of launching and recovering up to two UUVs per training event. UUVs can be autonomous or tethered and are controlled from the water surface or by a diver for real-time feedback to the operator. Diving personnel may be in the water in the near vicinity of the host vessel for the launch or retrieval portions of the activity. Underwater areas to be surveyed by the UUV are pre-programmed into the vehicles' navigation system prior to launch. UUVs are tracked by personnel on the host vessel to ensure they remain on course and, if needed, can be recovered at any point along the pre-programmed track.

2.1.3 Land-Based Training Activities

Land-based training activities are identified as over-the-beach, special reconnaissance, simulated building clearance, and high angle climbing. All land-based training activities would include support personnel. Support personnel are responsible for the safety and oversight of trainees participating in the activity. The support personnel continually evaluate the training scenario and employ standard

operating procedures (SOPs) to ensure that training activities are isolated and remain safe. Trainees receive safety briefings, have constant oversight by instructors, and NSWC Public Affairs Officers or their representatives would be available to interact with the public should anyone approach an active training scenario. Additionally, as part of the training objective that the activities be undetected, the support personnel teach trainees that no expended equipment, human waste, or transported liquids remain on site after the training activity is completed. One unmarked NSWC vehicle designated as an emergency response vehicle would be utilized by the support personnel; vehicles used by support personnel would be parked in designated areas that afford optimal availability if required during a training event.

2.1.3.1 Over-the-Beach Training Activities

During an over-the-beach training activity trainees would exit the water, cross the beach, and quietly transition to land-based activities. Upon arrival at a pre-designated area, trainees would remain out of sight for several hours before exiting the site or continuing to move towards a pre-determined objective. Rubber replicate weapons could be carried by trainees to imitate real-world events. In three federal property areas (Puuloa Range Training Facility, Pearl City Peninsula, and Marine Corps Base Hawaii – Kaneohe Bay Range Training Facility), actual weapons could be carried by trainees to existing live-fire training ranges.

2.1.3.2 Special Reconnaissance Training Activities

Upon arrival at a designated area, trainees would hike to a designated observation point. Trainees are taught the techniques for conducting reconnaissance without alerting anyone to their presence or location. Trainees would remain undetected for a period of time with the goal of leaving no trace of their presence behind. This includes no vegetation trampled, no branches broken, no footprints visible, or any other indicators that they were there. Trainees would use observation techniques, following procedures, and reporting back on a scenario involving role-play with military instructors or support staff. No reconnaissance would be intentionally performed on activities other than those staged and pre-arranged for training purposes.

2.1.3.3 Simulated Building/Structure Clearance Training Activities

Simulated building clearance is only proposed on federal property within the training study area. The activity would consist of trainees conducting simulated actions against a site, or a military individual designated as part of the exercise who is simulating a threat or enemy, within the boundaries of a confined area or building. Simulated building clearance training develops the trainees' ability to operate within a small unit, move into a structure, conduct clearance from room to room, and engage in role-play (military instructors or support staff) simulated combat scenarios. The combat scenarios involve the use of simulated weapons and simulated munitions from both trainees and support staff acting as enemy opponents. The intent is for trainees to remain concealed and silent, and then depart the area avoiding detection with minimal disturbance. The training includes the use of weapons configured to only fire plastic or paint pellets. No live-fire weapons or ammunition would be used. The simulated munitions would be marking rounds, which are specialized plastic/paint capsules that are environmentally friendly and water soluble. The temporary marks these simulated munitions make are about the circumference of a dime. Sounds associated with the firing of the simulated munitions are less than actual live rounds and sound similar to an air rifle. No property damage would occur, and cleanup (picking up simulated marking rounds/washing away paint marks if present) would be handled by the instructors and support staff immediately at the conclusion of the training scenario. Support staff would be on site at all times in order to ensure overall safety in the training environment.

2.1.3.4 High Angle Climbing Training Activities

High angle climbing events are training evolutions where trainees negotiate cliffs, rock faces, and other vertical challenges to develop infiltration and retrieval of climbing equipment techniques. Trainees would be instructed in the use of ropes and other climbing gear to traverse obstacles while carrying gear.

2.1.4 Air-Based Training Activities

Air-based training activities are conducted in areas identified as drop zones, helicopter landing zones, or authorized airspace, including restricted areas and warning areas, or in accordance with valid FAA Certificate of Authorization. Aircraft participating in air-based training events could include AC-130, C-17, helicopters, MV-22, or UAS' (Group 1 or Group 2). All air-based training events would include a supervisor, at least one medical corpsman, and up to 10 support personnel who are responsible for the safety and oversight of trainees participating in the event. When necessary, there would be support personnel on site to maintain a safety buffer, to prevent bystanders or traffic from entering into designated drop or landing zones. Two or three vehicles would be utilized by these personnel, with one emergency response vehicle. Safety personnel would also maintain a safety buffer around proposed water-based drop zones to prevent other watercraft from entering into a designated water drop zone.

2.1.4.1 Drop Zone Training Activities

Naval special operations personnel would utilize existing and new land-based and water-based drop zones within JBPHH and Marine Corps Base Hawaii property to conduct air-based training activities. Land-based drop zone training activities are conducted at sites where up to 40 trainees land after parachuting from a fixed-wing aircraft at an altitude between 12,500 and 500 feet above ground level (AGL). Water-based drop zone training activities are conducted at sites where up to 40 trainees land after parachuting from fixed-wing aircraft at an altitude between 5,000 and 1,500 feet AGL. Land-based and water-based drop zones may also be utilized for training activities where helicopters or MV-22 aircraft approach the ground or water surface (approximately 5–15 feet AGL) and up to 15 trainees practice inserting into an area or extracted (approximately 5 feet AGL) out of an area via helicopter rope suspension techniques. These techniques include rappelling, fast roping, casting, special patrol insertion and extraction, or hoist operation. Rappelling, fast roping, and special patrol insertion and extraction are techniques used to lower oneself down a rope quickly into an area that does not permit aircraft landing. A hoist operation is a technique used to extract trainees out of an area. Trainees practice extraction techniques in drop zones, such as being retrieved by a helicopter or MV-22 aircraft via a rope that is lowered into a pickup area (on land or over water), trainees hooking up to the specialized rope, and the helicopter vertically lifting from the extraction zone until the rope and trainees are clear of obstructions. Naval special operations drop zone training activities would

- include up to 6 hours of aircraft operation per training event
- utilize AC-130, C-17, MV-22, or similar aircraft to support training with parachutes
- utilize MV-22 aircraft or helicopters to support rappelling, fast roping, special patrol insertion and extraction or hoist operation over land or water
- hover for approximately 15 minutes when facilitating drop zone training activities via helicopter or MV-22
- coordinate use of airspace with FAA Honolulu Control Facility as far in advance as possible

2.1.4.2 Helicopter Landing Zone Training Activities

Helicopter landing zones would consist of dedicated helicopter landing pads within JBPHH property. In locations where no pad exists, the helicopter landing zones would be surveyed prior to use to identify any safety concerns or hazards. The Naval Air Training and Operation Procedures Standardization program determines requirements for each aircraft utilizing a landing zone. Naval special operations training utilizing helicopter landing zone training areas during a training event would

- include up to four hours of aircraft operation per training event
- utilize helicopter or MV-22 aircraft lowering to the ground surface to insert or extract naval special operations trainees in accordance with training and safety requirements
- occur as a standalone activity or used in conjunction with all training activities (with the exception of drop zones)
- utilize landing zones approved in accordance with FAA authorizations
- coordinate use of airspace with FAA Honolulu Control Facility as far in advance as possible

2.1.4.3 Unmanned Aircraft Systems Training Activities

The UAS consists of a hand-launched or catapult system, a control system, and a remotely piloted or self-piloted (i.e., preprogrammed flight pattern) air vehicle that may be fixed-wing or rotary-wing. They would carry only non-hazardous payloads such as cameras, sensors, and communications equipment.

Propulsion is through electrical motor-driven propellers powered by rechargeable batteries. UASs would be deployed and fly within an authorized training area over federal property (such as restricted airspace and warning areas), as prescribed by the DoD and FAA. For training outside restricted airspace or warning areas, the UAS would be flown over federal property in accordance with a valid FAA Certificate of Authorization. UAS training may be a standalone activity or used in conjunction with all training activities, with the exception of in drop zones. UAS utilized for proposed training would:

- be categorized as FAA Group 1 or Group 2 systems, weighing up to 55 pounds
- vary in size up to approximately 2 meters in length, with a wingspan of 3 meters
- normally operate below 3,500 feet AGL
- utilize on the ground observers (no manned aircraft observers)
- fly in accordance with FAA authorizations

2.2 Training Sites

Under the Proposed Action, proposed training activities would occur periodically throughout the State of Hawaii. The geographic regions include five Oahu regions: (1) JBPHH, (2) South, (3) Windward, (4) North, and (5) West Oahu; and the Islands of Hawaii, Kauai, Maui, Lanai, and Molokai (see Figure 1-2 through Figure 1-12). The geographic regions within the training study area are all capable of supporting the training activities (Section 2.1.1, Training Activities), objectives, and requirements. The training study area offers a varied topography, hydrography, and bathymetry (including strong and shifting currents) to units conducting extended, recurring, and sustainment training.

Naval special operations personnel consider several factors in addition to training qualifications and training requirements when selecting a site for training. The selection of a site is dependent on receiving real estate approvals/permits, seasonal conditions (high surf, dangerous currents, or high winds), and

site conditions (period of high public presence or protected natural resources considerations). Virtually all of the skills that the proposed training is designed to hone may be accomplished throughout all the geographic regions; however, consideration of the factors discussed above narrow the potential sites available for training at different times of the year. Some sites and facilities support specific individual training objectives and requirements. These training activities include:

- Over-the-beach carrying a live-fire weapon, moving to a designated live-fire range
    - Proposed locations: JBPHH Region - Puuloa Range Training Facility, Pearl City Peninsula, and Windward Oahu Region and Marine Corps Base Hawaii - Kaneohe Bay Range Training Facility.
- High-angle climbing
    - Proposed location: North Oahu Region.
- Drop zone requiring vegetation clearing
    - Proposed location: JBPHH Region - Waipio Peninsula.
- Simulated building clearance and UAS
    - Federal property within the training study area.
- Land-based drop zones and landing zones
    - Proposed locations: JBPHH Region - Waipio Peninsula, Pearl City Peninsula, Ford Island; North Oahu Region - Kanes (drop zone only); and West Oahu Region - Lualualei Annex.
    - Landing zones on Pearl City Peninsula would be utilized 5–12 times per year. Training would start at 1330 and run up to 2200 hours.
- Water-based drop zones
    - Proposed locations: JBPHH Region - Pearl City Peninsula and Windward Oahu Region - Marine Corps Base Hawaii (within the 500-yard security buffer surrounding the installation).

The variety of sites allows for a training progression to occur based on the trainees' skill set demonstrated as they accomplish each training skill objective. Multiple sites on Oahu and on or near other Hawaiian Islands are needed to accommodate seasonal changes, evolving skill sets, and site-specific restrictions that may occur at certain times of the year. The diversity of sites within the training study area also facilitates minimal interaction with the public and minimization of impacts on the natural environment at each potential training site through planned infrequent and random use. Additionally, infrequent use of sites helps to mitigate negative training aspects associated with trainees becoming too familiar with what to expect when they repeatedly conduct the same training at the same sites.

2.3 Training Equipment

Table 2-2 lists the current and proposed equipment that may be used during training activities across the training study area in Hawaii. Each activity would require a specific mix of personnel, equipment, and supporting systems. Further, the particular goal of a single training evolution may require a specific set of equipment.

Table 2-2: Current and Proposed Equipment for Naval Special Operations Training

Equipment Type	Description	Area of Utilization
Simulated Weapons		
Simulated Weapon	Trainees carry rubber simulated weapons throughout each training event to accurately represent the combat weight and balance of the weapon and to experience the considerations needed to maintain and keep functioning in undersea conditions.	Training Study Area
Real Weapons	Trainees carry real weapons throughout a training event to accurately represent the combat weight and balance of the weapon and to experience the considerations needed to maintain and keep functioning in undersea conditions. Real weapons/bullets will be carried only at three federal property locations. The three locations include Puuloa Range Training Facility, Pearl City Peninsula, and Marine Corps Base Hawaii – Kaneohe Bay Range Training Facility, where naval special operations personnel would conduct live-fire activities on already established and authorized live-fire ranges.	Three federal property locations (Puuloa Range Training Facility, Pearl City Peninsula, and Marine Corps Base Hawaii – Kaneohe Bay Range Training Facility)
Simunitions Cartridge	A small cartridge (plastic/paint capsules) that emits a plastic projectile that leaves a mark approximately the size of dime and is utilized only during simulated building clearance exercises. All traces of the marks would be removed by rubbing with water and a cloth, and all expended shell casings would be picked up by the instructors, support staff and trainees.	Only at federal property sites where simulated building clearance would occur
Boats		
Surface Support Craft	Surface support craft includes commercial or military boats (generally in the 20–36 foot range) for open water utility operations.	Training Study Area Waters
Submersibles	Submersible craft are manned or unmanned and include other underwater propulsion devices. The manned submersible craft is the primary transit and delivery vehicle for all naval special operations undersea maritime training events.	Training Study Area Waters
Small Inflatable Boats	Small rubber inflatable boats, typically no greater than 30 feet in length. Small boats may be used in conjunction with training systems during certain training scenarios, and for safety and training support.	Training Study Area Waters

Table 2-2: Current and Proposed Equipment for Naval Special Operations Training (continued)

Equipment Type	Description	Area of Utilization
Boats (continued)		
Personal Watercraft	Personnel watercraft such as jet skis or waverunners are used for swimmer safety in certain events during training.	Training Study Area Waters
UUV	UUVs and small remotely operated vehicles controlled by a trainee with real-time feedback. UUVs can be tethered, untethered or autonomous when operated and can operate on or below the surface.	Training Study Area Waters
Ground Support Vehicles		
Passenger Van	Personnel transport in support of training.	Training Study Area
Emergency Response Vehicle	Medical command and NSWC control vehicle in support of training.	Training Study Area
Pick-up Truck	Transport of essential equipment, including surface support craft and personnel in support of training.	Training Study Area
Aircraft		
AC-130 (or similar)	Fixed-wing aircraft with a large profile that operates at low altitude.	Training Study Area
C-17 (or similar)	Large military transport aircraft.	Training Study Area
MV-22 (or similar)	Tiltrotor aircraft with both vertical takeoff and landing and short takeoff and landing capabilities. Designed to combine the functionality of a conventional helicopter with the long-range, high-speed cruise performance of a turboprop aircraft.	Training Study Area
CH-53 (or similar type helicopter)	Heavy-lift transport helicopter.	Training Study Area

Notes: JBPHH = Joint Base Pearl Harbor Hickam, UUV = Unmanned Underwater Vehicle, NSWC = Naval Special Warfare Command

2.4 Training Area Screening Factors

NSWC considered three factors (training, safety, and logistics) when identifying broad geographic areas that could support warm-weather naval special operations training and satisfy the training requirements.

Training: Land and maritime special operations training activities prepare naval special operations personnel for global undersea operations in a spectrum of environments. NSWC evaluated the whole State of Hawaii to identify specific locales that were suited to support specific training requirements. Included in the evaluation were specific logistic and safety concerns, existing training, and the desire to have little to no impact on the public and environmental resources. NSWC must conduct warm-water training in Hawaii due to limits with personnel availability caused by a high operational tempo, and due to requirements that include submarine force concentration, military logistical support, military security, bathymetry, and warm water.

Bathymetry – National Oceanic Atmospheric Administration defines bathymetry as "the study of the 'beds' or 'floors' of water bodies, including the ocean, rivers, streams, and lakes." The term 'bathymetry' originally referred to the ocean's depth relative to sea level, although it has come to mean 'submarine topography,' or the depths and shapes of underwater terrain.

Hydrography – National Oceanic Atmospheric Administration defines hydrography as "the science that measures and describes the physical features of the navigable portion of the earth's surface and adjoining coastal areas."

The Proposed Action would support the foundation and mastery of skills necessary to meet diverse global training challenges required for naval special operations personnel prior to moving on to more challenging environments. Specific characteristics of the unique water and coastline environments of Hawaii are detailed below.

- Favorable weather conditions – Hawaii offers a warm water training environment that allows naval special operations personnel to master skills before transitioning to inclement weather conditions at other training locations.
- Access to both open-ocean and nearshore waters.
- A complex bathymetry – Hawaii offers challenges in operating and replicates real-world operational environments.
- Complex hydrographic features that offer unique and challenging training conditions.
- Varied operating environments, coupled with the extensive proximity of naval facilities and associated units, which allow for training from several diverse host platforms for the special operations submersibles. This diverse collection of associated units and platforms allows for a maximization of training by supporting other training evolutions during the same scheduled training period. The breadth of training sites across Hawaii ensures that new locations and the varied amount of training locations within the training cycle would prevent familiarity with a common training environment and continually challenge the special operations units conducting the training.

Safety: Due to the nature of the training operations, and the associated maritime environment in which they must be conducted, specific safety considerations must be in place to support naval special operations undersea water-based training activities. Specific safety considerations that must be met include:

- Ready access to an active recompression dive chamber within one-hour transit from the training site in accordance with the U.S. Navy Dive Manual, NAVSEA SS521-AG-PRO-010.
- Multiple military facilities with on-call response medical capabilities, and the capacity to mitigate impacts on commercial and personal activities and infrastructure in the training areas.
- Broad availability of on-call medical facilities offering the flexibility to rapidly respond to any emerging safety issue.

Logistics: Due to the unique training and operational requirements for naval special operations personnel, the proximity of secured Navy facilities/installations is critical. Specifically:

- The required level of security for the equipment used in some undersea water-based training activities can only be met on a military facility.
- Staging for all aspects of the training is optimally served on a local naval base. This includes
    - lodging
    - proximity to transportation
    - maintenance support
    - classified material storage
    - timely access to recompression chamber and medical support

2.5 Alternatives Development

NSWC must consider alternatives to the Proposed Action in accordance with the NEPA and CEQ regulations for implementing NEPA (Parts 1500–1508 of Title 40 of the C.F.R.). The potential environmental impacts of NSWC's Proposed Action to enhance current and advanced training for naval special operations and other U.S. special operation commands are associated with activities of personnel both in-water and movement overland, and associated air-based training activities. Accordingly, NSWC focused its alternatives analysis on variances to the frequency and variable use of training sites within the training study area to satisfy the purpose of and need for the Proposed Action (Section 1.3, Purpose of and Need for the Proposed Action). Reasonable alternatives must meet the stated objectives of the Proposed Action. Two action alternatives have been identified in addition to the No Action Alternative. These three alternatives are analyzed in this EA and discussed in detail below. Alternative 2 is the Preferred Alternative.

2.5.1 No Action Alternative

Under the No Action Alternative, the baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled. To date, four event-based Categorical Exclusions have been approved to support naval special operations training on non-federal land on Oahu and Hawaii Island for 110 events per year. For the most part, the four Categorical Exclusions developed to date cover in-water training activities including personnel swimming, and the use of small ships, boats and submersibles on a limited number of sites on Hawaii Island and Oahu including similar in-water activities within the Middle Loch of Pearl Harbor, JBPHH (Table 2-3).

Under the No Action Alternative, training locations available in Hawaii would continue to be restricted to a limited number of sites. When naval special operations personnel have limited sites for training, the essential element of unpredictability is removed from the training environment. Familiarity with a training site induces prior awareness of a training scenario, thus significantly reducing the quality of training. Training scenarios at the limited number of existing sites are not sufficiently diverse to support the requirements for intermediate and advanced warm-weather naval special operations training and

training progression, and thus do not adequately support the requirements to achieve combat readiness. The No Action Alternative does not meet the purpose of and need for the Proposed Action but it is being carried forward for analysis in this EA as a baseline from which to compare the impacts of the Proposed Action and alternatives.

2.5.2 Alternative 1

Under Alternative 1, proposed training activities would occur within the training study area, which includes the nearshore waters and land-based areas on Oahu, the Island of Hawaii, and Kauai; and nearshore waters (including harbors and bays) of Maui, Molokai, and Lanai (no land-based training is proposed on these three islands) (Table 2-3). Within the training study area, each non-federal property training site would be used for a maximum of six events per year (pending receipt of real estate agreements/right-of-entry permits) (Table 2-4). The maximum number of events across all non-federal land training sites would not exceed 198 events. Naval special operations personnel would also utilize federal property within the training study area up to 52 events per year to develop skills associated with the training activities. The 52 training events proposed on federal property would be distributed throughout the federal property within the training study area (Figure 1-2 and Figure 1-9). Under this alternative, NSWC would deploy a support vessel to facilitate water-based training occurring outside the one-hour distance from JBPHH. The support vessel would have a dive chamber available, and the capability to repair and recover training devices.

Table 2-3: Proposed Training Activity by Alternative and Region

Alternative	Region	Water-Based Training			Land-Based Training				Air-Based Training		
		D/S	I&E	L&R	OTB	SR	SBC	HA	DZ	LZ	UAS
No Action	JBPHH (Oahu)	X	X		X						
	Windward Region (Oahu)										
	North Region (Oahu)										
	South Region (Oahu)	X	X	X	X						
	West Region (Oahu)	X	X	X	X						
	Island of Hawaii	X	X								
	Kauai										
	Maui										
	Lanai										
	Molokai										

Table 2-3: Proposed Training Activity by Alternative and Region (continued)

Alternative	Region	Water-Based Training			Land-Based Training				Air-Based Training		
		D/S	I&E	L&R	OTB	SR	SBC	HA	DZ	LZ	UAS
Alternative 1	JBPHH (Oahu)	X	X	X	X	X	X		X	X	X
	Windward Region (Oahu)	X	X	X	X				X	X	X
	North Region (Oahu)	X	X	X	X			X	X	X	X
	South Region (Oahu)	X	X	X	X	X					X
	West Region (Oahu)	X	X	X	X	X	X		X	X	X
	Island of Hawaii	X	X	X	X	X					
	Kauai		X		X	X					X
	Maui	X	X	X							
	Lanai	X	X								
	Molokai	X	X								
Alternative 2	JBPHH (Oahu)	X	X	X	X	X	X		X	X	X
	Windward Region (Oahu)	X	X	X	X				X	X	X
	North Region (Oahu)	X	X	X	X			X	X	X	X
	South Region (Oahu)	X	X	X	X	X					X
	West Region (Oahu)	X	X	X	X	X	X		X	X	X
	Island of Hawaii	X	X	X	X	X					
	Kauai		X		X	X					X
	Maui	X	X	X							
	Lanai	X	X								
	Molokai	X	X								

Notes: D/S = Diver/Swimmer Training, I&E = Insertion and Extraction Training, L&R = Launch and Recovery Training, UUV = Unmanned Underwater Vehicle Activities, OTB = Over-The-Beach Training, SR = Special Reconnaissance Training, HA = High-Angle Climbing Training, SBC = Simulated Building Clearance Training

*Training frequency would increase with Alternative 2, see Table 2-4.

Table 2-4: Proposed Frequency of Training by Alternative

Activities	Region	Frequency***		
		Alternative 1	Alternative 2	No-Action Alternative
• Diver/Swimmer • Simulated Building Clearance* • Over The Beach**** • Insertion/Extraction • Launch/recovery • Special reconnaissance • Unmanned Aircraft Systems* • Landing zone/drop zone*	Joint Base Pearl Harbor-Hickam (Oahu)	Up to 6 events at an individual non-federal training site/year. (Maximum total of events on all non-federal sites would be 198 events) Up to 52 events of training on Federal property per year.	Up to 10 events at an individual non-federal training site/year. (Maximum total of events on all non-federal sites would be 330 events) Up to 265 events of training on Federal property per year	110 events/year. Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable (see Section 2.5.1, No Action Alternative).
• Diver/Swimmer • Over The Beach**** • Insertion/Extraction • Launch/recovery • Unmanned Aircraft Systems* • Landing zone/drop zone*	Windward Region (Oahu)			
• Diver/Swimmer • Over The Beach • Insertion/Extraction • Launch/recovery • Unmanned Aircraft Systems* • Landing zone/drop zone* • High angle climbing	North Region (Oahu)	Up to 6 events at an individual non-federal training site/year. (Maximum total of events on all non-federal sites would be 198 events) Up to 52 events of training on federal property per year.	Up to 10 events at an individual non-federal training site/year. (Maximum total of events on all non-federal sites would be 330 events) Up to 265 events of training on federal property per year	110 events/year. Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable (see Section 2.5.1, No Action Alternative).
• Diver/Swimmer • Over The Beach • Insertion/Extraction • Launch/recovery • Special reconnaissance • Unmanned Aircraft Systems* Diver/Swimmer • Simulated Building Clearance*	South Region (Oahu)			

Table 2-4: Proposed Frequency of Training by Alternative (continued)

Activities	Region	Frequency***		
		Alternative 1	Alternative 2	No-Action Alternative
• Over The Beach • Insertion/Extraction • Launch/recovery • Special reconnaissance • Unmanned Aircraft Systems* • Landing zone/drop zone*	West Region (Oahu)			
• Diver/Swimmer • Over The Beach • Insertion/Extraction • Launch/recovery • Special reconnaissance	Island of Hawaii	Up to 6 events at an individual non-federal training site/year. (Maximum total of events on all non-federal sites would be 198 events) Up to 52 events of training on federal property per year.	Up to 10 events at an individual non-federal training site/year. (Maximum total of events on all non-federal sites would be 330 events) Up to 265 events of training on federal property per year	110 events/year. Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable (see Section 2.5.1, No Action Alternative).
• Over The Beach • Insertion/Extraction • Special reconnaissance • Unmanned Aircraft Systems*	Kauai			
• Diver/Swimmer** • Insertion/Extraction** • Launch/recovery**	Maui Lanai Molokai			

*Activity occurs only on federal property. Proposed landing zone and drop zone frequency presented in Table 2-5.
**Activity occurs only in nearshore waters (harbors and bays).
***For analysis purposes, the frequency represents a conservative estimation.
****At Puuloa Range Training Facility, Pearl City Peninsula, and Marine Corps Base Hawaii - Kaneohe Bay Range Training Facility, naval special operations personnel would conduct live-fire activities on already established and authorized live-fire ranges.
Notes: Activities under the No Action Alternative are limited in scope and scale to a few non-federal sites on Oahu and the Island of Hawaii (Table 2-3). The limited number of sites available to trainees results in repeated use of sites and undue familiarity with the training scenarios, thus negating the quality of the training. The limited number of sites currently available in the State of Hawaii are not considered sufficiently diverse to support long-term training requirements and adequately prepare naval special operations personnel for missions. For all the alternatives, it should be noted that not every site will be used every year; however, for any particular site within a region and alternative, the maximums as described above would not be exceeded.

Under Alternative 1, proposed training would include drop zone training activities up to 30 events per year and landing zone training activities up to 20 events per year. Land-based drop zones and landing zones include JBPHH- Waipio Peninsula, Pearl City Peninsula, and Ford Island; North Oahu Region- Kanes (drop zone only); and West Oahu Region- Lualualei Annex. Water-based drop zones would be utilized within 500 yards offshore and locations include waters off JBPHH Region- Pearl City Peninsula; Windward Oahu Region- Marine Corps Base Hawaii-Kaneohe Bay Range Training Facility. Table 2-5 summarizes the air-based training proposed under Alternative 1. Air-based training would be conducted in accordance with FAA rules and regulations, and the Naval Air Training and Operation Procedures Standardization program.

Table 2-5: Proposed Air-Based Training by Alternative

Air-Based Training Activity*	Aircraft Type	Annual Training Events Including Air-Based Training			Annual Aircraft Operation Hours		
		Alternative 1	Alternative 2	No Action Alternative	Alternative 1	Alternative 2	No Action Alternative
Drop Zone Training	AC-130, C-17, MV-22, or Helicopter	**30**	**40**	**0**	**180 hours**	**240 hours**	**0**
Landing Zone Training	MV-22 or Helicopter	**20**	**30**	**0**	**80 hours**	**120 hours**	**0**
Total		**50**	**70**	**0**	**260 hours**	**360 hours**	**0 hours**

All training events would be conducted in accordance with military training procedures, approved SOPs, protective measures, and mitigation measures under existing regional environmental compliance documents (i.e., Integrated Natural Resources Management Plans [INRMP] or Protective Measures Assessment Protocol [PMAP]), in place to protect marine mammals and threatened and endangered species. Under Alternative 1, naval special operations would be positioned to accommodate training for USSOCOM components alongside naval special operations personnel. The occasional integration of other USSOCOM components would occur only with NSWC-led training. This will not expand the number of participants above 46.

2.5.3 Alternative 2

Alternative 2 includes the proposed training study area, and all activities and support platform (for training areas outside the one-hour distance from JBPHH), as described under Alternative 1; however, there would be an increase in the annual training conducted in the State of Hawaii (Table 2-4). Under Alternative 2, each non-federal training site would be used for a maximum of 10 events per year (pending receipt of real estate agreements/right-of-entry permits) within the training study area. The maximum number of events across all non-federal land training sites would not exceed 330 events. For federal property, up to 265 events would occur per year. The 265 training events proposed on federal property would be distributed throughout the federal property within the training study area (Figure 1-2 and Figure 1-9).

Under Alternative 2, proposed training would include drop zone and landing zone training activities up to 40 events per year and landing zone training areas up to 30 events per year (proposed locations are

the same as those described above under Alternative 1). Table 2-5 summarizes the air-based training under Alternative 2. Air-based training would be conducted in accordance with FAA rules and regulations, and the Naval Air Training and Operation Procedures Standardization program.

Increasing the frequency of training under Alternative 2 allows greater flexibility to support emerging training and demand requirements that are driven by national defense needs. All training events would be conducted in accordance with military training procedures, approved SOPs, protective measures, and mitigation measures under existing environmental compliance documents. Under Alternative 2, naval special operations would be positioned to accommodate training for additional USSOCOM components alongside naval special operations personnel. The occasional integration of other USSOCOM components would occur only with NSWC-led training.

The increased frequency of training under Alternative 2 best meets the purpose of and need for the Proposed Action. Alternative 2 best supports special operation forces as they acquire and master individual and team skills in the marine, terrestrial, and aviation aspects of naval special operations in order to progress to more advanced training and to be combat-ready when called to conduct special operations in support of Combatant Commanders.

2.6 Best Management Practices and Standard Operating Procedures

This section presents an overview of best management practices (BMPs) and SOPs that NSWC would incorporate into the proposed naval special operations training activities for naval special operations personnel. BMPs and SOPs are existing policies, practices, and measures to reduce the environmental impacts of designated activities, functions, or processes. Although BMPs and SOPs mitigate potential impacts by avoiding, minimizing, or reducing/eliminating impacts, BMPs and SOPs are distinguished from potential mitigation measures because BMPs and SOPs 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 and SOPs 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.

Table 2-6 includes a list of BMPs and SOPs. For all alternatives considered, BMPs and SOPs would be implemented as described in Table 2-6. Minimization and avoidance measures are discussed separately in Chapter 3 (Affected Environment and Environmental Consequences) when applicable. Navy special operations training would also follow the PMAP general training category.

The use of shipboard lookouts is a critical component of all Navy protective measures. Navy shipboard lookouts are highly qualified and experienced observers of the marine environment. Their duties require that they report all objects sighted in the water to the Officer of the Deck (e.g., trash, a periscope, marine mammals, sea turtles) and all disturbances (e.g., surface disturbance, discoloration) that may be indicative of a threat to the vessel and its crew.

Table 2-6: Best Management Practices for Naval Special Operations Training

Training Activity	BMP Description	Purpose
Water-Based Training Activities		
Swimmer/Diver	Diving and swimming events would have on site safety support. For dives there would be a minimum of two boats with support personnel. Boat 1 would have the Safety Supervisor with coxswain, crewman, and qualified medic. Boat 1 would maintain proximity to the divers or swimmers. Boat 2 would serve as a lookout boat and interdict oncoming vessel traffic. Additionally, depending on the length of the dive or swim, jet skis would be onsite to provide additional safety coverage.	Maintain safety of trainees and the public
All Activities	Vessels would avoid contact with hard surfaces. During in-water training activities, vessels and personnel would avoid marine mammals and ESA-listed species, vessels would remain on the water surface or within the water column (with the exception of small inflatable boats, which would be carried ashore). During water-based training activities, a crewman would act as a lookout during training evolutions on boats and support vessels to avoid marine mammals and ESA-listed species that may enter the area during training activities. During nighttime training, the lookout would be equipped with night vision goggles. If a marine mammal or ESA-listed species is observed in the vicinity of the training area and the training activity may affect the animal, the support vessel would signal the submersible for recall, or training may be shifted to avoid the animal. Vessels and personnel will actively move away from the direction that the marine species is traveling by putting the engine in neutral until the animal is at least 50 ft. (15.2 m) away, and then slowly moving away to the prescribed distance. If marine mammals or ESA-listed marine species are noticed within 50 yd. (45.7 m) of the training activities, training may continue only if, in the best judgment of the marine species observer, the activity would not affect the animal(s). Otherwise, the training will cease until the animal departs. If a nesting sea turtle is observed, then that area will be avoided to prevent disturbing the nesting female on land or returning to the water.	Maintain safety of trainees and avoidance of marine mammals and ESA-listed species
Land-Based Training Activities		
All Activities	Land-based training would have onsite safety personnel. At a minimum there would be three personnel: Lead Safety Supervisor, Assistant Safety Supervisor, and qualified medic. The medic would stage an emergency response vehicle onsite.	Maintain safety of trainees and the public

Table 2-6: Best Management Practices for Naval Special Operations Training (continued)

Training Activity	BMP Description	Purpose
All Activities	Vehicles would remain on existing established roadways, and sound would be minimized during training to avoid detection.	Maintain safety of trainees and the public, and terrestrial natural resources
Air-Based Training Activities		
Drop Zone and Landing Zone	Air-based training would have a Lead Air Safety Supervisor, Assistant Air Safety supervisor, and qualified medic with emergency response vehicle, and road guards. This ground crew element would set the conditions for air platforms to operate during landings and takeoffs. All air-based training would be conducted in accordance with Federal Aviation Administration rules and regulations, and the Naval Air Training and Operation Procedures Standardization program.	Maintain safety of trainees
Unmanned Aircraft System (UAS)	Support personnel would maintain line of sight at all times with the UAS. Personnel would enact immediate recovery in the event of a platform error in accordance with Federal Aviation Administration rules and regulations, and the Naval Air Training and Operation Procedures Standardization program.	Maintain positive control of the UAS before, during, and after training event
All Training Activities		
All Activities	Activities are coordinated with park managers and property owners. Coordination with local law enforcement is conducted on an as-needed basis. All training events would be conducted in accordance with military training procedures, approved standard operating procedures, and protective measures, including Chief of Naval Operations Instruction 5100.23G, *Navy Safety and Occupational Health Program Manual* (2011d).	Maintain safety of trainees and the public
All Activities	Naval special operations personnel would adhere to military installation specific standard operating procedures or other measures such as those detailed in Integrated Natural Resources Management Plans (INRMP). INRMPs integrate conservation measures as standard operating procedures to minimize and avoid potential impacts on natural resources on military installations while maintaining military readiness.	Compliance with established natural resource management procedures and measures

Notes: ft. = feet, m = meter(s), yd. = yard(s), ESA = Endangered Species Act

Because of the relatively smaller number of support boats that accompany submersibles and swimmers during in-water training activities, and the limited number of personnel that can be on a support vessel, dedicated lookouts would not likely be on board the small support boats; however, boat operators will have completed the Marine Species Awareness Training, which provides information on sighting, visual observation tools and techniques, and sighting notification procedures.

2.7 Alternatives Considered but not Carried Forward for Detailed Analysis

The following alternatives were considered, but not carried forward for detailed analysis in this EA as they did not meet the purpose and need for the project and they did not satisfy the training location screening factors presented in Section 2.4 (Training Area Screening Factors).

The other areas considered for warm water naval special operations training lack key components that are offered in Hawaii. Hawaii was selected due to limits with personnel availability caused by a high operational tempo, and the following requirements combined:

- submarine force concentration
- military logistical support
- military security
- bathymetry and warm water

As discussed in Section 2.2 (Training Sites), Hawaii, with a diversity of different island environmental conditions, contains the combination of water, land, and air-based areas that would support the required specialized training in a temperate environment. The proposed training locations in the State of Hawaii fulfill all of the naval special operations intermediate training requirements, and therefore Hawaii is considered the only feasible location for supporting naval special operations personnel prior to moving on to more challenging environments.

One site outside of Hawaii, the San Diego (California) Fleet Concentration Area, survived initial screening but was subsequently not carried forward for detailed analysis. Located primarily in and around San Diego Bay, the Fleet Concentration Area offers a somewhat similar diverse training environment to Hawaii, but on a much smaller scale and in a less temperate environment. Water temperatures in San Diego, particularly in the Bay, are colder than the Pacific Ocean around the Hawaiian Islands. Further, because San Diego Bay is relatively small and shallow, with a single channel to the sea, the area lacks the desired complex hydrography that facilitates skill mastery. Additionally, naval special operations units stationed in San Diego currently use this locale to conduct a broad spectrum of training for other missions that are independent of the proposed training addressed in this EA. Adding the training for the Proposed Action would impact other naval special operations training, and required training for other Navy and Marine Corps units in the San Diego Fleet Concentration Area. Consequently, the proposed training in Hawaii is needed to provide the diverse environment that replicates mission areas that feature similar challenges. This alternative was considered but is not being carried forward for detailed analysis in this EA because it does not offer the diverse bathymetric and hydrographic features of Hawaii or the favorable year-round weather conditions to support year-round training requirements. Accordingly, this alternative does not fulfill the training screening factor described above in Section 2.4 (Training Area Screening Factors) that would allow naval special operations personnel to master skills before transitioning to inclement weather conditions at other training locations.

3 Affected Environment and Environmental Consequences

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

All potentially relevant environmental resource areas were initially considered for analysis in this EA. In compliance with the NEPA, CEQ, and 32 C.F.R. part 775 guidelines, the discussion of the affected environment (i.e., existing conditions) focuses only on those resource areas potentially subject to impacts. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact.

"Significantly," as used in NEPA, requires considerations of both context and intensity. Context means that the significance of an action must be analyzed in several contexts 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 (40 C.F.R. part 1508.27). 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.

This section includes air quality, land use-recreation, biological resources, cultural resources, noise, and public health and safety, as potentially affected environments.

The potential impacts on the following resource areas are considered to be negligible or non-existent, and therefore were not analyzed in detail in this EA:

Water Resources: The Proposed Action would not impound, divert, drain, control, or otherwise modify the waters of any stream or other body of water. The proposed training activities do not involve changes to drainage patterns or introduce pollutants to training study area surface waters or groundwater. Water quality is not expected to undergo a measurable impact due to the Proposed Action.

Geological Resources: The Proposed Action does not include construction on undeveloped lands or ground-disturbing activities in any undisturbed areas.

Visual Resources: The Proposed Action does not include construction or permanent new structures over an undisturbed area and would not alter the visual landscape within the training study area. In addition, any vegetation clearing (only proposed at one location) would not change the overall composition of the landscape.

Airspace: The Proposed Action would not result in a permanent change of airspace designation or restriction in the existing airspace within the training study area or surrounding area. To support the UAS training activities, a Certificate of Authorization would be obtained from the FAA, or UAS would be operated within airspace designated as restricted airspace or warning areas. The Certificate of Authorization would specify provisions or limitations, if necessary as part of the approval, to ensure the UAS can operate safely with other airspace users. Air-based training involving aircraft would be conducted in accordance with FAA regulations and the Naval Air Training and Operating Procedures Standardization program.

Infrastructure: The Proposed Action does not include changes to infrastructure within the training study area. There would be no disruption or change to existing wastewater, water, or telecommunication services associated with the Proposed Action.

Transportation: The Proposed Action would not change or alter transportation facilities or circulation of traffic patterns within the training study area or surrounding area.

Hazardous Materials and Wastes: The Proposed Action involves minimal use of machinery, equipment, or vehicles; as such, no increases in the amount of hazardous waste produced would be expected. With implementation of BMPs, including compliance with Navy Spill Prevention and Control and Countermeasure plans, hazardous materials and waste would not be released into the environment under the Proposed Action. Military expended material such as flares and pyrotechnics, propellants, and explosives would not be utilized as part of naval special operations training as part of the proposed action. Hazardous materials and wastes would not be generated or released into the environment under the Proposed Action and expended batteries would be recycled or disposed of properly after returning from training activities through existing characterization, recycling, and disposal programs.

Socioeconomics and Environmental Justice: The Proposed Action would not change the population demographics, employment, or community characteristics within the training study area.

3.1 Air Quality

3.1.1 Introduction

Air pollution is a threat to human health and the environment (U.S. Environmental Protection Agency, 2007). In addition to damaging the natural environment, including trees, crops, plants, lakes, and animals, air pollution damages the exteriors of buildings, monuments, and statues. It creates haze or smog that reduces visibility and interferes with aviation. To improve air quality and reduce air pollution, Congress established the CAA in 1970 and followed with major amendments in 1977 and 1990, which set regulatory limits on air pollutants and helped to ensure basic health and environmental protection from air pollution.

Most air pollutants originate from stationary sources (e.g., factories, refineries, power plants), mobile sources (e.g., cars, trucks, buses), and 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.

Air quality is defined by ambient concentrations of specific air pollutants—pollutants the USEPA determined may affect the health or welfare of the public. Ambient air quality is reported as the atmospheric concentrations of specific air pollutants at a particular time and location. The units of measurement are expressed as a mass per unit volume (e.g., micrograms per cubic meter of air) or as a volume fraction (e.g., parts per million by volume). The ambient air pollutant concentrations measured at a particular location are determined by the pollutant emissions rate, local meteorology, and atmospheric chemistry. Wind speed and direction, the vertical temperature gradient of the atmosphere, and precipitation patterns affect the dispersal, dilution, and removal of air pollutant emissions from the atmosphere.

The CAA required that the USEPA establish National Ambient Air Quality Standards (NAAQS) for six major pollutants of concern: carbon monoxide (CO), sulfur dioxide, nitrogen dioxide, ozone, particulate matter (dust particles less than or equal to 10 microns in diameter and fine particulate matter less than or equal to 2.5 microns in diameter), and lead. These pollutants are called “criteria” pollutants. The

NAAQS set specific concentration limits for the pollutants in the outdoor (ambient) air. The concentration limits were developed because these pollutants are common in ambient outdoor air, considered harmful to public health and the environment, and come from numerous and diverse sources. The concentration limits are designed to aid in protecting public health (primary standards) and the environment (secondary standards).

In addition to the six criteria pollutants, the USEPA currently designates 187 substances as Hazardous Air Pollutants under the federal CAA. Hazardous air pollutants are air pollutants known or suspected to cause cancer or other serious health effects, or adverse environmental and ecological effects (U.S. Environmental Protection Agency, 2016a).

Criteria air pollutants are classified as either primary or secondary pollutants based on how they are formed in the atmosphere. Primary air pollutants are emitted directly into the atmosphere from the source of the pollutant and retain their chemical form. Examples of primary pollutants are the smoke produced by burning wood and volatile organic compounds (VOCs) emitted by industrial solvents. Secondary air pollutants are those formed through atmospheric chemical reactions that usually involve primary air pollutants (or pollutant precursors) and normal constituents of the atmosphere. Ozone, a major component of photochemical smog, is a secondary air pollutant. Ozone precursors fall into two broad groups of chemicals: nitrogen oxides and VOCs. Nitrogen oxides consist of nitric oxide and nitrogen dioxide. Finally, some criteria air pollutants are a combination of primary and secondary pollutants. Particulate matter less than or equal to 10 microns in diameter and particulate matter less than or equal to 2.5 microns in diameter are generated as primary pollutants by various mechanical processes (e.g., abrasion, erosion, mixing, or atomization) or combustion processes. They are also generated as secondary pollutants through chemical reactions or through the condensation of gaseous into fine aerosols.

Areas with air pollution problems typically have one or more criteria pollutants consistently present at levels that exceed the NAAQS. These areas are designated as nonattainment for the standards. Certain Naval special operations training activities under this action take place within nonattainment or maintenance areas. These areas are identified by their air quality designated areas (an area designated by the federal government where communities share a common air pollution problem).

The USEPA delegates authority to states, through their air quality management agencies, to prepare and implement State Implementation Plans for nonattainment areas, which demonstrate how the area will meet the NAAQS. Areas classified as attainment, after being designated as nonattainment, may be reclassified as maintenance areas subject to maintenance plans showing how the area will continue to meet federal air quality standards. If the state fails to develop an adequate plan to achieve and maintain the NAAQS or a State Implementation Plan revision is not approved by the USEPA, federal agencies must comply with the Federal Implementation Plan that the USEPA is required to develop. States may also choose to adopt the Federal Implementation Plan as an alternative to developing their own State Implementation Plan.

To facilitate their management, nonattainment areas for some criteria pollutants are further classified by the severity of their air quality problem:

- ozone – marginal, moderate, serious, severe, and extreme
- carbon monoxide – moderate and serious
- particulate matter – moderate and serious

The CAA allows states to establish air quality standards more stringent than the NAAQS; however, they are prohibited from imposing more stringent conformity requirements unless the requirements apply equally to non-federal activities. The State of Hawaii established standards more stringent than the NAAQS for certain pollutants (e.g., sulfur dioxide) and established standards for hydrogen sulfide, which is not covered by the NAAQS. Table 3-1 shows all NAAQS and Hawaii Standards.

Table 3-1: Federal and State Ambient Air Quality Standards

Air Pollutant	Time Average	Hawaii Standard	Federal Primary Standard	Federal Secondary Standard
Carbon Monoxide	1-hour average	9 ppm	35 ppm	None
	8-hour average	4.4 ppm	9 ppm	None
Lead	3-month average	1.5 µg/m^3	0.15 µg/m^3	Same as primary
Nitrogen Dioxide	1-hour average	None	100 ppb	None
	Annual average	0.04 ppm	53 ppb	Same as primary
Particulate Matter less than or equal to 10 microns in diameter	24-hour block average	150 µg/m^3	150 µg/m^3	Same as primary
	Annual average	50 µg/m^3	None	None
Particulate Matter less than or equal to 2.5 microns in diameter	24-hour block average	None	35 µg/m^3	Same as primary
	Annual average	None	12 µg/m^3	15 µg/m^3
Ozone	8-hour rolling average	0.08 ppm	0.070 ppm	Same as primary
Sulfur Dioxide	1-hour average	None	75 ppb	None
	3-hour block average	0.5 ppm	-	0.5 ppm
	24-hour block average	0.14 ppm	None	-
	Annual average	0.03 ppm	None	-
Hydrogen Sulfide	1-hour average	25 ppb	None	None

Source: Hawaii Department of Health (2015)
Notes: ppm = parts per million, ppb = parts per billion, µg/m^3 = micrograms per cubic meter

3.1.1.1 Hazardous Air Pollutants

Unlike the criteria pollutants, there are no NAAQS for hazardous air pollutants emissions. The CAA regulates stationary hazardous air pollutant emissions via two sets of national emissions standards: (1) the National Emission Standards for Hazardous Air Pollutants (40 C.F.R. part 61) regulate emissions of specific hazardous air pollutant compounds from specific sources, and (2) National Emission Standards for Hazardous Air Pollutants (40 C.F.R. part 63) regulate all hazardous air pollutant emissions from listed categories of stationary sources.

Mobile source hazardous air pollutants are emitted from highway vehicles and nonroad equipment, with six compounds being specifically identified as having the greatest influence on health: benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter. Specifically, Mobile Source Air Toxics are regulated by the 2007 Mobile Source Air Toxic Rules, which identified 21 compounds which are known or suspected to cause cancer or other serious health and environmental effects and the 2014 USEPA's Tier 3 vehicle and fuel standards which control the benzene

content of gasoline (U.S. Environmental Protection Agency, 2015). Mobile source Hazardous Air Pollutants are generally regulated at the production level, in the same manner as criteria pollutants.

3.1.1.2 General Conformity

The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds (U.S. Environmental Protection Agency, 2017). The emissions thresholds that trigger requirements for a conformity analysis are called *de minimis* levels. *De minimis* levels (in tons per year) vary by pollutant and also depend on the severity of the nonattainment status for the air quality management area in question.

A conformity applicability analysis is the first step of a conformity evaluation and assesses if a federal action must be supported by a conformity determination. This is typically done by quantifying applicable direct and indirect emissions that are projected to result due to implementation of the federal action. Indirect emissions are those emissions caused by the federal action and originating in the region of interest, but which can occur at a later time or in a different location from the action itself and are reasonably foreseeable. The federal agency can control and will maintain control over the indirect action due to a continuing program responsibility of the federal agency. Reasonably foreseeable emissions are projected future direct and indirect emissions that are identified at the time the conformity evaluation is performed. The location of such emissions is known and the emissions are quantifiable, as described and documented by the federal agency based on its own information and after reviewing any information presented to the federal agency. If the results of the applicability analysis indicate that the total emissions would not exceed the *de minimis* emissions thresholds, then the conformity evaluation process is completed. The State of Hawaii is designated as being in attainment for all criteria pollutants and therefore does not require a conformity determination. The *de minimis* thresholds are only applicable to areas that have been classified as being in nonattainment, which means they are not applicable to this analysis. However, the Prevention of Significant Deterioration (PSD) program is used to ensure that federal actions would not cause a region in attainment for all criteria pollutants to exceed NAAQS or local ambient air quality standards. The PSD permit must be obtained for any action that would result in a new major source or modify an existing major source resulting in a change of emissions that exceed a set of Significant Emission Rates, which are shown in Table 3-2. However, the Proposed Action would not qualify as a major source since there are no stationary sources of emissions. Although this means that the PSD program does not apply to this action, the significance thresholds that it establishes are still useful as a reference point to demonstrate whether an action will have an impact on the ambient air quality.

Table 3-2: Significant Emission Rates for Attainment Areas

Pollutant	Significant Emission Rate (tpy)
NOx	40
VOC	40
CO	100
SO_2	40
PM_{10}	15
$PM_{2.5}$	10

Notes: NO_x = nitrogen oxides, VOC = Volatile Organic Compound, CO = Carbon Monoxide, SO_2 = sulfur dioxide, PM_{10} = Particulate matter less than 10 microns, $PM_{2.5}$ = Particulate matter less than 2.5 microns, tpy = tons per year

3.1.1.3 Climate Change

Greenhouse gases (GHGs) are compounds that contribute to the greenhouse effect—a natural phenomenon in which gases trap heat within the lowest portion of the earth's atmosphere (surface-troposphere system), causing heating (radiative forcing) at the surface of the earth. The primary long-lived GHGs directly emitted by human activities are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride. Carbon dioxide, methane, and nitrous oxide occur naturally in the atmosphere. These gases influence the global climate by trapping heat in the atmosphere that would otherwise escape to space. The heating effect from these gases is considered the probable cause of the global warming observed over the last 50 years (U.S. Environmental Protection Agency, 2009c). Global warming and climate change affect many aspects of the environment. Not all effects of GHGs are related to climate. For example, elevated concentrations of carbon dioxide can lead to ocean acidification and stimulate terrestrial plant growth, and methane emissions can contribute to higher ozone levels.

As the administrator of the USEPA, Lisa Jackson determined that six GHGs in combination endanger both the public health and the public welfare of current and future generations. The USEPA specifically identified carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride as GHGs (U.S. Environmental Protection Agency, 2009a).

To estimate global warming potential, which is the heat trapping capacity of a gas, the United States quantifies GHG emissions using the 100-year timeframe values established in the Intergovernmental Panel on Climate Change Fourth Assessment Report (Intergovernmental Panel on Climate Change, 2007), in accordance with United Nations Framework Convention on Climate Change (United Nations Framework Convention on Climate Change, 2013) reporting procedures. All global warming potentials are expressed relative to a reference gas, carbon dioxide, which is assigned a global warming potential equal to 1. Six other primary GHGs have global warming potentials: 25 for methane, 298 for nitrous oxide, 124 to 14,800 for hydrofluorocarbons, 7,390 to greater than 17,340 for perfluorocarbons, 17,200 for nitrogen trifluoride, and up to 22,800 for sulfur hexafluoride. To estimate the carbon dioxide equivalency of a non-carbon dioxide GHG, the appropriate global warming potential of that gas is multiplied by the amount of the gas emitted. All six GHGs are multiplied by their global warming potential, and the results are added to calculate the total equivalent emissions of carbon dioxide. The dominant GHG emitted is carbon dioxide, mostly from fossil fuel combustion (85.4 percent) (U.S. Environmental Protection Agency, 2016b). Weighted by global warming potential, methane is the second largest component of emissions, followed by nitrous oxide. Global warming potential-weighted emissions are presented in terms of equivalent emissions of carbon dioxide, using units of metric tonnes.

The Proposed Action is anticipated to release GHGs to the atmosphere. These emissions are quantified (primarily using methods elaborated upon in the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2014* for the proposed Navy training and testing in the training study area) (U.S. Environmental Protection Agency, 2016b).

The potential effects of proposed GHG emissions are by nature global and may result in cumulative impacts because most individual sources of GHG emissions are not large enough to have any noticeable effect on climate change. Therefore, the impact of proposed GHG emissions to climate change is discussed in the context of cumulative impacts.

3.1.1.3.1 Current Requirements and Practices

In June 2014, the DoD released the 2014 *Climate Change Adaptation Roadmap* to document DoD's efforts to plan for the changes that are occurring or expected to occur as a result of climate change. The Roadmap provides an overview and specific details on how DoD's adaptation will occur, and describes ongoing efforts (U.S. Department of Defense, 2014).

The Navy is committed to improving energy security and environmental stewardship by reducing reliance on fossil fuels. The Navy is actively developing and participating in energy, environmental, and climate change initiatives that will increase use of alternative energy and reduce emissions of GHGs. The Navy has adopted energy, environmental, and climate change goals. These goals include increasing alternative energy use Navy-wide to 50 percent by 2020; reducing non-tactical petroleum use; ensuring environmentally sound acquisition practices; ensuring environmentally compliant operations for ships, submarines, aircraft, and facilities operated by the Navy; and implementing applicable elements of the Climate Change Adaptation Roadmap.

Equipment used by military units in the training study area, including ships and other marine vessels, aircraft, and other equipment, are properly maintained and fueled in accordance with applicable Navy requirements. Operating equipment meets federal and state emission standards, where applicable.

3.1.2 Affected Environment

The Proposed Action would take place in various locations around the State of Hawaii, which is regulated by the Clean Air Branch of the Hawaii Department of Health. The Clean Air Branch is responsible for implementing and enforcing State and federal air quality regulations in the State of Hawaii, which is classified by the USEPA as unclassified/attainment for all criteria pollutants; therefore, a Conformity Determination is not required for the Proposed Action (U.S. Environmental Protection Agency, 2017).

The State of Hawaii has some of the highest air quality in the country. The climate of Hawaii contributes to the excellent air quality in the following ways:

1. Consistent trade winds blowing out of the northeast quadrant efficiently carry away air pollutants that are produced on the island and promote effective dispersal.
2. Hawaii is located at such a great distance from other sources of pollution that the air that is carried to the islands is generally free of pollutants.
3. Atmospheric inversions are uncommon, meaning that there is generally good vertical dispersion of pollutants.

Other factors that affect air quality are the temperature and rainfall. Air temperatures in Hawaii generally range from 70 to 80 degrees Fahrenheit (°F) throughout the year with slight variability depending on the season. Rainfall is most abundant and frequent on the windward slopes of the mountains of each island. The driest location on average is near the summit of Mauna Kea (average of 8 inches per year), while the wettest location is near Big Bog on the windward slope of Haleakala (average of 404 inches per year) (Giambelluca et al., 2013). Rain is effective at washing dust and other air pollutants out of the atmosphere, which improves air quality (Chu, 2015).

3.1.3 Environmental Consequences

Effects on air quality are based on estimated direct and indirect emissions associated with the action alternatives. The area that would be impacted by air pollutants released by the Proposed Action is the air basin in which the project is located, the State of Hawaii Air Basin. Estimated emissions from a proposed federal action are typically compared with the relevant national and state standards to assess the potential for increases in pollutant concentrations. Since the State is in attainment for NAAQS, project emissions are compared to PSD Significant Emission Thresholds to determine whether a significant increase in emissions would occur.

3.1.3.1 No Action Alternative

Under the No Action Alternative, baseline training activities conducted in Hawaii over the past decade would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions. NSWC activities that were discussed in the various Categorical Exclusions would produce emissions that are considered negligible (Table 3-3). Under the No Action Alternative, air pollution associated with the No Action Alternative originates from watercraft and ground transportation. Equipment used for training in the training study area, including boats and vehicles, is properly maintained in accordance with applicable Navy and federal CAA (e.g., 40 C.F.R. 63 Subpart ZZZZ) requirements. Operating equipment meets federal and state emission standards, where applicable. There are no fixed sources of emissions, such as generators, contributing to emissions. All sources of pollution are considered to be mobile sources. Due to this aspect of naval special operations training and the fact that training activities occur over a large expanse of land, emissions are readily dispersed throughout the training study area, inhibiting accumulation of pollutants in a single location. Therefore, no significant impact on existing air quality or air resources would occur with implementation of the No Action Alternative.

Table 3-3: Emissions Sources and Annual Emission Rates Under the No Action Alternative

Equipment Type	Annual Emissions (tpy)					
	NO_x	VOC	CO	SO_x	PM_{10}	$PM_{2.5}$
Watercraft	16	205	500	1	0	0
Ground Transportation	5	0	3	0	0	0
Total	21	205	503	1	1	1
Significant Emission Rates	40	40	100	40	15	10
Exceeds Significance?	No	Yes	Yes	No	No	No

Notes: tpy = tons per year, NO_x = nitrogen oxides, VOC = volatile organic compounds, CO = carbon monoxide, SO_x = sulfur oxide, PM_{10} = particulate matter less than or equal to 10 microns in diameter, $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter

3.1.3.2 Alternative 1

Alternative 1 does not involve any construction activities, nor are there any fixed sources of emissions, such as stationary industrial generators, associated with training activities. A summary of air pollution sources is shown in Table 3-4 along with their expected annual emissions, which are based on the duration and emission release rates of the equipment used. Sources of emissions associated with the

Proposed Action include the combustion of fossil fuels from engines in ground vehicles, watercraft, aircraft, and mobile generators aboard the MV C-Commando. The analysis incorporates aircraft emissions that would be released below 3,000 feet AGL. C-17 or AC-130 aircraft would only be below this altitude during their takeoff and landing cycles. MV-22 aircraft are assumed to be below 3,000 feet for the duration of their use. UAS and UUVs would utilize rechargeable battery power and would not emit pollutants and are therefore excluded from the air quality analysis. Since NSWC baseline air emissions are negligible, as discussed in Section 3.1.3.1 (No Action Alternative), all of the emissions produced under Alternative 1 would be considered a change from the environmental baseline.

Alternative 1 would produce criteria pollutant emissions that exceed Significant Emission Rates for VOC and carbon monoxide pursuant to PSD permitting requirements. Since these thresholds are merely used as a reference point for the significance of pollutant emissions, a PSD permit would not need to be obtained. In addition, training activities under Alternative 1 would be distributed across the islands and would not cause pollutants to accumulate in localized areas. Therefore, implementation of Alternative 1 would not result in a significant change from the environmental baseline and would have negligible impacts on the ambient air quality of the region.

In addition to the criteria pollutants, trace amounts of mobile source air toxics (MSAT) would be emitted from aircraft, watercraft, and ground transportation utilized under Alternative 1. Although a quantitative estimation of MSAT production was not performed, they are generally produced in quantities one or more orders of magnitude smaller than criteria pollutants. Since criteria pollutants are not produced in sufficient quantities to violate NAAQS under Alternative 1, it can be assumed that MSATs would not be produced in large enough quantities to significantly affect the air quality (U.S. Environmental Protection Agency, 2007, 2008, 2009b).

Table 3-4: Emission Sources and Annual Emission Rates Under Alternative 1

Equipment Type	Annual Emissions (tpy)					
	NO_x	VOC	CO	SO_x	PM_{10}	$PM_{2.5}$
Watercraft and Aircraft	43	455	1,110	2	2	2
Ground Transportation	12	1	6	0	0	0
Total	55	455	1,116	2	2	2
Baseline Emissions	21	205	503	1	1	1
Change in Emissions	34	250	613	1	1	1
Significant Emission Rates	40	40	100	40	15	10
Exceeds Significance?	No	Yes	Yes	No	No	No

Notes: tpy = tons per year, NO_x = nitrogen oxides, VOC = volatile organic compounds, CO = carbon monoxide, SO_x = sulfur oxide, PM_{10} = particulate matter less than or equal to 10 microns in diameter, $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter

Alternative 1 would contribute directly to emissions of GHGs from the combustion of fossil fuels. Training activities would generate approximately 2,841 tons (2,577 metric tons) of carbon dioxide equivalent each year, as detailed in Appendix B (Air Quality Calculations). These estimated annual GHG

emissions would account for only 0.00004 percent of the United States' annual GHG emissions. This limited amount of emissions would not likely contribute to global warming to any discernible extent.

Therefore, no significant impacts would occur on air quality or air resources with implementation of Alternative 1.

3.1.3.3 Alternative 2

Activities under Alternative 2 would not differ from those of Alternative 1. However, the frequency of training events would increase. Construction activities would not occur, and no generators or other stationary sources of emissions would be used under Alternative 2. All emissions arise from mobile sources such as watercraft, aircraft, and ground transport. Similar to Alternative 1, only the aircraft emissions that would be released below 3,000 feet AGL were incorporated into this analysis. C-17 or AC-130 aircraft would only be below this altitude during their takeoff and landing cycles. MV-22 aircraft are assumed to be below 3,000 feet for the duration of their use. A summary of air pollution sources under Alternative 2 are shown in Table 3-5 along with their expected annual emissions, which are based on the duration and emission release rates of the equipment used.

Similar to Alternative 1, Alternative 2 would produce criteria pollutant emissions that exceed Significant Emission Rates for VOC and carbon monoxide pursuant to PSD permitting requirements. However, training activities under Alternative 2 would be distributed across the islands and would not cause pollutants to accumulate in localized areas. Therefore, implementation of Alternative 2 would not result in a significant change from the environmental baseline and would have negligible impacts on the ambient air quality of the region.

Table 3-5: Emission Sources and Annual Emission Rates Under Alternative 2

Equipment Type	Annual Emissions (tpy)					
	NO_x	VOC	CO	SO_x	PM_{10}	$PM_{2.5}$
Watercraft and Aircraft	48	503	1,228	3	2	2
Ground Transportation	12	1	6	0	0	0
Total	60	504	1,234	3	3	3
Baseline Emissions	21	205	503	1	1	1
Change in Emissions	39	299	731	2	2	2
Significant Emission Rates	40	40	100	40	15	10
Exceeds Significance?	No	Yes	Yes	No	No	No

Notes: tpy = tons per year, NOx = nitrogen oxides, VOC = volatile organic compounds, CO = carbon monoxide, SOx = sulfur oxide, PM_{10} = particulate matter less than or equal to 10 microns in diameter, $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter

In addition to the criteria pollutants, trace amounts of MSATs would be emitted from watercraft and ground transportation utilized under Alternative 2. Although a quantitative estimation of MSAT production was not performed, they are generally produced in quantities that are one or more orders of magnitude smaller than criteria pollutants. Since criteria pollutants are not produced in sufficient quantities to violate NAAQS under Alternative 2, it can be assumed that MSATs would not be produced in large enough quantities to significantly affect the air quality (U.S. Environmental Protection Agency, 2007, 2008, 2009b).

Implementation of Alternative 2 would contribute directly to emissions of GHGs from the combustion of fossil fuels. Training activities would generate approximately 3,428 tons (3,110 metric tons) of carbon dioxide equivalent each year, as detailed in Appendix B (Air Quality Calculations). These estimated annual GHG emissions would account for approximately 0.00004 percent of the United States' annual GHG emissions. This limited amount of emissions would not likely contribute to global warming to any discernible extent.

Although Alternative 2 produces slightly more emissions annually than Alternative 1, no significant impacts would occur on air quality or air resources with implementation of Alternative 2.

3.2 Land Use-Recreation

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.

3.2.1 Regulatory Setting

In many cases, land use descriptions are codified in installation master planning and local zoning laws. Office of the OPNAVINST 11010.40 establishes an encroachment management program to ensure operational sustainment that has direct bearing on land use planning on installations.

Through the CZMA, Congress established national policy to preserve, protect, develop, restore, or enhance resources in the coastal zone. This Act encourages coastal states to properly manage use of their coasts and coastal resources, prepare and implement coastal management programs, and provide for public and governmental participation in decisions affecting the coastal zone. To this end, CZMA imparts an obligation upon federal agencies whose actions or activities affect any land or water use or natural resource of the coastal zone to be carried out in a manner consistent to the maximum extent practicable with the enforceable policies of federally approved state coastal management programs. However, federal lands, which are “lands the use of which is by law subject solely to the discretion of the Federal Government, its officers, or agents,” are statutorily excluded from the State’s “coastal uses or resources.” If, however, the proposed federal activity affects coastal uses or resources beyond the boundaries of the federal property (i.e., has spillover effects), the CZMA Section 307 federal consistency requirement applies. As a federal agency, the NSWC is required to determine whether its proposed activities would affect the coastal zone. This takes the form of a consistency determination, a negative determination, or a determination that no further action is necessary.

3.2.2 Affected Environment

The training study area and contiguous nearshore waters encompass a broad spectrum of land use and landownership types, including private lands, public parks, harbors, golf courses, and recreation areas. Commercial, institutional, recreational, and military activities take place simultaneously within these areas.

Federally owned lands within the State of Hawaii include lands managed by the USFWS, National Park Service, and DoD (U.S. Geological Survey, 2003). Recreational opportunities across federal- and non-federal-owned lands include hunting, hiking, wildlife viewing, camping, fishing, beach combing, swimming, surfing, snorkeling, sailing, watercraft rentals, sunbathing, and picnicking. Generally, access to military installation recreational areas is restricted to military personnel and their families and is not open to the general public.

Hawaii’s unique environment and mild climate provide an ideal backdrop for a myriad of year-round mountain and coastal outdoor recreation activities. Mountain-based recreation is often in a forest

setting and tends to include activities such as hiking, wilderness camping, picnicking, and hunting. The Division of State Parks and Division of Forestry and Wildlife of the Department of Land and Natural Resources (DLNR) are most directly connected with mountain-based recreation. Coastal recreation along the shoreline and in the ocean includes surfing, swimming, snorkeling, diving, fishing, boating, beach activities, camping, and picnicking. State recreation agencies most directly connected with coastal recreation include the Division of State Parks, Division of Aquatic Resources, and the Division of Boating and Ocean Recreation (Hawaii Division of State Parks, 2015).

The 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation found that in 2011, 465,000 Hawaii residents and non-residents participated in outdoor recreational activities (U.S. Department of the Interior et al., 2011). In the public survey conducted for the Statewide Comprehensive Outdoor Recreation Plan, residents of Hawaii identified visiting the beach, swimming in the ocean, and snorkeling as the top three water-based activities. Hawaii residents also identified hiking, picnicking/BBQ, and wildlife watching as the top three land-based activities (Hawaii Division of State Parks, 2015).

The Statewide Comprehensive Outdoor Recreation Plan outlines a strategic plan with Goals and Objectives for recreation in Hawaii:

- Goal 1: Provide a world-class outdoor recreation experience (quality of the recreational experience).
    - Objective 1-1: Provide adequate facilities, infrastructure, and funding to expand access to and otherwise support high-demand outdoor recreation activities.
    - Objective 1-2: Focus outdoor recreation resources on maintaining and renovating existing facilities.
    - Objective 1-3: Promote new or enhanced accessibility to outdoor recreation through alternative transportation methods.
    - Objective 1-4: Encourage outdoor recreation through funding and provision of accessible recreation opportunities.
    - Objective 1-5: Eliminate user conflicts that prevent or limit people from participating in outdoor activities of their choice.
- Goal 2: Expand opportunities for public outdoor recreation (quantity of recreational facilities and opportunities).
    - Objective 2-1: Facilitate State and County awareness of and access to outdoor recreation funding.
    - Objective 2-2: Provide relief to outdoor recreation providers so that the threat from of liability keeps them from providing great service.
    - Objective 2-3: Take proactive measures to support enforcement so that limited resources can be utilized more efficiently and effectively.
    - Objective 2-4: Encourage public private partnerships to provide enhanced or innovative improvements and services.

3.2.2.1 State and County Parks

Hawaii's State Park System is composed of 50 state parks encompassing approximately 30,000 acres on five major islands. State parks offer varied ocean and land-based outdoor recreation and heritage opportunities (*Hawaii Administrative Rule Section 13-256-16*). A right-of-entry permit is required for any

activity other than camping, lodging, and activities compatible with the functions and purposes of each individual area, facility, or unit of the premises (*Hawaii Administrative Rule Section 13-256-16*). Several state parks are located within the training study area.

In addition to state parks, Hawaii has a number of county parks and recreational areas. The City and County of Honolulu's Department of Parks and Recreation is responsible for city parks on Oahu. The County of Maui's Department of Parks and Recreation manages county parks and recreational facilities throughout the Islands of Maui, Molokai, and Lanai. The County of Kauai's Department of Parks and Recreation manages parks throughout Kauai. Lastly, the County of Hawaii's Department of Parks and Recreation manages county parks throughout the Island of Hawaii. These county parks include campgrounds, beach parks, botanical gardens, and recreation facilities such as playgrounds, pools, boat ramps and courts for basketball or tennis. County parks are located within the training study area.

3.2.2.2 Hiking Trails

Numerous hiking trails throughout the State of Hawaii are managed and maintained by the State of Hawaii and the Division of Forestry and Wildlife's Na Ala Hele Trail and Access Program. However, there are unsanctioned trails in the State of Hawaii. These hiking trails are not maintained by a program or agency. Several sanctioned and unsanctioned hiking trails are within the training study area along the coastlines of Oahu and the Island of Hawaii.

3.2.2.3 Hunting

Kauai, Oahu, Maui, Molokai, Lanai, and the Island of Hawaii all have one or more state-designated public hunting areas called hunting units, which typically overlap with other recreational areas and are open for hunting at certain times of the year (Hawaii Division of Forestry and Wildlife, 2017c). In some areas, access across military lands is permitted for hunting activities with permission and in coordination with other ongoing military activities. Hunting for large or small game in Hawaii requires a license. Hunted game bird species include quail, dove, turkey, and pheasant (Hawaii Division of Forestry and Wildlife, 2017b). In addition to hunting game birds, hunted game mammal include pig, sheep, deer, and goat. Protected game mammals, which include the Brush-tailed wallabies and wild cattle, may not be hunted unless authorized by the Division of Forestry and Wildlife (Hawaii Division of Forestry and Wildlife, 2017a). In addition, the Division of Forestry and Wildlife sets hunting seasons and hours, determines authorized weapons, and may modify or cancel a hunting season depending on weather conditions or size of animal populations (Hawaii Division of Forestry and Wildlife, 2017c).

3.2.2.4 Beach and Ocean Recreation

The State of Hawaii offers a wide variety of beaches for recreation. Typical beach and water-based activities include swimming, snorkeling, surfing, paddling, boating, fishing, beach combing, and picnicking.

The Division of Boating and Ocean Recreation manages boating and ocean recreation facilities on the Island of Hawaii, Lanai, Maui, Kauai, Molokai and Oahu. These facilities include small boat harbors, launch ramps, and anchorage points (Hawaii Division of Boating and Ocean Recreation, 2015). The State of Hawaii Department of Transportation, Harbors Division maintains jurisdiction over ten harbors throughout the State. In addition to boating, personal watercraft recreation (e.g., jet skiing) is extremely popular in Hawaii. The increasing number of watercraft operating in designated riding areas prompted the DLNR to implement a 2005 rule (*Hawaii Administrative Rule Section 13-256-16*) requiring all personal watercraft operators to be certified in the safe use of their watercraft (Hawaii Division of Boating and Ocean Recreation, 2015).

DLNR's Division of Aquatic Resources is the lead state agency for monitoring recreational and commercial fishing within the State of Hawaii. Recreational fishing in Hawaii does not require a fishing license and shoreline areas are open for fishing unless otherwise posted. Fishing may be restricted in areas such as military bases, wildlife refuges, natural area reserves, harbors, or private property areas. Recreational fishing regulations depend on the species of fish. Size limits, bag limits, and seasonal restrictions are enforced for certain fish species. There are also restrictions specific to location, referred to as a regulated fishing area (Hawaii Division of Aquatic Resouces, 2016).

Individuals or vessels engaged in taking, selling, or offering for sale any marine life for commercial purposes (including charter fishing services) must obtain a Commercial Marine License from the Division of Aquatic Resources. The Division of Aquatic Resources defines "commercial purpose" as the taking of marine life for profit or gain, or as a means of livelihood, when the marine life is taken in or outside of the State, and when the marine life is sold, offered for sale, landed, or transported for sale anywhere in the State (Hawaii Division of Aquatic Resouces, 2017). The Division of Aquatic Resources collects various data in the form of fishing reports from fishermen, marine life and habitat surveys (e.g., fish counts/transects), creel surveys, port surveys, fish market sampling, and other scientific surveys for use in monitoring and assessing the aquatic resources of the State.

3.2.2.5 Land Use Compatibility

The training study area is located within the coastal zone of the State of Hawaii. The State of Hawaii Office of Planning is the lead agency for coastal management and is responsible for enforcing the State's federally approved Coastal Zone Management program (State of Hawaii, 2017). The Proposed Action is expected to have insignificant direct or indirect (cumulative and secondary) coastal effects. Activities on most federal properties should not be subject to further review by the Hawaii Coastal Zone Management Program per the "Navy/Marine Corps *De Minimis* Activities Under the CZMA" List (State of Hawaii, 2017). The Navy will comply with project mitigation and general conditions in accordance with General Condition 12 (Military Training and Testing) of the Navy/Marine Corps *De Minimis* Activities List. Federal project areas that are not covered by the Navy/Marine Corps *De Minimis* List will be evaluated by the Hawaii Coastal Zone Management Program via a Negative Determination. The Navy will complete a Federal Consistency Determination for activities that will occur on non-federal lands.

3.2.3 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. Factors affecting a proposed action in terms of land use include its compatibility with on-site and adjacent land uses, restrictions on public access to land, or change in an existing land use that is valued by the community. Other considerations are given to proximity to a proposed action, the duration of a proposed activity, and its permanence.

3.2.3.1 No Action Alternative

Under the No Action Alternative, baseline training activities conducted in Hawaii over the past decade would continue at the same level as currently scheduled, with the most current training activities being those approved event-based Categorical Exclusions, as applicable. NSWC activities that were discussed in the various Categorical Exclusions would not change land use, recreational activities, or recreational facilities. Therefore, no significant impact on existing land use or recreation would occur with implementation of the No Action Alternative.

3.2.3.2 Alternative 1

With implementation of Alternative 1, individuals would be allowed continued use of recreational areas on non-federal and federal lands consistent with existing access. Training would be localized, infrequent, brief in duration and consistent with the existing land use Trainees swimming in the water, moving across the beach, and walking on or off trails would be consistent with the manner in which the public conducts these same activities. Training would not restrict recreational activities within the training study area.

Under Alternative 1, the State of Hawaii recreational goals of ensuring quality recreational facilities and expanding recreation facilities throughout the State of Hawaii would be maintained. Minimization measures employed during training activities would limit encounters with the public during training events. For example, if the public enters the training area, the safety support personnel assess the situation and, based upon safety considerations, will either continue the training, temporarily suspend the training, completely stop the training, or relocate the training to another approved training site. The Navy, on behalf of NSWC, would obtain a right-of-entry permit prior to conducting any training activity where consent is needed from non-federal property owners. Training would only occur on non-federal property if proper consent was obtained. Within the training study area, an individual non-federal site would be used for no more than six events a year.

The airborne noise produced from surface vessels supporting training activities would be consistent with noise from non-Navy vessels (such as recreational fishing boats) common in the area and would not disrupt other recreational activities in the training study area. Due to their battery-operated propulsion system; the short duration of the flights; and their use only over federal property or within authorized airspace (restricted airspace and warning areas), typically away from the general public, proposed UAS training activities would not disrupt or interfere with other recreational activities. Airborne noise from training activities involving air-based training activities utilizing aircraft would have no effect on recreational activities as they are proposed to be conducted in designated areas consistent with other military activities and where public access is already restricted or limited. Drop zone and landing zone areas are not co-located with public recreational activities.

Land proposed for landing and drop zones would not require site construction or land modifications. A drop zone survey is required for airborne operations. Completing the drop zone survey process involves both physically inspecting the drop zone and documenting the information on Air Force Form 3823, Drop Zone Survey. In addition, the user must conduct a physical inspection of the drop zone prior to use to identify and evaluate potential hazards to airdropped personnel/equipment, man-made or natural structures, and ground personnel.

Drop zones and landing zone training activities would not affect recreation as the training is proposed in areas with existing limited or restricted public access. Water-based drop zone training activities proposed to be conducted in the waters around Marine Corps Base Hawaii would be conducted within the existing security buffer zone. The security buffer zone extends from the shore of the Mokapu Peninsula where Marine Corps Base Hawaii is located, 500 yards seaward, and restricts access to the sea space within the buffer, including access by recreation activities. The purpose of the security buffer zone is to maintain military security and public safety. Conducting water-based drop zone training activities within the security buffer would not impact individuals using the waters outside of the 500-yard security buffer and thus would not change access to or use of existing adjacent recreation areas. For all open water training events involving broadcast navigational hazards (including water-based parachute drops, cast and recovery, or operating and maneuvering small personal watercraft), naval special operations

support personnel would be present to ensure that training areas are clear and safe to conduct water-based training activities separate from the public. Therefore, no significant impacts on land use or recreation would occur with implementation of Alternative 1.

3.2.3.3 Alternative 2

Under Alternative 2, air-based training events would be conducted within or above federal property or within designated airspace (restricted airspace or warning areas) (Section 2.2, Training Sites). Land proposed for landing and drop zones would not require site construction or land modifications. A drop zone survey is required for airborne operations. Completing the drop zone survey process involves both physically inspecting the drop zone and documenting the information on Air Force Form 3823, Drop Zone Survey. In addition, the user must conduct a physical inspection of the drop zone prior to use to identify and evaluate potential hazards to airdropped personnel/equipment, man-made or natural structures, and ground personnel. Water-based drop zone training activities proposed to be conducted in the waters around Marine Corps Base Hawaii would be conducted within the existing security buffer zone and be the same as those described above under Alternative 1.

With implementation of Alternative 2, individuals would be allowed continued use of recreational areas on non-federal and federal lands consistent with existing access. The increase in training tempo associated with Alternative 2 would not impact land use or recreational activities due to the nature of the training activities being localized, infrequent, brief in duration, and consistent with the existing land use. Trainees swimming in the water, moving across the beach, and walking on or off trails would be consistent with the manner in which the public conducts these same activities. Training would not restrict recreational activities within the training study area.

Under Alternative 2, the State of Hawaii goals of ensuring quality recreational facilities and expanding recreation facilities throughout the State of Hawaii would be maintained. Under Alternative 2, minimization measures employed during training activities limit encounters with the public during training events. For example, if the public enters the training area, the safety support personnel assess the situation and, based upon safety considerations, will either continue the training, temporarily suspend the training, completely stop the training, or relocate the training to another approved training site. The Navy, on behalf of NSWC, would obtain a right-of-entry permit prior to conducting any training activity. Training would only occur on non-federal property if proper consent was obtained. Therefore, no significant impacts on land use or recreation would occur with implementation of Alternative 2.

3.3 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:

- *Terrestrial biological resources* (Section 3.3.2.1): terrestrial vegetation and terrestrial wildlife, including birds listed under the MBTA
- *Marine biological resources* (Section 3.3.2.2): marine vegetation and marine wildlife, including marine invertebrates, fish, sea turtles, and marine mammals
- *Special-status species* (Section 3.3.2.3): those terrestrial and marine species listed under the ESA or by the State of Hawaii (Hawaii Administrative Rules 13-124, Exhibit 2 and Hawaii Revised Statutes §195D) as threatened or endangered

3.3.1 Regulatory Setting

Special-status species, which, for purposes of this EA, are those species listed as threatened or endangered under the ESA, and species afforded federal protection under the MMPA or the MBTA. Special-status species also include those species addressed by State of Hawaii rules protecting threatened and endangered species (Section 1.6, Relevant Laws and Regulations). The federal regulatory frameworks relevant to biological resources analyzed in this EA are summarized below.

3.3.1.1 Endangered Species Act

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 NMFS to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species, or result in the destruction or adverse modification of designated critical habitat. Critical habitat cannot be designated on any areas owned, controlled, or designated for use by the DoD where an INRMP has been developed that, as determined by the Secretaries of the Interior or Commerce, provides a benefit to the species subject to critical habitat designation.

3.3.1.2 Marine Mammal Protection Act

All marine mammals are protected under the provisions of the MMPA. The MMPA prohibits any person or vessel from “taking” marine mammals in the U.S. or the high seas without authorization. The MMPA defines “take” to mean “to harass, hunt, capture, or kill or attempt to harass, hunt, capture, or kill any marine mammal.” In the case of military readiness activities, the MMPA defines “harassment” as any act of pursuit, torment, or annoyance which (i) has the significant potential to injure a marine mammal or marine mammal stock in the wild (Level A Harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering to a point where such behavioral patterns are abandoned or significantly altered (Level B Harassment).

3.3.1.3 Migratory Bird Treaty Act

Migratory and most native-resident bird species are protected under the MBTA, and their conservation by federal agencies is mandated by EO 13186 (*Responsibilities of Federal Agencies to Protect Migratory*

Birds). Under the MBTA it is illegal for anyone by any means or in any manner, to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests or eggs of such a bird at any time, except under the terms of a valid permit issued pursuant to federal regulations.

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. Congress defined military readiness activities as all training and operations of the armed forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Military readiness activities do not include: (A) routine operation of installation support functions such as administrative offices, military exchanges, water treatment facilities, schools, housing, storage facilities, and morale, welfare, and recreation activities; (B) the operation of industrial activities; or (C) the construction or demolition of facilities listed in A or B (50 C.F.R. part 21.3). For purposes of this EA, the proposed training operations are considered military readiness activities. In 2007, the final rule, known as the DoD Migratory Bird Rule (50 C.F.R. part 21), authorized the DoD to take migratory birds in such cases and includes a requirement that if the DoD determines that a proposed or an ongoing military readiness activity might result in a significant adverse effect on a population of a migratory bird species, they must confer and cooperate with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects. This is done in accordance with, and through, the NEPA process (this EA).

3.3.1.4 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) provides for the conservation and management of the fisheries resources of the U.S. Under the Act, EFH consists of the waters and substrate needed for federally managed fisheries species to spawn, breed, feed, or grow to maturity. For Hawaii, EFH is established by the Western Pacific Regional Fishery Management Council (WPRFMC). EFH has been established for five management units in the Main Hawaiian Islands: bottomfish and seamount groundfish, pelagics, crustaceans, precious corals, and coral reef ecosystem. Information on EFH for the management units is presented in the Fishery Ecosystem Plan (FEP) for the Pacific Pelagic Fisheries of the Western Pacific Region (Western Pacific Regional Fishery Management Council, 2009) and the Draft FEP for the Hawaii Archipelago (Western Pacific Regional Fishery Management Council, 2016a).

3.3.2 Affected Environment

The following discussions provide a description of existing conditions for each of the categories under biological resources within potential training locations identified in Section 2.2 (Training Sites). Because of the disparate conditions at different land-based and in-water training locations within the training study area, terrestrial and marine species and habitats are analyzed by island. Special-status species managed under the regulatory frameworks summarized in Section 3.3.1 (Regulatory Setting), including plants, terrestrial mammals, birds, invertebrates, marine fishes, sea turtles, and marine mammals, are described in Section 3.3.2.3 (Special-Status Species).

3.3.2.1 Terrestrial Biological Resources

This section describes the terrestrial plant communities, constituent plant species, and terrestrial wildlife resources within land-based training locations identified in Section 2.2 (Training Sites). Training on land would only occur on Kauai, Oahu, and the Island of Hawaii; therefore, only the training study areas on these islands are addressed.

3.3.2.1.1 Terrestrial Vegetation

Plants along the coasts of the Hawaiian Islands are adapted to salt-spray and wave wash and are typically found growing in low mats. Behind the immediate coastal area is a zone of vegetation that is quite varied in composition and structure, but somewhat less specialized in life form. Coastal plant communities in Hawaii are distributed across a very wide range of conditions and are not homogeneous. The primary factors that influence their composition and structure include moisture, substrate, and exposure to wind and salt water. Examples of native plants that comprise this coastal community include naupaka (*Scaevola taccada*), naio (*Myoporum sandwicense*), and mao (*Gossypium tomentosum*). Native plant species within the strand community represent one of the best surviving groups of the known Hawaiian flora (Warshauer et al., 2009).

Examples of non-native invasive plants within the strand community include large trees and shrubs such as ironwood (*Casuarina equisetifolia*) and kiawe (*Prosopis pallida*), and various herbaceous plants (New Zealand spinach [*Tetragonia tetragonioides*], Indian fleabane [*Pluchea indica*], and silky jackbean [*Canavalia sericea*]). In protected waters, such as bays and estuaries within the training study area, examples of non-native invasive plants include two species of mangroves (*Rhizophora mangle* and *Bruguiera sexangula*), pickleweed (*Batis maritime*), and water hyacinth (*Eichornia crassipes*) (U.S. Department of the Navy, 2011c, 2012; Warshauer et al., 2009).

Inland, the plant communities vary in both composition and structure, and individual plants are adapted to more diverse conditions (e.g., soil types, canopy cover, wind exposure, elevation, precipitation) (Warshauer et al., 2009). Representative native or indigenous trees include coconut, ohia, koa, and hala. Some representative invasive plants that may occur within the inland portions of the training study area include cape ivy (*Delairea odorata*), fountain grass (*Pennisetum setaceum*), devil weed (*Chromolaena odorata*), fireweed (*Senecio madagascariensis*), cane tubouchina (*Tibouchina herbacea*), glory bush (*Tibouchina urvilleana*), Himalayan blackberry (*Rubus armeniacus*), lantana (*Lantana camara*), two species of pampas grass (*Cortaderia jubata* and *Cortaderia selloana*), and miconia (*Miconia calvescens*) (Big Island Invasive Species Committee, 2018; Kauai Invasive Species Committee, 2018; Oahu Invasive Species Committee, 2018). Each island within the training study area has unique vegetation communities, summarized below.

Kauai

As shown in Figure 1-9, the Kauai training study area is limited to the western coastline, primarily on the Pacific Missile Range Facility (PMRF) and Polihale State Park. The Kauai region of the training study area is located on Kauai's Mana Plain, historically associated with an extensive wetland separated from the coastal beach by high sand dunes. PMRF abuts a 7,000-acre agricultural zone to the east of the facility, supporting coastal wetland habitats with hydrolytic vegetation. In addition, some of the last remaining dryland coastal habitats occur along this area of coastal Kauai, including the aalii nama scrub and Nohili dune habitats, which contain several rare plant species, including *Nama sandwicencis* and *Chamaesyce celastroides.* Two ESA-listed plant species potentially occur at PMRF and are discussed below in Section 3.3.2.3.1 (Special-Status Plants).

Oahu

Warshauer et al. (2009) noted that there are several sections of Oahu's coastline that are relatively undisturbed, and the strand communities in these areas support moderately diverse assemblages of dry region flora. The training study area within the JBPHH Region, including Pearl City Peninsula, Ford Island and Waipio Peninsula (Figure 1-3) includes maintained vegetation areas such as mowed grass, developed areas with concrete or asphalt or non-native scrub vegetation (e.g., haole koa [*Leucaena leucocephala*] and kiawe). Wetland areas within Pearl Harbor include mudflats, shallow ponds, small streams, pickleweed beds, cattails beds, and watercress beds. The non-developed portion of this shoreline supports estuaries with emergent vegetation and is targeted by both Navy and State of Hawaii natural resource staff for restoration activities (e.g., removal of invasive mangrove forests).

Much of the lowland vegetation (consisting of native, invasive, and planted species) within the training study area has been previously disturbed by human activities and includes areas frequented by the public, such as beach parks. Certain coastline and dune areas are less disturbed and provide habitat for largely native communities of strand vegetation.

Inland portions of the training study area within the Kahuku Training Area is mostly devoid of vegetation surrounded by grassy fields, and characterized by steep basalt cliffs. The proposed Oahu North training study area east of Kaena Point and west of Dillingham is primarily a mixture of lowland wet and wet cliff ecosystems that receive greater than 75 inches annual precipitation. The lowland wet ecosystem is generally found below 3,300 feet elevation and includes a variety of wet grasslands, shrublands, and forests. The wet cliff ecosystem is generally composed of shrublands on near-vertical slopes in areas, or in otherwise wet substrate conditions (77 Federal Register 57648). The training study area in the Lualualei Annex consists primarily of mowed areas of the non-native introduced buffelgrass (*Cenchrus ciliaris*), with smaller areas of kiawe-buffelgrass in the northwest and southern corners. The eastern portion is dominated by haole koa /kiawe scrub (U.S. Department of the Navy, 2011c).

Island of Hawaii

The training study area for the Island of Hawaii includes two stretches of coast along the western coast of the island. These locations along the Kona and Kohala coasts are usually lava flow flats, bluffs, or cliff faces, with primarily basaltic sediments. There are few beaches along this stretch of coast and many of these have been altered for resort and residential development, with severe losses of native plant species attributed to invasive plant invasions and ungulate pressure (Warshauer et al., 2009).

3.3.2.1.2 Terrestrial Wildlife

The Hawaiian Islands lie within the West Pacific Flyway, where the shoreline, estuarine, and open ocean environments support a variety of seabird species (U.S. Fish and Wildlife Service, 2005). Recent research estimates that 15 million seabirds inhabit the Hawaiian Archipelago; 22 species of seabirds regularly nest in the Hawaiian Islands, and many more pass through during migration to and from their breeding grounds elsewhere in the Pacific (Newton, 2010; U.S. Department of the Navy, 2015b). Because of the long isolation of the Hawaiian Islands before human contact, Hawaiian land birds exhibited a wide range of diverse species, numbering over 100 native land bird species. Subsequent to introductions of non-native birds and other animals, along with introduced pathogens, 64 native land bird species are now extinct (Flaspohler et al., 2010; Sax et al., 2002). Introduced diseases, ungulates, and predators, along with habitat loss are factors primarily responsible for the decline of avian and other wildlife diversity (U.S. Fish and Wildlife Service, 2005). The following subsections summarize the wildlife

resources within different regions of the training study area where land-based training activities would occur.

Kauai

Introduced bird species are the most abundant bird species at Barking Sands. This is typical of lowlands in the Hawaiian Islands, where most of the natural habitats have been altered by development and agriculture. Non-native birds commonly observed throughout PMRF include spotted dove (*Streptopelia chinensis*), zebra dove (*Geopelia striata*), northern mockingbird (*Mimus polyglottos*), northern cardinal (*Cardinalis cardinalis*), red-crested cardinal (*Paroaria coronata*), house finch (*Carpodacus mexicanus*), and Japanese white-eye (*Zosterops japonicus*).

A total of 14 MBTA-listed waterbirds, seabirds, shorebirds, and waterfowl have been recorded at PMRF, including northern shoveler (*Anas clypeata*), green-winged teal (*Anas crecca*), Pacific golden plover (*Pluvialis fulva*), black-bellied plover (*Pluvialis squatarola*), ruddy turnstone (*Arenaria interpres*), sanderling (*Calidris alba*), wandering tattler (*Tringa incana*), brown booby (*Sula leucogaster*), and black-footed albatross (*Phoebastria nigripes*). Western cattle egret (*Bubulcus ibis*), an introduced invasive species, are also residents. The drainage ditches at PMRF provide foraging and loafing habitat for native waterbird species, including the black-crowned night heron (*Nycticorax nycticorax*) and four endangered waterbirds (see Section 3.3.2.3.3, Special-Status Birds). In addition, Laysan albatross (*Phoebastria immutabili*s) and wedge-tailed shearwater (*Puffinus pacificus*) are known to nest at PMRF (Figure 3-1) (U.S. Department of the Navy, 2010a).

Common non-native mammal species at PMRF are feral cats (*Felis catus*), rats (*Rattus* spp.) and the common house mouse (*Mus muscalus*). Amphibian and reptile species at PMRF include the following non-native introduced species: marine toad (*Bufo marinus*), house gecko (*Hemidactylus frenatus*), mourning gecko (*Lepidodactylus lugubrus*), and snake-eyed skink (*Cryptoblepharus poecilopleurus*) (U.S. Department of the Navy, 2010a).

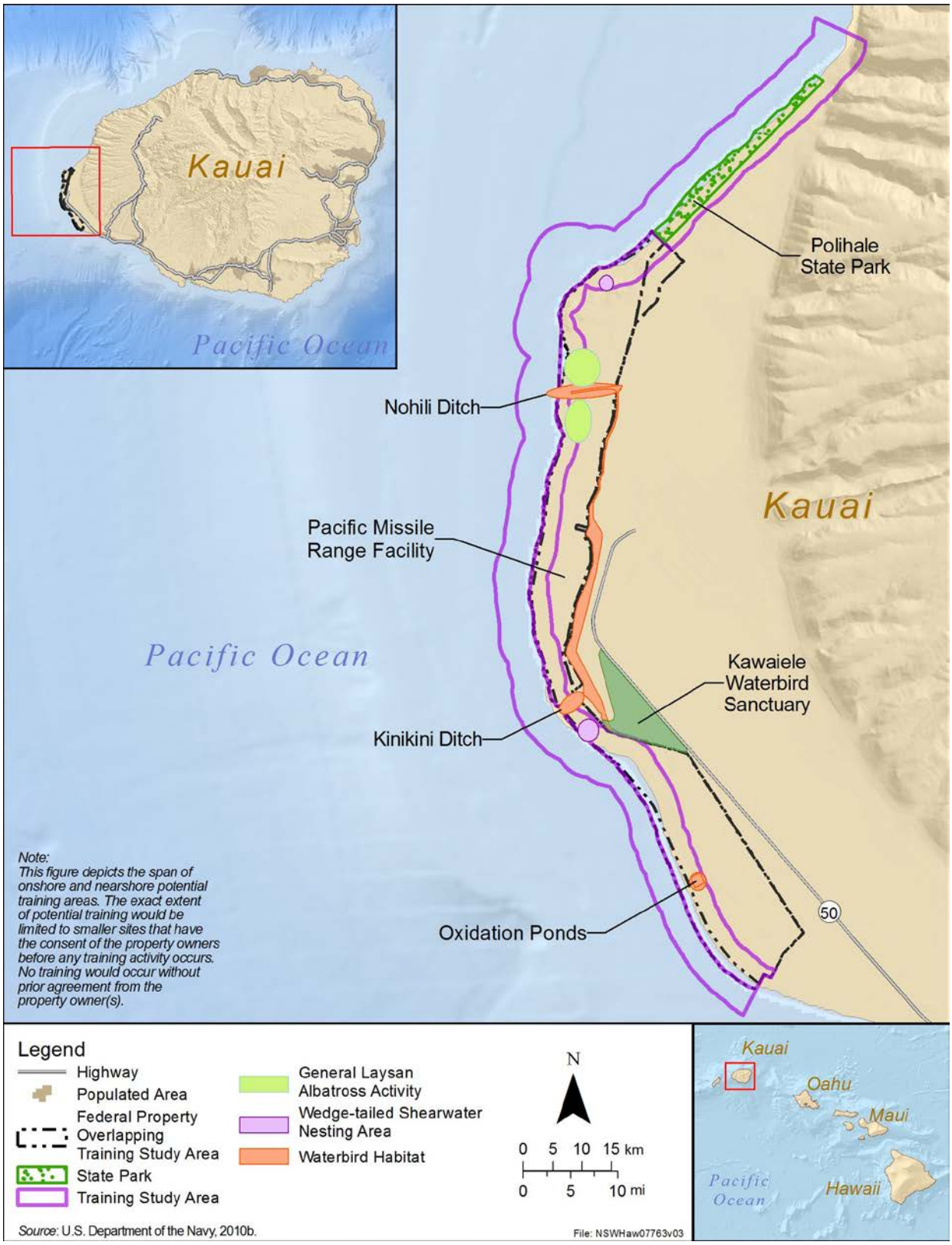

Figure 3-1: Occurrence of Waterbird Habitat, Wedge-tailed Shearwater Nesting, and Laysan Albatross Areas at PMRF and the Training Study Area, Kauai

Oahu

The South Oahu Region of the training study area on Oahu extends on either side of Pearl Harbor on the southern coastline, from Barbers Point to east of Sand Island, as well as Koolina Harbor, and has developed coastlines (Figure 1-4). Within the JBPHH Region of the training study area, wildlife habitats are varied and support a relatively wider diversity of bird species relative to other locations within the training study area. Some of the most valuable waterbird habitat can be found at the Waiawa Unit of Pearl Harbor National Wildlife Refuge. A total of 26 resident and migrant bird species are known to occur within Pearl Harbor, including four federally listed endangered endemic waterbirds (see Section 3.3.2.3.3, Special-Status Birds). In addition, Pearl Harbor supports a diverse number of migrant species, such as the Pacific golden-plover, ruddy turnstone, wandering tattler, sanderling, northern shoveler, mallard (*Anas platyrhinos*), lesser scaup (*Aythya affinis*), northern pintail (*Anas acuta*), green-winged teal, and American wigeon (*Anas americana*). The introduced western cattle egret is also a year-round resident within Pearl Harbor. The majority of the birds recorded during surveys within Pearl Harbor were introduced species, including spotted dove, gray francolin (*Francolinus pondicerianus*), and zebra dove (U.S. Department of the Navy, 2011c).

The Windward Oahu Region of the training study area on Oahu includes Kahana Bay, a stretch of coast running north from He'eia Pier in Kaneohe Bay, a stretch of coastline along Marine Corps Base Hawaii, Kaneohe Bay, the coastline along Kailua Bay, and the coastline along Waimanalo Bay from Bellows Air Force Station to Makapuu Point (see Figure 1-5). Native waterbirds and seabirds along this stretch of coast include great frigatebird (*Fregata minor*), wandering tattler, sanderling, ruddy turnstone, Pacific golden plover, black-crowned night heron, brown noddy (*Anous stolidus*), black noddy (*Anous minutus*), sooty tern (*Onychoprion fuscatus*), brown booby, masked booby (*Sula dactylatra*), Bulwer's petrel (*Bulweria bulwerii*), Laysan albatross, grey-backed tern (*Onychoprion lunatus*), and red-tailed tropicbird (*Phaethon rubricauda*) (Hawaii Department of Land and Natural Resources, 2015b).

MCBH, Kaneohe Bay supports a large colony of wedge-tailed shearwaters (*Puffinus pacificus chlororhunchus*) along the Fort Hase shoreline of Kailua Bay and east of the Nuupia Ponds Wildlife Management Area (WMA) as well as a large red-footed booby (*Sula sula*) colony at Ulupau Crater in the Ulupau WMA (Figure 3-2). The red-footed booby colony is one of only two colonies in the Main Hawaiian Islands. Both species are known to move between colonies on MCBH, Kaneohe Bay and the Moku Manu State Wildlife Sanctuary, a 17-acre islet approximately 0.5 mile northeast of Ululpau Head/MCBH, Kaneohe Bay (Figure 3-2). This State Wildlife Sanctuary supports nesting wedge-tailed shearwater, black noddy, brown noddy, Bulwer's petrel, red-tailed tropicbird, sooty tern, great frigatebird, Christmas shearwater, grey-backed tern, masked booby, brown booby, and red-footed booby (Hawaii Department of Land and Natural Resources, 2015b; U.S. Marine Corps, 2017).

Introduced spotted dove, zebra dove, northern mockingbird, northern cardinal, red-crested cardinal, house finch, Japanese white-eye, common myna (*Acridotheres tristis*), and European house sparrow (*Passer domesticus*) are common throughout Oahu. Non-native mammals include small Indian mongoose (*Herpestes auropunctatus*), feral cats, rats, and house mice (Hawaii Department of Land and Natural Resources, 2015b).

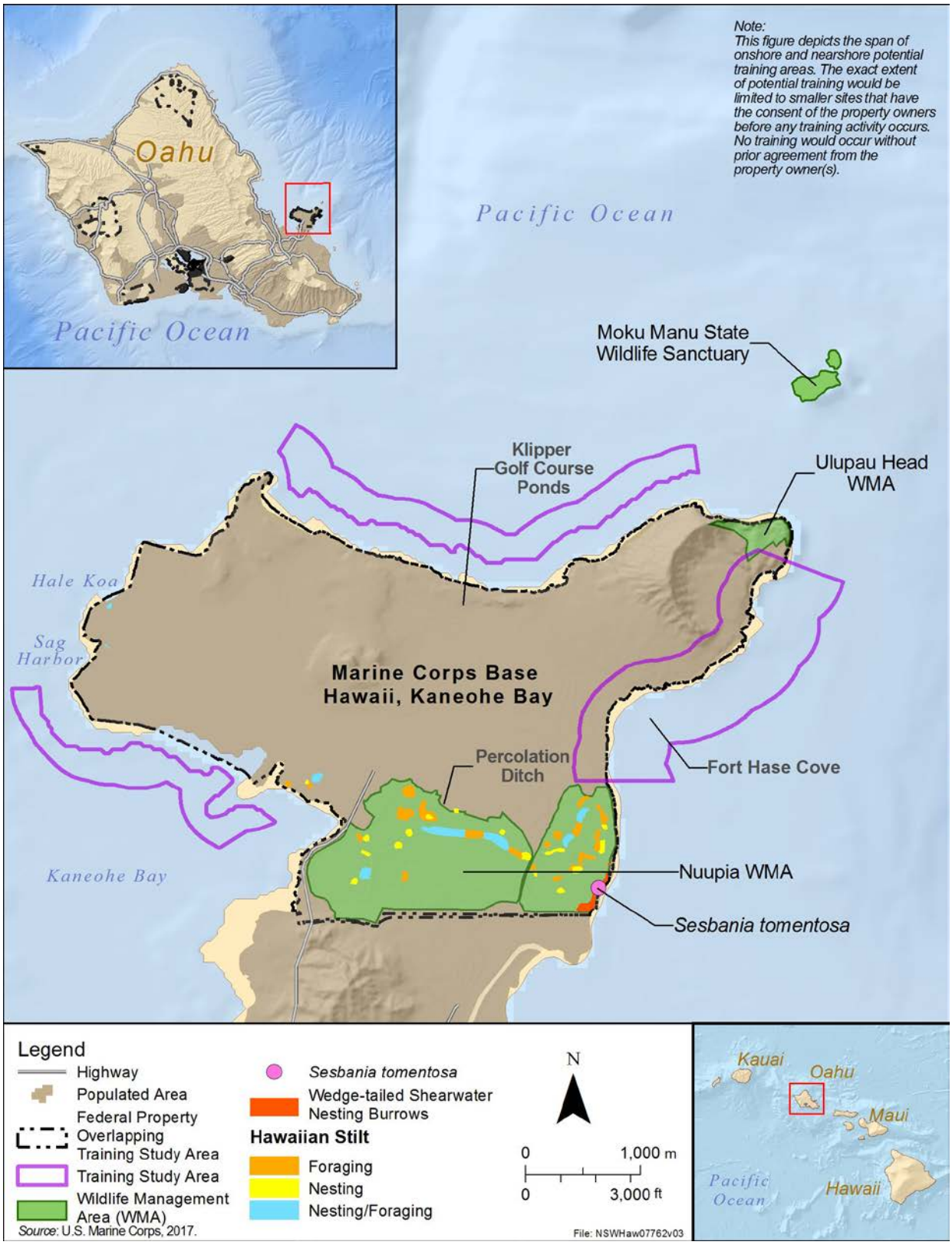

Figure 3-2: Occurrence of ESA-listed Plant and Wildlife Species and WMAs on Marine Corps Base Hawaii Kaneohe Bay

Island of Hawaii

The training study area for the Island of Hawaii includes two stretches of coast along the western shore of the island. These coastal areas are characterized by lava cliffs with intermittent stretches of beach. Non-native introduced bird species expected along the Kona coast within the training study area include spotted dove, zebra dove, northern mockingbird, northern cardinal, red-crested cardinal, house finch, Japanese white-eye, common myna, and European house sparrow. Non-native mammals include small Indian mongoose (*Herpestes auropunctatus*), feral cats, rats, and house mice. There are a few small coastal wetlands that support a number of ESA-listed waterbird species (see Section 3.3.2.3.3, Special-Status Birds). Seabirds and shorebirds along the coast are expected to be similar to those found on other Hawaiian islands.

3.3.2.2 Marine Biological Resources

Marine biological resources within the training study area are found in a variety of benthic habitats, within the water column, and in intertidal zones of beaches and rocky shores within approximately 12 nautical miles from the shoreline. Marine biological resources within these shallow water habitats and deeper water areas are summarized below.

3.3.2.2.1 Marine Vegetation

Marine vegetation includes plants such as mangroves, algae, and various seagrasses that occur in marine or estuarine waters. Mangroves in Hawaii are considered invasive with some areas targeted for removal and restoration (U.S. Department of the Navy, 2011c). Invasive mangrove concentrations have been identified around Molokai, Oahu, and Kauai, with the most extensive mangroves occurring along the south shore of Molokai and along the northern shore of Pearl Harbor with spotty locations in Kaneohe Bay (Costa & Kendall, 2016).

In shallow water reef communities, crustose coralline algae and macroalgae are the primary components of marine vegetation communities (Costa & Kendall, 2016). Dense native seagrass beds are found growing on soft sediment offshore from beach areas and freshwater inlets. Invasive algae species (e.g., gorilla seaweed [*Gracilaria salicornia*]) are established in some shoreline areas (Costa & Kendall, 2016). In general, coastal waters that have suitable substrates and relatively lower wave intensity, such as bays, support higher concentrations of marine vegetation.

3.3.2.2.2 Marine Invertebrates

Marine invertebrates in the training study area occur in a variety of ocean habitats. For purposes of this EA, marine invertebrates are described in two broad categories—corals and benthic invertebrates. Information on marine invertebrates within coastal waters of islands within the training study area are compiled from the University of Hawaii at Manoa's Coral Reef Assessment and Monitoring Program (University of Hawaii at Manoa, 2015a) and Fisheries Ecology Research Lab (University of Hawaii at Manoa, 2015b), and The Nature Conservancy's Hawaii Marine Program (The Nature Conservancy, 2015), and summarized by Bauer et al. (2016). Major taxonomic groups for marine invertebrates in nearshore waters of Hawaii include sponges (Phyluim Porifera); foraminifera, radiolarians, and cillates (Phylum Foraminifera); corals, hydroids, and jellyfish (Phylum Cnidaria); segmented worms (Phylum Annelida); bryzoans (Phylum Bryozoa); cephalopods, bivalves, sea snails, chitons (Phylum Mollusca); shrimp, crab, lobster, barnacles, copepods (Phylum Arthropoda-Crustacea); and sea stars, sea urchins, and sea cucumbers (Phylum Echinodermata) (Bauer et al., 2016).

Corals are invertebrates that are related to anemones, jellyfish, and hydras. They are made of invertebrate polyps and can generally be categorized as either hard or soft. Hard corals have calcium carbonate skeletons, grow in colonies, and are reef-building animals that live in symbiosis with phytoplankton called zooxanthellae. Soft corals are flexible, have calcareous particles in their body walls for structural support, can be found in both tropical and cold ocean waters, do not grow in colonies or build reefs, and do not always contain zooxanthellae. Animals that live on the sea floor are called benthos. Most of these animals lack a backbone and are called invertebrates. Typical benthic invertebrates include sea anemones, sponges, corals, sea stars, sea urchins, worms, bivalves, crabs, and many more. Spalding et al. (2007) places the Hawaiian Archipelago within the Hawaii ecoregion, Hawaiian province, and the Eastern Indo-pacific biogeographic realm. Coral diversity in the Hawaiian Islands is comparable to that found in the Western Atlantic and Caribbean, both of which have less than 1/10th the number of coral species found in Guam and the Commonwealth of the Northern Mariana Islands. However, diversity is only one measure of the biological importance of a coral reef, and the Hawaiian reefs are significant from an ecological, commercial, recreational, and cultural perspective.

The western coast of Kauai exhibits low hard coral cover, with the highest amounts reported along the northern coast near Hanalei Bay (Pacific Islands Ocean Observing System, 2018). While no explicit recent quantitative surveys have been carried out for in-coastal waters of PMRF, repetitive quantitative surveys were conducted in this area on an annual basis from 1994 through 1997 as part of the required compliance for the National Pollutant Discharge Elimination System permit for the Zone of Mixing of the Kekaha Sugar Mill Discharges (U.S. Department of the Navy, 2010b). In addition, Dollar and Brock (2007) conducted qualitative surveys off Barking Sands to evaluate marine communities. The most-abundant species (*Porites lobata*, *Pocillopora meandrina*, and *Montipora patula*, and coral) cover less than 2 percent of the bottom within the southernmost sector of the PMRF. Other less-abundant species in the area include *Porites compressa*, *Montipora capitata*, and *Pavona varians* (U.S. Department of the Navy, 2010b).

Around Oahu, high amounts of coral cover are reported by Bauer et al. (2016) at Kaneohe Bay and other areas with low turbidity (e.g., Hanauma Bay). Relatively high amounts of coralline algae are found in Kaneohe Bay and along the windward coast, as well as south-facing shores near Makapuu. Waters off of the Kaneohe Bay Range Training Facility (Ulupau Crater), off shore of Fossil Beach, are also known to support important coral reef areas, in terms of diversity and structure, for a wide variety of marine wildlife. The total number of stony corals and diversity of species within Pearl Harbor appears to have increased since 1974 (U.S. Department of the Navy, 2011c). Unfortunately, the dramatic increase in gorilla seaweed (*Gracilaria salicornia*) in the coral colonies is of great concern in and around Oahu. This algae has devastated corals in many areas of Hawaii (including areas within Pearl Harbor and Kaneohe Bay), and its presence in Hanauma Bay adversely impacts stony coral growth and recruitment, and the general macrobenthic invertebrate diversity and fish stocks (Smith et al., 2004). In addition, this invasive red alga cans lead to changes in physical parameters on the reef, including reduced irradiance, increased sedimentation, and marked variation in diurnal dissolved oxygen and pH cycles (Martinez et al., 2012).

Along Hawaii's Kona and Kohala coasts, Bauer et al. (2016) reported relatively high amounts of coral cover. On the Island of Hawaii, the majority of sites surveyed were located on the western leeward side of the island. Bauer et al. (2016) reported coral species richness (lower numbers of differing species) was relatively low along much of the western portion of the island, with moderately higher values occurring in bays. Representative species include non-gorgonian Alcyonacea (suborders Alcyoniina and Stolonifera) and gorgonian Alcyonacea (suborders Calcaxonia, Halaxonia, Scleraxonia).

3.3.2.2.3 Marine Fishes

Fishes are vital components of the marine ecosystem and have great ecological and economic aspects. To protect this resource, NMFS works with the regional fishery management councils to identify the essential habitat for every life stage of each federally managed species, using the best available scientific information. Information on ESA-listed fish species that occur in the training study area is presented below in Section 3.3.2.3 (Special-Status Species).

Coral reef fish communities in the Hawaiian Islands show a consistent pattern of dominant species groups throughout the year, including wrasses (Labridae), triggerfishes (Balistidae), and butterflyfishes (Chaetodontidae) (Hoover, 2008). Several of the reef-associated fish species (bigeye scad [*Selar crumenophthalmus*], mackerel scad [*Decapterus macarellus*], goatfishes [Mullidae], and squirrelfishes [Holocentridae]) in the training study area also show seasonal fluctuations, which are usually related to movements of juveniles into new areas or spawning activity (Pacific Islands Fisheries Science Center, 2014; Rodgers et al., 2015). Although species composition may change, the dominant fish groups are similar among the reefs throughout the training study areas.

The WPRFMC has authority over the managed fisheries based in, and surrounding, the State of Hawaii. The 2009 FEP for the Hawaii Archipelago was developed by the WPRFMC as a Fisheries Management Plan and is consistent with the MSA and the national standards for fishery conservation and management (Western Pacific Regional Fishery Management Council, 2016a). The FEP does not establish any new fishery management regulations, but consolidates existing fishery regulations for demersal species. Specifically, this FEP identifies as management unit species those species known to be present in waters around the Hawaiian islands, including bottomfishes and seamount groundfishes, crustaceans, precious corals, and coral reef ecosystems. Although pelagic fishery resources play an important role in the biological as well as the socioeconomic environment of these islands, they are managed separately through the Pacific Pelagic FEP (Western Pacific Regional Fishery Management Council, 2016b). EFH includes all types of aquatic habitat, including wetlands, coral reefs, seagrasses, and rivers where fish spawn, breed, feed, or grow to maturity.

3.3.2.2.4 Marine Reptiles

The USFWS and NMFS share federal jurisdiction for sea turtles, with the USFWS having lead responsibility on the nesting beaches and NMFS, the marine environment. As all sea turtle species are listed under the ESA, they are discussed in Section 3.3.2.3 (Special-Status Species).

3.3.2.2.5 Marine Mammals

Pursuant to the ESA and MMPA, NMFS has jurisdiction and management authority for marine mammals (whales, dolphins, and seals) in Hawaiian waters. NMFS also has jurisdiction over the Hawaiian monk seal in all environments, including on land. All marine mammals in the United States are protected under the MMPA, and some species receive additional protection under the ESA. The MMPA defines a marine mammal "stock" as "a group of marine mammals of the same species or smaller taxon in a common spatial arrangement that interbreed when mature." For management purposes under the MMPA, a stock is considered an isolated population or group of individuals within a whole species that is found in the same area. However, generally due to a lack of sufficient information, management stocks defined by NMFS may include groups of multiple species, such as with *Mesoplodon* beaked whales (Carretta et al., 2014). Although all marine mammals are protected under the MMPA, only a few species that occur in the training study area are listed under the ESA. Information on ESA-listed marine mammals is presented below in Section 3.3.2.3 (Special-Status Species). Only those ESA-listed species

that have the potential to be impacted by training and testing activities are discussed further. Information on marine mammals not protected under the ESA that are commonly observed throughout the training study areas is presented below.

Marine mammals are a diverse group of approximately 130 species. Most live predominantly in the marine habitat, although some species (e.g., monk seals) spend time in terrestrial habitats (Jefferson, 2009; Rice, 1998). Marine mammal species with the potential to occur in the training study area include humpback whales (*Megaptera novaeangliae*), short-finned pilot whales (*Globicephala macrorhynchus*), bottlenose dolphins (*Tursiops truncatus gilli*), and spinner dolphins (*Stenella longirostris*). The humpback whale is the most common baleen species found in Hawaiian waters, although rare sightings of fin, minke, Bryde's, blue, and North Pacific right whales are possible (Hawaii Department of Land and Natural Resources, 2017). As many as 10,000 humpbacks migrate to Hawaiian waters every year to mate, give birth, and nurse their calves. The mating and calving season runs from November through May, with peak occurrences from January through March (Richie et al., 2016). The Hawaii Distinct Population Segment for humpback whales was recently delisted by NMFS (National Marine Fisheries Service, 2016a); however, this species is still protected under the MMPA (as are all marine mammals).

3.3.2.3 Special-Status Species

A total of 34 ESA-listed species are potentially present within the training study area: 5 terrestrial plants, 1 terrestrial mammal, 9 birds, 8 insects, 2 marine fish, 3 sea turtles, and 6 marine mammals (Table 3-6). A total of 36 species are listed by the State of Hawaii: the 34 that are federally listed in addition to 2 species of birds that are not federally listed under the ESA. The training study area also includes portions of federally designated critical habitat for nine terrestrial plants and two marine mammals. In older critical habitat listings, the USFWS considered primary constituent elements (PCEs) to determine which areas to designate as critical habitat. PCEs are those physical and biological features that are essential to the conservation of the species and that may require special management considerations or protection. Although the term PCE is no longer used by the USFWS (81 Federal Register 7414), as it is used in the older critical habitat designations in Federal Register notices, the term has been retained in this document for consistency, when appropriate, to aid in review.

The following discussion addresses the known or potential occurrence of each special-status species and associated designated or proposed critical habitat for ESA-listed species within the training study area for each island, not the occurrence across the entire island or all islands in the Hawaiian archipelago.

Table 3-6: Threatened and Endangered Species Known to Occur or Potentially Occurring in the Training Study Area and Presence of Critical Habitat within Training Study Area

Common Name (Scientific Name)	Federal Status	State Status	Occurrence within Training Study Area	CH Present within Training Study Area?
Terrestrial Plants				
Lau ehu (*Panicum niihauense*)[1]	E, CH	E	Kauai: PMRF, Polihale State Park	Yes
Ohai (*Sesbania tomentosa*)[2]	E, CH	E	Kauai: Polihale State Park	Yes
Ko oloa ula (*Abutilon menziesii*)[3]	E	E	Oahu: Lualualei Annex	NA
Puukaa (*Cyperus trachysanthos*)[4]	E	E	Oahu: Lualualei Annex	NA
Ihi ihi (*Marsilea villosa*)[8]	E, CH	E	Oahu: Lualualei Annex	No
Terrestrial Mammals				
Hawaiian hoary bat (*Lasiurus cinereus semotus*)[9]	E	E	Oahu, Kauai, Island of Hawaii: all locations	NA
Birds				
Band-rumped storm petrel (*Oceanodroma castro*) Hawaii DPS[10]	E	E	Coastal waters of Kauai and Island of Hawaii	NA
Hawaiian common gallinule (*Gallinula galeata sandvicensis*)[14]	E	E	Kauai: PMRF Oahu: Pearl Harbor, MCBH Kaneohe Bay	NA
Hawaiian coot (*Fulica alai*)[11]	E	E	Kauai: PMRF Oahu: Pearl Harbor, MCBH Kaneohe Bay	NA
Hawaiian duck (*Anas wyvilliana*)[12]	E	E	Kauai: PMRF Oahu: Pearl Harbor, MCBH Kaneohe Bay	NA
Hawaiian goose (*Branta sandvicensis*)[13]	E	E	Kauai: PMRF, Polihale State Park Island of Hawaii: all locations	NA
Hawaiian hawk (*Buteo solitarius*)[5, 6]	E	E	Island of Hawaii: southern TSA	NA
Hawaiian petrel (*Pterodroma phaeopygia sandwichensis*)[15]	E	E	Kauai: PMRF, Polihale State Park	NA
Hawaiian stilt (*Himantopus mexicanus knudseni*)[16]	E	E	Kauai: PMRF Oahu: Pearl Harbor, MCBH Kaneohe Bay, Maunaloa Bay	NA
Newell's Townsend's shearwater (*Puffinus auricularis newelli*)[17]	T	T	Kauai: PMRF, Polihale State Park	NA
Short-eared owl (*Asio flammeus sandwichensis*)[18]	NL	E (Oahu)	Oahu: all locations	NA
White tern (*Gygis alba*)[18]	NL	T	Oahu: Pearl Harbor, MBH Kaneohe Bay, shoreline between Pearl Harbor and Diamond Head	NA

Table 3-6: Threatened and Endangered Species Known to Occur or Potentially Occurring in the Training Study Area and Presence of Critical Habitat within Training Study Area (continued)

Common Name (Scientific Name)	Federal Status	State Status	Occurrence within Training Study Area	CH Present within Training Study Area?
Insects				
Yellow-faced bees				
Hylaeus anthracinus[19]	E	E	Oahu: coastal locations Island of Hawaii: coastal locations	NA
Hylaeus assimulans[20]			None	
Hylaeus facilis[21]			None	
Hylaeus hilaris[22]			None	
Hylaeus kuakea[23]			None	
Hylaeus longiceps[19]			Oahu: coastal locations	
Hylaeus mana[23]			None	
Orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*)[24]	E	E	Oahu: Pearl Harbor	NA
Marine Fishes				
Oceanic whitetip shark (*Carcharhinus longimanus*)[25]	T	T	Waters around all islands	NA
Giant manta ray (*Manta birostris*)[26]	T	T	Waters around all islands	NA
Sea Turtles				
Green turtle (*Chelonia mydas*) Central North Pacific DPS[27]	T	T	Nesting and basking: all islands. In-water: all islands.	NA
Hawksbill turtle (*Eretmochelys imbricata*)[28]	E	E		NA
Olive ridley turtle (*Lepidochelys olivacea*)[29]	E	E	Nesting: Oahu (MCBH Kaneohe Bay). In-water: all islands.	NA
Marine Mammals				
False Killer Whale (*Pseudorca crassidens*) Main Hawaiian Islands Insular DPS[30]	ESA: E, CH MMPA: depleted stock	E	Waters around all islands.	Yes
Blue whale (*Balaenoptera musculus*)[31]	ESA: E MMPA: depleted stock	E	Waters around all islands.	NA
Fin whale (*Balaenoptera physalus*)[32]	ESA: E MMPA: depleted stock	E	Waters around all islands.	NA
Sei whale (*Balaenoptera borealis*)[33]	ESA: E MMPA: depleted stock	E	Waters around all islands.	NA
Sperm whale (*Physeter macrocephalus*)[34]	ESA: E MMPA: depleted stock	E	Waters around all islands.	NA

Table 3-6: Threatened and Endangered Species Known to Occur or Potentially Occurring in the Training Study Area and Presence of Critical Habitat within Training Study Area (continued)

Common Name (Scientific Name)	Federal Status	State Status	Occurrence within Training Study Area	CH Present within Training Study Area?
Marine Mammals (continued)				
Humpback whale (*Megaptera novaeangliae*) Hawaii DPS[35]	ESA: NL MMPA: strategic stock	NL	Waters around all islands.	NA
Hawaiian monk seal (*Neomonachus schauinslandi*)[36]	ESA: E, CH MMPA: depleted stock	E	Haulouts and pupping grounds: all islands. In-water: all islands.	Yes

Notes: CH = critical habitat, DPS = Distinct Population Segment, E = endangered, NA = not applicable: critical habitat not designated for the species or critical habitat does not fall within the training study area, MCBH = Marine Corps Base Hawaii, MMPA = Marine Mammal Protection Act, NL = not listed, PCH = proposed critical habitat, PMRF = Pacific Missile Range Facility, T = threatened.
Sources: [1]61 Federal Register 53108; 68 Federal Register 9116; U.S. Fish and Wildlife Service (2017c). [2]68 Federal Register 9116; U.S. Fish and Wildlife Service (2015d). [3]U.S. Fish and Wildlife Service (2011e). [4]U.S. Fish and Wildlife Service (2013). [5]U.S. Fish and Wildlife Service (1984). [6]73 Federal Register 45680. [8]U.S. Fish and Wildlife Service (2011d); 77 Federal Register 57648. [9]U.S. Fish and Wildlife Service (2011c). [10]81 Federal Register 67786. [11]U.S. Fish and Wildlife Service (2011b, 2015c). [12]U.S. Fish and Wildlife Service, (2011b, 2015a). [13]U.S. Fish and Wildlife Service (2004, 2011a). [14]U.S. Fish and Wildlife Service (2011b, 2015b). [15]U.S. Fish and Wildlife Service (2017b). [16]U.S. Fish and Wildlife Service (2010, 2011b). [17]U.S. Fish and Wildlife Service (2017a). [18]Pyle & Pyle (2017) [19]81 Federal Register 67786; Schonberg et al. (2009a). [20]81 Federal Register 67786; Schonberg et al. (2009b). [21]81 Federal Register 67786; Schonberg et al. (2009e). [22]81 Federal Register 67786; Schonberg et al. (2009d). [23]81 Federal Register 67786; Schonberg et al. (2009c). [24]81 Federal Register 67786; Mazzacano (2008); U.S. Department of the Navy (2011c). [25]83 Federal Register 4153. [26]83 Federal Register 2916. [27]81 Federal Register 20058. [28]National Marine Fisheries Service (2013). [29]National Marine Fisheries Service and U.S. Fish and Wildlife Service (2014). [30]77 Federal Register 70915; 82 Federal Register 51186; 83 Federal Register 35062. [31]National Marine Fisheries Service (2016c). [32]National Marine Fisheries Service (2016c). [33]National Marine Fisheries Service (2016c). [34]National Marine Fisheries Service (2016c). [35]81 Federal Register 62260. [36]80 Federal Register 50926; National Marine Fisheries Service (2016c).

3.3.2.3.1 Special-Status Plants

Lau ehu (*Panicum niihauense*)

Listed by the USFWS as an endangered species in 1996, *Panicum niihauense* (Hawaiian common name lau ehu), a member of the grass family (Poaceae), is a perennial bunchgrass with unbranched aerial stems. The species is found scattered in sand dunes in coastal shrubland at elevations between 0 and 337 feet. The primary threats to *P. niihauense* are destruction by off-road vehicles, competition with non-native plants, a risk of extinction from naturally occurring events (e.g., landslides or hurricanes), and reduced reproductive vigor due to the small number of individuals in the remaining population (61 Federal Register 53108).

Occurrence within the Kauai Training Study Area. At the time of listing in 1996, *P. niihauense* was only known historically from Niihau (last observed in 1949) and one population of 23 individuals at Polihale State Park on Kauai (61 Federal Register 53108). Since that time, the species population has never exceeded approximately 35 individuals at Polihale State Park, with 29–-34 individuals in 2006, 30–35

individuals in 2008, 4–11 individuals in 2014, and 6 individuals in 2015 (U.S. Fish and Wildlife Service, 2017c).

In 2003, the USFWS designated 429 acres of critical habitat for this endangered plant on Kauai, with 369 acres occurring within the Kauai training study area, including 177 acres within PMRF and 196 acres within Polihale State Park (Figure 3-3); the designated critical habitat within PMRF is unoccupied (68 Federal Register 9116). As stated above, currently the only known *P. niihauense* population is at Polihale State Park (U.S. Fish and Wildlife Service, 2017c).

Ohai (*Sesbania tomentosa*)

Listed by the USFWS as an endangered species in 1994, *Sesbania tomentosa* (Hawaiian common name ohai), a member of the pea family (Fabaceae), is typically a sprawling short-lived perennial shrub, but may also be a small tree (U.S. Fish and Wildlife Service, 1999). Within the Kauai training study area and northern Oahu training study area, *S. tomentosa* is found on sandy beaches, dunes, or pond margins at elevations between 0 and 694 feet. It commonly occurs in naupaka (*Scaevola taccada*) shrubland or mixed coastal dry shrubland and mixed coastal dry cliffs with the associated native plant species *Chamaesyce celastroides, Cuscuta sandwichiana*, *Dodonaea viscosa, Heteropogon contortus, Myoporum sandwicense, Nama sandwicensis, Scaevola sericea, Sida fallax, Sporobolus virginicus, Vitex rotundifolia,* or *Waltheria indica.* The primary threats to *S. tomentosa* are habitat degradation caused by competition with various nonnative plant species; lack of adequate pollination; seed predation by rats (*Rattus* spp.), mice, and, potentially, nonnative insects; fire; and destruction by off-road vehicles and other human disturbances (68 Federal Register 9116; 68 Federal Register 35950). Studies of *Sesbania tomentosa* individuals at Kaena Point on Oahu revealed that yellow-faced bees (*Hylaeus spp.*), themselves recently listed under the ESA as endangered (see below), are the primary pollinators of *S. tomentosa* (U.S. Fish and Wildlife Service, 2010a).

Occurrence within the Kauai Training Study Area. At the time of listing in 1994, the species occurred between Mana town and Mana Point and at Polihale State Park on Kauai. The population on State-owned land at Polihale State Park consisted of about 30 individuals growing in an area of approximately 110–540 square feet in a lithified dune area at approximately 40 feet elevation. At the time of critical habitat designation in 2003, *S. tomentosa* was known from 1 occurrence, with 11 individuals, at Polihale State Park on Kauai (68 Federal Register 9116). Since 2003 the numbers of individuals at Polihale State Park have ranged from a low of 12 in 2008 to a high of 23 in 2005. The most current surveys found 20 individuals in 2011 and 2012 (U.S. Fish and Wildlife Service, 2015a).

In 2003, critical habitat was designated for *S. tomentosa* in one unit totaling 110 acres on Kauai that is within the training study area (68 Federal Register 9116) (Figure 3-3). The currently known PCEs of critical habitat for *S. tomentosa* on Kauai include, but are not limited to, the habitat components provided by:

- sandy beaches, dunes, or pond margins in coastal dry shrublands or mixed coastal dry cliffs, and contain one or more of the following associated native plant species: *Chamaesyce celastroides, Cuscuta sandwichiana, Dodonaea viscosa, Heteropogon contortus, Myoporum sandwicense, Nama sandwicensis, Scaevola sericea, Sida fallax, Sporobolus virginicus, Vitex rotundifolia*, or *Waltheria indica*
- elevations between 0 and 427 feet (68 Federal Register 9116)

Occurrence within the Oahu Training Study Area. In 2008, two self-established plants were discovered at Marine Corps Base Hawaii, Kaneohe Bay within the Nuupia Ponds WMA along the coastline of Fort Hase, and they have been monitored since (Figure 3-2) (U.S. Marine Corps, 2017).

Ko oloa ula (*Abutilon menziesii*)

Listed as endangered in 1986, *Abutilon menziesii* is a long-lived perennial shrub in the mallow family (Malvaceae) with coarsely toothed, silvery heart-shaped leaves. Currently, there are three populations totaling 40–60 individuals on Oahu, all within the Lualualei Annex. There are three populations totaling at least 220 individuals on Maui and two populations totaling several hundred individuals on Lanai; there are no known occurrences on Hawaii Island. Threats to the species include fire, invasive introduced plants that modify habitat, and overgrazing by feral introduced animals (e.g., deer, goats) (U.S. Fish & Wildlife Service, 2011b).

Occurrence within the Oahu Training Study Area. Three populations of *A. menziesii* occur on Lualualei Annex (Figure 3-4; *Note*: the single location depicted south of the Niulii Pond Wildlife Refuge consists of two populations). All three populations are found in sparse kiawe forest, with buffelgrass as the predominant ground cover. All individuals have been tagged and are monitored regularly (U.S. Department of the Navy, 2011c).

Puukaa (*Cyperus trachysanthos*)

Listed as endangered in 1986, *Cyperus trachysanthos* is a short-lived perennial sedge found in wet sites (ephemeral streams, seasonal wetlands, mud flats, wet clay soil, or wet cliffseeps) on coastal cliffs or talus slopes at elevations between 10 and 525 feet. Its habitat requires periodic flooding and drying for the species to emerge and reproduce. Historically it occurred on Niihau, Kauai, Oahu, Molokai, and Lanai (U.S. Fish and Wildlife Service, 1999). Currently it is known to occur only on Oahu and Kauai. *Cyperus trachysanthos* is threatened by introduced invasive plants, particularly alien grasses; fire; grazing and trampling by introduced ungulates; alteration of wetlands; and climate change (U.S. Fish & Wildlife Service, 2013).

Occurrence within the Oahu Training Study Area. Three small populations of *Cyperus trachysanthos* are found in the southern area of the Lualualei Annex (Figure 3-4) (U.S. Department of the Navy, 2011c).

Ihi ihi (*Marsilea villosa*)

Listed as endangered in 1992, *Marsilea villosa* (Hawaiian common name ihi ihi), a fern in the water clover fern family (Marsileaceae), is known from Niihau, Molokai, and Oahu. Restricted to low elevations, the species is found in areas that flood periodically, such as small depressions and flood plains with clay soils. Standing water is required for sexual reproduction, and drying is required for new plant establishment and for sporocarp maturation. Threats to the species include the encroachment of non-native vegetation, habitat degradation by off-road vehicles, fire, development, small population size, and trampling and other impacts by humans and introduced mammals (U.S. Fish & Wildlife Service, 1996).

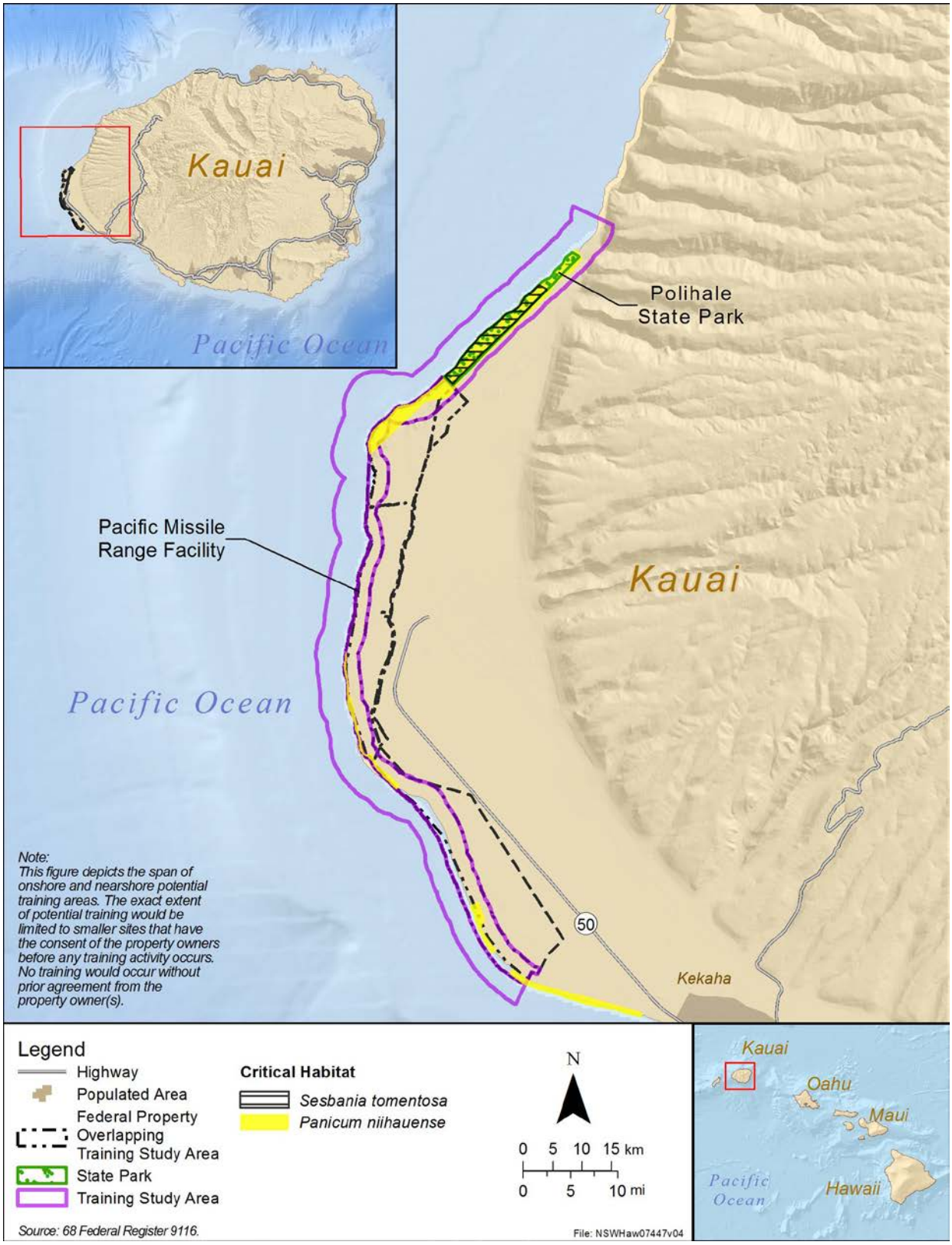

Figure 3-3: Critical Habitat for *Panicum niihauense* and *Sesbania tomentosa* within and Adjacent to the Training Study Area: Kauai

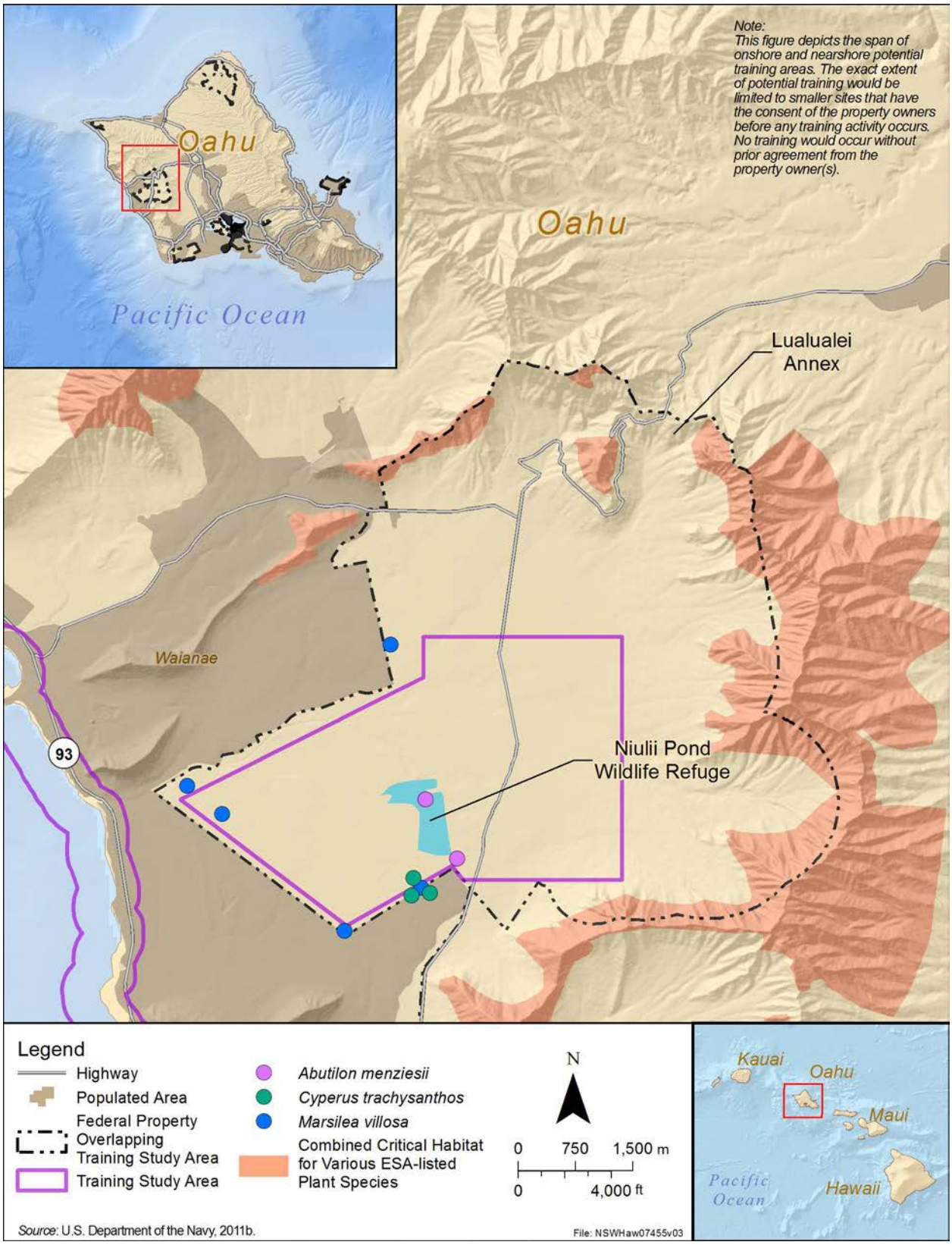

Figure 3-4: Occurrence of ESA-listed Plant Species and Critical Habitat at the Lualualei Annex, Oahu Training Study Area

At the time the USFWS designated critical habitat in 2003, this species was known from five occurrences of an unknown number of individuals on Oahu. Currently, *M. villosa* is found in two naturally occurring populations of an unknown number of individuals in seasonal wetlands of the coastal and lowland dry ecosystems at Koko Head (Ihiihilauakea Crater) and Lualualei in the Waianae and Koolau mountains ; 77 Federal Register 57648).

Occurrence within the Oahu Training Study Area. Five populations of *M. villosa* are found on the Lualualei Annex (see Figure 3-4). All populations are monitored year round (U.S. Department of the Navy, 2011c). Although critical habitat for *M. villosa* was designated within the Lualualei Annex in 2003, critical habitat was revised in 2012 and, based on the Navy's 2011 INRMP and addendum for JBPHH, the USFWS exempted the 169 acres of Navy lands within the Lualualei Annex from the final designation of critical habitat for *M. villosa* under section 4(a)(3)(B)(i) of the ESA (77 Federal Register 57648).

Although critical habitat has been designated for 21 plant species within the Lualualei Annex, no critical habitat occurs within the training study area (see Figure 3-4).

3.3.2.3.2 Special-Status Mammals

Hawaiian Hoary Bat (*Lasiurus cinereus semotus*)

Listed by the USFWS in 1970 as an endangered species, the Hawaiian hoary bat (Hawaiian common name ope ape a) is Hawaii's only native terrestrial mammal and occurs on all the major islands in the Hawaiian Archipelago, including Kauai, Oahu, Maui, Molokai, and the Island of Hawaii. Breeding populations occur on all of the main Hawaiian Islands except for Niihau and Kahoolawe (Hawaii Department of Land and Natural Resources, 2015a; U.S. Fish and Wildlife Service, 1998). The largest populations of hoary bats are believed to occur on Kauai and the Island of Hawaii. When originally listed, threats to the species included habitat loss, pesticide use, predation, alteration of prey availability due to the introduction of non-native insects, and roost disturbance. Since that time, the greatest observed mortality of bats has occurred from bats being caught on barb wire fences; however, the actual extent of this problem is unclear. In addition, collision with wind turbines has been documented as an additional threat with 46 Hawaiian hoary bat fatalities recorded at existing wind farms on Maui, Oahu, and the Island of Hawaii from 2006 to 2012 (Na Pua Makani Power Partners, 2016; U.S. Fish and Wildlife Service, 1998, 2011c). Critical habitat has not been designated for this species.

The Hawaiian hoary bat is a medium-sized bat that is insectivorous and nocturnal. On the Island of Hawaii, the habitats in which Hawaiian hoary bats forage are extremely varied and include forest gaps and clearings, forest edges, along planted windrows of trees, above forest canopies, and along roads that include undisturbed native forest, mature eucalyptus plantations having mixed understory trees and shrubs, lowland forest dominated by introduced trees, suburban and urban areas richly planted with ornamental trees, grassland/pasture, river gorges, arboretums, macadamia nut orchards, lava flows, streams and ponds, and coastal embayments. They have been documented foraging from 3 to over 483 feet above the ground or water, and have a diverse diet, feeding on a variety of native and non-native flying insects, including moths, beetles, crickets, mosquitoes, and termites. They have been observed foraging either just before or after sunset depending on the time of year, and activity patterns may also be affected by altitude (Bonaccorso et al., 2015; U.S. Fish and Wildlife Service, 1998; Whitaker & Tomich, 1983).

Mating appears to occur between September and December with birth of young (twins typically) during May or June. Mother bats likely stay with their pups until they are 6–7 weeks old. Based on studies on the Island of Hawaii, hoary bats are fairly widespread and known to migrate from lowland rainforests of

eastern Hawaii, occupied during the summer and fall breeding season, to the interior highlands (at elevations of 3,280–11,811 feet) during the winter post-lactation period (Bonaccorso et al., 2015; Gorresen et al., 2015; U.S. Fish and Wildlife Service, 1998). However, hoary bats can also range between habitats and elevations within a single night to target optimal local foraging opportunities (Gorresen et al., 2015). Little is known regarding dispersal or movements, but inter-island dispersal is possible. They are solitary roosters, although mothers and pups roost together, and utilize the foliage of both native and nonnative vegetation; they have rarely been observed roosting in lava tubes, cracks in rocks, or man-made structures (Bonaccorso et al., 2015; U.S. Fish and Wildlife Service, 1998).

Occurrence within the Kauai Training Study Area. A 2010 occupancy study for Hawaiian hoary bats revealed that bat presence at PMRF, including its satellite facilities at Makaha Ridge and Kokee, was widespread. Bats were noted to be in all regions sampled during every sampling period with high detectability levels observed between September 2010 and February 2011. Hawaiian hoary bats at PMRF utilized all areas of the facility year round with seasonal movement patterns indicating use of low elevation habitats (i.e., PMRF) most during the late summer and fall with increased use of high elevation areas (i.e., Makaha Ridge and Kokee) in winter months. In addition, "fall swarming," a behavior in preparation for mating noted in Hawaiian hoary bats on the Island of Hawaii, in which adult bats and fledging young gather, was documented at PMRF from September to December highlighting the importance of the facility to the species (Bonaccorso & Pinzari, 2011).

Occurrence within the Oahu Training Study Area. Although Hawaiian hoary bats have been documented on Oahu (Kahuku Wind Power LLC., 2010; U.S. Army Garrison Hawaii, 2017; U.S. Fish and Wildlife Service, 1998), little research on the species has been conducted on the island. Gorreson et al. (2015) noted that bats on Oahu were acoustically cryptic and were less frequently detected in windward northern areas than in leeward southern parts of their study area. Seasonal peaks in acoustic detection on Oahu were observed from March through September coinciding with the birthing and raising of young for the species.

The Oahu Army Natural Resources Program conducted acoustic monitoring for the Hawaiian hoary bat from 2010 to 2013 on all Oahu Army Training Areas and Hawaiian hoary bats were present at all training areas: Dillingham Military Reservation, Kahuku Training Area, Kawailoa Training Area, Makua Military Reservation, and Schofield Barracks Military Reservation (U.S. Army Garrison Hawaii, 2017).

To date, no surveys for the Hawaiian hoary bat have been conducted on MCBH, Kaneohe Bay property.

Surveys of only two JBPHH properties, Lualualei Annex and Red Hill Storage Facility, have been conducted to date. These surveys were completed in 2014 and included a total of five acoustic monitoring stations in habitats deemed likely to support bat occupancy. Bat presence was noted at both the Red Hill Storage Facility and at Kolekole Pass; Kolekole recorded the highest number of individual bat detection nights. Most notably, no bats were detected at any of the three stations located at the floor of Lualualei (Bonaccorso et al., 2015).

Occurrence within the Island of Hawaii Training Study Area. Visual observations and echolocation monitoring suggest that the Hawaiian hoary bat is fairly widespread around the Island of Hawaii and would be expected to occur within the training study area (Bonaccorso et al., 2015; Gorresen et al., 2015; Jacobs, 1994).

3.3.2.3.3 Special-Status Birds

The following section provides a discussion of the known occurrence of ESA- and state-listed bird species within the proposed training study area. Note that although the ESA-listed endangered Oahu elepaio (*Chasiempis ibidis*) and associated designated critical habitat occurs in the eastern portion of the Lualualei Annex (Figure 3-5), the proposed training study area and training activities would be sufficiently distant from elepaio habitat that there would be no impacts to either the species or critical habitat. Therefore, the Oahu elepaio is not discussed further.

Hawaiian Coot (*Fulica alai*)

Listed by the USFWS in 1970 as an endangered species under the Endangered Species Preservation Act (later to become the ESA in 1973), the Hawaiian coot (Hawaiian common name alae ke oke) is an endemic Hawaiian species. At the time of its listing as an endangered species, it was considered a subspecies of the American coot and was listed as *Fulica americana alai*. It has been considered a distinct species (*Fulica alai*) since 1993 (U.S. Fish and Wildlife Service, 2011b).

Hawaiian coots occur on all of the main Hawaiian Islands except Kahoolawe, with Oahu, Maui, and Kauai currently supporting 80 percent of the population. Coots move between islands in response to rainfall patterns when water levels are low and food sources become concentrated. Hawaiian coots nest year round on open fresh water and brackish ponds, taro ponds, shallow reservoirs, irrigation ditches, and in small openings of marsh vegetation. They construct floating nests with aquatic vegetation in open water or anchored to emergent vegetation. Hawaiian coots are generalist feeders, obtaining food near the surface of the water, diving, or foraging in mud or sand. They also graze on upland grassy sites such as golf courses that are adjacent to wetlands, especially during times of drought and when food is unavailable elsewhere. Food items include seeds and leaves of aquatic plants and various invertebrates, including snails, crustaceans, and aquatic or terrestrial insects, tadpoles, and small fish. Threats to Hawaiian coots include loss of wetland habitat and predation of eggs, young, and adults by introduced predators such as cats, dogs (*Canis familiaris*), mongoose, rats, fish (e.g., large-mouth bass [*Micropterus* sp.], bullfrogs (*Lithobates catesbeianus*), black-crowned night heron, and Western cattle egret (U.S. Fish and Wildlife Service, 2011b).

<u>Occurrence within the Kauai Training Study Area</u>. Hawaiian coots have been documented foraging and loafing at PMRF within the facility's ditches and at the oxidation pond (see Figure 3-1). They also occur within wetland areas immediately east of the center of the installation boundary (U.S. Department of the Navy, 2010b).

<u>Occurrence within the Oahu Training Study Area</u>. The species is common on Oahu where it is found in a variety of coastal wetlands and reservoirs throughout the island (Hawaii Department of Land and Natural Resources, 2015b; U.S. Fish and Wildlife Service, 2011b).

At Marine Corps Base Hawaii, Kaneohe Bay Hawaiian coots nest, forage, and loaf at the Percolation Ditch wetland, Klipper Golf Course ponds, and Nuupia WMA (see Figure 3-2) (U.S. Marine Corps, 2011, 2017).

At JBPHH, Hawaiian coots are regularly observed along the shoreline, estuarine, and freshwater habitats of Pearl Harbor. They are also found at the Niulii Pond Wildlife Refuge at the Lualualei Annex (Figure 3-5) (U.S. Department of the Navy, 2011c).

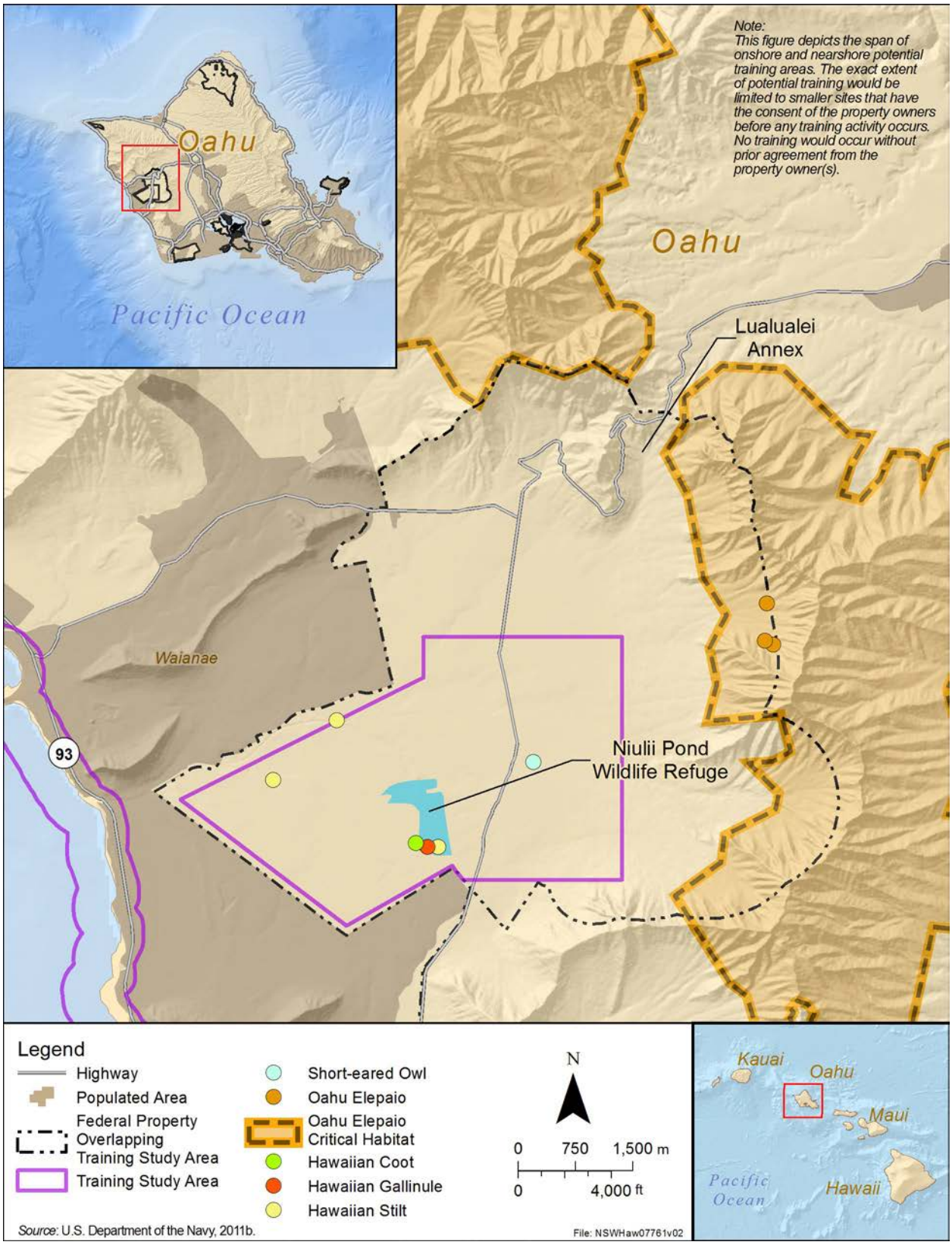

Figure 3-5: Occurrence of Special-status Bird Species at the Lualualei Annex and Training Study Area, Oahu

Occurrence within the Island of Hawaii Training Study Area. Four ponds support the majority of coots on the Island of Hawaii, with only two within the training study area: Aimakapa and Opaeula ponds (Figure 3-6). These two ponds anchor the continuous network of wetlands along the Kona Coast and together have maintained 90 percent of the Hawaiian coots for the island of Hawaii (U.S. Fish and Wildlife Service, 2011b).

Hawaiian Stilt (*Himantopus mexicanus knudseni*)

Listed by the USFWS in 1970 as an endangered species under the Endangered Species Preservation Act (later to become the ESA in 1973), the Hawaiian stilt (Hawaiian common name aeo) is an endemic Hawaiian subspecies of the North American black-necked stilt (*Himantopus mexicanus*). The endangered Hawaiian stilt is currently found in wetland habitats below 600 feet elevation on all of the main Hawaiian Islands except Kahoolawe. The species utilizes fresh, brackish, and saline coastal waters for foraging with nesting occurring on freshly exposed mudflats with some low growing vegetation. Nesting normally occurs from mid-February through late August, varying among years, probably due to water levels. Hawaiian stilts are opportunistic feeders, feeding on a wide variety of invertebrates and other aquatic organisms as available in shallow water wetlands and mudflats. Specific prey include aquatic insects, polychaete worms, small crabs and fish, and tadpoles. As with the Hawaiian coot, between-island movements for this species are thought to be associated with seasonal precipitation patterns and food availability in wetlands. Threats to Hawaiian stilts include loss of wetland habitat and predation of eggs, young, and adults by predators such as cats, dogs, mongoose, rats, Hawaiian short-eared owl (*Asio flammeus sandwichensis*), black-crowned night heron, and Western cattle egret (U.S. Fish and Wildlife Service, 2011b).

Occurrence within the Kauai Training Study Area. At PMRF, Hawaiian stilts are generally found in the same habitat as Hawaiian coots: within the facility's ditches, at the oxidation pond, and within wetland areas along the center of the installation immediately east of the installation boundary (see Figure 3-1); they have also been occasionally observed on the beach (U.S. Department of the Navy, 2010b).

Occurrence within the Oahu Training Study Area. Oahu supports the largest number of Hawaiian stilts in the Hawaiian Islands, with most of the population found on the north and windward coasts of the island with smaller numbers utilizing wetland habitats such as those associated with Pearl Harbor and along the leeward coast (U.S. Fish and Wildlife Service, 2011b).

At Marine Corps Base Hawaii, Kaneohe Bay, large numbers of Hawaiian stilts utilize wetland habitats for foraging, loafing, and nesting, particularly the Nuupia Ponds WMA (see Figure 3-2). Stilts also utilize grassy areas of the facility for loafing and foraging and can be seen on roadsides, in parks, and on lawns throughout the installation (U.S. Marine Corps, 2011).

At JBPHH, Hawaiian stilts are known to regularly loaf and forage along the shoreline, estuarine, and freshwater habitats of Pearl Harbor. They are also found at the Niulii Pond Wildlife Refuge and in drainage ditches and open grassy areas at the Lualualei Annex (see Figure 3-5) (U.S. Department of the Navy, 2011c).

Occurrence within the Island of Hawaii Training Study Area. Hawaiian stilts occupy the same Aimakapa and Opaeula ponds along the Kona Coast as Hawaiian coots (Figure 3-6). The Aimakapa and Opaeula ponds anchor the continuous network of wetlands along the Kona Coast and together have maintained 95 percent of the Hawaiian stilts for the Island of Hawaii (U.S. Fish and Wildlife Service, 2011b).

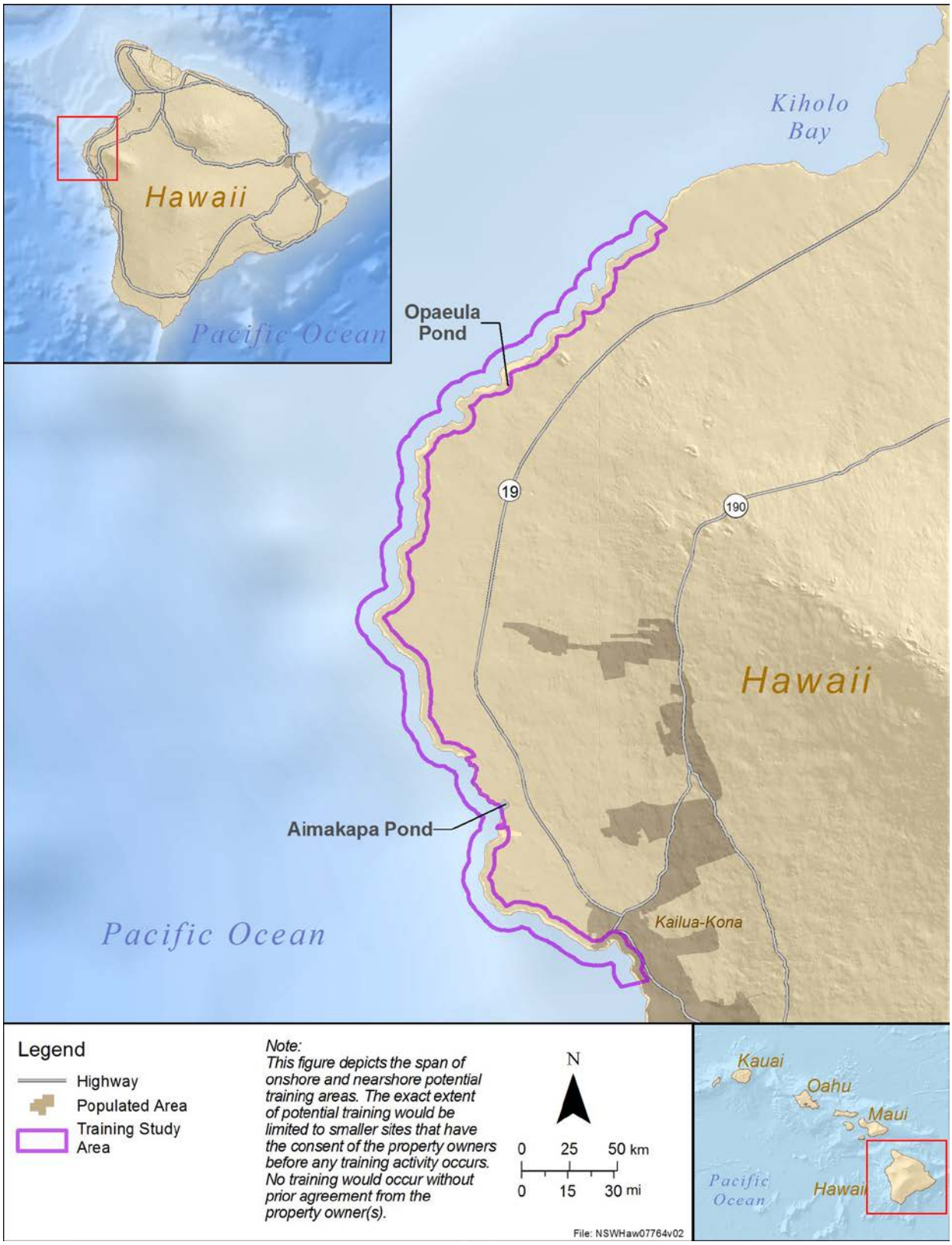

Figure 3-6: Occurrence of Ponds Supporting ESA-listed Waterbirds within the Training Study Area, Hawaii Island

Hawaiian Common Gallinule (*Gallinula galeata sandvicensis*)

The Hawaiian common moorhen (Hawaiian name alae ula) was listed by the USFWS in 1967 as an endangered species under the Endangered Species Preservation Act (later to become the ESA in 1973). At the time of listing, the species was considered a subspecies of the Old World common moorhen (*Gallinula chloropus*). In 2015, research indicated that the New World and Old World populations are separate species and the common and scientific names were changed accordingly to Hawaiian common gallinule (hereafter Hawaiian gallinule) and *Gallinula galeata sandvicensis*, respectively (U.S. Fish and Wildlife Service, 2015b).

Currently Hawaiian gallinules are found only on the islands of Kauai and Oahu with each island roughly supporting half of the total population. As with the previously discussed Hawaiian coot and Hawaiian stilt, this species uses a variety of freshwater coastal wetland habitats for foraging and nesting. Little is known of the Hawaiian gallinule's breeding biology. Most nests are inconspicuously placed within dense emergent vegetation over shallow freshwater less than 24 inches deep. The emergent vegetation is folded over into a platform nest. Breeding occurs year round, with peaks from March through August. Nesting phenology is tied to water levels and the presence of appropriately dense emergent vegetation. They are opportunistic feeders, and food items consumed include algae, seeds and other plant material, aquatic insects, and mollusks. Hawaiian gallinules are the most secretive of the native Hawaiian waterbirds, generally foraging and nesting in dense emergent vegetation. Threats to the species are similar to those for Hawaiian coots and stilts (U.S. Fish and Wildlife Service, 2011b).

Occurrence within the Kauai Training Study Area. At PMRF, the Hawaiian gallinules are known to regularly forage and loaf within the irrigation canals of the facility (e.g., Kinikini Ditch) and within wetland areas along the center of the installation immediately east of the installation boundary (see Figure 3-1) (U.S. Department of the Navy, 2010b).

Occurrence within the Oahu Training Study Area. On Oahu, the species is widely distributed with most birds found between Haleiwa and Waimanalo; small numbers occur at Pearl Harbor and the leeward coast at Lualualei Valley (Hawaii Department of Land and Natural Resources, 2015b).

At Marine Corps Base Hawaii, Kaneohe Bay, Hawaiian gallinules nest, forage, and loaf at the Percolation Ditch wetland, Klipper Golf Course ponds, and Nuupia Ponds WMA (see Figure 3-2) (U.S. Marine Corps, 2011, 2017).

At JBPHH, Hawaiian gallinules are regularly observed along the shoreline, estuarine, and freshwater habitats of Pearl Harbor. They are also found at the Niulii Pond Wildlife Refuge at the Lualualei Annex (see Figure 3-5) (U.S. Department of the Navy, 2011c).

Hawaiian Duck (*Anas wyvilliana*)

Listed by the USFWS in 1967 as an endangered species under the Endangered Species Preservation Act (later to become the ESA in 1973), the Hawaiian duck (Hawaiian common name koloa) is currently found along the shoreline, estuarine, and freshwater habitats of Niihau, Kauai, Oahu, Maui, and Hawaii, with approximately 80 percent of the Hawaiian duck population found on Kauai. The species is also known from a wide variety of artificial wetland habitats, including flooded grasslands; taro, lotus, shrimp, and fish ponds; irrigation ditches; and reservoirs. The species typically forages in shallow water (less than 5 inches deep) and are opportunistic in their diet, including snails, dragonfly larvae, earthworms, grass seeds, green algae, and seeds/leaf parts of wetland plants. Nesting occurs year round, but most activity occurs between January and May. Nests are usually on the ground near water. Threats to Hawaiian

ducks are similar to those for coots, stilts, and gallinules (U.S. Fish and Wildlife Service, 2011b). One of the biggest threats to koloa is hybridization with feral mallards. Oahu and Maui populations have high percentages of hybrid koloa (U.S. Fish and Wildlife Service, 2015a).

Occurrence within the Kauai Training Study Area. At PMRF, Hawaiian ducks can be found foraging and loafing in the ditches and oxidation pond of the facility and within wetland areas along the center of the installation immediately east of the installation boundary (see Figure 3-1) (U.S. Department of the Navy, 2010b).

Occurrence within the Oahu Training Study Area. On Oahu, populations are found in a variety of wetland habitats including, but not limited to, those of: Kawainui, Hamakua, and Heeia marshes, James Campbell NWR, and in wetland habitats in or near Punahoolapa, Haleiwa, Pearl Harbor, and Lualualei Valley.

At Marine Corps Base Hawaii, Kaneohe Bay, Hawaiian ducks nest, forage, and loaf at the Percolation Ditch wetland, Klipper Golf Course ponds, and Nuupia Ponds WMA (see Figure 3-2) (U.S. Marine Corps, 2011, 2017).

At JBPHH, Hawaiian ducks are regularly observed along the estuarine and freshwater habitats of Pearl Harbor. They are also found at the Niulii Pond Wildlife Refuge at the Lualualei Annex (see Figure 3-5) (U.S. Department of the Navy, 2011c).

Occurrence within the Island of Hawaii Training Study Area. On Hawaii Island, breeding by this species is centered in the Kohala Mountains extending to Hawi and along the Hamakua coast to Hilo. The species is noted to occur infrequently mostly in fall and winter throughout the rest of the island (Pyle & Pyle, 2017) and are expected to occur with Hawaiian coots, stilts, and gallinules within the Aimakapa and Opaeula ponds along the Kona coast (see Figure 3-6).

Hawaiian Goose (*Branta sandvicensis*)

Listed by the USFWS in 1967 as an endangered species under the Endangered Species Preservation Act (later to become the ESA in 1973), the Hawaiian goose (Hawaiian common name nene) is currently found on Kauai, Maui, Molokai, and Hawaii, with the majority of the population found on Kauai; a pair nested on Oahu in 2014 at the James Campbell National Wildlife Refuge. In April 2018, the USFWS proposed to downlist the nene from endangered to threatened as the species' status has improved such that it is not currently in danger of extinction throughout all or a significant portion of its range (83 Federal Register 13919).

Hawaiian geese are found in a variety of native and non-native habitats at elevations ranging from sea level to upwards of 8,200 feet. They are ground nesters, building simple nests that consist of a shallow bowl lined with plant material and down, generally built under woody or herbaceous plants that have a somewhat open canopy. Nesting habitat ranges from grasslands and shrublands to mid-to-high elevation lava fields and coastal wetlands. Hawaiian geese have an extended breeding season, and nesting may occur in all months except May, June, and July, although the majority of birds nest between October and March, and most clutches are laid between October and December. They are known to readily utilize standing water, when present, for bathing, drinking, and predator avoidance. Hawaiian geese graze and browse on the leaves, seeds, flowers, and fruits of at least 50 native and nonnative grasses, sedges, composites, and shrubs. While threats to Hawaiian geese include habitat loss and predation by introduced mammalian predators, vehicular collision is also a persistent problem faced by the species especially in and around heavily trafficked areas (Hawaii Department of Land and Natural Resources, 2015b; U.S. Fish and Wildlife Service, 2004).

Occurrence within the Kauai Training Study Area. Hawaiian geese are found in the greatest concentration at PMRF within the Kinikini Ditch vicinity. A total of 115 banded individuals and numerous unbanded individuals have been recorded at the facility, and regular surveys by PMRF natural resource staff indicate that Hawaiian geese are consistently present on base. Surveys in 2016 documented an average of 27 geese, with up to 79 individuals observed on a single day. Active nesting by the species is common with a total of 15 chicks hatched at PMRF in 2016.

Occurrence within the Oahu Training Study Area. Hawaiian geese are not known to occur within the JBPHH parcels. They occasionally visit Marine Corps Base Hawaii, Kaneohe Bay: four were observed in December 2014 at the Klipper Golf Course, and five briefly visited the Water Reclamation Facility in February 2016 (U.S. Marine Corps, 2017).

Occurrence within the Island of Hawaii Training Study Area. Hawaiian geese are known to occasionally occur with Hawaiian coots, stilts, and gallinules within the Aimakapa and Opaeula ponds along the Kona coast, but are generally found at higher elevations on the Island of Hawaii (e.g., Hakalau Forest National Wildlife Refuge, Hawaii Volcanoes National Park) (Hawaii Department of Land and Natural Resources, 2015b; U.S. Fish and Wildlife Service, 2004). Although Hawaiian geese may seasonally use lowlands on Hawaii Island, lowlands are often unsuitable because of intense human activity or dense predator populations (Uyehara & Misajon, 2007).

Hawaiian Hawk (*Buteo solitarius*)

The Hawaiian hawk (Hawaiian common name io) was listed as endangered in 1967 based on its restricted range on the island of Hawaii; its small population size, which at the time was thought to be in the low hundreds; and the assumption that it was endangered by loss of native forest habitat from agriculture, logging, and commercial development. The Hawaiian hawk is a small, broad-winged hawk endemic to the Hawaiian Islands and is the only member of the family Accipitridae (hawks, eagles, kites, harriers, and Old World vultures) that is resident and nests in the Hawaiian Islands. Currently, it is found only on the island of Hawaii; it occurs from low to high elevations and occupies a variety of habitat types, including native forest, secondary forest consisting primarily of non-native plant species, agricultural areas, and pastures. It preys on insects, rats, mice, mongoose, and a wide variety of native and introduced bird species (U.S. Fish & Wildlife Service, 2008; U.S. Fish and Wildlife Service, 1984).

In 2008, the USFWS proposed removing the Hawaiian hawk from the List of Endangered and Threatened Wildlife (73 Federal Register 45680). A Draft Post-delisting Monitoring Plan was prepared in 2008 (U.S. Fish & Wildlife Service, 2008), and delisting was again announced in 2009 and 2014 (74 Federal Register 6853, 74 Federal Register 27004, 79 Federal Register 8413). Several studies have shown that range-wide population estimates have been stable for at least 20 years and this species is not threatened with becoming endangered throughout all or a significant portion of its range in the foreseeable future (U.S. Fish & Wildlife Service, 2008).

Occurrence within the Island of Hawaii Training Study Area. The current range of the Hawaiian hawk does not include the Kona Coast within the training study area as the hawk is typically found at elevations of 1,000 feet and higher in the western portion of Hawaii Island (U.S. Fish & Wildlife Service, 2008; U.S. Fish and Wildlife Service, 1984). However, there is one record of the species from 1990 at the southern end of the southern-most training study area, near Kailua-Kona.

Band-rumped Storm Petrel (*Oceanodroma castro*) (Hawaii Distinct Population Segment)

The band-rumped storm petrel (Hawaiian common name akeake) is a mid-sized pelagic seabird with three widely separated breeding areas in the Pacific: Japan, Hawaii, and Galapagos. The Hawaii population is considered a Distinct Population Segment and was listed by the USFWS as endangered in 2016 due to the small population size and limited distribution. It nests in crevices or holes in remote high cliff locations on the island of Kauai and in steep open to vegetated cliffs and in sparsely vegetated high-elevation lava fields on the Island of Hawaii. Band-rumped storm petrels are regularly seen in coastal waters of Kauai, Niihau, and Hawaii. Predation by nonnative animals on nests and adults during the breeding season is the greatest threat to the Hawaiian population of the band-rumped storm petrel. Attraction of adults and fledglings to artificial lights, and collision with structures and utility lines, are also considered serious threats (81 Federal Register 67786).

Occurrence within the Kauai Training Study Area. Offshore of Kauai, the species has been documented to "raft" or form concentrations on the water of a few to as many as 100 birds prior to coming ashore to its breeding colonies. Auditory detections on Kauai indicate that nesting occurs predominately on the Na Pali coast and Waimea Canyon with small numbers also found in Wainiha Valley (81 Federal Register 67786).

The band-rumped storm-petrel only occurs at PMRF as it flies over the installation while moving between inland breeding sites and offshore feeding areas. Two band-rumped storm petrels were recovered at PMRF, one in 2008 and one in 2011, due to light attraction and fallout (U.S. Department of the Navy, 2016).

Occurrence within the Island of Hawaii Training Study Area. The first confirmed documented nesting by the species was in 2015 when two active band-rumped storm petrel nests were discovered on the north slope of Maunaloa at nearly 7,000 feet above sea level within the boundaries of the Army's Pohakuloa Training Area. Nesting has also been observed at Hawaii Volcanoes National Park (81 Federal Register 67786; (Hawaii Department of Land and Natural Resources, 2015b)). The species may occasionally fly over the training study area along the Kona coast on its way to and from offshore foraging areas.

Hawaiian Petrel (*Pterodroma phaeopygia sandwichensis*)

Listed by the USFWS in 1967 as an endangered species under the Endangered Species Preservation Act (later to become the ESA in 1973), the Hawaiian petrel (Hawaiian common name uau) currently breeds in high elevation colonies primarily on east Maui; on Mauna Loa, in Waimanu Valley in the Kohala Mountains, and Hawaii Volcanoes National Park's Kahuku Unit on Hawaii Island; on Lanai; and on northwestern Kauai. Breeding Hawaiian petrels make their inland flights after dusk and their seaward flight pre-dawn. Predation by nonnative animals on nests and adults during the breeding season is the greatest threat to the Hawaiian petrel. Attraction of adults and fledglings to artificial lights, and collision with structures and utility lines, are also considered serious threats (Hawaii Department of Land and Natural Resources, 2015b; U.S. Fish and Wildlife Service, 2017b).

Occurrence within the Kauai Training Study Area. From 2007–2015 a single Hawaiian Petrel was found grounded at PMRF due to light attraction and fallout. It is estimated that cumulatively, over the fall fledging season, a significant number of Hawaiian petrels pass over and near PMRF. An estimated mean of 92 shearwater/petrel targets per night and an estimated 5,128 shearwater/petrel targets were documented flying over or immediately adjacent to PMRF during a fall radar sampling period in 2015 (U.S. Department of the Navy, 2016).

Occurrence within the Island of Hawaii Training Study Area. Similar to the band-rumped storm petrel that also breeds in high elevation areas of Hawaii, the Hawaiian petrel may occasionally fly over the training study area along the Kona coast on its way to and from offshore foraging areas.

Newell's Townsend's Shearwater (*Puffinus auricularis newelli*)

Listed by the USFWS in 1975 as a threatened species, the Newell's Townsend's shearwater (Hawaiian common name ao) is an endemic Hawaiian seabird found on Kauai, Hawaii, and Maui, with 90 percent of the population found on Kauai. A colonial, nocturnal burrow and crevice nester at high elevations, the Newell's Townsend's shearwater makes its inland flights after dusk and its seaward flight pre-dawn. The breeding season for the Newell's Shearwater runs from April to November. The species, much like other nocturnal seabirds in the islands, is threatened by predation from non-native mammals, collision with powerlines, light attraction, and fallout (Hawaii Department of Land and Natural Resources, 2015b; U.S. Fish and Wildlife Service, 2017a).

Occurrence within the Kauai Training Study Area. On Kauai, fallout for this species has occurred on an annual basis at PMRF with 29 birds having been grounded as a result of light attraction and fallout at the facility from 2010–2016. It is estimated that, cumulatively over the fall fledging season, a significant number of Newell's Townsend's shearwaters pass over and near PMRF. An estimated mean of 92 shearwater/petrel targets per night and an estimated 5,128 shearwater/petrel targets were documented flying over or immediately adjacent to PMRF during a fall radar sampling period in 2015 (U.S. Department of the Navy, 2016).

Occurrence within the Island of Hawaii Training Study Area. Similar to the band-rumped storm petrel and Hawaiian petrel that also breed in high elevation areas of Hawaii, the Newell's Townsend's shearwater may occasionally fly over the training study area along the Kona coast on its way to and from offshore foraging areas.

Short-eared Owl (*Asio flammeus sandwichensis*)

The Hawaiian short-eared owl (Hawaiian common name pueo) is not listed under the ESA but is listed by the State of Hawaii as endangered only on Oahu (Hawaii Department of Land and Natural Resources, 2015b). However, the species is protected under the MBTA on all islands.

The Hawaiian short-eared owl is an endemic subspecies of the short-eared owl that is found worldwide. Found on all the Main Hawaiian Islands from sea level to 8,000 feet, the species is thought to have colonized the Hawaiian Islands sometime after the arrival of Polynesians. Unlike most owls, the short-eared owl is active during the day, and is commonly seen hovering or soaring over open areas where it preys primarily on small mammals, and occasionally birds (Snetsinger et al. [1994] and Mostello [1996] as cited in Na Pua Makani Power Partners (2016)). They occur in a variety of habitats, including wet and dry forests, but are most common in open habitats such as grasslands, shrublands, and montane parklands, including urban areas and those actively managed for conservation. Constructed by females, nests have been found throughout the year and are comprised of simple scrapes on the ground lined with grasses and feather down. Young may fledge from nest on foot before they are able to fly and depend on their parents for approximately two months. Threats to the species are likely the same factors that threaten other native Hawaiian birds, including loss and degradation of habitat and predation by introduced mammals. Because short-eared owls nest on the ground, their eggs and young are vulnerable to predation by rats, feral cats, and the small Indian mongoose.

Occurrence within the Oahu Training Study Area. Short-eared owls are known to occur within or in the vicinity of the Kahuku Training Area, Makua Military Reservation, JBPHH (including the Lualualei Annex), and Marine Corps Base Hawaii, Kaneohe Bay (Kahuku Wind Power LLC., 2010, 2017; Na Pua Makani Power Partners, 2016; The Pueo Project, 2018; U.S. Department of the Navy, 2011c; U.S. Marine Corps, 2011). They are expected to occur within all portions of the Oahu training study area in appropriate nesting and foraging habitat (e.g., open areas, particularly grasslands, wetlands, coastal dunes, and rangelands).

White Tern (*Gygis alba*)

The white tern (Hawaiian common name manu o ku) is a small, entirely white tern that breeds throughout the Northwestern Hawaiian Islands and on Oahu. Not as colonial or social as most other terns, it prefers to nest in loosely associated groups or singly, typically near coastal foraging areas. White tern remain paired for several seasons and often return to the same nest site year after year. No nest is constructed and a single egg is laid wherever a suitable depression is found, typically on tree branches, buildings or other man-made structures, rock ledges, or on the ground. In Hawaii, white terns breed year round, with some pairs successfully raising two or three broods per year. Fledglings are dependent on adults for up to two months. White terns often join mixed species feeding flocks where they feed on mostly juvenile goatfish and flying fish by dipping the surface or surface diving. White tern typically remain near their breeding sites year round, seldom venturing far from shore. Like all seabirds, adults and nests are susceptible to predation by rats and feral cats (Hawaii Department of Land and Natural Resources, 2015b).

Occurrence within the Oahu Training Study Area. White terns commonly nest in Honolulu, from Sand Island in the west, to Interstate H1 to the north, and east to Waiaiae, northeast of Diamond Head (Whiteterns.org, 2018). They have also been observed at the Pearl Harbor National Wildlife Refuge Honouliuli and Waiawa Units and Marine Corps Base Hawaii, Kaneohe Bay (U.S. Department of the Navy, 2011c; U.S. Marine Corps, 2011).

3.3.2.3.4 Special-Status Invertebrates

Yellow-faced Bees (*Hylaeus* spp.)

Listed by the USFWS as endangered in 2016, seven endemic species of bees in the genus *Hylaeus* historically occurred on the Main Hawaiian Islands except for Kauai and Niihau: *H. anthracinus, H. longiceps, H. facilis, H. assimulans, H. hilaris, H. mana,* and *H. kuakea*. Commonly known as yellow-faced bees or masked bees for their yellow-to-white facial markings, they were found in a variety of habitats ranging from coastal to lowland dry and lowland mesic habitats. The coastal ecosystem includes mixed herblands, shrublands, and grasslands, from sea level to 980 feet elevation, generally within a narrow zone above the influence of waves to within 330 feet inland. The lowland dry ecosystem is found on all the main Hawaiian Islands and includes shrublands and forests generally below 3,300 feet elevation that receive less than 50 inches annual rainfall, or are in otherwise prevailingly dry substrate conditions. Areas consisting of predominantly native species in the lowland dry ecosystem are now rare and are best represented on the leeward sides of the islands. The lowland mesic ecosystem includes a variety of grasslands, shrublands, and forests, generally below 3,300 feet elevation, that receive between 50 and 75 inches annual rainfall (80 Federal Register 58820).

These bees are important pollinators of native Hawaiian plants, many of which are also endangered. Protection of these pollinators could aid the recovery of endangered Hawaiian plants. These bees require a habitat with a diversity of plants that flower throughout the year so that a consistent source of

pollen and nectar is available. Many species nest in the ground, but some nest in hollow stems of plants; the availability of nest sites is another important habitat requirement for these animals (Schonberg et al., 2009c; Xerces Society, 2018).

Hawaiian yellow-faced bees are threatened by development (especially in coastal areas), fire, feral ungulates such as pigs, invasive ants, and the loss of native vegetation to invasive plant species. Because remnant populations of many species of Hawaiian yellow-faced bees are small and isolated, they are especially vulnerable to habitat loss, predation, stochastic events, and other changes to their habitat (Xerces Society, 2018).

Occurrence within the Kauai Training Study Area. Yellow-faced bees did not historically occur nor do they currently occur on Kauai (80 Federal Register 58820).

Occurrence within the Oahu Training Study Area. All of the species except *H. hilaris* historically occurred on Oahu and *H. assimulans* is considered extirpated from Oahu. Although *H. mana* was first recorded on Oahu in the leeward Koolau Mountains at an elevation of about 1,400 feet and *H. kuakea* in the Honouliuli Preserve in the Waianae mountains at an elevation of about 1,900 feet, there are no historical records of these species for Oahu (Schonberg et al., 2009c).

H. anthracinus is currently known only from Kaena Point Natural Area Reserve, along the Ka Iwi Scenic Shoreline, and at the James Campbell National Wildlife Refuge (Schonberg et al., 2009a). Surveys conducted at Marine Corps Base Hawaii, Kaneohe Bay in November 2016 and May 2017 confirmed *H. anthracinus* in coastal strand habitat of Pyramid Rock, North Beach, and Fort Hase (U.S. Marine Corps, 2017).

H. longiceps is currently known only from Kaena Point Natural Area Reserve and Kahuku Point. The species is found in relatively high densities in these areas on *Sesbania tomentosa* and tree heliotrope (*Heliotropium foertherianum* [*Tournefortia argentea*]) (Magnacca & King, 2013; Schonberg et al., 2009e).

Occurrence within the Island of Hawaii Training Study Area. Of the seven yellow-faced bee species, only *H. anthracinus* was historically found on the Island of Hawaii. Currently, the species is known from three locations potentially within the training study area: Kona Coast State Park, Kaloko-honolohau National Historic Park, and Makalawena Beach (Schonberg et al., 2009a). Within these areas *H. anthracinus* are restricted to a 33–66-feet-wide corridor along the coast; they do not occur on sandy beaches or inland. They are, however, found on rocky shorelines with naupaka (*Scaevola* spp.) and tree heliotrope (Magnacca & King, 2013).

Orangeblack Hawaiian Damselfly (*Megalagrion xanthomelas*)

Listed by the USFWS in 2016 as an endangered species, the endemic orangeblack Hawaiian damselfly occurs in suitable aquatic habitat in coastal and lowland dry and lowland mesic habitats. Because of its ability to use a variety of aquatic habitats for breeding sites, it was considered Hawaii's most abundant damselfly species. It was historically present on Nihau, Oahu, Lanai, Molokai, Maui, Hawaii, and possibly Kauai; the species is now extirpated on Maui and Kauai (81 Federal Register 67786).

The orangeblack Hawaiian damselfly breeds primarily in coastal wetlands and lower or terminal stillwater reaches of perennial streams. In the absence of predators, especially introduced fish species, it can breed successfully in standing pools of intermittent mid-elevation streams, freshwater marshes, reservoirs, garden pools, and ornamental ponds. Adults do not disperse far from the nymphal habitat, and lay their eggs in the tissues of aquatic plants found in slow reaches of streams and in stream pools (Mazzacano, 2008).

The primary reason for the species listing is the loss of suitable aquatic habitat across all islands, including past and present land use and water management practices (e.g., agriculture, urban development, ground water development, and destruction of perched aquifer and surface water resources), habitat modification and destruction by feral ungulates (i.e., pigs, goats, axis deer), and predation by non-native fish, non-native aquatic invertebrates, and the non-native bullfrog (81 Federal Register 67786).

Occurrence within the Oahu Training Study Area. The species was believed to have been extirpated on Oahu until the discovery of a single population in 1994 on the grounds of the Tripler Army Medical Facility (U.S. Fish and Wildlife Service, 2014). Occurrences within suitable aquatic habitat within the Training Study Area is currently unknown.

Occurrence within the Island of Hawaii Training Study Area. Although the current status is not known, the species was known to occur in a number of coastal wetlands on Hawaii (Anaehoomalu Bay, Hawa Bay, Hilea Stream, Hilo, Honokohau, Kiholo Bay, Ninole Springs, Onomea Bay, Whittington Beach, Keaukaha, Kapoho, Honaunau, and Pahue Bay) (U.S. Fish and Wildlife Service, 2014). Honokohau is the only location that occurs within the Hawaii training study area.

3.3.2.3.5 Special-Status Marine Fish

Oceanic whitetip shark (*Carcharhinus longimanus*)

On December 29, 2016, NMFS published a proposed rule to list the oceanic whitetip shark as threatened (81 Federal Register 96304). On January 30, 2018, NMFS published the Final Rule listing this species as threatened and also concluded that critical habitat is not determinable because data sufficient to perform the required analyses are lacking (83 Federal Register 4153).

Oceanic whitetip sharks are found worldwide in warm tropical and subtropical waters between the 30° North and 35° South latitude near the surface of the water column (Young et al., 2016). Oceanic whitetips occur throughout the Central Pacific, including the Hawaiian Islands south to Samoa Islands and in the eastern Pacific from Southern California to Peru, including the Gulf of California. This species has a clear preference for open ocean waters, with abundances decreasing with greater proximity to continental shelves. Allen and Cross (Allen & Cross, 2006) categorized oceanic white tip sharks as holoepipelagic with individuals found mostly far from shore. Preferring warm waters near or over 68°F (20°Celcius), and offshore areas, the oceanic whitetip shark is known to undertake seasonal movements to higher latitudes in the summer (National Oceanic and Atmospheric Administration, 2016a) and may regularly survey extreme environments (deep depths, low temperatures) as a foraging strategy (Young et al., 2016). Oceanic whitetip sharks could occur in deep open ocean areas throughout the Hawaiian Islands and in the offshore portions of the training study areas.

Giant Manta Ray (*Manta birostris*)

The giant manta ray was proposed to be listed as a threatened species under ESA by NMFS on January 12, 2017 (82 Federal Register 3694). Based on the best scientific and commercial information available, including the status review report (Miller & Klimovich, 2016), and after taking into account efforts being made to protect these species, NMFS determined that the giant manta ray is likely to become an endangered species within the foreseeable future throughout a significant portion of its range. On January 22, 2018, NMFS published the Final Rule listing this species as threatened and also concluded that critical habitat is not determinable because data sufficient to perform the required analyses are lacking (83 Federal Register 2916).

Giant manta rays are visitors to productive coastlines with regular upwelling, including oceanic island shores, and offshore pinnacles and seamounts. They utilize sandy bottom habitat and seagrass beds, as well as shallow reefs, and the ocean surface both inshore and offshore. The species ranges globally and is distributed in tropical, subtropical, and temperate waters. They migrate seasonally usually more than 600 miles, however are not likely across ocean basins (National Oceanic and Atmospheric Administration, 2016b).

Giant manta rays are found throughout the Hawaiian Islands, including the training study area, and large aggregations are known to occur primarily along the Kona coast off the Island of Hawaii (Defenders of Wildlife, 2015). These aggregations are likely timed to peak seasonal abundances of prey, such as zooplankton.

3.3.2.3.6 Special-Status Marine Reptiles

Of the five sea turtle species that are found in Hawaiian waters or that nest on beaches within the Hawaiian Islands, all are designated as either threatened or endangered under the ESA. Information on sea turtle in-water occurrence and nesting and basking activities (green sea turtles only) within coastal waters of islands within the training study area are compiled from sea turtle stranding summaries (Murakawa, 2014; Richie et al., 2016) and map guides for basking and nesting activity (Parker et al., 2015), and summarized by Roberson et al. (2016).

Three species of sea turtles are known to occur in waters surrounding the islands within the training study area (Roberson et al., 2016): green, hawksbill, and olive ridley.

Green Sea Turtle (*Chelonia mydas*) Central North Pacific Distinct Population Segment

The green sea turtle was first listed under the ESA in 1978. In 2016, the NMFS and USFWS reclassified the species into 11 “distinct population segments,” which maintains federal protections while providing a more tailored approach for managers to address specific threats facing different populations. The geographic areas that include these distinct population segments are (1) North Atlantic Ocean, (2) Mediterranean Sea, (3) South Atlantic Ocean, (4) Southwest Indian Ocean, (5) North Indian Ocean, (6) East Indian Ocean – West Pacific Ocean, (7) Central West Pacific Ocean, (8) Southwest Pacific Ocean, (9) Central South Pacific Ocean, (10) Central North Pacific Ocean, and (11) East Pacific Ocean (81 Federal Register 20058). Only the Central North Pacific distinct population segments occur within the training study area.

The green sea turtle is distributed worldwide across tropical and subtropical coastal waters generally between 45° north and 40° south. The optimal developmental habitats for late juveniles and foraging habitats for adults are warm shallow waters with abundant submerged aquatic vegetation and close to nearshore reefs or rocky areas (Holloway-Adkins, 2006; Seminoff et al., 2002). Climate change and ocean warming trends may impact the habitat and range of this species over time (Fuentes et al., 2013).

The green sea turtle is by far the most abundant sea turtle in Hawaiian waters and is present year round (Richie et al., 2016; Roberson et al., 2016). Green sea turtles nest on beaches within the training study area, while they feed and migrate throughout all waters off the Hawaiian Islands. Green sea turtles are reported to bask at 62 beaches within the Main Hawaiian Islands, with most of these reported locations on Oahu (34 percent) and Island of Hawaii beaches (31 percent) (Roberson et al., 2016). Nesting for green sea turtles are believed to be most numerous within the Main Hawaiian Islands on Kauai, with Kauai accounting for 40 percent of green sea turtle nesting activity mostly reported from the southern and western coasts of the island (including along PMRF beaches) (Dollar & Brock, 2007). Oahu accounts

for 23 percent of nesting activities, with reports of regular nesting events (at least one report every year) at Police Beach and near Kahuku along the north and windward-facing coasts (Roberson et al., 2016).

Hawksbill Sea Turtle (*Eretmochelys imbricata*)

The hawksbill turtle is listed as endangered under the ESA (35 Federal Register 8491). While the current listing as a single global population remains valid, data may support separating populations, at least by ocean basin, under the distinct population segment policy. The most recent status review document was released in 2013 by the NMFS and USFWS (National Marine Fisheries Service & U.S. Fish and Wildlife Service, 2013).

The hawksbill is the most tropical of the world's sea turtles, rarely occurring above 35° N or below 30° south (Witzell, 1983). While hawksbills are known to occasionally migrate long distances in the open ocean, they are primarily found in coastal habitats and use nearshore areas more exclusively than other sea turtles (Witzell, 1983). Hawksbill sea turtles are considered rare within Pearl Harbor, with one sighting reported in 2004 and another in 2008. No other sightings have been reported, with regular dive surveys occurring quarterly in Pearl Harbor since 2000 (U.S. Department of the Navy, 2011c). No detections of hawksbills were reported during marine species surveys of Pearl Harbor from 2013 through 2015 (Ritchie, 2016).

Hawksbill sea turtles also nest on Hawaiian beaches and may be concentrated around the Island of Hawaii (particularly along the Hamakua Coast and eastern shores of the Island of Hawaii). Fewer than 20 hawksbills are estimated to nest in the Main Hawaiian Islands each year and, based on nesting data compiled by Roberson et al. (2016), hawksbill nesting does not occur on beaches within the training study area. A few females nest each year on Maui and Molokai and have been observed occasionally nesting on Oahu (Parker et al., 2009).

Olive Ridley Sea Turtle (*Lepidochelys olivacea*)

Olive ridley turtles that are found in the training study area are listed as threatened under the ESA (43 Federal Register 32800). Based on genetic data, the worldwide olive ridley population is composed of four main lineages: east India, Indo-Western Pacific, Atlantic, and eastern Pacific Ocean. Most olive ridley turtles found in Hawaiian waters are of the eastern Pacific Ocean lineage, with about a third from the Indo-Western Pacific lineage (National Marine Fisheries Service & U.S. Fish and Wildlife Service, 2014; Shankar et al., 2004).

Rare instances of nesting occur in the Hawaiian Islands, with the first olive ridley nest documented in 1985 at Paia, Maui. A second nest was recorded in Hilo, Hawaii, in 2002, and a third olive ridley nest was recorded at Marine Corps Base Hawaii Kaneohe Bay in 2009 (U.S. Marine Corps, 2017). None of these reported nesting locations are within the training study area. In contrast, offshore long-line fisheries interaction data in Hawaii suggest that approximately 19 percent of the sea turtles in offshore waters are olive ridleys (U.S. Department of the Navy, 2017).

3.3.2.3.7 Special-Status Marine Mammals

False Killer Whale (*Pseudorca crasidens*) Main Hawaiian Islands Insular Distinct Population Segment

NMFS currently recognizes three stocks of false killer whale in Hawaiian waters: the Hawaii pelagic stock, the Northwestern Hawaiian Islands stock, and the Main Hawaiian Islands insular stock (Bradford et al., 2012; Bradford et al., 2015; Carretta et al., 2015; Forney et al., 2010; National Oceanic and Atmospheric Administration, 2012; Oleson et al., 2010). The Main Hawaiian Islands insular stock

(considered resident to the Main Hawaiian Islands consisting of Kauai, Oahu, Molokai, Lanai, Kahoolawe, Maui, and Hawaii) is listed as endangered as a Distinct Population Segment under the ESA (Carretta et al., 2017a). The other two stocks of false killer whales in Hawaii, which are not listed under the ESA, are not discussed further.

Critical habitat was designated in July 2018 (83 Federal Register 35062), and a recovery plan is still under development (82 Federal Register 51186). Designated critical habitat creates a zone around the Main Hawaiian Islands, from west of Niihau east to Hawaii, in water depths from 45 meters to 3,200 meters (83 Federal Register 35062). These areas contain the physical and biological features needed for the conservation and recovery of the species: (1) prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and population growth; (2) waters free of pollutants of a type and amount harmful to the false killer whale; and (3) habitat free of anthropogenic noise that would significantly impair the value of the habitat for false killer whale use or occupancy development. The following DoD areas in the training study area are excluded from the designated critical habitat based on national security impacts: PMRF offshore ranges (including the Shallow Water Training Range, the Barking Sands Tactical Underwater Range, and the Barking Sands Underwater Range Extension), Warning Area 188, Fleet Operational Readiness Accuracy Check Site Range, and the Shipboard Electronic Systems Evaluation Facility. The Ewa Training Minefield and the Naval Defensive Sea Area are precluded from the critical habitat designation because they are managed under the JBPHH INRMP (83 Federal Register 35062).

Individuals of the insular stock use habitats surrounding the main Hawaiian islands and show habitat use patterns closely associated with the islands, generally within 40 kilometers of the main Hawaiian Islands, but ranging up to 140 kilometers. This stock also relies on the submerged habitats around the main Hawaiian islands for its major activities of foraging (primarily in the pelagic areas of the submerged habitat), socializing, and reproducing (82 Federal Register 51186).

Blue Whale (*Balaenoptera musculus*)

Blue whales were listed as endangered throughout their range on December 2, 1970 (35 Federal Register 18319). The blue whale inhabits all oceans and typically occurs near the coast, over the continental shelf; however, they are also found in oceanic waters, having been sighted, acoustically recorded, and satellite tagged in the eastern tropical Pacific (Ferguson, 2005; Stafford et al., 2004). The first published sighting record of blue whales near Hawaii is that of Berzin and Rovnin (1966), though two blue whales were seen with fin whales and an unidentified rorqual in November 2010 during a survey of Hawaiian U.S. Exclusive Economic Zone waters (Bradford et al., 2013); (Carretta et al., 2014). Four sightings have been made by observers on Hawaii-based longline vessels. Additional evidence that blue whales occur in the Hawaiian Islands comes from acoustic recordings made off Oahu and Midway Islands which showed bimodal peaks throughout the year, with central Pacific call types heard during winter and eastern Pacific calls heard during summer (Stafford et al., 2001).

Fin Whale (*Balaenoptera physalus*)

The fin whale was listed as endangered under the ESA on June 2, 1970. During the 20th century, more fin whale were taken by industrialized whaling than any other species (Rocha et al., 2014). In the North Pacific, NMFS recognizes three fin whale stocks: (1) a Northeast Pacific stock in Alaska; (2) a California, Oregon, and Washington stock; and (3) a Hawaii stock (Allen & Angliss, 2013; Carretta et al., 2014).

Although some fin whales migrate seasonally (Falcone et al., 2011; Mate et al., 2015; Mate et al., 2016), NMFS does not recognize fin whales from the Northeast Pacific stock as being present in Hawaii. There

are known sightings from Kauai, Oahu, Hawaii, and a single stranding record from Maui (Mobley et al., 1996; Shallenberger, 1981; U.S. Department of the Navy, 2011b). A single sighting was made during aerial surveys from 1993 to 1998, five sightings were made in offshore waters during a 2002 survey of waters within the Hawaiian Exclusive Economic Zone, and there were two fin whales sighted during a 2010 survey of the same area (Barlow et al., 2006; Bradford et al., 2015; Carretta et al., 2010; Mobley et al., 1996; Mobley et al., 2000). A single juvenile fin whale was reported off Kauai during Navy sponsored marine mammal research in 2011 (U.S. Department of the Navy, 2011b). Based on sighting data and acoustic recordings, fin whales are likely to occur in Hawaiian waters mainly in fall and winter (Barlow et al., 2004; Barlow et al., 2006; Barlow et al., 2008; Klinck et al., 2015).

Sei Whale (*Balaenoptera borealis*)

The sei whale was listed as endangered under the ESA on December 2, 1970. A recovery plan for the sei whale was completed in 2011 and provides a research strategy for obtaining data required to estimate population abundance and trends, and to identify factors that may be limiting the recovery of this species (National Marine Fisheries Service, 2011b). Sei whales in Hawaii are assigned to the Hawaii stock and along the U.S. west coast (Carretta et al., 2017b). Sei whales are distributed far out to sea in temperate regions of the world and do not appear to be associated with coastal features. The most recent stock assessment for this species estimates a minimum of 93 sei whales are within the Hawaiian Islands Exclusive Economic Zone (Carretta et al., 2014).

Sperm Whale (*Physeter macrocephalus*)

The sperm whale has been listed as endangered since 1970 under the precursor to the ESA (National Marine Fisheries Service, 2009). Sperm whales are divided into three stocks in the Pacific; only the Hawaii and California/Oregon/Washington stock occurs within the training study area.

Sperm whales occur in Hawaii waters and are one of the more abundant large whales found in that region (Baird et al., 2003; Barlow, 2006; Bradford et al., 2017; Mobley et al., 2000). A total of 21 sperm whale sightings were made during a summer/fall 2002 shipboard survey of waters within the U.S. Exclusive Economic Zone of the Hawaiian Islands, although only four of these sightings were around the Main Hawaiian Islands (Barlow, 2006). During a follow-up survey conducted in 2010, there were 41 sperm whale sightings, mainly concentrated in offshore areas in the northwestern portion of the U.S. Exclusive Economic Zone of the Hawaiian Islands (Bradford et al., 2017). Based on predictive habitat-based density models derived from line-transect survey data collected between 1997 and 2012 within the central North Pacific, relatively high densities of sperm whales are predicted within the U.S. Exclusive Economic Zone of the Hawaiian Islands during the summer and fall, particularly in the northwest Hawaiian islands (Forney et al., 2015). In 2015, acoustic detections of sperm whales occurred over the abyssal plain to the south of Oahu and did not seem to be related to bathymetric features such as seamounts (Klinck et al., 2015), while the number of sperm whales in the main Hawaiian islands remains low (Forney et al., 2015). Sperm whales appear to have a preference for deep waters (Baird, 2013; Jefferson et al., 2015) and would likely not be encountered in the training study areas.

Hawaiian Monk Seal (*Neomonachus schauinslandi*)

The Hawaiian monk seal was listed as endangered under the ESA in 1976 (National Marine Fisheries Service, 1976) and is listed as depleted under the MMPA. The species is considered a high priority for recovery, based on the high magnitude of threats, the high recovery potential, and the potential for economic conflicts while implementing recovery actions (National Marine Fisheries Service, 2007, 2011a, 2016b). Hawaiian monk seals are managed as a single stock. There are six main reproductive

subpopulations: French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, Midway Island, and Kure Atoll in the northwestern Hawaiian Islands. There are small numbers of monk seals also occurring across the main Hawaiian Islands. In 2013 there were an estimated minimum of 179 individuals in the main Hawaiian Islands; the total population based on those counted in the Northwest Hawaiian Islands is estimated to be 909 individuals (Carretta et al., 2017a). The approximate area encompassed by the northwestern Hawaiian Islands was designated as the Papahanaumokuakea National Marine Monument in 2006, in part to protect the habitat of the Hawaiian monk seal.

A recovery plan for the Hawaiian monk seal was completed in 1983 and is currently undergoing revision (National Marine Fisheries Service, 2007, 2011a, 2016b). Due to the proximity of the Hawaiian monk seal to human development, commerce, recreation, and culture, the 2007 revised Recovery Plan included a recommendation to develop a management plan specifically addressing issues in the main Hawaiian Islands (National Marine Fisheries Service, 2007). In response to that recommendation, a “Main Hawaiian Islands Monk Seal Management Plan” was developed (National Marine Fisheries Service, 2016b).

NMFS designated critical habitat for the Hawaiian monk seal on beaches and offshore areas for all of the islands included in the training study area (Figure 3-7 through Figure 3-15). There are no recent sightings of Hawaiian monk seals within Pearl Harbor, but historic sightings suggest that they periodically enter Pearl Harbor (Johanos et al., 2015). The training study areas overlaps with critical habitat designated for the Hawaiian monk seal. Where designated, Hawaiian monk seal critical habitat in the main Hawaiian Islands includes terrestrial habitat that extends 5 meters inland from the shoreline between designated boundary points. The final rule designating the critical habitat for Hawaiian monk seals included the following essential features (80 Federal Register 50926): (1) terrestrial areas and adjacent shallow, sheltered aquatic areas with characteristics preferred by monk seals for pupping and nursing, (2) marine areas from 0 to 200 meters in depth that support adequate prey quality and quantity for juvenile and adult monk seal foraging, and (3) significant areas used by monk seals for hauling out, resting, or molting.

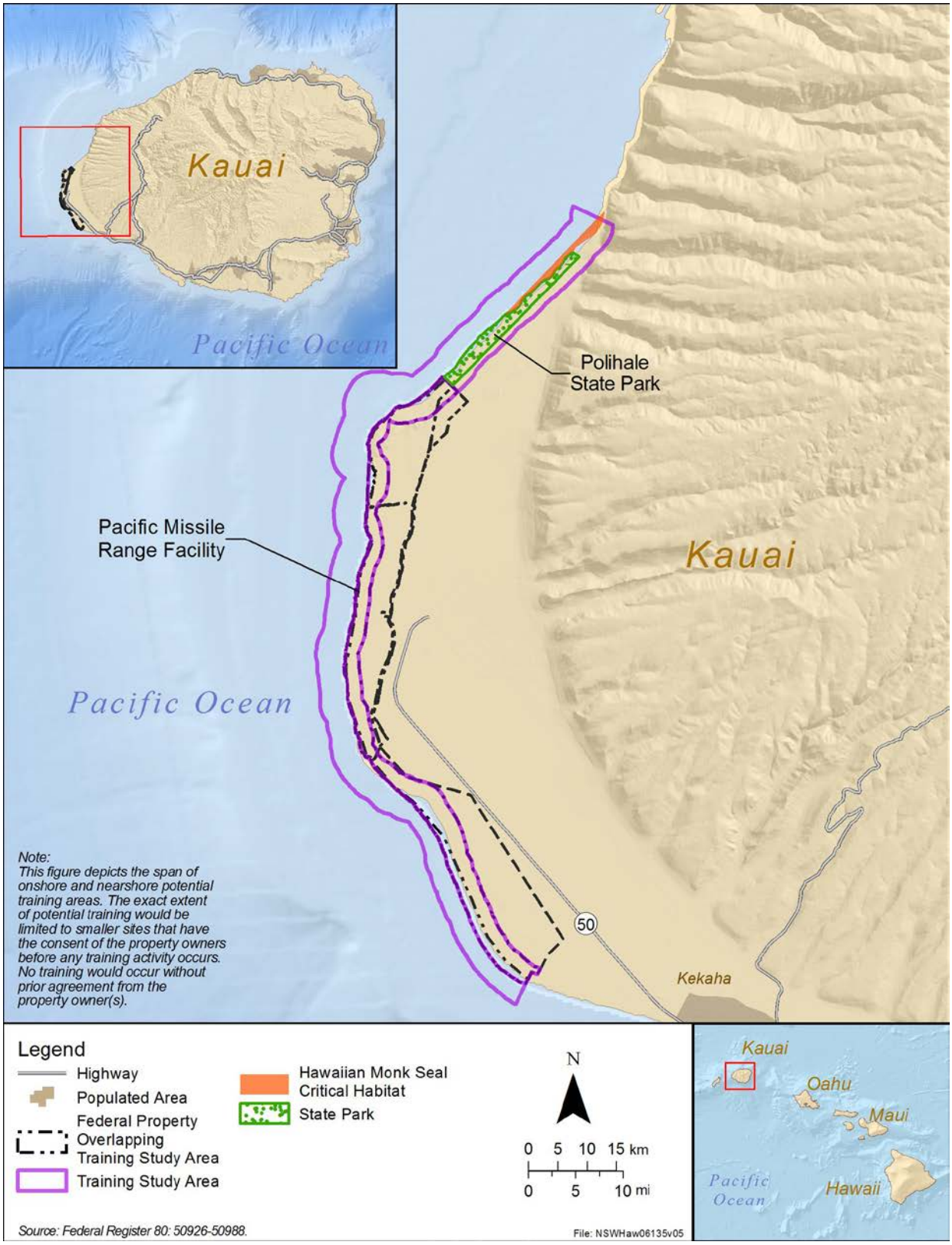

Figure 3-7: Hawaiian Monk Seal Critical Habitat within and Adjacent to the Training Study Area: Kauai

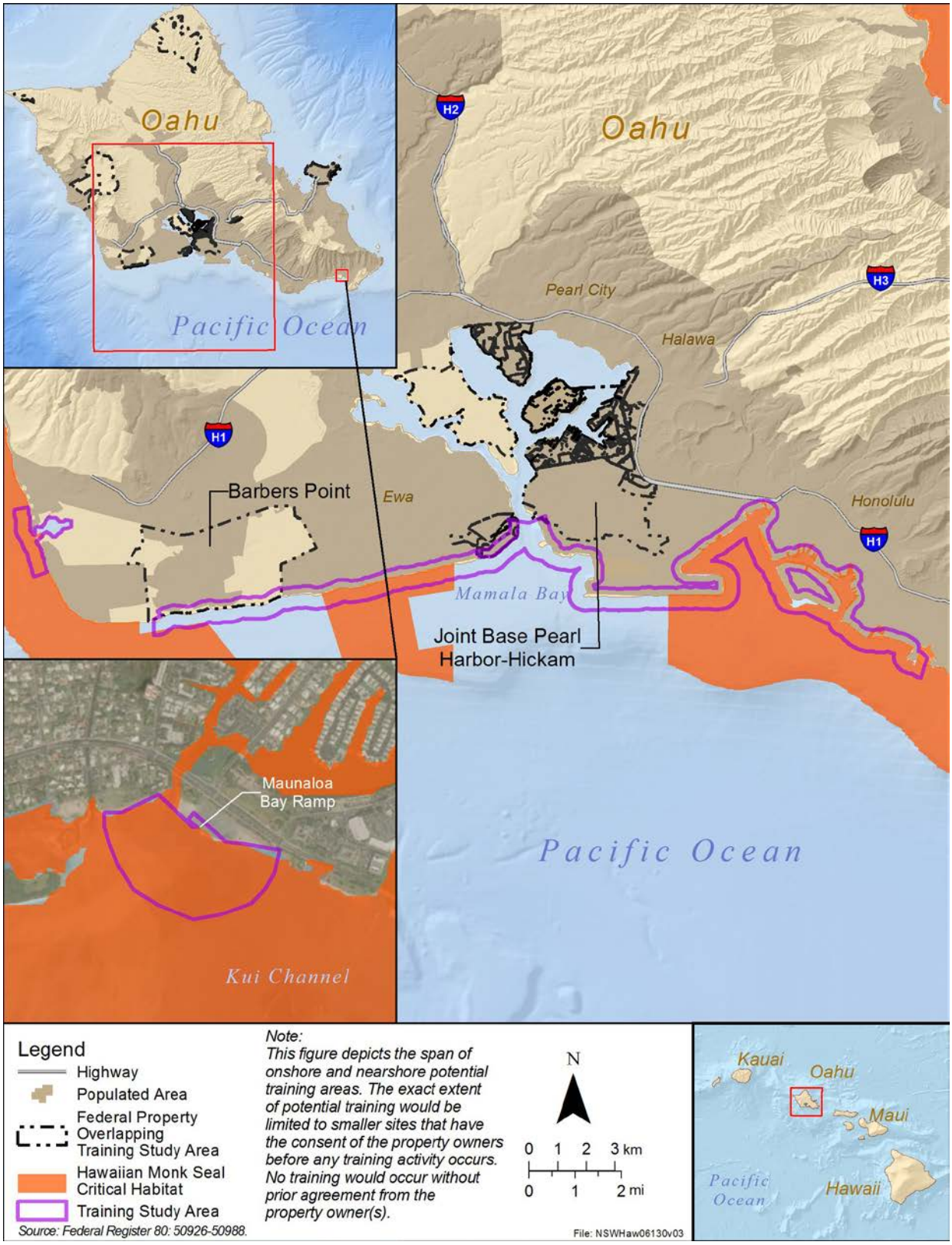

Figure 3-8: Hawaiian Monk Seal Critical Habitat within and Adjacent to the Training Study Area: South Oahu

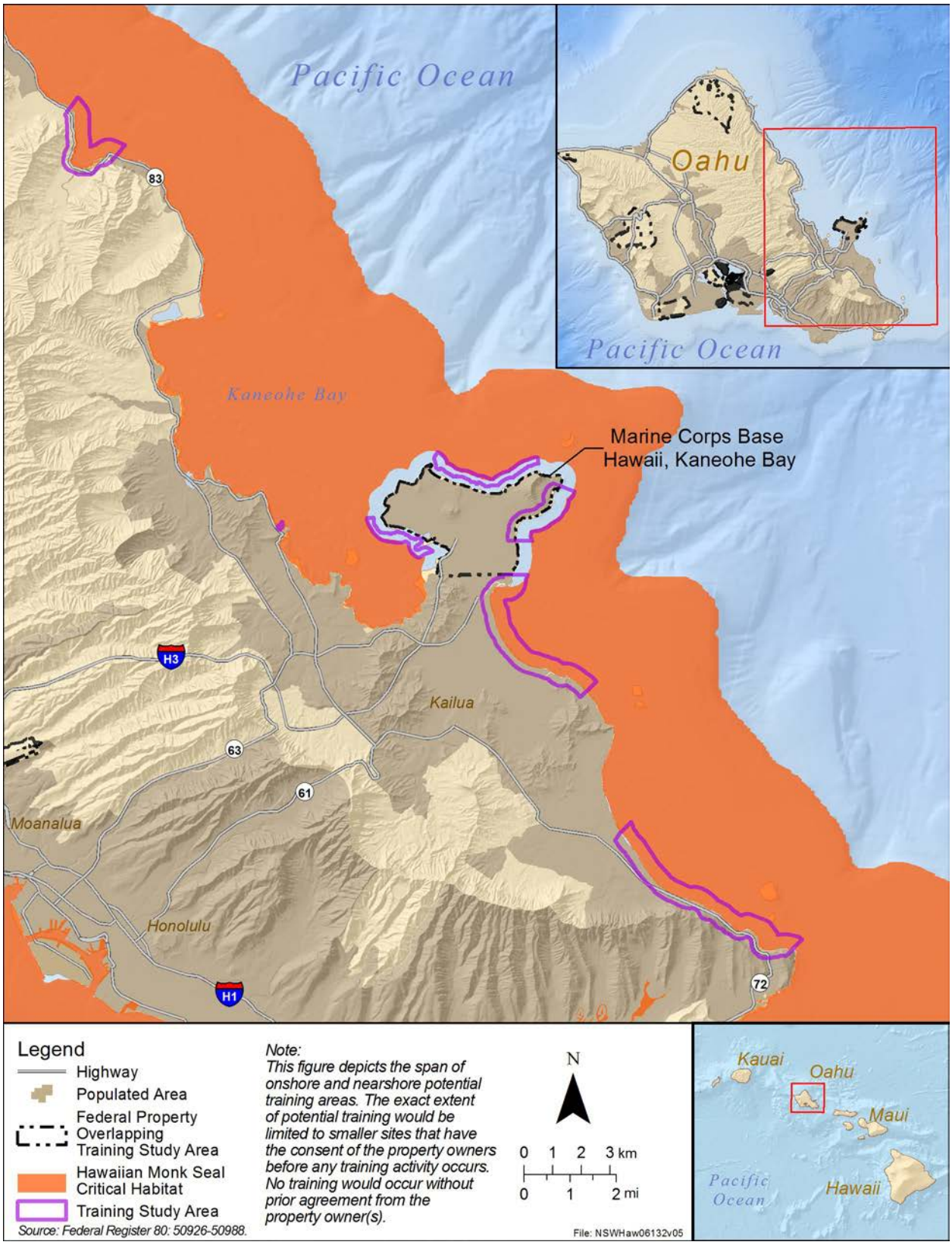

Figure 3-9: Hawaiian Monk Seal Critical Habitat within and Adjacent to the Training Study Area: Windward Oahu

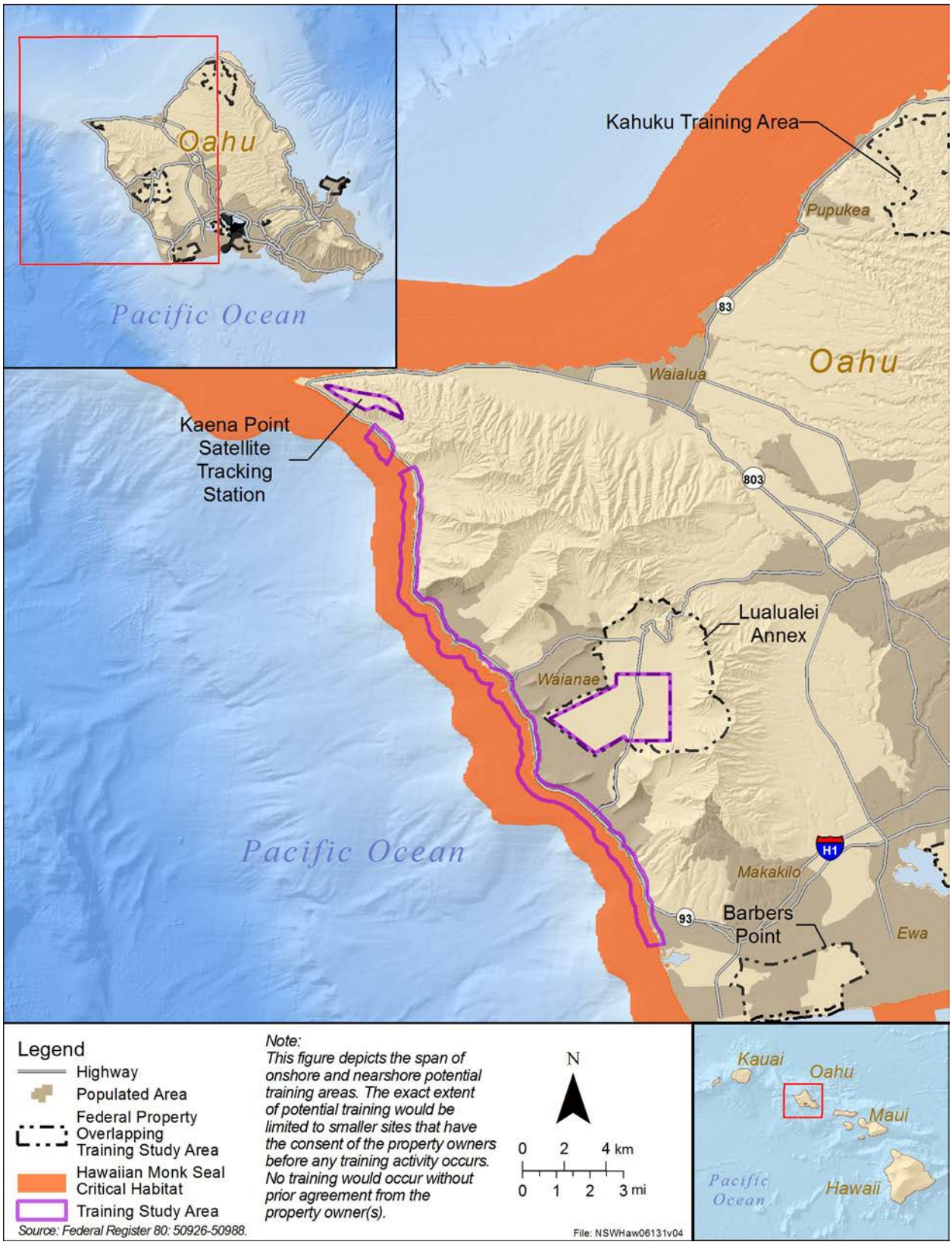

Figure 3-10: Hawaiian Monk Seal Critical Habitat within and Adjacent to the Training Study Area: West Oahu

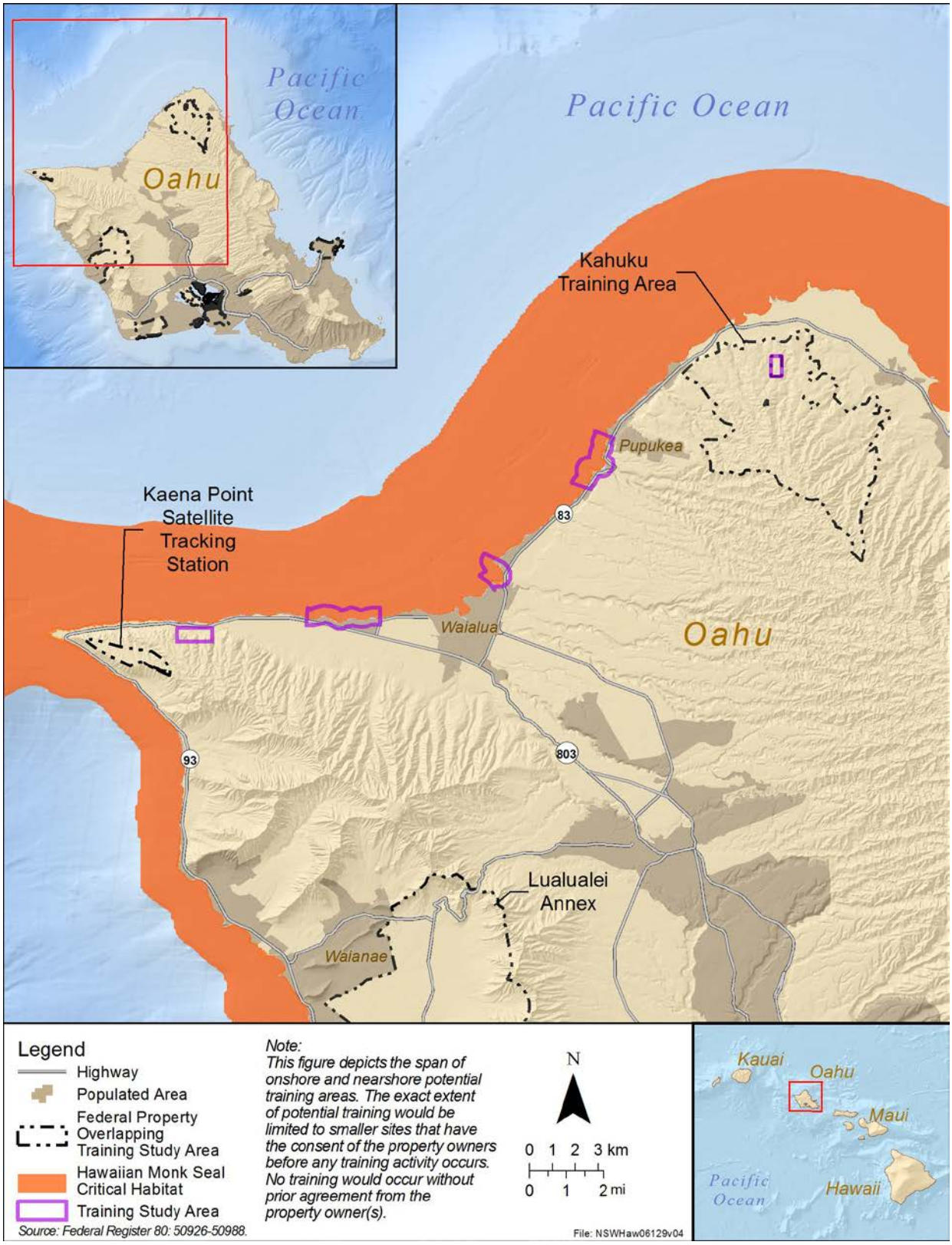

Figure 3-11: Hawaiian Monk Seal Critical Habitat within and Adjacent to the Training Study Area: North Oahu

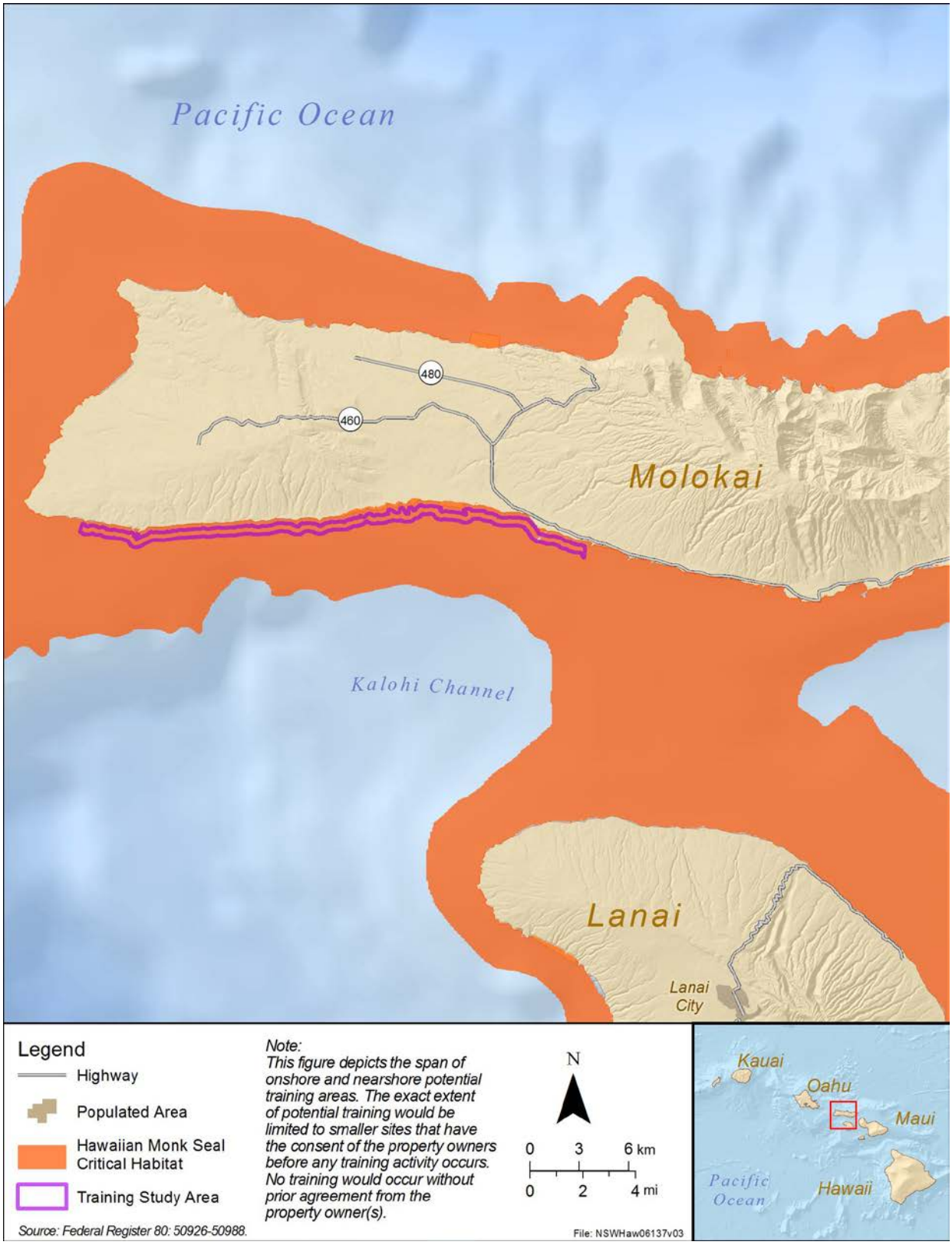

Figure 3-12: Hawaiian Monk Seal Critical Habitat within and Adjacent to the Training Study Area: Molokai

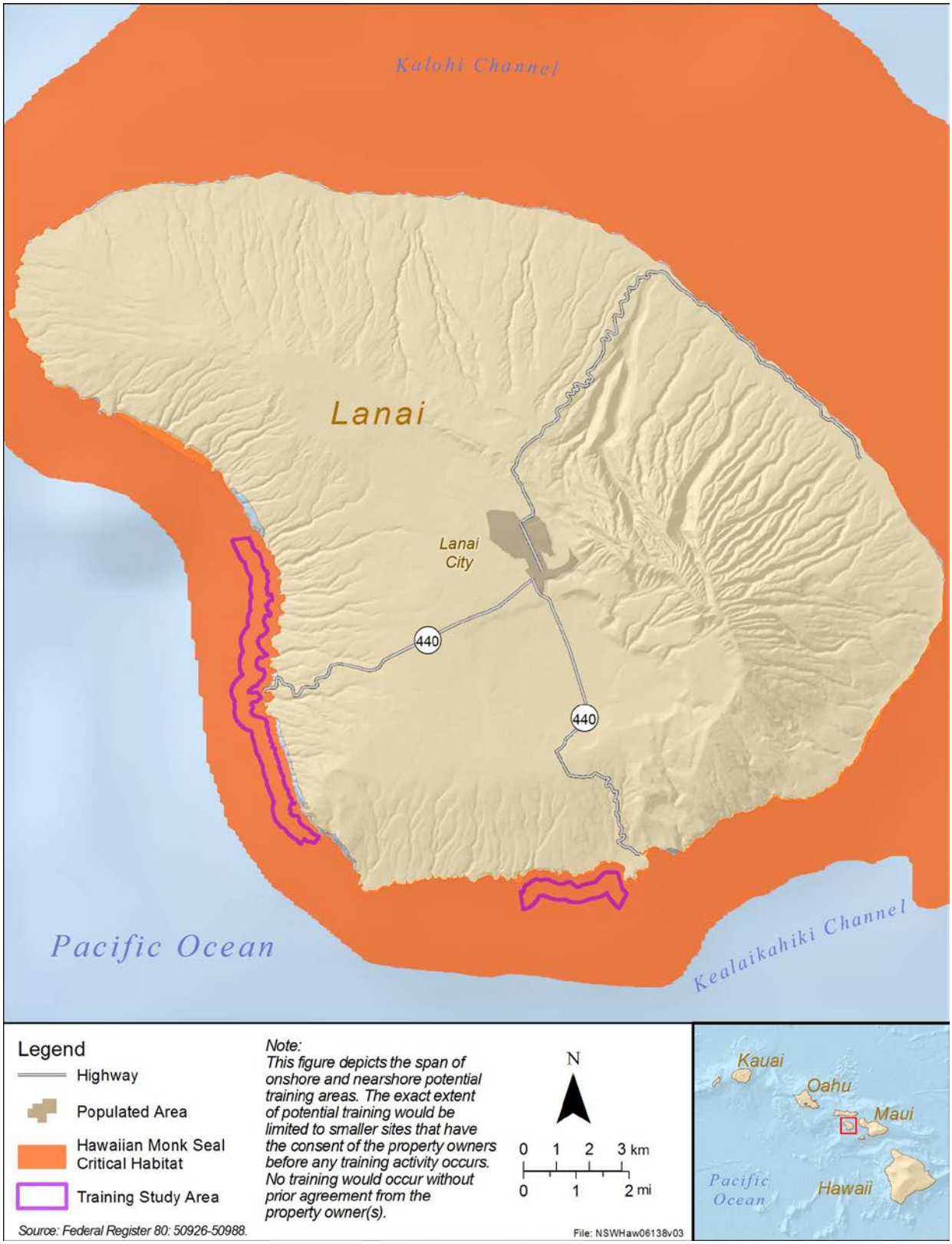

Figure 3-13: Hawaiian Monk Seal Critical Habitat within and Adjacent to the Training Study Area: Lanai

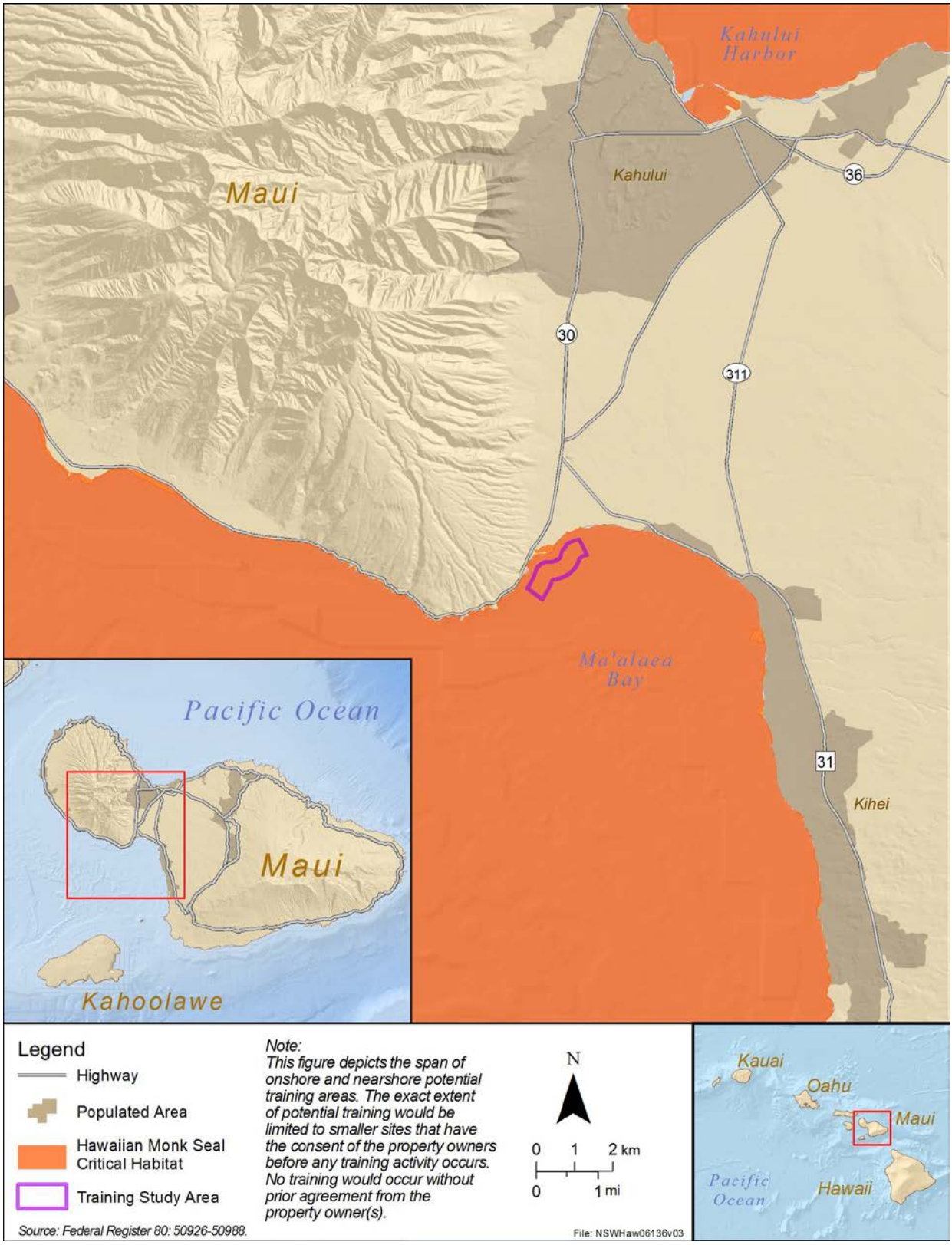

Figure 3-14: Hawaiian Monk Seal Critical Habitat within and Adjacent to the Training Study Area: Maui

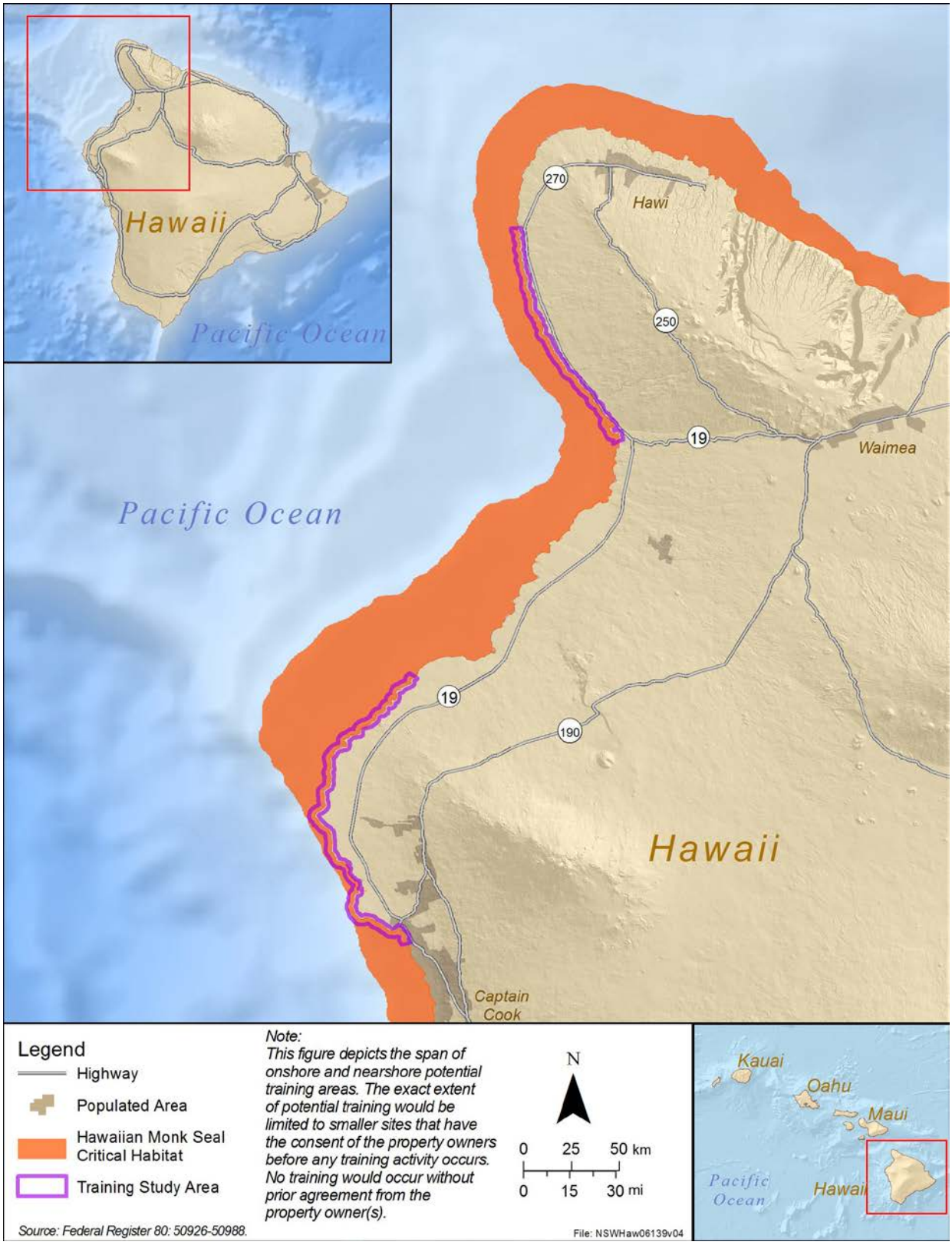

Figure 3-15: Hawaiian Monk Seal Critical Habitat within and Adjacent to the Training Study Area: Island of Hawaii

3.3.3 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. The Navy has identified three primary potential stressors from the Proposed Action that may impact biological resources and are described below:

1. **Physical Presence**. The physical presence of submersibles, swimmers, surface vessels, and trainees on land may cause temporary behavioral impacts on animal species.
2. **Acoustic Stressors**. Some training activities would generate noise in the environment, such as the use of surface vessels, vehicles, simulated munitions, and aircraft (e.g., sonar navigational devices similar commercial fish finders, UASs, tiltrotor aircraft, and helicopters).
3. **Physical Disturbance and Strike**. Training activities described in this EA may directly contact or strike a species.

A number of activity-specific protection measures, installation-specific natural resource training constraints, and other factors reduce the potential impacts of stressors on biological resources and are summarized below. These measures are common to all alternatives analyzed in this EA.

Activity-specific Protection Measures. In order to reduce the potential impacts of the stressors from the Proposed Action, training activities are designed with activity-specific protection measures that ensure compliance with existing agreements between the Navy and regulatory agencies. Examples of these measures include watch-out and avoidance procedures for marine mammals in water and on land, as well as avoiding potential impacts on seagrass beds by avoiding sensitive areas and timing of activities (e.g., avoiding low tides for some sensitive locations). In addition, trainees reference the PMAP Mitigation Report for in-water training activities, and reference other restrictions during training activities on land. PMAP is a decision support and situational awareness software tool that the Navy uses to facilitate compliance with mitigation measures when conducting certain training activities. PMAP ensures that trainees involved in an activity are aware of the mitigation requirements and that all mitigations are implemented appropriately. For example, operators are required to obtain a PMAP Mitigation Report prior to each training cycle. Specific mitigation measures for in-water activities are discussed in more detail under each resource area where PMAP is applicable.

Location-specific Natural Resource Training Restrictions. Proposed training activities would adhere to location-specific training restrictions defined in installation INRMPs (for DoD-owned properties) and land use and real estate agreements for any non-federal properties where training activities would occur. These restrictions are the result of stewardship and compliance actions in consultation with USFWS and NMFS for other military proposed actions. These training constraints are also adhered to for training activities and are considered in the analysis of potential impacts of the Proposed Action. These constraints are discussed in the following analyses for potential impacts of the proposed training activities. For activities that may occur on non-federal properties, sensitive ecological resources may be defined in land use and real estate agreements. For example, training activities that may occur on state parks would be by agreement with the Hawaii DLNR State Parks Division. Training activities would be consistent with management objectives of individual parks, including prohibiting training in sensitive areas containing important natural and cultural resources.

Biosecurity Standard Operating Procedures. Biosecurity planning is a standard operating procedure during exercise planning and execution. All training events would be conducted in accordance with existing military training procedures, approved SOPs, and protective mitigation measures that are in place to avoid or minimize the potential for biosecurity concerns. Naval special operations personnel

would follow site-specific recommendations in Navy, U.S. Marine Corps, and Army installations in Hawaii, where activity planners and resource managers have a suite of recommendations to reduce, to the maximum extent practical, the transport, introduction, and establishment of potentially invasive species. Other recommendations may be sourced from the Navy-funded *Regional Biosecurity Plan for Micronesia and Hawaii*, completed in 2015. Volume I, Appendix K of the biosecurity plan addresses general biosecurity recommendations for the State of Hawaii, and Appendix M includes recommendations for U.S. DoD activities (U.S. Department of the Navy, 2015b). Volume II of the Biosecurity Plan includes a risk assessment for potential introductions of invasive species to freshwater environments (U.S. Department of the Navy, 2015a), Volume III includes a risk assessment for marine environments (U.S. Department of the Navy, 2015d), and Volume IV includes a risk assessment for potential introductions on land in terrestrial environments (U.S. Department of the Navy, 2015c).

Host installations are responsible for relaying any installation-specific biosecurity requirements and concerns. These same recommendations would be followed to the maximum extent practical in areas not under DoD jurisdiction. For example, biosecurity concerns may be identified in land use and real estate agreements for activities that may occur on state parks and other non-federal properties. With site-specific recommendations in Navy and Army installations in Hawaii, site-specific measures that may be identified on state parks and other non-federal properties, and general biosecurity measures identified in Regional Biosecurity Plan for Micronesia and Hawaii, activity planners and resource managers have a suite of recommendations to reduce, to the maximum extent practical, the transport, introduction, and establishment of potentially invasive species. Because of the types of training activities discussed in this EA, and with biosecurity procedures actively in place, the potential for invasive species transport and spread associated with the proposed training activities is not analyzed as a potential stressor on biological resources.

Siting for Potentially Invasive Training Activities. Siting of certain activities is an important consideration for the analysis of potential impacts on biological resources. For example, the use of simulated munitions would only occur at specific locations during simulated building clearance training activities, in existing structures and occasionally outdoors. These structures are located in previously developed areas, and the noise generated from simulated munitions would not likely impact biological resources in any measureable way. For those activities that would occur outside, the noise generated from firing the simulated munition would be similar to that of firing an air rifle or slamming a car door and significantly less than the noise produced from firing actual live rounds. It also would not likely impact biological resources in any measurable way. Practice locations for UAS are sited only on federal properties or in already-approved airspace. These siting restrictions for potentially disturbing training activities reduces the potential for biological resources to be exposed to noise-related stressors.

Low Impact/Minimally Invasive Training Activities. Training activities considered in this EA are designed to be minimally invasive. Potential impacts from stressors on biological resources are minimized by the nature and objectives of the training activity. In addition, the stressors that would potentially impact biological resources are similar to factors that may alert potential adversaries and non-combatants in real-world operations.

3.3.3.1 No Action Alternative

Under the No Action Alternative, training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions. Therefore, no significant impacts on biological resources would occur with implementation of the No Action Alternative.

3.3.3.2 Alternative 1

3.3.3.2.1 Terrestrial Biological Resources

Terrestrial Vegetation, Including Special-Status Plants

The stressor analyzed for potential impacts on terrestrial vegetation is physical disturbance and strike. Foot traffic during training exercises and vegetation management to maintain landing zones are the only activities that would introduce physical disturbance and strike stressors for terrestrial vegetation. Physical presence and acoustic stressors are not applicable to terrestrial vegetation. Secondary stressors are not analyzed because terrestrial vegetation would not be impacted by temporary impacts on water quality.

Physical Disturbance and Strike. There is the potential for trainees to step on vegetation as they move through an area. Because the goal of training is for the trainees to be in the field undetected, the environment would be minimally disturbed and materials (e.g., gear and trash) would not be left behind. In addition, identical travel routes would be rarely used; the level of foot traffic associated with each group would not wear paths in the training study area. Training activities on federal property would be in compliance with installation INRMPs, and sensitive biological resources would be identified and avoided to the maximum extent practicable. Similarly, land use and real estate agreements would also identify sensitive biological resources within state parks and other non-federal properties. These areas would be avoided in accordance with land use and real estate agreements.

Existing vegetation management (mowing grass) would be continued at areas proposed for landing zone and drop zone training activities (JBPHH Region: Pearl City Peninsula, Ford Island; North Oahu Region: Kanes (drop zone only); and West Oahu Region: Lualualei Annex). To maintain safe and accessible helicopter landing zone and drop zone training at Waipio Peninsula (JBPHH Region), minor vegetation removal is required (i.e., selective cutting of larger non-native brush and trees). Processing of cut vegetation is required to use the JBPHH's green waste protocol to prevent the spread of the coconut rhinoceros beetle (*Oryctes rhinoceros*) (Joint Base Pearl Harbor-Hickam, 2016).

Proposed training activities within the West Oahu Region portion of the training study area at Lualualei Annex would overlap the occurrence of three endangered plant species: *Marsilea villosa*, *Cyperus trachysanthos*, and *Abutilon menziesii*. There is no critical habitat within the Lualualei Annex portion of the training study area. Because of the non-intrusive nature of proposed training that would occur within the Lualualei Annex portion training study area, and because trainees would avoid areas that may support individual listed plant species identified in the JBPHH INRMP and by the installation Natural Resources Manager, there would be no significant impacts to individual plants with implementation of Alternative 1.

On Kauai, over-the-beach training would overlap 196 acres of designated critical habitat for *P. niihauense* and 110 acres for *S. tomentosa* within Polihale State Park. Both species are known to occur only within state-owned land at Polihale State Park (68 Federal Register 9116). Although designated critical habitat occurs within four areas on PMRF, proposed training activities would not occur within these areas. Because of the non-intrusive nature of proposed over-the-beach training that would occur in critical habitat within Polihale State Park, and because trainees would avoid areas that may support individual *P. niihauense* and *S. tomentosa* identified in the real estate agreements between the Navy and the Hawaii DLNR State Parks Division, there would be no significant impacts to individual *P. niihauense* and *S. tomentosa* or associated critical habitat with implementation of Alternative 1.

Impact Summary. Impacts on vegetation from Alternative 1 are expected to be minimal, short term, and temporary based on the (1) relatively low intensity of the impacts, (2) localized nature of the impacts, (3) infrequent nature of the impacts, and (4) brief duration of the activities (Table 2-2). Overall, the non-invasive nature of the naval special operations training activities (e.g., no live-fire, no construction, no digging, no fires, no human waste) would have minimal effects on terrestrial vegetation because of the short duration, infrequency of occurrence, and low intensity of the proposed training activities. Because the goal of training is for the trainees to be in the field undetected, the environment would be minimally disturbed and materials (e.g., gear and trash) would not be left behind. In addition, identical travel routes would rarely be used; the level of foot traffic associated with each group would not wear paths in the training study area. Long-term consequences to terrestrial vegetation are not expected under Alternative 1. Therefore, no significant impacts on vegetation would occur with implementation of Alternative 1.

ESA Determination. Pursuant to the ESA, proposed training activities, as described above, may affect, but are not likely to adversely affect ESA-listed plants and associated critical habitat. As required by section 7(a)(2) of the ESA, the Navy is conducting informal consultation with the USFWS to assess the potential impacts of the Preferred Alternative (Alternative 2) on ESA-listed terrestrial species and associated critical habitat. The outcome of the consultation will be described in the Final EA.

Terrestrial Wildlife, Including Special-Status Species

Physical presence, physical disturbance and strike, and acoustic stressors were analyzed because these stressors may potentially impact terrestrial wildlife resources. Potential impacts to migratory birds and the ESA-listed Hawaiian coot, Hawaiian moorhen, Hawaiian duck, Hawaiian stilt, and Hawaiian goose are assessed below. In addition, there is potential for the ESA-listed Hawaiian hoary bat, Newell's Townsend's shearwater, band-rumped storm petrel, and Hawaiian petrel to fly through areas where training activities would occur on Kauai and the Island of Hawaii.

Physical Presence. If trainees are in close proximity to birds, birds may flush or flee from nests and roosts, stop normal activities (e.g., foraging), or may not react at all. Once the trainees have passed and the perceived threat is gone, flushed birds would return to previous activities (Wright et al., 2007). The Hawaiian hoary bat, with year-round occurrence likely at all the proposed land training areas, may forage in close proximity to trainees during night-time and early evening training activities. Responses from bats, if any, may include moving to other foraging areas away from the training activity. Because the goal of training is for trainees to be in the field undetected, the environment would be minimally disturbed. In addition, identical travel routes would not be used; trainees would not pass through the same areas in the training study area. Because these are trainees in training, support vehicles are on standby for safety and may disturb birds; however, the support vehicles would stay on established roads. These disturbances are expected to be short term and infrequent.

On military installations where land training activities are proposed, a number of mitigation measures would be implemented to reduce potential training impacts on terrestrial wildlife species. JBPHH; Marine Corps Base Hawaii, Kaneohe Bay; and PMRF support a number of ESA-listed waterbird species. Within the land portions of the training study area where training activities are proximate to sensitive wildlife resources, the Navy continues to prohibit some activities within 1,000 meters of posted signs marking the presence of rare and protected plant and animal species or restoration projects. In addition, night training would use no or minimal lighting, which would avoid visual disturbance to nocturnal species (e.g., shearwaters). Training activities would be consistent with training area restrictions defined

in installation INRMPs, where training activities would either be limited or prohibited to avoid potential impacts to sensitive ecological resources (U.S. Department of the Navy, 2010b, 2011c, 2012; U.S. Marine Corps, 2011, 2017). Where areas are not clearly marked, coordination with installation environmental personnel would occur prior to training activities. For example, at PMRF, training activities would be coordinated with installation personnel to avoid locations of Laysan albatross and wedge-tailed shearwater nests and other areas where the birds may be present.

For activities that may occur on non-federal properties, sensitive ecological resources may be defined in land use and real estate agreements. For example, training activities that may occur on state parks would be by agreement with the Hawaii DLNR State Parks Division. Training activities would be consistent with management objectives of individual parks, including prohibiting training in sensitive areas containing important natural and cultural resources.

Physical Disturbance and Strike. Helicopters used during training activities may present strike risk and physical disturbance from rotor wash for ESA-listed and migratory birds and Hawaiian hoary bats. Drop zones and landing zones are proposed for use during training activities on Oahu. These sites are at locations on: JBPHH Region: JBPHH Pearl City Peninsula, Ford Island, Waipio Peninsula; North Oahu Region: Kanes (drop zone only); Windward Oahu Region: Marine Corps Base Hawaii, Kaneohe Bay; and West Oahu Region: Lualualei Annex. Sites proposed for drop zones and landing zones are in previously disturbed areas that are either abandoned paved areas overgrown with vegetation (e.g., former runway on Ford Island), previously disturbed areas now overgrown with shrubby non-native vegetation (e.g., kiawe and haole koa), or mowed areas. None of these sites are in wetland areas where waterbirds would be expected to nest and forage, however, waterbirds and other birds may transit through the area while a helicopter approaches a landing zone or drop zone. In addition, access to proposed drop zones within the marine environment offshore of Marine Corps Base Hawaii, Kaneohe Bay may impact migratory birds, particularly seabird colonies, with the potential for bird strikes or disturbance to adults and young at the nests. In accordance with standard Bird/Animal Aircraft Strike Hazard measures for aircrew safety and to avoid and minimize impacts to migratory birds and ESA-listed species, proposed aircraft activities would avoid all known seabird colonies and wetland areas that support migratory birds and ESA-listed waterbirds at JBPHH, PMRF, and Marine Corps Base Hawaii, Kaneohe Bay by 500 feet AGL and 1,000 feet laterally. Strike risk for bats would only occur while bats are actively foraging in open areas in and around landing zones (during twilight and nighttime training activities). Behavioral responses would likely include fleeing an area or moving away from the disturbance. Therefore, strike risk of birds or bats by helicopters would be considered unlikely.

UAS training would be restricted to military installations on Oahu and Kauai within authorized airspace, including restricted areas and warning areas. There is a strike risk of birds and bats when these species are in the same airspace as UAS, which typically operate below 3,500 feet (above mean sea level). Bats typically fly lower to the ground and would only be at risk for strikes when they are active (primarily at dusk and at night), and when UAS operate at lower altitudes and are taking off or landing. Proposed training activities using UAS would occur routinely at locations already used by other military aircraft. Birds and bats are already exposed to, and likely habituated to, military flight training activities in these locations. Therefore, strike risk by UAS would be considered minimal.

Trainees traversing beaches where bird nesting occurs have the potential to step on nests (crushing eggs or recently hatched chicks, or destroying nests, which may induce adult birds to abandon nests). Some nests are more difficult to detect. The potential for foot traffic during training activities to step on nests is not likely to occur for the same reasons specified above for physical presence (e.g., installation-

specific training constraints specified in INRMPs and communicated to operators by natural resource specialists, and training constraints specified in land use and real estate agreements for non-DoD properties). Similarly, potential strikes by surface vehicles used to support training activities are considered unlikely as vehicles would drive within specified speed limits on designated existing roads.

Existing vegetation management (mowing grass) would be continued at areas proposed for landing zone and drop zone training activities (JBPHH Region: Pearl City Peninsula, Ford Island; North Oahu Region: Kanes (drop zone only); and West Oahu Region: Lualualei Annex). To maintain safe and accessible helicopter landing zone and drop zone training at Waipio Peninsula (JBPHH Region), minor vegetation removal is required (e.g., selective cutting of larger brush and trees). Trees over 15 feet in height would not be felled during the endangered Hawaiian Hoary bat pupping season (approximately June 1–September 15). Processing of cut vegetation is required to use the JBPHH's green waste protocol to prevent the spread of the coconut rhinoceros beetle (*Oryctes rhinoceros*) (Joint Base Pearl Harbor-Hickam, 2016).

Acoustic Stressors. Numerous studies have documented that wild animals respond to human-made noise (Bowles et al., 1995; Goldstein et al., 2005; Krausman et al., 1998; Larkin et al., 1996; National Park Service, 1994; Weisenberger et al., 1996). The manner in which animals respond to noise depends on several factors, including life history characteristics of the species, characteristics of the noise source, loudness, how suddenly the sound occurs (onset rate), distance from the noise source, presence/absence of associated visual stimuli, and previous exposure to the sound. Noise may cause physiological or behavioral responses that reduce the animals' fitness or ability to grow, survive, and reproduce successfully. The potential effects of noise on wildlife can take many forms, including changing habitat use and activity patterns, increasing stress response, decreasing immune response, reducing reproductive success, increasing predation risk, degrading communication, and damaging hearing if the sound is sufficiently loud or prolonged (Larkin et al., 1996).

Studies on the effects of aircraft noise on wildlife have been predominantly conducted on mammals and birds. Some studies have shown that the responses of large mammals to aircraft noise are transient and of short duration and suggest that animals acclimate to the sounds (Krausman et al., 1993; Krausman et al., 1998; Weisenberger et al., 1996). Similarly, the effect on raptors and other non-migratory birds (e.g., waterfowl, grebes) from aircraft low-level flights were found to be brief and not detrimental to reproductive success (Ellis et al., 1991; Grubb & Bowerman, 1997; Lamp, 1989; Smith et al., 1988).

A strong and consistent behavioral or physiological response is not necessarily indicative of negative consequences to individuals or to populations (Bowles, 1995; Larkin et al., 1996; National Park Service, 1994). For example, many of the reported behavioral and physiological responses to noise are within the range of normal adaptive responses to external stimuli, such as predation, that wild animals face on a regular basis. In many cases, individuals would return to homeostasis or a stable equilibrium almost immediately after exposure. The individual's overall metabolism and energy budgets would not be affected, assuming it had time to recover before being exposed again. If the individual does not recover before another exposure, physiological responses could be cumulative and lead to reduced fitness. However, it is also possible that an individual would have an avoidance reaction (i.e., move away from the noise source) to repeated exposure or habituate to the noise when repeatedly exposed.

A primary concern with implementation of the proposed action is that low-altitude overflights may cause physiological or behavioral responses that reduce the animals' fitness or ability to survive. High-noise events (like a low-altitude aircraft overflight or sudden sonic boom) may cause animals to startle

or engage in escape or avoidance behaviors, such as flushing or running away. These activities impose an energy cost that, over the long term, may affect survival or growth. In addition, the animals may spend less time engaged in necessary activities like feeding, foraging, or caring for their young because they spend time in noise avoidance activity. However, most of the effects of noise are mild enough that they may never be detectable as changes in population size or population growth against the background of normal variation (Bowles, 1995). Many other environmental variables (e.g., predators, weather, changing prey base, ground-based human disturbance) may influence reproductive success and confound the ability to identify the ultimate factor in limiting productivity of a certain nest, area, or region.

The only noise source analyzed for potential impacts on terrestrial wildlife is the use of helicopters and UAS. Helicopters typically operate below 3,000 feet AGL when supporting drop zone training activities utilizing parachutes and may occur as low as 5–100 feet AGL when supporting helicopter rope suspension techniques. This low altitude increases the likelihood that birds would respond to noise from helicopter overflights with reactions such as flushing (Stalmaster & Kaiser, 1997). Helicopters travel at slower speeds (less than 100 knots), which increases the duration of noise exposure compared to fixed-wing aircraft. Nearshore areas of the coast are the primary foraging habitat for many bird species. The presence of dense aggregations of birds associated with coastal habitats (including Pearl Harbor and inland wetlands within the training study area) is a potential concern during low-altitude helicopter activities. Although birds may be more likely to react to helicopters than to fixed-wing aircraft, Navy helicopter pilots avoid large flocks of birds to protect aircrews and equipment, thereby also reducing disturbance to birds. In accordance with the Marine Corps Base Hawaii Kaneohe Bay Bird/Animal Aircraft Strike Hazard (BASH) Plan and the implementation of standard measures for aircrew safety, and to avoid and minimize impacts to migratory birds and ESA-listed species, proposed aircraft activities would avoid all known seabird colonies and wetland areas that support migratory birds and ESA-listed waterbirds at JBPHH and Marine Corps Base Hawaii, Kaneohe Bay by 500 feet AGL and 1,000 feet laterally. Noise from drop zone activities and low-altitude helicopter overflights would only be expected to elicit short-term behavioral or physiological responses in exposed birds. Occasional startle or alert reactions to aircraft noise are not likely to disrupt major behavior patterns (such as migrating, breeding, feeding, and sheltering) or to result in serious injury to any birds.

UAS would be used in training activities during approximately 10 percent of the land-based training activities, and only on DoD property. Proposed UAS training is not expected to adversely affect any wildlife species in and around the DoD property where UAS would be used. In addition, many of the species that occur on military properties and around airfields are already exposed to, and likely habituated to, military flight training activities.

Impact Summary. Impacts on terrestrial wildlife resulting from physical presence, physical disturbance and strike, and acoustic stressors are expected to be minimal, short term, and recoverable based on the (1) relatively low intensity of the impacts, (2) localized nature of the impacts, (3) infrequent nature of the impacts, (4) brief duration of the activities, and (5) SOPs designed to minimize or avoid impacts on sensitive species and their habitats. Overall, the non-invasive nature of the training activities (e.g., no live-fire, no construction, no digging, no fires, no human waste) would have minimal effects on terrestrial biological resources because of the short duration, infrequency of occurrence, and low intensity of the proposed training activities. Training activities associated with the proposed action are low impact and activities would occur at infrequent intervals and for a brief duration of time. Because the goal of training is for the trainees to be in the field undetected, the environment would be minimally

disturbed. In addition, identical travel routes would rarely be used; the level of foot traffic associated with each group would not wear paths in the training study area. For these reasons, long-term consequences to individuals or populations of terrestrial wildlife are not expected to result from the proposed activities under Alternative 1. Therefore, no significant impacts on terrestrial wildlife would occur with implementation of Alternative 1.

MBTA Conclusion. A variety of bird species would be encountered in the training study area, including those listed under the MBTA. Under the MBTA regulations applicable to military readiness activities (50 C.F.R. Part 21), with implementation of the aircraft flight restrictions listed above, impacts from proposed training activities under Alternative 1 would not result in a significant adverse effect on migratory bird populations.

ESA Determination. The proposed training activities may affect, but are not likely to adversely affect two species of yellow-faced bees (*Hylaeus anthracinus* and *H. longiceps*), orangeblack damselfly, Hawaiian coot, Hawaiian common gallinule, Hawaiian duck, Hawaiian stilt, Hawaiian goose, Hawaiian petrel, band-rumped storm petrel, Newell's Townsend's shearwater, Hawaiian hawk, Hawaiian hoary bat, and three species of sea turtles (green turtle, hawksbill turtle, and olive ridley turtle) when they occur in the terrestrial environment because these species may be exposed to physical disturbance and strike and acoustic stressors. As required by section 7(a)(2) of the ESA, the Navy is conducting informal consultation with the USFWS to assess the potential impacts of the Preferred Alternative (Alternative 2) on ESA-listed terrestrial species and associated critical habitat. The outcome of the consultation will be described in the Final EA.

3.3.3.2.2 Marine Biological Resources

Marine Vegetation

Physical disturbance and strike is the only stressor from training activities that may impact marine vegetation. Other stressors, such as physical presence, are not analyzed because proposed training activities would not introduce these stressors to submerged marine vegetation, and acoustic stressors are not applicable to marine vegetation. For example, the Proposed Action does not include construction on undeveloped lands or permanent ground-disturbing activities over an undisturbed area, and the footprint of each training activity would not measurably change the water quality in any given area or result in turbidity that would affect the marine environment. There are no ESA-listed marine plant species within the training study area and no designated critical habitat for marine plants.

Physical Disturbance and Strike. Under Alternative 1, activities that involve vessels and personnel in the water and on the seafloor could impact marine vegetation present in the training study area. Such activities would include inflatable boat landings and foot traffic from trainees swimming from boats to shore and walking in the intertidal and beach zones. As a general practice, small inflatable boats used during activities land at the more sandy areas where less vegetation is present to avoid damage to vessels. The shoreline environment is also typically very dynamic because of its exposure to wave action and cycles of erosion and deposition. Marine vegetation disturbed by training activities would also be influenced by natural disturbances, such as waves, tide, current, and storm energy. Marine vegetation, if disturbed by training activities, is expected to recover shortly after the disturbance.

Impact Summary. Proposed training activities would have minimal impacts on submerged vegetation because the types of training activities that would occur in areas supporting marine vegetation (e.g., swimming, personnel insertions using small rubber craft) are minimally invasive to marine environments. Because marine vegetation is already adapted to natural disturbances, any disturbances

from activities under Alternative 1 would not be expected to cause long-term or permanent impairment to the surrounding marine vegetation, particularly at the proposed training frequency. Therefore, no significant impacts on marine vegetation would occur with implementation of Alternative 1.

Marine Invertebrates

Physical disturbance and strike stressors could potentially impact corals and marine invertebrates within the training study area and are analyzed below. Other stressors (physical presence and acoustic stressors) are not analyzed because introduction of these stressors would be limited, and some stressors (acoustic) would not apply to marine invertebrates. No ESA-listed marine invertebrates or associated designated critical habitat are found within the training study area.

Physical Disturbance and Strike. Under Alternative 1, small inflatable boat landings and foot traffic from trainees swimming from boats and submersibles to shore and walking in the intertidal and beach zones could impact marine invertebrates, such as corals, that are present in the training study area by damaging or removing those species during training activities. Recovery from potential damage could be slow depending on the species. However, as a general practice, small inflatable boats would be used during these activities and would be used more on sandy areas, where fewer invertebrates are present and where damage to the boats could be more readily avoided .

In NMFS' 2014 *Biological Opinion of U.S. Navy's Training Exercises and Testing Activities in the Hawaii-Southern California Training and Testing Study Area* (National Marine Fisheries Service, 2014, 2015), National Oceanic and Atmospheric Administration Fisheries Service determined that eight species of coral (*Acropora paniculata*, *Alevopora verrilliana*, *Pocillopora elegans* - Indo Pacific, *Euphyllia paraancora*, *Montipora dilatata*, *Montipora flabellata*, *Montipora turgescens*, and *Montipora patula* [*verrilli*]) that were proposed for listing at the time would not be affected by the Proposed Action (including amphibious warfare activities and Naval Special Operations' training activities) because of existing Navy SOPs that avoid impacts on corals. Due to this Biological Opinion, NMFS determined that listing of these corals was "not warranted." As stated previously, the same standard operation procedures and mitigation measures named in the NMFS' 2014 Biological Opinion for similar training activities described in this EA would be carried forward, therefore avoiding or minimizing potential impacts on corals.

Impact Summary. Proposed training activities would have minimal impacts on marine invertebrates because of the minimally invasive training activities and avoidance measures (e.g., timing of activities to avoid low tides and geographic restrictions on sensitive coral reef areas). Any disturbances from activities under Alternative 1 would not be expected to cause long-term or permanent impairment to the surrounding benthic habitats because any damage would likely be very small and localized. Therefore, no significant impacts on marine invertebrates would occur with implementation of Alternative 1.

Marine Fishes, Including Special-Status Species

Stressors analyzed below include physical presence, physical disturbance and strike, and acoustic stressors because of their potential to impact fishes in the training study area. There are two ESA-listed fish species, the oceanic whitetip shark and giant manta ray, within the training study area and no designated critical habitat for fishes. Numerous fish species are managed by the WPRFMC, and potential impacts to those species are analyzed below.

Physical Presence. Activities proposed under Alternative 1 that involve vessels, personnel, and parachute operations in the water could impact fish present in the training study area. Such activities would include landing on shore with small inflatable boats, moving through water in the submersible vehicle, foot traffic from trainees swimming from boats to shore, and trainees being deployed from aircraft into the water to conduct drop zone training activities (e.g., parachute operations, cast and recover, or helicopter rope suspension training). These activities are proposed to occur nearshore and in the waters off any one of the training locations, as well as other nearshore areas of the training study area. Water-based drop zone training activities are proposed at JBPHH and Marine Corps Base Hawaii. Fish would likely only respond to trainees in the water by fleeing the area and return to normal activities (e.g., foraging, resting) after the training activity has concluded. These impacts would be short term and minor, with no long-term impacts on fish or fish populations in coastal waters where training activities would occur.

Physical Disturbance and Strike. Vessels do not normally collide with fish, most of which can detect and avoid them. One study on Barents Sea capelin (*Mallotus villosus*) behavioral responses to vessels showed that most adults exhibit avoidance responses to engine noise, sonar, depth finders, and fish finders, reducing the potential for vessel strikes (Jørgensen et al., 2004). Activities involving vessel movements occur intermittently and range in duration from a few minutes to a few hours. While vessel movements have the potential to expose fish occupying the water column to sound and general disturbance, potentially resulting in short-term behavioral or physiological responses, such responses would not be expected to compromise the general health or condition of individual fish.

Acoustic Stressors. Noise from submersible sonar, vessels, and aircraft has the potential to expose fish to sound and general disturbance, which could result in short-term temporary behavioral or physiological responses (e.g., avoidance, stress, increased heart rate) (Popper & Hawkins, 2016).

Submersibles use a sonar device to report depths to aid in navigation during a training activity. These devices have similar specifications to commercially available “fish finders” and other hand-held sonar devices, which typically generate frequencies over 200 kilohertz (kHz) and source levels less than 160 decibels (dB) referenced to 1 micropascal (dB re 1 µPa). In the NMFS’ 2015 *Biological Opinion of U.S. Navy's Training Exercises and Testing Activities in the Hawaii-Southern California Training and Testing Study Area* (National Marine Fisheries Service, 2014, 2015), devices with these specifications are considered *de minimis* sources of sound in the water. For fishes, the frequencies over 200 kHz overlaps with the hearing sensitivities of some fish species (e.g., a few species of shad within the Clupeidae family), but the low-intensity sound levels generated by these devices, the rapid dissipation of high-frequency sonar in water, and the localized area of impacts are unlikely to impact fishes (Popper & Hawkins, 2016).

Fishes may be exposed to sound from vessel movement, which involves transits to and from ports to various locations within the training study area. Proposed training activities involve maneuvers by various types of surface ships, boats, small personal watercraft, and submarines (collectively referred to as vessels). Moderate- to low-level passive sound sources, including vessel noise, would not likely cause any direct injury or trauma due to characteristics of the sounds and the moderate source levels. Training activities involving vessel movements would occur intermittently and are widely dispersed throughout the training study area. All fish species should be able to detect vessel noise due to its low-frequency content and their hearing capabilities, and exposure to vessel noise would only result in short-term behavioral or physiological responses (e.g., avoidance, stress).

Rotary-wing aircraft (helicopters) produce low-frequency sound and vibration (Pepper et al., 2003). Aircraft would pass quickly overhead and helicopters may hover for up to 15 minutes at a time at a distance of 5–15 feet above the water surface during water-based drop zone activities. Even though fish may be exposed to fixed-wing or helicopter aircraft-generated noise wherever aircraft overflights occur, the sound is primarily transferred into the water from air in a narrow cone under the aircraft. Fish would have to be at or near the surface at the time of an overflight to be exposed to significant sound levels.

Impact Summary. The risk of physical presence of trainees, physical disturbance or strike from vessels, and acoustic energy (noise) generated during training activities under Alternative 1 would be extremely low because (1) most fish can detect and avoid vessel (surface and submersible) and human movements, and (2) activities occur at infrequent intervals and for a brief duration of time. Potential impacts of exposure to vessels and noise generated by vessels are not expected to result in substantial changes to an individual's behavior, fitness, or species recruitment and are not expected to result in population-level impacts. Since impacts from these stressors would be unlikely, impacts on individual fish or fish populations would be negligible. Therefore, no significant impacts on marine fish would occur with implementation of Alternative 1.

Essential Fish Habitat Conclusion. Pursuant to the EFH requirements of the MSA and implementing regulations, activities proposed under Alternative 1 that involve vessels and personnel in the water could potentially impact EFH species and habitats present in the training study area. Such activities would include landing on shore with small inflatable boats, and foot traffic from trainees swimming from boats and submersibles to shore and walking in the intertidal and beach zones. These areas are typically very dynamic because of their exposure to wave action and cycles of erosion and deposition. Some temporary behavioral or physiological responses (e.g., avoidance, stress, increased heart rate) would occur from increased vessel and aircraft noise, but these impacts would be short term and temporary in nature. In addition, the physical presence of training activities in nearshore areas where EFH species and habitats occur could disturb, damage, or remove habitat used by EFH species. However, it is expected that most of these impacts would be temporary, and recovery would occur over a short period of time.

Disturbances from activities under Alternative 1 would also not be expected to cause long-term or permanent impairment to EFH because of the dynamic nature of these nearshore habitats, and SOPs would be used to avoid impact on marine invertebrates, vegetation, and fish that are protected under EFH. These procedures include restricting vessel activity to high-tide periods to avoid direct impacts on corals when activities would occur over sensitive benthic habitats (other SOPs that would avoid impacts on other marine resources are described under sea turtles and marine mammals). Therefore, no significant impacts on EFH species or habitat would occur with implementation of Alternative 1. In addition, no direct or indirect changes to EFH that would have a considerable impact on waters, substrate, or prey necessary for spawning (fish, invertebrates, or vegetation), breeding, feeding, or growth to maturity of aquatic species would occur. The Navy has determined that under Alternative 1 there would be no adverse effect on EFH within the training study area.

ESA Determination. Pursuant to the ESA, proposed training may affect oceanic whitetip shark and giant manta ray in all marine portions of the Training Study Area. As required by section 7(a)(2) of the ESA, the Navy is conducting informal consultation with NMFS to assess the potential impacts of the Preferred Alternative (Alternative 2) on ESA-listed marine species and associated critical habitat. The outcome of the consultation will be described in the Final EA.

Sea Turtles

Physical presence, physical disturbance and strike, and acoustic stressors are analyzed below because they have the potential to impact sea turtles in the training study area. There are no critical habitat designations for sea turtle species within the training study area.

Physical Presence. Activities proposed under Alternative 1 that involve vessels, personnel, and parachute operations in the water could impact sea turtles present in the training study area. Such activities would include small vessel movements, in-water presence of trainees swimming to beaches, and trainees being deployed from aircraft into the water to conduct drop zone training activities (e.g. parachute operations, cast and recover, or helicopter rope suspension training). These activities are proposed to occur nearshore and in the waters off any one of the training locations, as well as other nearshore areas of the training study area. Water-based drop zone training activities are only proposed at JBPHH and MCBH. Sea turtle presence in the training study area would be common and occur in the same areas where training activities are proposed. Swimmer presence, boat traffic, and submersible use have the potential to disturb turtles and elicit an alerting, avoidance, or other behavioral reaction. As stated previously, minimal to no lighting is used during training activities, which avoids disturbance to nesting females and emergent hatchlings from artificial lighting.

Physical Disturbance and Strike. Sea turtles can detect approaching vessels, likely by sight rather than by sound (Bartol & Ketten, 2006). During water-based training, use of NSWC vessels such as small personal watercraft operated at high speeds within nearshore waters could present a relatively greater risk for strike because of the higher concentrations of sea turtles in these areas and the difficulty for vessel operators to avoid collisions when conducting high-speed activities. Vessel-related injuries to sea turtles are more likely to occur in areas with high boating traffic, such as harbors and marinas. NMFS maintains a sea turtle stranding database, which tracks stranding event locations and likely causes (e.g., boat impacts, fishing gear interactions). Of the 176 sea turtle stranding events reported for sea turtles in 2015, 22 (12.5 percent) were from boat impacts (National Marine Fisheries Service, 2015). Of the 22 strandings that likely resulted from boat impacts, 19 were from Oahu, 1 from Kauai, 1 from Maui, and 1 from the Island of Hawaii. Two of the 19 Oahu strikes were reported from Pearl Harbor (the NMFS database does not indicate if the strike was from a Navy vessel). Depending on the training location, the risk for vessel strike varies based on where the training activity would occur. During proposed water-based training activities, a crewman would act as a lookout during training evolutions on boats and support vessels to avoid sea turtles that may enter the area during training activities. During nighttime training, the lookout would be equipped with night vision goggles. If a sea turtle is observed in the vicinity of the training area when submersibles are used, the support vessel would signal the submersible for recall, or training may be shifted to avoid the sea turtle. If a sea turtle is in the immediate area of a training activity, the activity would cease until the sea turtle leaves the area. In some instances, canceling the training for the night may be necessary.

Strikes to sea turtles from water-based drop zone activities would be unlikely because safety personnel observe areas prior to activities taking place to ensure marine mammals are not present.

Over-the-beach training activities presents risks to sea turtle nests and hatchlings. SOPs that are captured in pre-activity planning and part of installation training restrictions include the following: (1) prior to conducting a landing exercise, an inspection and survey protocol includes a pre-landing survey (within one hour of the activity) of sea turtles on the beach and sea turtle nesting sites; (2) sea turtle nesting sites are marked, and no trespassing by persons or vehicles within 50 feet of the nest is

permitted; and (3) should sea turtles be found on the beach, the landing activity is delayed until the animal(s) have voluntarily left the area or moved to another location free of such animals.

Acoustic Stressors. Noise from submersible sonar, vessels, and aircraft has the potential to expose sea turtles to sound and general disturbance, which could result in short-term temporary behavioral or physiological responses (e.g., avoidance, stress, increased heart rate). Submersibles use a sonar device to report depths to aid in navigation during a training activity. These devices have similar specifications to commercially available "fish finders" and other hand-held sonar devices, which typically generate frequencies over 200 kHz and source levels less than 160 dB re 1 µPa. In NMFS' 2015 *Biological Opinion of U.S. Navy's Training Exercises and Testing Activities in the Hawaii-Southern California Training and Testing Study Area* (National Marine Fisheries Service, 2014, 2015), devices with these specifications are considered *de minimis* sources of sound in the water. In addition, these devices are downward facing, which limits the volume of water that carries the high-frequency sound. For sea turtles, the behavioral effects threshold used by NMFS is 175 dB or greater; therefore, no behavioral effects would be expected because the sonar devices would not exceed the source level threshold for behavioral effects.

Popper (2014) suggests that the relative risk of a sea turtle behaviorally responding to a continuous noise, such as vessel noise, is high when near a source (tens of meters), moderate when at an intermediate distance (hundreds of meters), and low at farther distances. Sea turtles exposed to noise generated from Navy vessels during training activities may not respond at all or exhibit brief startle dive reactions. For example, if a sea turtle is observed basking on the surface near a passing vessel, it is not clear that the individual would exhibit any reaction other than a brief startle and avoidance reaction, if they react at all. Rotary-wing aircraft (helicopters) produce low-frequency sound and vibration; most of the underwater sounds from aircraft would be strongest just below the surface and directly under the aircraft, and the amount of sound entering the ocean from aircraft would be very limited in duration, sound level, and affected area. Some animals at or near the water surface may exhibit startle reactions to certain aircraft overflights if aircraft altitude is low. This could mean a hovering helicopter, for which the sight of the aircraft and water turbulence could also cause a temporary behavioral response.

Impact Summary. Impacts on sea turtles in water and on land are expected to be minimal, short term, and recoverable based on the (1) relatively low intensity of the impacts, (2) localized nature of the impacts, (3) infrequent nature of the impacts, (4) brief duration of the activities, and (5) SOPs designed to minimize or avoid impacts on sea turtles in water, at basking locations, and on nesting beaches. For these reasons, long-term consequences to individuals or populations of sea turtles in the terrestrial and marine environment are not expected to result from the activities under Alternative 1. Therefore, no significant impacts on sea turtles would occur with implementation of Alternative 1.

ESA Determination. Pursuant to the ESA, proposed training may affect green sea turtles, olive ridley, and hawksbill sea turtles in all marine portions of the training study area and over-the-beach training locations on Oahu and Kauai. As required by section 7(a)(2) of the ESA, the Navy is conducting informal consultation with the USFWS and NMFS to assess the potential impacts of the Preferred Alternative (Alternative 2) on ESA-listed sea turtle species within the terrestrial and marine environments. The outcome of the consultation will be described in the Final EA.

Marine Mammals

Physical presence, physical disturbance and strike, and acoustic stressors are analyzed below because of their potential to impact marine mammals in the training study area.

Physical Presence. Physical presence of trainees in the water may induce temporary behavioral changes. Because small craft and submersibles in the water would likely cause the initial response, behavioral changes associated with the physical presence of trainees are considered under the physical disturbance and strike stressor category. The Hawaiian monk seals and other ESA-listed marine mammals such as blue whales, fin whales, sei whales, and main Hawaiian island insular false killer whales could occur where training activities are proposed. The only designated critical habitat within the training study area is for the Hawaiian monk seal. Critical habitat for the main Hawaiian island insular false killer whales has been proposed in nearshore areas from the 45-meter to 3,200-meter depth contours around the main Hawaiian Islands from Niihau east to the Island of Hawaii. Numerous non-ESA-listed toothed whale species likely occur in nearshore waters of the training study area. These species are protected under the MMPA.

Physical Disturbance and Strike. Activities proposed under Alternative 1 that involve vessels, personnel, and parachute operations in the water could impact marine mammals such as humpback whales, main Hawaiian Island insular false killer whales, and Hawaiian monk seals, as well as other marine mammals (e.g., spinner dolphins) that are present in the training study area. Such activities would include small vessel movements, submersible movements through the water, and in-water presence of trainees swimming to beaches. These activities are proposed to occur nearshore and in the waters of the training study area. Water-based drop zone training activities are proposed to occur within the waters surrounding Marine Corps Base Hawaii and within JBPHH. Strikes to marine mammals from water-based drop zone activities would be unlikely because safety personnel observe areas prior to activities taking place to ensure marine mammals are not present.

Most vessel use would be in nearshore waters using small craft within the training study area. Marine mammals generally occur in deeper waters than the training study area, although spinner dolphins commonly occur close to land, and humpback whales occasionally venture close to shorelines (Costa & Kendall, 2016). Marine mammals engage in avoidance behavior when surface vessels move toward them (Magalhães et al., 2002; Senigaglia et al., 2016). It is not clear whether these responses are caused by the physical presence of a surface vessel, the underwater noise generated by the vessel, or an interaction between the two, though the noise generated by the vessels is probably an important contributing factor to the responses of cetaceans to the vessels. In one study, North Atlantic right whales were documented to show little overall reaction to the playback of sounds of approaching vessels, but they did respond to an alert signal by swimming strongly to the surface (Nowacek et al., 2016). Aside from the potential for a risk of collision, physical disturbance from vessel use is not expected to result in more than a short-term behavioral response, because marine mammals engage in these avoidance behaviors.

It is most likely that any marine mammal in the training study area would have an initial reaction to the boat's presence, such as leaving the area or tolerating the activity (e.g., continuing feeding, socializing, migrating, sleeping); a secondary reaction to the multiple trainees' presence in the water would not be likely to occur. Due to the passage of time (less than an hour) between the boat presence and trainees entering the water, animals are likely to continue with their initial reaction of either retreating from the area or tolerating the activity at the site.

Vessel speed, size, and mass are all important factors in determining potential impacts of a vessel strike to marine mammals (Conn & Silber, 2013; Gende et al., 2011; Silber et al., 2010; Vanderlaan & Taggart, 2007; Wiley et al., 2016). Overall, collision avoidance success is dependent on a marine mammal's ability to identify and locate the vessel from its radiated sound and the animal's ability to maneuver away from

the vessel in time. For example, based on hearing capabilities and dive behavior, some whales may not be capable of successfully completing an escape maneuver, such as a dive, in the time available after perceiving a fast-moving vessel.

Boats carrying trainees for specific qualification training activities comply with established boating laws, reduce speed in accordance with established safety procedures, and avoid contact and proximity to marine mammals. During proposed water-based training activities, a crewman would act as a lookout during training evolutions on boats and support vessels to avoid marine mammals that may enter the area during training activities. During nighttime training, the lookout would be equipped with night vision goggles. If a marine mammal is observed in the vicinity of the training area when submersibles are used, the support vessel would signal the submersible for recall, or training may be shifted to avoid the marine mammal. If a marine mammal were in the immediate area of a training activity, the activity would cease until it leaves the area. In some instances, canceling the training for the night may be necessary.

All vessels would avoid direct “head-on” approaches to marine mammals and maneuver to maintain a mitigation zone of 500 yards around whales and 200 yards around all other marine mammals (with the exception of bow-riding dolphins). These requirements do not apply when a vessel’s safety is at risk (e.g., a course correction would cause an imminent and serious threat to personnel and equipment). If a marine mammal other than a whale (e.g., dolphins riding bow waves) continues to close in on the vessel after there has already been one maneuver or speed change to avoid the marine mammal, no further action is required. During over-the-beach training, trainees would look for hauled-out Hawaiian monk seals while coming ashore. If a Hawaiian monk seal were spotted on the beach, trainees would stay at least 50 yards away to make sure the resting monk seal is not disturbed.

In addition to the above measures, SOPs would be implemented to minimize and avoid potential impacts to sensitive resources before training activities occur. For example, Navy Training and Operations staff adhere to Navy policies regarding education, inspections of training areas, and other protections at Pearl Harbor Naval Complex and nearshore training areas pertaining to marine mammals (including Hawaiian monk seals) and other protected species (U.S. Department of the Navy, 2011c, 2015b). Naval special operations personnel would adhere to military installation-specific SOPs or other measures such as those detailed in installation INRMPs. INRMPs integrate conservation measures as SOPs to minimize and avoid potential impacts to natural resources on military installations while maintaining military readiness. Prior to any training activities, training areas are inspected for the presence of marine mammals (including Hawaiian monk seals). If marine mammals are observed during these inspections, training activities are delayed until the marine mammals voluntarily leave the area. If a Hawaiian monk seal is observed in Pearl Harbor, in nearshore training areas, or on property actively used by the Navy, the animal is reported to the Port Operations Tower, which controls vessel traffic. All vessels are advised of the sighting, advised that the animal is a highly endangered species, and cautioned to stay clear. The Navy continues to require that established procedures are followed during amphibious crew inserts. These include having designated lookouts watching for other vessels, obstructions to navigation, marine mammals (including whales and Hawaiian monk seals), and sea turtles. Training coordinators are required to review training overlays that identify the insertion points and any nearby restricted areas. All sensitive biological receptors are avoided during training exercises (U.S. Department of the Navy, 2011c). Naval special operations personnel would also utilize the PMAP tool as appropriate to ensure compliance with mitigation requirements that may be applicable to a selected in-water training area.

Acoustic Stressors. Submersibles use a sonar device to report depths to aid in navigation during a training activity. These devices have similar specifications to commercially available "fish finders" and other hand-held sonar devices, which typically generate frequencies over 200 kHz and source levels less than 160 dB re 1 µPa. In NMFS' 2015 *Biological Opinion of U.S. Navy's Training Exercises and Testing Activities in the Hawaii-Southern California Training and Testing Study Area* (National Marine Fisheries Service, 2014, 2015), devices with these specifications are considered *de minimis* sources of sound in the water and are not considered in models that estimate potential behavioral or injurious effects on marine mammals. This is because these types of devices do not produce pressure waves that are considered dangerous or that would cause temporary changes in behavior when exposed to the sound source. In addition, because the frequency bands used in these types of devices are very narrow, masking of underwater sounds that marine mammals use for orientation or underwater vocalizations would not occur, as would be expected for broader frequency band widths of other sonar systems.

In most cases, exposure of a marine mammal to noise from fixed-wing aircraft or helicopters' aircraft presence would last for only seconds as the aircraft quickly passes overhead. However, during water-based drop zones activities, helicopter aircraft may lower to a distance of 5–15 feet above the water surface and hover for up to 15 minutes, which may elicit a stronger behavioral response due to the proximity to marine mammals, the slower airspeed and therefore longer exposure duration, and the downdraft created by the helicopter's rotor. Marine mammals would likely avoid the area under the helicopter. It is unlikely that an individual would be exposed repeatedly for long periods. Marine mammals at or near the surface when an aircraft flies or hovers overhead at low altitude may startle, divert their attention to the aircraft, or avoid the immediate area by swimming away or diving. No more than short-term reactions are likely. No long-term consequences for individuals, species, or stocks would be expected.

Impact Summary. Impacts on marine mammals in water and on land are expected to be minimal, short term, and recoverable based on the (1) relatively low intensity of the impacts, (2) localized nature of the impacts, (3) infrequent nature of the impacts, (4) brief duration of the activities, and (5) SOPs designed to minimize or avoid impacts on marine mammals in water and hauled-out Hawaiian monk seals on beaches. For these reasons, long-term consequences to individuals or populations of marine mammals are not expected to result from the activities under Alternative 1. Therefore, no significant impacts or long-term effects on marine mammals would occur with implementation of Alternative 1.

ESA Determination. Pursuant to the ESA, proposed training activities may affect Hawaiian monk seals during over-the-beach training activities on Oahu and Kauai, and may affect Hawaiian monk seals in all marine training areas. Because proposed training activities would also occur in water and on land in areas designated as critical habitat for the Hawaiian monk seal, the Proposed Action may affect designated critical habitat for the Hawaiian monk seal. Under Alternative 1, proposed training activities would not impact the essential features of monk seal critical habitat, including (1) areas with characteristics preferred by monk seals for pupping and nursing; (2) shallow, sheltered aquatic areas adjacent to coastal locations preferred by monk seals for pupping and nursing; (3) marine areas from 0 to 500 meters in depth preferred by juvenile and adult monk seals for foraging; (4) areas with low levels of anthropogenic disturbance; (5) marine areas with adequate prey quantity and quality; and (6) significant areas used by monk seals for hauling out, resting, or molting (National Oceanic and Atmospheric Administration, 2015).

The proposed in-water training activities may affect the blue whale (Central North Pacific Stock), Main Hawaiian Islands Insular false killer whale, fin whale, sei whale, and sperm whale. The types of impacts

anticipated from in-water activities would be short term (where normal activities would resume after training events cease or move through the area) and minor (minor behavioral changes). As required by section 7(a)(2) of the ESA, the Navy is conducting informal consultation with NMFS to assess the potential impacts of the Preferred Alternative (Alternative 2) on ESA-listed marine mammals and associated critical habitat. The outcome of the consultation will be described in the Final EA.

MMPA Conclusion. Pursuant to the MMPA, the Navy has determined that under Alternative 1, Level A and Level B harassment of marine mammals are not expected to occur. The types of impacts anticipated from in-water activities would be short term (where normal activities would resume after training events cease or move through the area) and minor (minor behavioral changes), and would not be considered Level B harassment.

3.3.3.3 Alternative 2

Alternative 2 includes the training study area and all activities as described under Alternative 1, with an increase in training tempo of activities conducted in the State of Hawaii. Training would occur throughout the training study area, but the annual utilization of specific sites would increase to accommodate training requirement changes and facilitate adaptation of training to meet emerging real-world tasking. Despite the increase in tempo and the addition of training locations, no additional impacts on terrestrial vegetation and wildlife, marine vegetation, marine invertebrates, marine fish, sea turtles, or marine mammals are expected. The proposed training activities under Alternative 2 would likely induce a slight increase in the number of individual animals that would potentially experience temporary behavioral effects; however, these animals would quickly resume normal activities after the disturbance ceases or trainees move through an area. There would be no detectable increases in overall impacts compared to those discussed under Alternative 1. Therefore, no significant impacts on terrestrial and marine biological resources, including ESA-listed species and MBTA-listed species, would occur with implementation of Alternative 2. As required by section 7(a)(2) of the ESA, the Navy is conducting informal consultation with NMFS to assess the potential impacts of the Preferred Alternative (Alternative 2) on ESA-listed marine species and associated critical habitat. The outcome of the consultation will be described in the Final EA.

Under Alternative 2, potential impacts to EFH species and habitats would be the same as those described above for Alternative 1. Some temporary behavioral or physiological responses (e.g., avoidance, stress, increased heart rate) would occur from increased vessel noise, but these impacts would be short term and temporary in nature. In addition, the physical presence of training activities in nearshore areas where EFH species and habitats occur could disturb, damage, or remove habitat used by EFH species. However, it is expected that most of these impacts would be temporary, and recovery would occur over a short period of time. Disturbances from activities under Alternative 2 would also not be expected to cause long-term or permanent impairment to the EFH because of the dynamic nature of these nearshore habitats and the SOPs that would be used to avoid impact on marine invertebrates, vegetation, and fish that are protected under the EFH. Therefore, the Navy has determined that under Alternative 2 there would be no adverse effect on EFH within the training study area.

The Navy has determined that under Alternative 2, training activities will not result in the unintentional take of marine mammals incidental to those activities, as defined under the MMPA. The types of impacts anticipated from in-water activities would be short term (where normal activities would resume after training events cease or move through the area) and minor (minor behavioral changes), and would not be considered Level B harassment.

3.4 Cultural Resources

This discussion of cultural resources includes prehistoric and historic districts, sites, buildings, structures, or objects included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). Cultural resources can be divided into three major categories:

- Archaeological resources (prehistoric and historic) are locations where human activity measurably altered the earth or left deposits of physical remains.
- Historic architecture includes standing buildings, structures, and other built-environment resources of historic or aesthetic significance.
- Traditional cultural properties may include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

3.4.1 Regulatory Setting

Cultural resources are governed by federal laws and regulations, including the 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.

Additional regulations and guidelines for submerged cultural resources include the *Abandoned Shipwreck Guidelines* prepared by the National Park Service (National Park Service, 2007) and, for the purposes of conducting research or recovering Navy ship and aircraft wrecks, the *Guidelines for Archaeological Research Permit Applications on Ship and Aircraft Wrecks under the Jurisdiction of the Department of the Navy* (36 C.F.R. part 767), overseen by the Naval History and Heritage Command. These resources are also protected under the Submerged Lands Act of 1953, the Abandoned Shipwreck Act of 1987, and the Sunken Military Craft Act of 2004.

Section 106 of the NHPA requires federal agencies to consider the effects of their actions on cultural resources listed in or eligible for inclusion in the National Register. In order to satisfy this requirement, the regulations implementing Section 106 (36 C.F.R. Part 800) require federal agencies to consult with the appropriate State Historic Preservation Officer (SHPO); Advisory Council on Historic Preservation; Native American tribes; Native Hawaiian Organizations; other local, state, and federal agencies; and the public. Consultation with the Hawaii SHPO is ongoing. The Navy will evaluate, in consultation with the SHPD, what effects the Proposed Action may have on identified historic properties. The Navy's Section 106 requirements will be completed once the SHPO has concurred with a finding of No Adverse Effect.

3.4.2 Affected Environment

Cultural resources that are listed in the NRHP or determined eligible for listing in the NRHP are "historic properties" as defined by the NHPA. The list was established under the NHPA and contains listed historic properties. It does not include eligible historic properties. It 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 a federal agency official with

concurrence from the applicable SHPD. A NRHP-eligible property has the same protections as a property listed in the NRHP. The historic properties may include archaeological and architectural resources and Traditional Cultural Properties. The DoD has conducted inventories of cultural resources at the SHPD for areas outside of DoD lands and at all installations, including Marine Corps Base Hawaii, JBPHH Region, Barbers Point, and Kahuku Training Area on Oahu; and the PMRF on Kauai, to identify historic properties that are listed or potentially eligible for listing in the NRHP.

The Area of Potential Effect (APE) for historic properties is the geographic area or areas within which an undertaking (project, activity, program, or practice) may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of the undertaking and may be different for various kinds of effects caused by the undertaking. For this Proposed Action, the Navy determined that the APE includes the footprint of the naval special operations training area in the State of Hawaii. The APE is made up of locations on six of the main Hawaiian islands, Oahu (including [1] JBPHH, [2] South, [3] Windward, [4] North, and [5] West Oahu), Island of Hawaii (along two stretches of the Kona coast); Kauai (between the PMRF and Polihale State Park); Lanai (in-water); Maui (in-water); and Molokai (in-water) (shown as the Training Study Area in Figures 2-1 through 2-11).

The APE on Oahu falls within five traditional districts: Ewa, Kona, Koolaupoko, Waialua, and Waianae. These districts include federal properties JBPHH, Lualualei Training Area, USCG Station Barbers Point, Iroquois Point Harbor, Puuloa Range Training Facility, Kaena Point Satellite Tracking Station, Marine Corps Base Hawaii, and Kahuku Training Area. The APE on Oahu also contains Hawaii State Parks and private property. On the Island of Hawaii, the APE includes two stretches of the western coast from Mahukona State Park to Kawaihai Harbor in Kohala and from Hualalai Golf Course to Captain Cook in Kona. The APE on the Island of Kauai is limited to one area on the western side of the island between the PMRF and Polihale State Park. The APE includes Polihale State Park, Barking Sands beach, and nearshore waters off the western shore of the island.

The APE is located in the two water areas along the west coast of Lanai between Kaholo Pali and Honopu Bay near Nanahoa (two sea stacks) (including Kaumalapua Harbor), and between Puupehe near Hulope Beach and Huawai Bay near the islet of Poopoo. One water area off of Maui on the northwestern side of Maalaea Bay on the mid-southern side of the island is included in the APE. Around Molokai, the APE includes the waters between Hale O Lono Harbor and Kaunakakai Harbor on the southern shore.

The chronology, or historical sequence for the Hawaiian Islands, is detailed in the Integrated Cultural Resource Management Plans for Barbers Point, JBPHH, Kahuku Training Area and Marine Corps Base Hawaii on Oahu; and the PMRF on Kauai (U.S. Department of the Navy, 2008b). The Hawaiian cultural sequence has been divided into four general phases through archaeological research. These phases include the Colonization Period (Anno Domini [A.D.] 300–600), the Development Period (A.D. 600–1300), the Expansion Period (A.D. 1300–1650), and the Late Pre-Contact Period (A.D. 1650–1778).

During the Colonization Period (A.D. 300–600), the Hawaiian Islands were populated by the first people that sailed there from eastern Pacific islands. This led to the Development Period (A.D. 600–1300), during which the first permanent settlements appear on the Hawaiian Islands around A.D. 1220–1261 (Rieth et al., 2011) and utilized optimum environments such as fertile valleys and coastal resources. Traditional Hawaiian artifacts include bone and shell fishhooks, basalt net sinkers, basalt grinding stones (poi pounders), awls and scrapers, shell beads, dog tooth pendants, expedient flake tools, and basalt

adzes for wood work such as carving outrigger canoes. Midden deposits indicate that traditional Hawaiians gathered nearshore shellfish, fished in both nearshore and deep water, and cultivated sweet potato, taro, and coconut.

The Hawaiian population increased in the following years during the Expansion Period (A.D. 1300–1650), inland regions were utilized more extensively, and the wetland agricultural system intensified. By the early 14th century, a more complex political organization was developed, increasing the political power of chiefs. Large temples (heiau) and fishponds (loko), which were related to political power, began appearing at this time (Cordy, 1996). Fishponds were used for food production and an estimated 360 fishponds were built across the island chain (Hommon, 2013). Between the 15th and 18th centuries during the Late Pre-Contact Period (A.D. 1650–1778), there were several shifts of power throughout the islands, resulting in warfare within and between the islands.

British explorer Captain James Cook arrived in the Hawaiian Islands in 1778, bringing Western ideas and influences. Captain Cook was followed by British Captain George Vancouver in 1788, who presented cows to King Kamehameha I. By 1815, Palmer Parker was working for King Kamehameha I as a bullock hunter. He established the first cattle ranch on the Island of Hawaii. Kamehameha I united the Hawaiian Islands in 1818 with help from British and American traders. Hawaii assumed importance in the east-west fur trade during this period as vessels began regularly stopping in Hawaii to replenish supplies. Hawaii also became the focal point for the Pacific whaling industry. By the 1840s, approximately 600 whaling vessels were arriving in Hawaii each year (Kelley, 2006).

In 1841, sugarcane was introduced to Hawaii and quickly became an important commercial enterprise. In 1848, the Mahele (once called the Great Mahele) ended the traditional land tenure (ahupuaa) system, and introduced the new concept of private property in Hawaii. This required that the islands be surveyed and mapped for the first time. The Mahele was strongly supported by western business men, who stood to gain from owning private land in economic profits. By the 1850s, steamships were brought to the Pacific for inter-island commerce, including transportation of people and products such as sugar and beef. This introduction of steamships and interisland travel required navigation aids such as the building of light houses. Along with these new industries, roads and railroad lines were built on the islands to transport sugarcane and people. As industry and infrastructure from the west came to the islands, a new way of life and culture grew and people began to move to towns and cities for new available jobs. This led to the development of the City of Honolulu on Oahu and districts such as China Town and Merchant Street. These are now districts that have been nominated to the NRHP and include a number of historic buildings due to the historic architecture in the area.

After the Late Pre-Contact Period in the early 1800s, early development of military installations (approximately late 1800s–early 1900s) began to take shape in the Hawaiian Islands by both the Hawaiians, Americans, and other foreigners such as the Russians. Later during World War II, the coastal defenses were developed further and Japan's attack on Hawaii and Pearl Harbor led to the War in the Pacific and the United States involvement in World War II. The attack and involvement lead to a build-up of military structures such as hangars, batteries, and other military bases. The Cold War (between 1947 and 1991) was a state of tension between powers in the Eastern and Western Blocs after World War II. Differences in political ideology between the two blocs led to a buildup in military weaponry and defenses as tensions increased between the two powers. Cold War era buildings, districts, and sites were created on Oahu at various military installations and Kauai at the PMRF.

The Navy reviewed existing information on historic properties within the APE from the SHPD, from the DoD cultural resources reports, and from the National Park Service's Focus digital library. This review resulted in the identification of 852 historic properties (listed and eligible) in the APE: 580 from Oahu, 182 from Hawaii Island, 80 from Kauai, 0 from Lanai, 4 from Maui, and 6 from Molokai. Although these historic properties are within the APE, the majority will not be utilized for training. These traditional and historic resources are located in the waters and on the shores of the Hawaiian Islands, many of which have not been evaluated for National Register eligibility. However, they will be treated as eligible for consultation purposes.

The Navy also reviewed the inventory of properties listed in the NRHP through the National Park Service's Focus digital library and found 33 listed properties in the APE: 5 National Historic Landmarks (NHLs), 6 historic districts, 14 buildings and structures, 2 historic objections, and 6 archaeological sites.

3.4.2.1 Archaeological Resources

Many traditional Hawaiian site types are present within the APE ranging from agriculture, aquaculture, burials, habitation, markers (cairns), religious, petroglyphs, and salt production sites. Historic archaeological sites are found on all of the Hawaiian Islands. Historic archaeological sites in the APE can be classified into the following categories, Agriculture, Burial, Habitation, Military, Ranching, Religious, Transportation, and Other. Archaeological resources listed on the NRHP and within the APE are shown in Table 3-7.

Table 3-7: NRHP Listed Archaeological Resources Within the APE

#	PROPERTY NAME	LOCATION	DATE LISTED	RESOURCE ID
1	Huilua Fishpond (NHL)	Kaneohe, Oahu	10/15/1966	66000295
2	Mokapu Burial Area	Kaneohe, Oahu	11/15/1972	72000428
3	Heeia Fishpond	Kaneohe, Oahu	1/17/1973	73000671
4	Okiokilepe Pond	Pearl Harbor, Oahu	3/14/1973	73000673
5	Oahu Rail and Land Right of Way	Nanakuli, Oahu	12/1/1975	75000621
6	Hale Halawai O Holualoa (NHL)	Kailua-Kona, Hawaii Island	6/5/1987	87000794
7	Kiholo-Puako Trail (Ala Loa [Long trail])	South Kohala, Hawaii Island	6/5/1987	87001127
8	*USS Arizona*	Honolulu, Oahu	5/5/1989	89001083
9	*USS Utah*	Honolulu, Oahu	5/5/1989	89001084
10	Kalaoa Permanent House	Kailua-Kona, Hawaii Island	11/21/1992	92001552

Note: NHL = National Historic Landmark

3.4.2.1.1 Terrestrial Archaeological Resources

Types of archeological resource sites eligible or potentially eligible for listing on the NRHP in the APE include religious sites (heiau), large complexes (archaeological districts and complexes), and other eligible sites such as salt pans, petroglyphs, and trails on Oahu and Hawaii Island. At the PMRF Barking Sands on Kauai, 31 of the sites have been determined eligible for listing in the NRHP. The PMRF operates under two significant agreements, a Memorandum of Agreement from 1999 for ground-disturbing activities and burial treatment with SHPD, and a programmatic agreement for Navy undertakings in

Hawaii. Fishponds are the terrestrial archaeological resources in the waters off Molokai. No terrestrial archaeological resources are within the APE on Maui or Lanai (U.S. Department of the Navy, 2014).

3.4.2.1.2 Submerged Archaeological Resources

The most likely types of submerged cultural (i.e., archaeological) resources, including ship and plane wrecks, to occur around the Hawaiian Islands are 19th and 20th century cargo ships; whaling and merchant ships (e.g., steamships); fishing boats; aircraft, amphibious craft, and warships; and recreational craft. The Automated Wreck and Obstruction Information System, Region 16 (2010), records the approximate locations of some deep-water submerged cultural resources (U.S. Department of the Navy, 2013).

Numerous known cultural resources are located in the waters surrounding Oahu, many of which are related to military actions during World War II. Pearl Harbor, which is listed in the National Register as an NHL contains major shipwrecks: the *USS Arizona* and the *USS Utah*, both of which are listed in the NRHP (U.S. Department of the Navy, 2013). Submerged cultural resources located near the Island of Hawaii are concentrated along the coastline where rugged shorelines created hazards for vessels within the APE. Within and near the APE on the northeastern coastline, multiple surveys have been conducted by various state and commercial agencies documenting the location of submerged cultural resources.

No submerged cultural resources have been identified within the APE on Kauai. Submerged cultural resources within the APE at Maalaea Bay on Maui include three tracked amphibious vehicles, which sank during training exercises close to shore, and the wreck of a World War II plane just outside the bay. Other submerged cultural resources in the APE near Molokai have been identified. Historic properties in the waters off Molokai include six fishponds along the southwestern coast between Hale O Lono Harbor and Kaunakakai Harbor (Kikauhi, Keanakalole, Kukuku, Pakanaka, Kaluaapuhi, and Kalokoeli fishponds). None of the submerged cultural resources in the APE on the Island of Hawaii, near Maui, or near Molokai are listed on the NRHP; however, they may be eligible for listing. No submerged historic properties have been identified within the APE on Lanai.

3.4.2.2 Historic Architecture

Types of previously recorded historic architecture (e.g., buildings) in the APE include commerce, habitation, military, religious, transportation, and other. NHLs within the APE consist primarily of features of the built environment, such as buildings, structures, and campuses; however, several NHLs are comprised of archaeological resources and are listed in the archaeological section (Section 3.4.2.1, Archaeological Resources). NRHP-listed architecture within the APE are shown in Table 3-8.

Table 3-8: NRHP-Listed Architecture in the APE

#	PROPERTY NAME	LOCATION	DATE LISTED NRHP	DAHP RESOURCE ID
1	United States Naval Base Pearl Harbor (NHL)	Pearl City, Oahu	10/15/1966	66000940
2	*USS Arizona Memorial* (NHL)	Pearl City, Oahu	10/15/1966	66000944
3	*USS Missouri* (NHL)	Honolulu, Oahu	5/14/1971	71000877
4	Moana Hotel (NHL)	Honolulu, Oahu	8/7/1972	72000417
5	Kapapa Island Complex	Kapapa Island, Hawaii Island	8/21/1972	72000430
6	Kealakakua Bay Historical District	Captain Cook, Hawaii Island	12/12/1973	73000651

Table 3-8: NRHP Listed Architecture in the APE (continued)

#	PROPERTY NAME	LOCATION	DATE LISTED NRHP	DAHP RESOURCE ID
7	Hulihee Palace (NHL)	Kailua-Kona, Hawaii Island	5/25/1973	73000653
8	Lapakahi Complex	Mahukona, Hawaii Island	7/2/1973	73000654
9	Chinatown Historic District	Honolulu, Oahu	1/17/1973	73000658
10	Falls of Clyde (NHL)	Honolulu, Oahu	7/2/1973	73000659
11	Merchant Street Historic District	Honolulu, Oahu	6/19/1973	73000661
12	Waianae District	Waianae, Oahu	1/21/1974	74000720
13	Aloha Tower at Pier 9 (NHL)	Honolulu, Oahu	5/13/1976	76000660
14	U.S. Coast Guard Makapuu Light House (NHL)	Waimanalo, Oahu	12/7/1977	77000447
15	Mokuaikaua Church (NHL)	Kailua-Kona, Hawaii Island	10/3/1978	78001015
16	War Memorial Natatorium (NHL)	Honolulu, Oahu	8/11/1980	80001283
17	*USS Bowfin* (NHL)	Honolulu, Oahu	11/16/1982	82000149
18	Battery Hasebrouck (NHL)	Honolulu, Oahu	6/5/1984	84000925
19	Battery Hawkins (NHL)	Honolulu, Oahu	6/5/1984	84000928
20	Battery Jackson (NHL)	Honolulu, Oahu	6/5/1984	84000954
21	Battery Selfridge (NHL)	Honolulu, Oahu	6/5/1984	84000975
22	Hickam Field (NHL)	Honolulu, Oahu	9/16/1985	85002725
23	Kaneohe Naval Air Station (NHL)	Kailua, Oahu	5/28/1987	87001299
24	*USS Arizona*	Honolulu, Oahu	5/5/1989	89001083
25	*USS Utah*	Honolulu, Oahu	5/5/1989	89001084

Notes: DAHP = Department of Archaeology and Historic Preservation, NHL = National Historic Landmark
NRHP = National Register of Historic Places

Types of architectural resource sites eligible or potentially eligible for listing on the NRHP in the APE include roads, highways, houses, parks, lighthouses, batteries, towers, ships, hotels, revetments, and complexes. On Oahu, Hawaii Island and Kauai, these architectural resources are from many eras such as the Cold War, World War II, military occupation, plantation living, and modern building. Architectural resource sites are generally found on land and therefore are not found in the APE on Maui, Molokai, or Lanai (Thompson, 1986; U.S. Department of the Navy, 2014).

3.4.2.3 Traditional Cultural Properties

Traditional Cultural Properties are defined by the U.S. Department of the Interior National Parks Service American Indian Liaison Office as “a property that is eligible for inclusion in the NRHP based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community” (U.S. Department of the Interior, 2012). No Traditional Cultural Properties have been identified in the APE on Oahu or Hawaii Island.

Studies at the PMRF Barking Sands in the APE on Kauai have identified one traditional cultural property (U.S. Department of the Navy, 2014). This traditional cultural property, called Nohili Dunes, includes Elekuna Heiau, an ancient burial ground, and habitation sites. The legend of Nohili Dunes identifies a

fisherman who went out to sea, tying his nine dogs to three stakes before he left. When he returned home, exhausted after battling heavy seas, he forgot to untie his dogs. In the morning, the dogs had disappeared, but three mounds of sand remained and, upon each step on the sand, he heard a low bark. He dug for the dogs, but this only generated more "barking" sands, and he continued to hear the barks daily as he crossed the beach. For this reason, the Nohili Dunes are known as Barking Sands (Dlendorf, 2013). This traditional cultural property is eligible for listing on the NRHP.

Traditional Cultural Properties are generally found on land and therefore are not found in the APE on Maui, Molokai, or Lanai.

3.4.3 Environmental Consequences

Analysis of potential impacts on 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 effects may be the result of direct effects such as a physical damage to an architectural resource and the indirect effect that people are no longer able to see or access that resource. The Navy is consulting with the SHPD, in fulfillment of the Navy's Section 106 requirements, on what effects Alternative 1 or 2 may have on identified historic properties.

3.4.3.1 No Action Alternative

Under the No Action Alternative, baseline training activities conducted in Hawaii over the past decade would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable. NSWC activities that occurred in the Hawaii region under the various Categorical Exclusions would have no adverse effects with regard to archaeological resources, historic architecture, or traditional cultural properties. Therefore, no significant impact on existing cultural resources would occur with implementation of the No Action Alternative.

3.4.3.2 Alternative 1

3.4.3.2.1 Archaeological Resources

Implementation of Alternative 1 would not include explosives, construction, tree climbing, digging, building of camp fires, or infrastructure. Impacts on archaeological resources are not expected because (1) vehicles supporting training events would remain on existing established roadways; (2) live-fire would only occur at designated live-fire facilities at JBPHH Region, Puuloa Training Range Facility, JBPHH Pearl City Peninsula, and Marine Corps Base Hawaii, Kaneohe Bay Training Range Facility; and (3) surface sites such as heiau and other sacred sites would be avoided during training activities.

Naval special operations training would avoid known burial sites and known archaeological sites. In the event archaeological materials not previously identified are discovered, all training activities in the immediate area would be stopped, and the Navy's Cultural Resources Manager would be contacted to take actions to resolve adverse effects and notify the SHPO and any Native Hawaiian organization that might attach religious and cultural significance to the affected property, per section 800.13(b)(3).

Water-based training would avoid known shipwrecks or sunken resources that may be present within the APE. In addition, proposed training activities would avoid contact with hard surfaces that may be

present within the training study area in the interest of trainee safety and avoidance of potential adverse effects.

Air-based training would include the use of UASs and helicopters utilizing existing or new proposed drop zones and landing zones. These existing or new proposed drop zones and landing zones include JBPHH Region Pearl City Peninsula, Marine Corps Base Hawaii, Ford Island, Lualualei Annex, Kanes drop zone at the Kahuku Training Area, and JBPHH Region Waipio Peninsula. The Pearl City Peninsula drop zone and the Marine Corps Base Hawaii drop zones would occur over the water. Activities at these water drop zone locations would not impact submerged historic resources because activities would occur within the water column and would not contact the seafloor. Use of the drop zones and landing zones on Pearl City Peninsula would not alter the appearance of the peninsula and thus would not adversely affect the NHL.

Two proposed landing zones and drop zones are located on Ford Island. One is near the *USS Utah*, which is a historic property, and the other is on the Ford Island Airfield, another historic property. The area proposed for use would not impact the *USS Utah* because no construction, vegetation clearing, or ground disturbance would be conducted. Ford Island is part of the Pearl Harbor NHL; utilizing drop zones and landing zones on the island is consistent with its historic use as an airfield and would not adversely affect the historic property.

The proposed Lualualei landing zones and drop zones and existing Kanes drop zone within the Kahuku Training Area are located within an area that lacks integrity and do not contain any known historic properties or archeological sites. No construction or vegetation removal would be necessary at the proposed Lualualei or existing Kanes landing zones or drop zones.

Vegetation removal or cutting would be limited to the proposed drop zone/landing zone at Waipio Peninsula on Oahu, which consists of a large area where trainees (and sometimes the helicopter) would land after parachuting from an aircraft or participating in helicopter rope suspension techniques. This area consists of a filled-in fishpond and former sugarcane fields. It is vegetated with non-native plants such as red mangrove (*Rhizophora mangle*) and kiawe (*Prosopis pallida*). Portions of Waipio Peninsula were acquired during World War II, and used for storage. Little construction appears to have occurred during World War II in the former sugarcane fields where the landing zone/drop zone vegetation clearing is proposed. Furthermore, no historic properties have been identified in this area. Waipio Peninsula falls within the boundaries of the Pearl Harbor NHL. Removal of the non-native vegetation on Waipio Peninsula and use of the landing zone/drop zone would not adversely affect the NHL.

Training activities would not disturb known burial and other sites and would avoid known shipwrecks or submerged resources that may be present within the APE. When applicable, the proposed training would follow the protocols established under (1) existing Programmatic Agreements, (2) Integrated Cultural Resources Management Plans and requirements of landowners, where applicable, and (3) minimization and avoidance measures established during the Section 106 consultation to further avoid and minimize the potential for impact on or disturbance of archeological resources. Therefore, no adverse effects with regard to archaeological resources would occur under Alternative 1.

3.4.3.2.2 Historic Architecture

Under Alternative 1, simulated building clearance training would occur on federal property, and any use of historic buildings would follow established protocols to protect the buildings, including removal of all training material afterwards. Therefore, no adverse effects with regard to historic architecture would occur under Alternative 1.

3.4.3.2.3 Traditional Cultural Properties

Under Alternative 1, training activities would be non-invasive in nature and would not restrict the ability of individuals to use or access traditional cultural property sites such as the Nohili Dunes. Training activities would avoid the Nohili Dunes, including Elekuna Heiau, an ancient burial ground, and habitation sites. The proposed training would follow the appropriate protocols established under existing approved SOPs (protective measures that are in place to avoid and minimize the potential for impact to traditional cultural properties on Kauai). When applicable, the proposed training also would follow protocols established as part of the Section 106 consultation, which may result in specific minimization and avoidance measures. Alternative 1 would not impact or disturb traditional cultural properties present within the training study area. Therefore, a finding of no historic properties adversely affected with regard to traditional cultural properties would occur under Alternative 1.

3.4.3.3 Alternative 2

3.4.3.3.1 Archaeological Resources

While there is an increase in training frequency under Alternative 2 when compared to Alternative 1, there would be no change in anticipated effects, as activities would be non-invasive in nature as described under Alternative 1. Training activities would not disturb known burial or other archaeological sites and would avoid known shipwrecks or sunken resources that may be present within the APE. Therefore, a finding of no historic properties adversely affected with regard to archaeological resources would occur under Alternative 2.

3.4.3.3.2 Historic Architecture

Under Alternative 2, training activities would be the same as described under Alternative 1. Simulated building clearance training would occur on federal property, and any use of historic buildings would follow established protocols to protect the buildings, including removal of all training material afterwards. Therefore, a finding of no historic properties adversely affected with regard to historic architecture would occur under Alternative 2.

3.4.3.3.3 Traditional Cultural Properties

Under Alternative 2, training activities would be non-invasive in nature as described above under Alternative 1. In addition, proposed increases under Alternative 2 would not restrict the ability of individuals to use or access sites. Training activities would avoid the Nohili Dunes, including Elekuna Heiau, an ancient burial ground, and habitation sites. When applicable, the proposed training would follow the appropriate protocols established under existing approved SOPs and protective measures that are in place to avoid and minimize the potential for impact on traditional cultural properties. Therefore, a finding of no historic properties adversely affected with regard to traditional cultural properties would occur under Alternative 2.

3.5 Noise

This discussion of noise includes the types or sources of noise and the associated points of interest 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 dB
- Frequency – the number of cycles per second the air vibrates, in Hertz
- 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.

3.5.1 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 (A-weighted decibels [dBA]). In this document, the dB unit refers to A-weighted sound levels. Table 3-9 provides a comparison of how the human ear perceives changes in loudness on the logarithmic scale.

Figure 3-16 (Cowan, 1994) 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.

Table 3-9: Subjective Responses to Changes in A-Weighted Decibels

Change	Change in Perceived Loudness
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic – twice or half as loud
20 dB	Striking – fourfold change

Note: dB = decibels

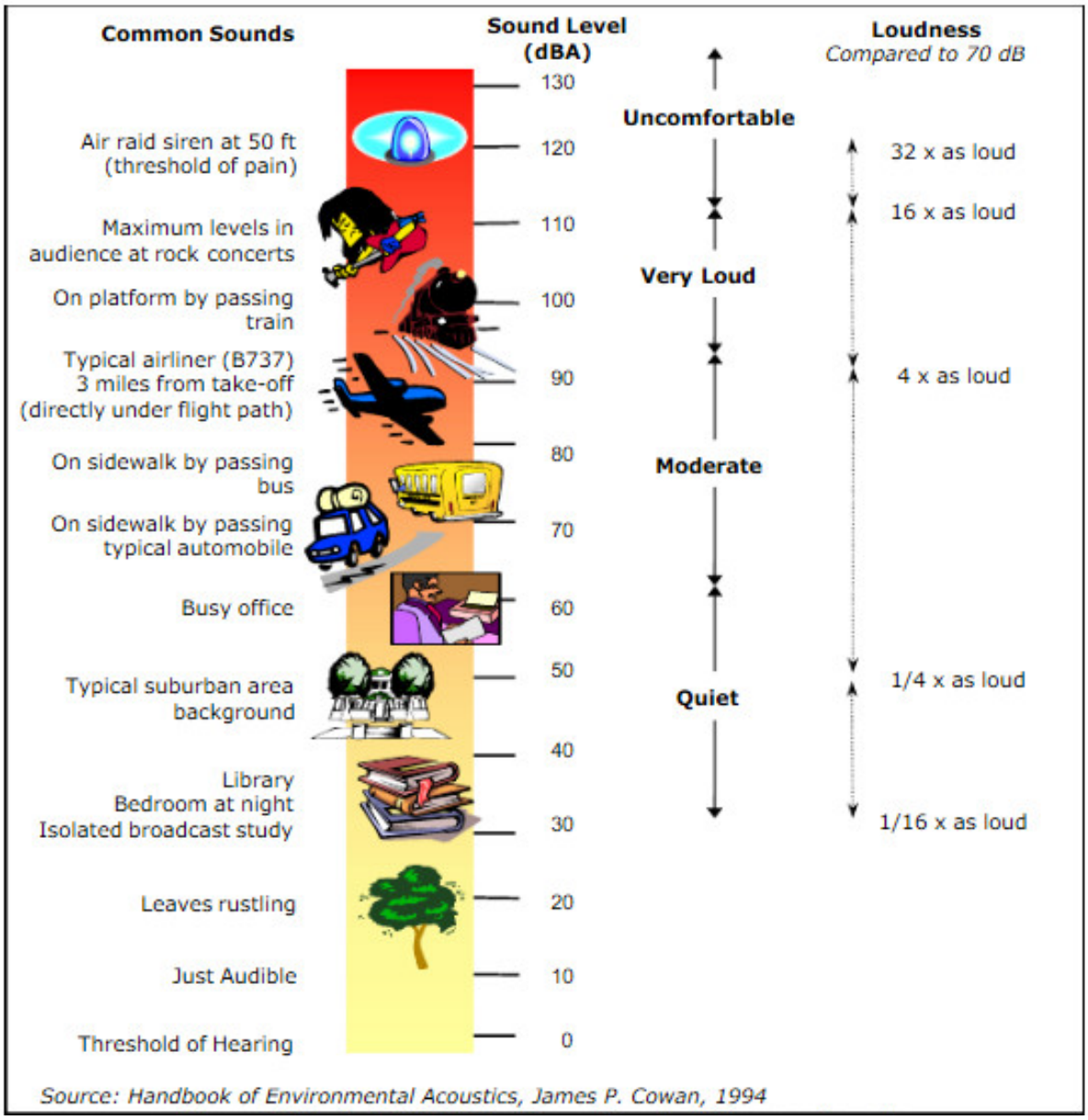

Figure 3-16: A-Weighted Sound Levels from Typical Sources

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. A variety of noise metrics have been developed to describe noise over different time periods, as discussed below.

3.5.2 Noise Metrics

A metric is a system for measuring or quantifying a particular characteristic of a subject. Since noise is a complex physical phenomenon, different noise metrics help to quantify the noise environment. While the Day-Night Average Sound Level (DNL) noise metric is the most commonly used tools for analyzing noise in the community, the DoD has been developing additional metrics (and analysis techniques).

These supplemental metrics and analysis tools provide more detailed noise exposure information for the decision process and improve the discussion regarding noise exposure.

3.5.2.1 Day-Night Average Sound Level

The DNL metric is the energy-averaged sound level measured over a 24-hour period, with a 10-dB penalty assigned to noise events occurring between 10 p.m. and 7 a.m. (acoustic night). DNL values are average quantities, mathematically representing the continuous sound level that would be present if all of the variations in sound level that occur over a 24-hour period were averaged to have the same total sound energy. The DNL metric quantifies the total sound energy received and is therefore a cumulative measure, but it does not provide specific information on the number of noise events or the individual sound levels that occur during the 24-hour day. DNL is the standard noise metric used by the U.S. Department of Housing and Urban Development, FAA, USEPA, and DoD. Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments; there is a consistent relationship between DNL and the level of annoyance. Most people are exposed to sound levels of 50–55 DNL or higher on a daily basis.

Research has indicated that about 87 percent of the population is not highly annoyed by outdoor sound levels below 65 dB DNL (Federal Interagency Committee on Urban Noise, 1980). Therefore, the 65 dB DNL noise contour is used to help determine compatibility of military operations with local land use.

3.5.2.2 Equivalent Sound Level

A cumulative noise metric useful in describing noise is the Equivalent Sound Level (L_{eq}). L_{eq} is the continuous sound level that would be present if all of the variations in sound level occurring over a specified time period were smoothed out as to contain the same total sound energy. The same calculation for a daily average time period such as DNL but without the penalties is a 24-hour equivalent sound level, abbreviated $L_{eq}(24)$. Other typical time periods for L_{eq} are 1 hour and 8 hours.

3.5.2.3 Sound Exposure Level

The Sound Exposure Level (SEL) metric is a composite metric that represents both the intensity of a sound and its duration. Individual time-varying noise events (e.g., aircraft overflights) have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. SEL provides a measure of total sound energy of the entire acoustic event, but it does not directly represent the sound level heard at any given time. During a time-varying noise event, SEL captures the total sound energy from the beginning of the acoustic event to the point when the receiver no longer hears the sound. It then condenses that energy into a 1-second period of time and the metric represents the total sound exposure received. The SEL has proven to be a good metric to compare the relative exposure of transient sounds, and is the recommended metric for sleep disturbance analysis (U.S. Department of Defense, 2009).

3.5.2.4 Maximum Sound Level

The highest A-weighted sound level measured during a single event where the sound level changes value with time is called the maximum A-weighted sound level or L_{max}. During a noise event, the noise level starts at the ambient or background noise level, rises to the maximum level, and returns to the background level. L_{max} defines the maximum sound level occurring for a fraction of a second. In this EA, L_{max} is used in the analysis of speech interference.

3.5.2.5 Number of Events Above a Threshold Level

The "Number of Events Above a Threshold Level" metric provides the total number of noise events that exceed a selected noise level threshold during a specified period of time (U.S. Department of Defense, 2009). Combined with the selected noise metric, L_{max} or SEL, the Number of Events Above metric is symbolized as NAXXmetric (NA = number of events above, XX = dB level, metric = L_{max} or SEL). For example, the L_{max} and SEL Number of Events Above metrics are symbolized as NA75L_{max} and NA75SEL, respectively, with 75 dB as the example dB level. In this EA, an L_{max} threshold is selected to analyze speech interference and an SEL threshold is selected for analysis of sleep disturbance.

3.5.3 Noise Effects

An extensive amount of research has been conducted regarding noise effects, including annoyance, potential hearing loss, speech interference, noise effects on children in the classroom, sleep interference, workplace noise, and non-auditory health effects to children and the elderly. These effects are summarized below.

3.5.3.1 Annoyance

As previously noted, the primary effect of noise on exposed communities is long-term annoyance, defined by USEPA as any negative subjective reaction on the part of an individual or group. The scientific community has adopted the use of long-term annoyance as a primary indicator of community response and there is a consistent relationship between DNL and the level of community annoyance (Federal Interagency Committee on Noise, 1992).

3.5.3.2 Potential Hearing Loss

People living in high noise environments for an extended period of time (40 years) can be at risk for hearing loss called Noise Induced Permanent Threshold Shift (NIPTS). The NIPTS defines a permanent change in hearing level, or threshold, caused by exposure to noise (U.S. Environmental Protection Agency, 1982). According to the USEPA (1974), changes in hearing level of less than 5 dB are generally not considered noticeable. There is no known evidence that an NIPTS of less than 5 dB is perceptible or has any practical significance for the individual affected. Furthermore, the variability in audiometric testing is generally assumed to be plus or minus 5 dB. The preponderance of available information on hearing loss risk is from the workplace with continuous exposure throughout the day for many years.

Based on a report by Ludlow and Sixsmith (1999), there were no major differences in audiometric test results between military personnel who, as children, had lived in or near installations where fast jet operations were based, and a similar group who had no such exposure as children. Hence, for the purposes of this EA, the limited data are considered applicable to the general population, including children, and are used to provide a conservative estimate of the risk of potential hearing loss.

3.5.3.3 Speech Interference

Speech interference associated with noise is a primary cause of annoyance for communities. Speech interference can cause disruption of routine activities, such as enjoyment of radio or television programs, telephone use, or family conversation, giving rise to frustration or irritation. In extreme cases, speech interference may cause fatigue and vocal strain to individuals who try to communicate over the noise. In this EA, speech interference is measured by the number of daily indoor events (from 7 a.m. to 10 p.m.) that exceed 50 dB L_{max} at selected locations.

3.5.3.4 Classroom Criteria and Noise Effects on Children

Research suggests that environments with sustained high background noise can have variable effects, including effects on learning and cognitive abilities and various noise-related physiological changes. Research on the impacts of noise in general on the cognitive abilities of school-aged children has received more attention in recent years. Several studies suggest that high noise levels can affect the academic performance of school children. Physiological effects in children exposed to noise and the potential for health effects have been the focus of limited investigation (U.S. Department of Defense, 2009).

Analyses for school-aged children are similar to speech interference by using the indoor number of events exceeding 50 dB L_{max}, but also has the added restriction of using an outdoor equivalent noise level of 60 dB L_{eq}(9hr). This represents a level that a person with normal hearing can clearly hear a speaker (teacher) speaking at a level of 50 dB indoors in a classroom setting.

3.5.3.5 Sleep Disturbance

The disturbance of sleep is a major concern for communities exposed to nighttime noise. In this EA, sleep disturbance uses the SEL noise metric and calculates the probability of awakening from a single noise event. The results are then presented as a percent probability of people awakening (U.S. Environmental Protection Agency, 1974).

3.5.3.6 Workplace Noise

In 1972, the National Institute for Occupational Safety and Health (NIOSH) published a criteria document with a recommended exposure limit of 85 dBA as an 8-hour time-weighted average. This exposure limit was reevaluated in 1998 when NIOSH made recommendations that went beyond conserving hearing by focusing on the prevention of occupational hearing loss. Following the reevaluation using a new risk assessment technique, NIOSH published another criteria document in 1998, which reaffirmed the 85 dB recommended exposure limit (National Institute for Occupational Safety and Health, 1998).

3.5.4 Nonauditory Health Effects

Studies have been conducted to examine the nonauditory health effects of noise exposure, focusing primarily on stress response, blood pressure, birth weight, mortality rates, and cardiovascular health. Exposure to noise levels higher than those normally produced in the community can elevate blood pressure and the levels of stress hormone. However, the response to such loud noise is typically short in duration: after the noise goes away, the physiological effects reverse and levels return to normal. In the case of repeated exposure to noise, the connection is not as clear. The results of most cited studies are inconclusive, and it cannot be conclusively stated that a causal link exists between noise exposure and the various type of nonauditory health effects that were studied (U.S. Department of Defense, 2009).

3.5.4.1 Noise Effects on Children

A review of the scientific literature indicated that there has not been a tremendous amount of research in the area of noise effects on children. The research reviewed does suggest that environments with sustained high background noise can have variable effects, including effects on learning and cognitive abilities and various noise-related physiological changes. Research on the impacts of noise, and noise in general, on the cognitive abilities of school-aged children has received more attention in recent years. Several studies suggest that noise can affect the academic performance of school children. Physiological effects in children exposed to noise and the potential for health effects have been the focus of limited investigation (U.S. Department of Defense, 2009).

3.5.4.2 Noise Effects on the Elderly

Based upon a study by the Harvard School of Public Health, older people exposed to noise, especially at higher levels, may experience an increased risk of hospitalization for cardiovascular disease (Correia et al., 2013). This study concluded a statistically significant association between exposure to high level noise and risk of hospitalization for cardiovascular diseases among older people living near airports.

3.5.5 Regulatory Setting

Under the Noise Control Act of 1972, the Occupational Safety and Health Administration established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed is 115 dBA and exposure to this level must not exceed 15 minutes within an 8-hour period. The standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits.

3.5.6 Affected Environment

3.5.6.1 Points of Interest

Many components may generate noise and warrant analysis as contributors to the total noise impact. 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 (point of interest) is defined as a land use where people involved in indoor or outdoor activities may be subject to stress or considerable interference from noise. Such locations or facilities often include residential dwellings, hospitals, nursing homes, educational facilities, and libraries. Points of interest may also include noise-sensitive cultural practices, some domestic animals, or certain wildlife species.

The training study area and contiguous nearshore waters encompass a broad spectrum of populations and landownership types, including DoD facilities, private lands, public parks, harbors, golf courses, and recreation areas. Commercial, institutional, recreational, and military activities take place simultaneously within this area. Private lands and DoD facilities are typically restricted from public use and access. Within the training study area on Oahu, this includes JBPHH, Marine Corps Base Hawaii, Kahuku Training Area, Kaena Point Satellite Tracking Station, Lualualei Annex, and the PMRF on Kauai. The remaining lands in the training study area are generally publicly accessible to recreation, commercial, and institutional activities where authorized by the landowners or land managers. The affected environment includes five Oahu regions: (1) JBPHH, (2) South, (3) Windward, (4) North, and (5) West Oahu, along with the Island of Hawaii, Kauai, Maui, Lanai, and Molokai. Training at the islands of Maui, Lanai, and Molokai are water-based training only.

All five Oahu regions and Island of Hawaii training areas include private lands, public parks, harbors, golf courses, and recreation areas, including Lapakahi State Historical Park and Kauai-Polihale State Park. Commercial, educational, institutional, recreational, and military activities take place simultaneously within all five Oahu regions and Island of Hawaii training areas.

While recreational activities can occur simultaneously with training activities on Kauai, and in waters surrounding Maui, Lanai, and Molokai, there are no churches, schools, hospitals, or private residences near these training areas.

3.5.6.2 Ambient Noise Conditions

Ambient sound levels would likely vary by location. Ambient background noise in urbanized areas typically varies from 60 to 70 dBA. Typical residential noise has been measured at 65 dBA (Cavanaugh & Tocci, 1998). Noise measurements taken on Ford Island and in locations near Joint Base Pearl Harbor-Hickam indicated nighttime hourly sound levels between 50 and 60 dBA, with daytime noise levels between 55 and 65 dBA (U.S. Army Garrison Hawaii, 2010).

Additional ambient noise measurements were taken in 2010 along the eastern shore of the Pearl City Peninsula in support of the Sea-Based X-Band Radar Vessel Maintenance and Repair EA (ManTech International Corporation, 2010). The location of these ambient noise conditions is approximately 0.75 miles south of the Lehua Elementary School. Daytime noise levels (1-hour Leq) at this location were between 53 and 55 dBA. Over the course of a three-day data collection period, the ambient noise level exceeded 56.3 dBA only 5 percent of the time. Nighttime ambient noise levels were noted between 45 and 50 dBA. Most noises at this location were road and wind noise.

Noise measurements at Marine Corps Base Hawaii, Kaneohe Bay indicated that, during active runway use by helicopters and other aircraft or amphibious training, noise levels typically range between 70 and 75 dBA. During periods of no runway use or training, the noise levels are equal to or less than 55 dBA during the day and fall to less than 45 dBA during the evening and night hours. The nearest point of interest to the runways at Marine Corps Base Hawaii, Kaneohe Bay is Hale Koa Beach, where noise levels are similar to the noise levels described at the runway (U.S. Department of the Navy, 2008a).

In more remote areas, ambient noise conditions are typically lower than those in more urbanized areas. For instance, at the Makua Military Reservation (within the Oahu West Training region and north of the Lualualei Annex), noise is generated from infantry and helicopter gunnery training events and other low-level noise sources such as wind, surf, birds, insects, and light highway traffic. Ambient noise levels at Makua Beach are estimated to be between 40 and 50 dBA, with peaks reaching noise levels greater than 70 dBA during high tide and afternoon winds. When there are no training events in progress at Makua Military Reservation, noise conditions are dominated by wind, bird songs, and insects. Under these conditions, noise levels typically vary between approximately 25 dBA and 45 dBA (U.S. Department of the Navy, 2008a).

3.5.7 Environmental Consequences

Analysis of potential noise impacts includes estimating likely noise levels from the Proposed Action and determining potential effects to points of interest. Noise in relation to biological resources and wildlife species is discussed in the Biological Resources section.

3.5.7.1 No Action Alternative

Under the No Action Alternative, baseline training activities conducted in Hawaii over the past decade would continue at the same level as currently scheduled, with the most current training activities being those approved event-based Categorical Exclusions, as applicable. NSWC activities that occurred in the Hawaii region under the various Categorical Exclusions would not change baseline noise levels. Therefore, no significant impact on the existing noise environment would occur with implementation of the No Action Alternative.

3.5.7.2 Alternative 1

Under Alternative 1, sources of in-air noise include the aircraft utilized for drop or landing zones, marine support vessels, and surface vehicles that accompany trainees on land or provide transport to trainees.

The intent of naval special operations training activities is to remain undetected and to leave no trace of their presence during or after the training activity. These operational procedures minimize noise and potential noise impacts.

3.5.7.2.1 Aircraft Noise

The proposed air-based training activities would utilize aircraft including fixed-wing (such as C-17 or AC-130), helicopters or MV-22. The analysis of potential noise impacts from the Proposed Action presents a conservative approach assuming that MV-22 aircraft have the highest noise level of all the aircraft proposed for use. Table 3-10 presents the estimated received maximum noise levels from the MV-22 at the closest point of interest to the drop or landing zone. The estimated maximum noise levels are based on values reported in the 2009 MV-22 West Coast Homebasing EIS.

Table 3-10: Estimated Received Maximum Sound Levels (L_{max}) at Points of Interest

Site	Distance in Miles to Points of Interest (from center of Drop/Landing Zone)	Flight Elevation (AGL) and Estimated Received Maximum Noise Level (Lmax)[1]			
		500	1000	2000	5000
Ford Island (center)	1.5 (McGrew Point Residences)	64	63	62	59
Ford Island (northeast grassy area)	1.0 (McGrew Point Residences)	67	66	65	61
Waipio Peninsula	0.95 (Waipahu District Residences)	68	67	65	61
JBPHH Pearl City Peninsula (southwest land)	0.9 (Lehua Elementary School)	68	67	66	61
JBPHH Pearl City Peninsula (southwest water)	0.5 (Pearl City Residences/Neal Blaisdell Park)	73	72	70	63
JBPHH Pearl City Peninsula (northeast)	0.3 (Waiawa Road Residences)	78	76	72	64
Marine Corps Base Hawaii[2] (southwest water)	0.95 (Kaneohe Residences)	68	67	65	61
Marine Corps Base Hawaii (waters off Pyramid Beach)	1.9 (Kaneohe Residences)	61	61	59	55
Marine Corps Base Hawaii (waters off Fort Hasse Beach)	0.9(North Kailua residences)	68	67	66	61
Kanes (Kuhuku Training Area)	0.95 (Kawela Gultch Residences)	67	67	65	61
Lualualei Annex	0.4 (Hakimo Place Residences)	75	74	71	63

[1]Estimated L_{max} values are based on estimated slant distances (elevation of flight + horizontal distance from center of drop zone/landing zone to point of interest).

[2] Water-based drop zones at Marine Corps Base Hawaii are located within the 500 yard security buffer associated with the installation.

Note: AGL = Above Ground Level (feet).
Source: U.S. Department of the Navy (2009).

The majority of drop zone and landing zones where aircraft would hover are located at distances great enough from points of interest such that received maximum levels would be below 65 dBA, and would not elevate the DNL above 65 dBA. For example, drop zones that are offshore are typically conducted for a duration of up to 15 minutes, over 3,000 feet from the points of interest, and received noise levels from activities conducted offshore are expected to be negligible.

For drop/landing zones on Ford Island, the closest points of interest are to the northeast across Pearl Harbor in the McGrew Point area of Aiea (as military housing is not analyzed in this EA), approximately 1.0 mile from the northeast landing/drop zone on Ford Island and 1.5 miles from the landing/drop zone in the center of Ford Island. Typically, aircraft maintain an elevation between 2,000 and 5,000 feet and only drop below 2,000 feet for up to 15 minutes during the activity to land and takeoff, or to hover during deployment of training participants. At this location, rotary-wing noise would be audible, but the maximum sound level would not be in excess of 65 dBA for flight activities above 2,000 feet. Received maximum sound levels in this region would be anticipated to be between 65 and 70 dBA for lower hovering or landing activities (activities below 2,000 feet), and would be audible to receptors that are outside. At these received levels, it is anticipated that recreational activities would not be significantly affected. Indoor sound levels such as those within houses or buildings are expected to be lower than outdoor sound levels, reducing the potential for speech interference or classroom interference. Further, these activities are expected to last minutes, thus reducing their potential to impact hourly sound levels or overall DNL.

At the Lualualei Annex, the northeast portion of land on JBPHH Pearl City Peninsula, and the water drop zone at JBPHH Pearl City Peninsula, there are points of interest less than 0.5 mile from the training activities. At Lualualei Annex, residences on Hakimo Place are approximately 0.4 mile from the center of the landing/drop zone. The potential impact at these locations is determined by the length of time that the MV-22 is operating below 2,000 feet AGL. Typically, the aircraft maintains an elevation between 2,000 and 5,000 feet and only drops below 2,000 feet for up to 15 minutes during the activity to land and takeoff, or to hover during deployment of training participants. In this scenario, the contribution to the noise environment will be noticeable. Of note, a recent study (*Environmental Review for Basing MV-22 Aircraft at Marine Corps Air Station Futenma and Operating in Japan - Final, May 2012*) (U.S. Marine Corps, 2012) showed that an MV-22 at arrival or near touchdown has a maximum sound level of 83 dBA, measured at a distance of 500 feet abeam of the aircraft on the left side. A single event may be considered "noisy," but a single event lasting no more than a few minutes at low elevation would not affect the hourly L_{eq}, and thus the DNL would not change. It is important to note that while DNL levels may not change, the perceived impact of the noise from these activities would be greater in more rural areas, such as the residences near the Lualualei Annex drop zone and landing zone, where ambient daytime noise levels are lower than those in the JBPHH region.

As indicated in Table 3-10, residences on Hakimo Place near the Lualualei Annex could experience received maximum sound levels of up to 75 dBA for activities below 2,000 feet. Typical maximum sound levels from training (between 2,000 and 5,000 feet) would be between 63 and 71 dBA. During landing or hovering activities, these activities would be audible at outdoor locations. Indoor sound levels are expected to be lower, thus reducing the potential for speech interference. Further, though the landing or hovering noise would be audible at sensitive receptors, the levels are not high enough to create indoor levels that result in learning interference, nor are they loud enough to impact hearing abilities.

For the JBPHH Pearl City Peninsula, points of interest within 0.5 mile of the zones include houses (along Waiawa Road to the north), parks (Lehua Community Park), schools (Lehua Elementary School), the

Pearl Harbor National Wildlife Refuge, and churches. As indicated in Table 3-10, activities that are below 2,000 feet would create received maximum noise levels at these points of interest above 70 dBA. Landing zones on JBPHH Pearl City Peninsula would be utilized 5–12 times per year. Training would start at 1330 and could occur as late as 2200 hours. Given these operational constraints, potential impacts at Lehua Elementary would be reduced, as the school completes its day at 1400. Nearby residences could still experience maximum received sound levels (outside) between 70 and 78 dBA. This outdoor maximum noise level would be audible, but it would not be at levels that would damage hearing. Additionally, indoor levels are expected to be lower than outdoor levels. As such, indoor speech interference would not be anticipated. Further, as the training activities at JBPHH Pearl City Peninsula would only occur between 1330 and 2200, sleep disturbance would not be anticipated to be significant.

UAS training would take place in the context of military installations where training operations occur. Small hand-launched or catapult launched UASs would be used during training activities and would operate below 3,500 feet AGL. For reference and comparative purposes only, at a distance of 28 feet (8.5 meters), the received level from a Shadow UAS is approximately 108 dBA; at 204 feet (62.2 meters), the received level drops to 85 dBA (National Guard Bureau & U.S. Army Corps of Engineers, 2008). Once the UAS reaches approximately 3,000 feet (914.4 meters) AGL, the Shadow would no longer be heard on the ground. The hand held UASs proposed for use in this EA are smaller and are designed to be quieter than the Shadow; thus, noise levels would be inaudible at a lower altitude than that of the Shadow, though would be expected to be audible at operating elevations (between 65 and 85 dBA depending on elevation). Based on the low proposed frequency of operations (10 percent of the time training is occurring) and the low noise levels of UAS equipment, UAS noise would not be expected to have any measurable effect on overall noise levels or to add measurably to the existing DNL.

3.5.7.2.2 Marine Support Vessel Noise

In 2012, an independent study modeled airborne noise emissions for a multipurpose ship and a fishing research vessel and compared with field measurements in 2012 (Badino et al., 2012). At 25 meters from the operating vessels, the modeled received noise level was approximately 60 dBA for the fisheries vessel, and 70 dBA for the multipurpose vessel. At distances of 100 meters, these received levels would drop to approximately 48 and 58 dBA, respectively, due to propagation loss. During the proposed training activities, surface support vessels would likely be at or greater than 100 meters from shore. Further, vessel operation associated with training activities would be intermittent, and not at a fixed position. Given the discussion above, points of interest along the shoreline and further inland would not be impacted from sounds emitting from surface ships at levels that would contribute enough energy to exceed 65 dBA DNL. Sound levels up to 65 dBA DNL are considered to be compatible with land uses such as residences, transient lodging, and medical facilities.

3.5.7.2.3 Land-Based Training Noise

Noise-generating events from proposed land-based activities would be intermittent and the contribution of noise from training activities to the hourly sound levels (L_{eq}) would be low (and thus, their contribution to the DNL would be low). As mentioned above, the trainees strive to avoid detection and try to avoid or minimize civilian exposure. As such, the main noise sources on land are not from the training activities, but from the vehicles used to transport trainees or provide training support. Typical sound levels from a single diesel truck driving by is approximately 88 dBA at 50 feet (U.S. Department of Transportation, 2006). There is minimal travel of personnel and equipment from the staging areas on federal property to the individual training sites. Personnel utilize government and public waterways and

roads, and travel includes military support vehicles towing small boats and the movement of safety and maintenance equipment. Transportation also includes military personnel involved in the safety and training phases of the event. As such, the noise contribution from vehicles would be intermittent and would not contribute enough energy to exceed 65 dBA DNL. A single event may be considered "noisy," but a single event of 88 dBA lasting no more than a few seconds would not affect the hourly L_{eq}, and thus the DNL would not change.

3.5.7.2.4 Summary

Training events are performed with the training goal that the activities be undetected. Independent of location, the amount of noise created by these activities would not be sufficient enough to affect the community noise levels. Aircraft activities would create noticeable noise at points of interest proximate to the training activity, however, their contribution to the noise environment is expected to be minimal due to the short amount of time that the aircraft is below 2,000 feet. While community noise levels are not expected to be impacted, individual disturbances from maximum sound levels will still occur. However, any disturbances are expected to be short term and infrequent and any impacts on points of interest are minimal and short term based on the (1) relatively low intensity of the impacts, (2) localized nature of the impacts, (3) infrequent nature of the impacts, and (4) brief duration of the activities. Therefore, Alternative 1 would not result in significant impacts to the noise environment.

3.5.7.3 Alternative 2

Under Alternative 2, the same training parameters and considerations as Alternative 1 would take place, but the number of training events at these locations would increase. Under Alternative 2, the increase in training when compared to Alternative 1 would result in the same parameters and considerations as described above. Noise generating events from land-based activities would remain intermittent and the contribution of noise from training activities to the hourly sound levels (L_{eq}) would be low (and thus, their contribution to the DNL would be low). Training activities would have the same requirements and safety restrictions as Alternative 1. Given the nature of the action (i.e., teaching trainees the skills needed to avoid detection and not leaving any trace of presence during or after training activities), Alternative 2 would not have a substantially greater impact on the noise environment compared to Alternative 1.

Aviation flight time would increase approximately 40 percent under Alternative 2 to a total of 40 drop zone and 30 landing zone activities. An increase in activities at any of the proposed landing or drop zone would result in a commensurate rise in received noise levels, and as described above, the mission profile will determine the amount of noise surrounding the training activity. However, given the number of proposed training locations and the low total number of air-based training activities proposed annually, the contribution to the noise environment at any given drop zone or landing zone site is expected to be infrequent and only occasionally impact the overall noise exposure levels. Therefore, Alternative 2 would not result in significant impacts to the noise environment.

3.6 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. Public health and safety within this EA discusses information pertaining to community emergency services, operations, and environmental health and safety risks to children.

Community emergency services are organizations that 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.

Operational safety may refer to the actual use of the facility or built-out proposed project, or training or testing activities and potential risks to inhabitants or users of adjacent or nearby land and water parcels. Safety measures are often implemented through designated safety zones, warning areas, or other types of designations.

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.

3.6.1 Regulatory Setting

Aircraft safety is based on the physical risks associated with aircraft flight. Military aircraft fly in accordance with Federal Aviation Regulations Part 91, *General Operating and Flight Rules*, which govern such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes. These rules include the use of tactical training and maintenance test flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations. In addition, military aviators must also adhere to the flight rules, air traffic control, and safety procedures provided in Navy guidance. The FAA issues a Notice to Airmen (NOTAM) to disseminate information on upcoming or ongoing military training exercises with airspace restrictions (including the operation of UAS). Operators of civilian aircraft are responsible for being aware of any NOTAMs that are in effect. The FAA issues Certificates of Authorization to public and government operators for specific UAS activities. Certificates of Authorization may include specific safety provisions or limitations that a UAS operator must follow as part of the approval. The DoD has signed a memorandum of agreement with the FAA that includes the procedure for obtaining a Certificate of Authorization and requires additional safety measures (U.S. Department of Defense, 2013). For example, under this memorandum, UAS cannot be operated over populated areas unless airworthiness allows.

In accordance with Title 33, Part 72 of the C.F.R., the USCG, National Ocean Service, and National Geospatial-Intelligence Agency (NGA) issue Notice to Mariners (NOTMARs), which provides timely marine safety information for the correction of all U.S. Government navigation charts and publications from a wide variety of sources, both foreign and domestic. To ensure the safety of life at sea, the information published in the NOTMAR is designed to provide for the correction of unclassified nautical charts, the unclassified NGA/Defense Logistics Information Service Catalog of Hydrographic Products, U.S. Coast Pilots, NGA List of Lights, USCG Light Lists, and other related nautical publications produced by NGA, National Ocean Service, and the USCG.

EO 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."

3.6.2 Affected Environment

The training study area and contiguous nearshore waters encompass a broad spectrum of populations and landownership types, including private lands, public parks, harbors, golf courses, and recreation areas. Commercial, institutional, recreational, and military activities take place simultaneously within this area.

The American Community Survey's five-year estimate for 2011–2015 estimated that the State of Hawaii had a population of approximately 308,197 children below the age of 18 (21.9 percent of the total population of Hawaii). These estimates do not include tourists or other visitors within the training study area. Approximately 10.6 percent of the Hawaii population is below the poverty line (U.S. Census Bureau, 2016).

Several federal, State, and local emergency services respond to emergencies within the training study area, including local fire, police, and the USCG. NSWC currently designs and implements the safety and inspection procedures for operations and activities within the training study area. In the absence of specific guidance on matters of safety, NSWC follows the most prudent course of action to ensure the safety of all training participants and the nonparticipating public. The following paragraphs briefly discuss general rules and practices for recreational, commercial, institutional, and military use in sea surface areas, on land, and in airspace.

Although much of the offshore navigable and public waters in the training study area are freely accessible to the public for recreational and commercial activities, these waters include restricted areas, safety zones, danger zones, and prohibited areas, which limit or prohibit the public's access to certain waters. Public access is restricted in the waters around Marine Corps Base Hawaii, located on the Mokapu Peninsula in the Windward Oahu Region. Marine Corps Base Hawaii is surrounded by a security buffer zone which extends from the shore of the Mokapu Peninsula 500 yards seaward and restricts access to the sea space within the buffer, including access by recreation activities. The purpose of the security buffer zone is to maintain military security and public safety.

For periodic training events currently conducted within the training study area, the USCG ensures that private and commercial vessels are aware of operations that could affect them and that they comply with all maritime regulations as administered by the USCG. NSWC safety measures ensure public health and safety primarily through published and periodically reviewed SOPs that are designed to minimize or avoid civilian exposure to training activities. Private and commercial vessels are informed about temporary closures through the NOTMAR.

DoD facilities are typically restricted from public use. Within the training study area, this would include JBPHH, Puuloa Range Training Facility, Marine Corps Base Hawaii, Kahuku Training Area, Barbers Point, Air Force Tracking Station, Lualualei Annex on Oahu, and PMRF on Kauai. The remaining lands in the training study area are, generally, accessible to recreation, commercial, and institutional activities by the public where authorized by the landowners or land managers.

The airspace in the training study area is accessible to general aviation (recreational, private, corporate) and commercial aircraft. The FAA is responsible for the safe and efficient use of U.S. airspace by military

and civilian aircraft and for supporting national defense requirements. Within the training study area, controlled airspace is categorized into five separate classes within the National Airspace System: Class A through Class E, where Class B, C, or D is established to regulate air operations within an airport environment. The airspace management and use within the training study area is coordinated through air traffic control, which provides aircraft scheduling in accordance with the individual airspace classifications. The FAA regulates military operations in the National Airspace System through implementation of FAA Handbook JO 7400.2L - Procedures for Handling Airspace Matters and other joint agreements for special military operations. The DoD and FAA coordinate to establish policy, criteria, and specific procedures for air traffic control planning, coordination, and services during defense activities and special military operations.

3.6.3 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 training study area. Specifically, this section provides information on hazards associated with the training activities identified in Chapter 2 (Proposed Action and Alternatives). Additionally, this section addresses the environmental health and safety risks to children.

3.6.3.1 No Action Alternative

Under the No Action Alternative, baseline training activities conducted in Hawaii over the past decade would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable. NSWC activities that occurred in the Hawaii region under the various Categorical Exclusions would not change public health and safety. Therefore, no significant impact on existing public health and safety would occur with implementation of the No Action Alternative.

3.6.3.2 Alternative 1

Under Alternative 1, land-based and air-based training activities would occur on three Hawaiian Islands and water-based training activities would occur in the waters around six Hawaiian Islands. Navy policy requires that training activities ensure the safety and health of personnel and the public and requires that every possible precaution in planning and executing its actions are enforced to prevent injury to people or damage to property. Naval special operations personnel conduct all training events in accordance with military training procedures, approved SOPs, and protective measures, including OPNAVINST 5100.23G, *Navy Safety and Occupational Health Program Manual* (2011d). These policies assure a thorough consideration of public health and safety in conjunction with Navy personnel and their activities. Proposed training activities would not require assistance from local law enforcement for traffic or pedestrian control. NSWC would coordinate with local law enforcement when necessary. Therefore, there would be no additional demand on local law enforcement.

As described in Chapter 2 (Proposed Action and Alternatives), proposed training activities would not include using live-fire weapons or explosives; however, in three locations (Puuloa Range Training Facility, Pearl City Peninsula, and Marine Corps Base Hawaii – Kaneohe Bay Range Training Facility), live-fire weapons would be carried over federal land to reach existing live-fire ranges on federal property. These three locations are within federal property with limited and restricted public access and are authorized live-fire training areas. To further ensure public safety in all other areas of the training study area, trainees would not carry loaded weapons or explosives during training events.

Alternative 1 does not include the construction, improvement, or maintenance of any road or right-of-way. Alternative 1 also does not include designating or altering any special use airspace or restricted waters. All personnel would transit to and from training areas using existing roads, flight paths, and waterways in compliance with all applicable safety regulations.

Supervisor and safety personnel focus on maintaining a safety buffer around the small submersible or watercraft consistent with USCG regulations, namely the USCG Navigation Rules and Regulations Handbook, and as site conditions and the surrounding environmental dictate. For example, navigation lights on a dive boat (red over white over red) or a dive flag indicate that a dive is in progress and other vessels should keep well clear and at slow speed. Dive site locations would avoid locations that experience heavy traffic patterns, such as main shipping routes or fishing activities. In the event maritime vessels approach an active dive site, safety personnel would utilize Channel 16 (intended for international distress, safety, and calling) to contact vessels. If an oncoming vessel does not respond, a safety boat would approach the vessel and, depending on the situation, ask it to (1) hold its position; (2) go around the dive site; (3) if necessary, be escorted by the safety boat around the dive site; or (4) recall its divers to the surface or go to deep submerge. This ensures safety for the trainees, training vessels, and any commercial and civilian craft that may transit adjacent to the event location.

In addition to maintaining a safety buffer, supervisor and safety support personnel are responsible for identifying hazards to navigation that could affect the safety of the trainees, and recalling swimmers and divers, or the small submersible, to the surface, if conditions require. If the public enters the training area, the selected training may temporarily cease while the public transits the training area.

In cases where certain training activities involve navigational hazards, primarily parachute drops or cast and recovery, NSWC would coordinate with the USCG to issue NOTMARs that advise mariners on information concerning the safety of navigation. NOTMARs also would identify locations of planned NSWC activities and alert the public to the need to avoid those locations. For all open water training events involving broadcast navigational hazards, a Safety Officer would be present to ensure that training areas are clear and safe to conduct. In addition, on-call medical response personnel would be available throughout each training event. Water-based drop zone training activities proposed to be conducted in the waters around Marine Corps Base Hawaii would be conducted within the existing security buffer zone. The security buffer zone extends from the shore of the Mokapu Peninsula where Marine Corps Base Hawaii is located, 500 yards seaward and restricts access to the sea space within the buffer, including access by recreation activities. The purpose of the security buffer zone is to maintain military security and public safety. Conducting water-based drop zone training activities within the security buffer would not impact individuals using the waters outside of the 500-yard security buffer and thus would not affect public safety.

Trainees use fish-finder type sonar when conducting water-based training. To ensure safe and effective sonar use, NSWC applies safety procedures consistent with the U.S. Navy Diving Manual, Appendix 1A, *Safe Diving Distances from Transmitting Sonar*, the Navy's governing document for protecting divers during active sonar use (U.S. Department of the Navy, 2011a). The manual provides procedures for calculating safe distances from active sonar. These procedures are derived from experimental and theoretical research conducted at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit. Safety distances vary based on conditions that include type of sonar, and duration of time in the water. These safety distances would also be applicable to recreational swimmers and divers. The sonar used during naval special operations training is the same as fish-finder type sonar employed by recreational and commercial fishermen, and commonly used throughout the training study

area. Considering the existing use of fish-finder type sonar in the training study area, anticipated infrequent and short-term use of areas proposed for training and the large expanse of the training study area, naval special operations training is not anticipated to overlap with recreational swimmers or divers or result in impacts on members of the public.

All training events on non-federal land areas, and within state-owned harbors would be conducted in accordance with real estate agreements and approvals. NSWC would coordinate with land managers (where applicable), and property owners prior to use of property for training. NSWC would secure the appropriate permits, permissions, passes, or approvals prior to performing activities on these properties. NSWC safety measures include SOPs that are designed to avoid or minimize civilian exposure to training activities. For example, if the public enters the training area, the safety support personnel would assess the situation and, based upon safety considerations, would either continue the training, temporarily suspend the training, completely stop the training, or relocate the training to another approved training site. Prior to land-based training, support staff would typically visit a site. If members of the public are present, then the training event could shift away from the public or would not take place at the selected site. Additionally, support staff would be on site at all times to ensure overall safety in the training environment. While schools and churches are present throughout the training study areas in the JBPHH Region, training is not proposed to occur within schools or church facilities. The measures described above to minimize naval special operations training interaction with the public would further avoid potential impacts on the public's use of school and church facilities.

When conducting air-based training activities, naval special operations personnel would be supported by other DoD services, including Navy, Air Force, Marine Corps or Army and their associated aircraft assets. All aircraft used to support naval special operations training would be operated in accordance with all FAA safety regulations and Naval Air Training and Operating Procedures Standardization program. Safety regulations include NOTAMs created and transmitted to alert aircraft pilots of any hazards in route to or at a specific location as needed, which would include the location of parachute training operations. Operators of civilian aircraft are responsible for being aware of any NOTAMs that are in effect.

Proposed UAS training would occur at DoD property. UASs would carry non-hazardous payloads and would be operated in accordance with all FAA safety regulations and the DoD's memorandum of agreement with the FAA (Federal Aviation Administration, 2002). To operate UAS, NSWC would obtain a Certificate of Authorization prior to operating these systems. If necessary, the Certificate of Authorization would include additional safety measures that would be adhered to while operating the UAS. UAS training activities would have staff on hand who would be responsible for the safety and oversight of trainees participating in these activities and would utilize ground-based observers when operating UAS.

During training events, NSWC would dedicate a vehicle for emergency response. Commander Navy Region Hawaii would be contacted if a spill of any hazardous substance or oil were to occur into State waters, the ground, or in air, in accordance with the Navy's Oil and Hazardous Substance Integrated Contingency Plan. Commander Navy Region Hawaii would also be contacted if an oil spill occurred that could violate water quality standards, cause a film or sheen or discoloration on the water surface or shoreline, or cause sludge or emulsion to be deposited beneath the surface of the water. Should any spill pose a threat to human health, 911 would be called immediately. Any petroleum-contaminated soil from an accidental spill would be treated, stored, transported, handled, labeled, and disposed of in

accordance with federal, state, and local regulations. This ensures safety for the trainees, training vessels, and any commercial and civilian craft that may transit adjacent to the event location.

As discussed above, Navy policy requires that training activities ensure the safety and health of personnel and the public. Alternative 1 would not result in environmental health or safety risks that would disproportionately affect children. Therefore, no significant impacts on public health and safety would occur with implementation of Alternative 1.

3.6.3.3 Alternative 2

Under Alternative 2, the same impacts, analysis, and measures from Alternative 1 would apply to the proposed training activities and regions in the training study area. The increase in the number of training events at locations in the training study area would not result in environmental health or safety risks that would disproportionately affect children. Alternative 2 would have the same safety restrictions and requirements as described under Alternative 1, where personnel would transit to and from training areas using existing roads, and waterways in compliance with all applicable safety regulations. Supervisor and safety personnel would be present at training sites to ensure safety of the training site for trainees and public (if present). The increase in frequency would not have a substantially greater impact on public health and safety compared to Alternative 1. Therefore, no significant impacts on public health and safety would occur with implementation of Alternative 2.

3.7 Summary of Potential Impacts on Resources

A summary of the potential impacts associated with each of the action alternatives and the No Action Alternative are presented in Table 3-11.

Table 3-11: Summary of Potential Impacts on Resource Areas

Resource Area: Air Quality		
No Action Alternative	***Alternative 1***	***Alternative 2***
Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable. Therefore, no significant impact on air quality or air resources would occur with implementation of the No Action Alternative.	Transportation vehicles, vessels, aircraft and training equipment associated with proposed training activities would generate emissions; however the emissions would not result in a significant change from the environmental baseline and would have negligible impacts on the ambient air quality of the region. In addition, the dispersive nature of the proposed activities would prevent pollutants concentrating in a single location and would not result in a new major source of emissions that could cause the State of Hawaii to exceed NAAQS. The State of Hawaii is designated as being in attainment for all criteria pollutants and therefore does not require a conformity determination. Therefore, no significant impacts on air quality or air resources would occur with implementation of Alternative 1.	Transportation vehicles, vessels, aircraft and training equipment associated with proposed training activities would generate emissions greater than Alternative 1 due to the increase in tempo and would not result in a significant change from the environmental baseline and would have negligible impacts on the ambient air quality of the region. In addition, the dispersive nature of the proposed activities would prevent pollutants concentrating in a single location and would not result in a new major source of emissions that could cause the State of Hawaii to exceed NAAQS. The State of Hawaii is designated as being in attainment for all criteria pollutants and therefore does not require a conformity determination. Therefore, negligible impacts on air quality or air resources would occur with implementation of Alternative 2.
Resource Area: Land Use - Recreation		
No Action Alternative	***Alternative 1***	***Alternative 2***
Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable. Therefore, no significant impacts on land use or recreation would occur with implementation of the No Action Alternative.	The proposed training activities under Alternative 1 would not restrict the ability of individuals to use or access recreational areas and would be limited to no more than six training events annually at a single site. Right-of-entry permits and real estate agreements would be obtained prior to conducting training in areas where consent is needed. Minimization measures employed during training activities would limit encounters with the public during training events. Therefore, no significant impacts on land use or recreation would occur with implementation of Alternative 1.	The proposed training activities under Alternative 2 would not restrict the ability of individuals to use or access recreational areas. The increase in tempo to no more than 10 training events annually at a site would not affect the public's ability to use recreation areas due to training activities being localized, infrequent, and brief in duration. Right-of-entry permits would be obtained prior to conducting training in areas where consent is needed. Minimization measures employed during training activities would limit encounters with the public during training events. Therefore, no significant impacts on land use or recreation would occur with implementation of Alternative 2.

Table 3-11: Summary of Potential Impacts on Resource Areas (continued)

Resource Area: Biological Resources		
No Action Alternative	***Alternative 1***	***Alternative 2***
Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved and event-based Categorical Exclusions, as applicable. Therefore, no significant impacts on biological resources would occur with implementation of the No Action Alternative.	Proposed training activities under Alternative 1 may affect but would not adversely affect five ESA-listed plant species and associated critical habitat for two of the species, the orangeblack damselfly, two yellow-faced bee species, Hawaiian coot, Hawaiian common gallinule, Hawaiian duck, Hawaiian stilt, Hawaiian goose, Hawaiian hawk, band-rumped storm petrel, Hawaiian petrel, Newell's Townsend's shearwater, Hawaiian hoary bat, oceanic whitetip shark, giant manta ray, green turtle, hawksbill turtle, olive ridley turtle, Hawaiian monk seal and associated critical habitat, blue whale (Central North Pacific Stock), Main Hawaiian Islands Insular false killer whale and associated critical habitat, fin whale, sei whale, and sperm whale. Species would likely respond to the physical presence of trainees by temporarily stopping normal activities (e.g., feeding, resting) to move away from the activity. This type of impact is anticipated to be short term (where normal activities would resume after training events cease or move through the area) and minor (where behavioral changes would be insignificant). Potential effects to the species overall would be insignificant, as effects on individuals would be temporary and effects to habitat discountable because of the non-invasive nature and intent to leave no trace during or after a training event. Proposed training activities would have no significant impact on terrestrial wildlife and vegetation under Alternative 1 *(continued on next page)*.	Proposed training activities under Alternative 2 may affect but would not adversely affect five ESA-listed plant species and associated critical habitat for two of the species, orangeblack damselfly, two yellow-faced bee species, Hawaiian coot, Hawaiian common gallinule, Hawaiian duck, Hawaiian stilt, Hawaiian goose, Hawaiian hawk, band-rumped storm petrel, Hawaiian petrel, Newell's Townsend's shearwater, Hawaiian hoary bat, oceanic whitetip shark, giant manta ray, green turtle, hawksbill turtle, olive ridley turtle, Hawaiian monk seal and associated critical habitat, blue whale (Central North Pacific Stock), Main Hawaiian Islands Insular false killer whale and associated critical habitat, fin whale, sei whale, and sperm whale. In accordance with section 7 of the ESA, the Navy is currently conducting informal consultation with the USFWS and NMFS regarding potential effects of Alternative 2 (Preferred Alternative) on ESA-listed species and designated critical habitat. Species would likely respond to the physical presence of trainees by temporarily stopping normal activities (e.g., feeding, resting) to move away from the activity. This type of impact is anticipated to be short term (where normal activities would resume after training events cease or move through the area) and minor (where behavioral changes would be insignificant). Potential effects to the species overall would be insignificant, as effects on individuals would be temporary and effects to habitat discountable because of the non-invasive nature and intent to leave no trace during or after a training event. (*continued on next page*).

Table 3-11: Summary of Potential Impacts on Resource Areas (continued)

Resource Area: Biological Resources (continued)		
No Action Alternative	***Alternative 1***	***Alternative 2***
	Under the MBTA regulations applicable to military readiness activities (50 C.F.R. Part 21), with implementation of the identified aircraft flight restrictions, impacts from proposed training activities under Alternative 1 would not result in a significant adverse effect on migratory bird populations. Implementation of Alternative 1 would not adversely affect EFH within the training study area, and Level A and Level B harassment of marine mammals are not expected to occur. Therefore, no significant impacts on marine biological resources would occur with implementation of Alternative 1 and the proposed action is unlikely to result in take of a marine mammal under the MMPA.	Proposed training activities would have no significant impact on terrestrial wildlife and vegetation under Alternative 2. Although the tempo of proposed training activities on land and in water would increase under Alternative 2 compared to Alternative 1, the same responses would be expected with Alternative 2 Under the MBTA regulations applicable to military readiness activities (50 C.F.R. Part 21), with implementation of the identified aircraft flight restrictions, impacts from proposed training activities under Alternative 2 would not result in a significant adverse effect on migratory bird populations. Alternative 2 would have no adverse effect on EFH within the training study area, and Level A and Level B harassment of marine mammals are not expected to occur. Therefore, no significant impacts on marine biological resources would occur with implementation of Alternative 2 and the proposed action is unlikely to result in take of a marine mammal under the MMPA.

Table 3-11: Summary of Potential Impacts on Resource Areas (continued)

Resource Area: Cultural Resources		
No Action Alternative	***Alternative 1***	***Alternative 2***
Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable. Therefore, no significant impacts on cultural resources would occur with implementation of the No Action Alternative.	The proposed training activities would be non-invasive in nature. Training would also follow the protocols established under existing Programmatic Agreements and Integrated Cultural Resources Management Plans and requirements of landowners, where applicable, to further avoid and minimize the potential for impacts on archeological resources, historic architecture, and traditional cultural properties. Specific minimization and avoidance measures may be added after Section 106 consultation (including coordination with Native Hawaiian organizations) is complete. Therefore, a finding of no historic properties affected would occur with implementation of Alternative 1.	The proposed training activities would be non-invasive in nature. While tempo would increase under Alternative 2, training would follow the protocols established under existing Programmatic Agreements and Integrated Cultural Resources Management Plans and requirements of landowners, where applicable, to further avoid and minimize the potential for impacts on archeological resources, historic architecture, and traditional cultural properties. Specific minimization and avoidance measures may be added after Section 106 consultation (including coordination with Native Hawaiian organizations) is complete. Therefore, a finding of no historic properties affected would occur with implementation of Alternative 2.
Resource Area: Noise		
No Action Alternative	***Alternative 1***	***Alternative 2***
Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable. Therefore, no significant impact on the noise environment would occur with implementation of the No Action Alternative.	Training activities would generally occur away from residentially zoned areas and the operational conditions of land-based activities is to remain undetected and leave no trace of presence during or after the training. In addition, the operational conditions of aviation activities to maintain elevations above 2,000 feet except for short periods (below 500 feet for approximately 10 minutes) associated with proposed training under Alternative 1 avoids and minimizes noise and potential noise impacts. Disturbances are expected to be short term and infrequent and any impacts on points of interest are minimal and short term based on the (1) relatively low intensity of the impacts, (2) localized nature of the impacts, (3) infrequent nature of the impacts, and (4) brief duration of the activities. Therefore, Alternative 1 would not result in significant impacts to the noise environment.	Training activities would generally occur away from residentially zoned areas and the operational conditions of land-based activities is to remain undetected and leave no trace of presence during or after the training. In addition, the operational conditions of aviation activities to maintain elevations above 2,000 feet except for short periods (below 500 feet for approximately 10 minutes) associated with proposed training under Alternative 2 avoids and minimizes noise and potential noise impacts. Disturbances are expected to be short term and infrequent and any impacts on points of interest are minimal and short term based on the (1) relatively low intensity of the impacts, (2) localized nature of the impacts, (3) infrequent nature of the impacts, and (4) brief duration of the activities. Therefore, Alternative 2 would not result in significant impacts to the noise environment.

Table 3-11: Summary of Potential Impacts on Resource Areas (continued)

Resource Area: Public Health and Safety		
No Action Alternative	***Alternative 1***	***Alternative 2***
Baseline training activities conducted in Hawaii over the past decades would continue at the same level as currently scheduled, with the most current training activities being those approved under event-based Categorical Exclusions, as applicable. Therefore, no significant impacts on public health and safety would occur with implementation of the No Action Alternative.	Navy policy requires that training activities ensure the safety and health of personnel and the public. Under Alternative 1, proposed training would not include use of live-fire weapons; however, in three locations live-fire weapons would be carried overland to reach existing live-fire ranges. The ranges are within federal property and with limited and restricted public access; therefore, public health and safety would not be affected. For other training activities, personnel would travel using existing roads and waterways in compliance with applicable safety regulations. Air-based activities, including the use of aircraft and UAS, would comply with FAA safety regulation, the Department of Defense's memorandum of agreement with the FAA and the Naval Air Training and Operating Procedures Standardization program (Federal Aviation Administration, 2002). All training events on land areas and within state-owned harbors would be conducted in accordance with real estate agreements and approvals. A safety buffer would be established around maritime and land based training areas, and NSWC would have a vehicle dedicated for emergency response during training events. Size and type of safety buffer would vary by training site. NSWC would coordinate with the U.S. Coast Guard to notify mariners on the safety of navigation. Therefore, no significant impacts on public health and safety would occur with implementation of Alternative 1.	Navy policy requires that training activities ensure the safety and health of personnel and the public. Under Alternative 2, proposed training would not include use of live-fire weapons; however, in three locations live-fire weapons would be carried overland to reach existing live-fire ranges. The ranges are within federal property and with limited and restricted public access; therefore, public health and safety would not be affected. For other training activities, personnel would travel using existing roads and waterways in compliance with applicable safety regulations. Air-based activities, including the use of aircraft and UAS, would comply with FAA safety regulation, the Department of Defense's memorandum of agreement with the FAA and the Naval Air Training and Operating Procedures Standardization program (Federal Aviation Administration, 2002). All training events on land areas and within state-owned harbors would be conducted in accordance with real estate agreements and approvals. A safety buffer would be established around maritime- and land-based training areas, and NSWC would have a vehicle dedicated for emergency response during training events. NSWC would coordinate with the U.S. Coast Guard to notify mariners on the safety of navigation. The increase in tempo would not have a substantially greater impact on public health and safety when compared to Alternative 1. Therefore, no significant impacts on public health and safety would occur with implementation of Alternative 2.

Notes: EFH= Essential Fish Habitat, ESA = Endangered Species Act; FAA = Federal Aviation Administration; MBTA= Migratory Bird Treaty Act; MMPA = Marine Mammal Protection Act; NAAQS = National Ambient Air Quality Standards; NSWC = Naval Special Warfare Command; UAS = Unmanned Aircraft System.

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 the NEPA, CEQ regulations, and CEQ guidance. Cumulative impacts are defined in 40 C.F.R. 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."

To determine the scope of environmental impact analyses, agencies shall consider cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact analysis document.

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 (Council on Environmental Quality, 2005) and Consideration of Cumulative Impacts in EPA Review of NEPA Documents (U.S. Environmental Protection Agency, 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 resource areas of the proposed action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
- If one or more of the affected resource areas 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 will include those areas previously identified in Chapter 3 (Affected Environment and Environmental Consequences) for the respective resource areas. 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 Action locale. 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 (Definition of Cumulative Impacts), it was determined if a relationship exists such that the affected resource areas of the Proposed Action (included in this EA) might interact with the affected resource area 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 (Council on Environmental Quality, 2005), these actions considered but excluded from further cumulative effects analysis are not catalogued here as 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
Past Actions	
Construction of a Submarine Drive-In Magnetic Silencing Facility	EA
Pali Kilo Beach Cottages Expansion	EA
Naval Special Warfare Undersea Enterprise Consolidation	EA
Naval Undersea Warfare Center Division Fixed Surface Ship Radiated Noise Measurement	EA
Marine Corps Base Hawaii Wave Energy Test Site	EA
Present and Reasonably Foreseeable Future Actions	
T-Pier Demolition at Marine Corps Base Hawaii Kaneohe Bay	EA
Long Range Strike Weapon Systems Evaluation Program	EA
Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii	EIS
Cove Outdoor Recreation Center and Marina Improvements	EA
Hawaii and Southern California Training and Testing	EIS/OEIS
U.S. Coast Guard Training Activities in Hawaii	EA and EIS/OEIS

Table 4-1: Cumulative Action Evaluation (continued)

Action	Level of NEPA Analysis
Photovoltaic and Battery Energy Storage Systems	EA
Present and Reasonably Foreseeable Future Actions	
Commercial Wind Energy Development	N/A
Recreational Fishing	N/A
Commercial Fishing	N/A
Maritime Traffic	N/A
Coastal Land Development and Tourism	N/A
Undersea Communications Cables	EA
Aquaculture	N/A
Academic Research	N/A

Notes: EA = Environmental Assessment, EIS = Environmental Impact statement, OEIS = Overseas Environmental Impact Statement, N/A = Not Applicable

4.3.1 Past Actions

4.3.1.1 Construction of a Submarine Drive-In Magnetic Silencing Facility

Construction of a new drive-in submarine magnetic silencing facility was completed in December 2010 at JBPHH. The project replaced existing submarine deperming piers and structures and constructed land-based support facilities. Deperming is accomplished by wrapping heavy gauge copper cables around the hull and superstructure of the vessel; then very high electrical currents are pulsed through the cables to erase the permanent magnetism from ships and submarines. This camouflages them against magnetic detection vessels, marine mines with magnetic detection sensors, and interference with communications and navigation equipment.

Use of the facility is ongoing and risk for impacts associated with vessel traffic (such as strikes and noise) are present but negligible due to the reduced speed of vessels in this location.

4.3.1.2 Pali Kilo Beach Cottages Expansion, Marine Corps Base Hawaii

Existing services include 12 single and duplex recreational cottages. Expansion would occur on a previously developed 0.44-acre site used to store emergency generators and other portable equipment and would construct 19 new cottages (49 total new lodging units) adjacent to the shoreline. Construction would be implemented through 2026.

Cottage construction does not involve in-water work; however, construction activities and recreation by cottage tenants during operation may affect, but are not likely to adversely affect, ESA-listed sea turtles or the Hawaiian monk seal. Other future impacts on nearshore environments and EFH are possible from increased recreational activity.

4.3.1.3 Naval Special Warfare Undersea Enterprise Consolidation

This project includes consolidation of continental U.S.-based Naval Special Warfare Undersea Enterprise units and an existing unit currently located at JBPHH. Approximately 200,000 square feet of working space and supporting infrastructure would be provided through adaptive reuse of a historic property on Ford Island (Building 55), improvements to existing facilities, and new construction within the existing

unit's Pearl City Peninsula compound. Personnel and dependents would increase the population on Oahu by approximately 1,200, and implementation would occur over a 5–10-year period (U.S. Department of the Navy, 2011b).

The project did not involve in-water or over-water construction activities, and in-water operations are consistent with normal base activity. Increased population could increase nearshore population density, including additional participation in recreation and consumptive activities.

4.3.1.4 Naval Undersea Warfare Center Division Fixed Surface Ship Radiated Noise Measurement System

This project includes the installation and operation of a hydrophone array, undersea data transmission cable, and a shore station cable landing to measure underwater vessel noise (propulsion, ship machinery, and flow noise). Temporary impacts associated with sediment suspension during drilling operations for undersea cable installation were identified, along with anticipated negligible impacts on marine wildlife, including avoidance by individuals, during construction. No long-term impacts are anticipated.

4.3.1.5 Marine Corps Base Hawaii Wave Energy Test Site

The Marine Corps Base Hawaii Wave Energy Test Site has constructed two wave energy test sites and is testing offshore wave energy conversion devices. Construction included installation and operation of moorings, trunk power and communications transmission cables, in-water scientific data gathering equipment, and associated shoreside electrical transmission and monitoring equipment.

Ongoing environmental considerations for operation and maintenance include noise, entanglement and collision hazard, electrical leakage, heat, and electric and magnetic fields. It was determined that construction and operation are not likely to adversely affect any ESA-listed species or their designated or proposed critical habitat.

4.3.2 Present and Reasonably Foreseeable Actions

4.3.2.1 T-Pier Demolition at Marine Corps Base Hawaii Kaneohe Bay

This project includes demolition of Facility 1662, the former Naval Ocean Systems Command Pier, to include removal of concrete decking, support pilings, and existing utility lines associated with the pier.

No long-term environmental impacts are anticipated; short-term noise and turbidity in the nearshore marine environment during demolition activities expected.

4.3.2.2 Long Range Strike Weapon Systems Evaluation Program

The long-range evaluation tests include live and inert weapon systems deployed from aircraft for detonation in the air as well as at and below the water surface. Missions in 2017–2020 would occur once a year over five consecutive days.

Detonations associated with this program would produce underwater noise and explosions; however, due to shallow detonations, it is not anticipated that cratering would occur at the seafloor. Metals would sink, disperse, or bind to sediments. Individual fish in the area may be killed by the strike or the associated pressure bubble. An Incidental Take Authorization for marine mammals and sea turtles (hawksbill, loggerhead, olive Ridley, leatherback, and Central North Pacific distinct population segment of green sea turtle) was issued for the 2016 event, and a similar Authorization is anticipated for the 2017–2020 tests.

4.3.2.3 Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

Two Marine Medium Tiltrotor squadrons with a total of 24 MV-22 Osprey aircraft and one Marine Light Attack Helicopter squadron with 15 AH-1 Cobra and 12 UH-1 Huey attack and utility helicopters are based at Marine Corps Base Hawaii. The aircraft conduct aviation training, readiness, and special exercise operations at training facilities statewide. Basing facilities are located at Marine Corps Base Hawaii, Kaneohe Bay. Aviation operations are conducted at training areas on the islands of Kauai, Oahu, Maui, and Hawaii.

Noise impacts from the new aircraft mix are less than the previous aircraft mix, reducing impacts on Hawaiian monk seal habitat. The additional squadrons based at Marine Corps Base Hawaii, Kaneohe Bay considered an increase in population density; thus, there is additional participation in recreation and consumptive activities in the nearby nearshore coastal areas.

4.3.2.4 Cove Outdoor Recreation Center and Marina Improvements

This project consists of improvements to the Cove facilities at Marine Corps Base Hawaii. Proposed improvements address deficiencies and increased demand for outdoor recreational resources including construction of a wave attenuator to protect existing and proposed boating/recreation facilities; construction of additional boat slips, storage, parking, and pavilion; and on-shore and underwater improvements to three existing boat launches and seawall improvement.

The project is not likely to adversely affect Hawaiian monk seal, Hawaiian stilt, green sea turtle, and hawksbill sea turtle and was exempt from a negative determination from the Hawaii Coastal Zone Management Program.

4.3.2.5 Hawaii-Southern California Training and Testing

The U.S. Navy has prepared two iterations of this EIS/OEIS and is preparing the third to assess the potential environmental impacts associated with two categories of military readiness activities: training and testing. These water-based (at-sea) training activities, which do not have a land-based component, were consulted on under the ESA and MMPA. The water-based naval special operations training covered in the HSTT EIS/OEIS is considered at-sea training and does not include land-based components. Collectively, the at-sea areas in the EIS/OEIS are referred to as the HSTT Study Area (Study Area). In the EIS/OEIS, the Navy assesses military readiness activities that could potentially impact human and natural resources, especially marine mammals, sea turtles, and other marine resources. The range of alternatives includes a No Action Alternative and other reasonable courses of action. The military readiness activities proposed in the EIS/OEIS include the use of active sonar and explosives at sea off the coasts of Hawaii and Southern California, on the high seas where training and sonar testing and maintenance may occur during vessel transit between these areas, in the Temporary OPAREA north and west of the HRC, and at select Navy pierside and harbor locations. These military readiness activities are generally consistent with those analyzed in the HSTT EIS/OEIS completed in December 2013 and are representative of training and testing that the Navy has been conducting in the HSTT Study Area for decades.

While the HSTT EIS/OEIS addressed several resource areas, potential impacts on resource areas under HSTT EIS/OEIS that are the same as those analyzed in this EA would be considered for the cumulative effects analysis. These resource areas include air quality, biology (marine species), and public health and safety. The emission of criteria pollutants resulting from activities in the Study Area would not cause a violation or contribute to an ongoing violation of the NAAQS. Navy training and testing activities have

the potential to expose marine species to multiple acoustic, energy, physical disturbance and strike, entanglement, ingestion, and secondary stressors. However, long-term consequences to marine species in the Study Area are not anticipated. Because of the Navy's SOPs, impacts on public health and safety would be unlikely.

4.3.2.6 U.S. Coast Guard Training Activities in Hawaii

The USCG performs maritime humanitarian, law enforcement, and safety services in estuarine, coastal, and offshore waters. The USCG 14th District carries out its mission and conducts unit training in and around Hawaii. USCG training in Hawaii includes surface vessel live-fire training with small- and medium-caliber weapons, primarily conducted in Warning Areas 189, 193, and 194 within the HRC.

USCG mission and training activities result in vessel noise and could result in collisions with marine mammals and sea turtles. Sonar detection systems could have impacts on marine mammals, including toothed whales and pinnipeds, but only short-term, minor, adverse effects would be expected as the high frequency is similar to common commercial fish finder systems. Gunnery activities could result in military expended material being released in the benthic environment; however, results of Navy modeling efforts discussed for the project indicate a low risk that marine mammals or sea turtles would be struck by military expended material during training activities, and it is likely that similar USCG activities would have a similarly low risk.

4.3.2.7 Photovoltaic and Battery Energy Storage Systems

The U.S. Navy has proposed a renewable energy project consisting of a combined utility-scale photovoltaic array on an 87-acre site and a 94-acre site. The project would improve power quality and energy resiliency in support of the PMRF by supplementing the more vulnerable and lower quality power from the local power plant. The solar array system could generate up to 44 megawatts of direct current electrical power and would feed this electricity into the Kauai Island Utility Cooperative electrical grid for all users, public, and military. New electrical transmission lines would be installed either overhead or underground.

The anticipated environmental impacts are primarily terrestrial. The project would expand the energy portfolio available to the PMRF and the Kauai Island Utility Cooperative electrical grid, reducing the need for development of offshore energy resources (i.e., fuel tanker traffic, wind energy development).

4.3.2.8 Commercial Wind Energy Development

Three offshore wind projects have been proposed for federal waters around Oahu, Hawaii. Commercial-scale offshore wind facilities are similar to onshore wind facilities, and, depending on rotor size and spacing requirements, can include from 14 (110-meter rotor diameter) to 40 (150-meter rotor diameter) turbines in one Outer Continental Shelf block (3 statute miles by 3 statute miles). Average leaseholds are eight blocks, and current technology limits development to waters no deeper than 100 meters. Development includes installing the substructure, which is typically a large steel tube (up to 20 feet in diameter) driven 80–100 feet below the mudline in 15–100 foot water depths, with the pole and turbine mounted on top. Each turbine is connected by power cable to an electric service platform/substation, typically located somewhere within the turbine array, from which buried high voltage cables transmit the power to an onshore substation for integration into the onshore grid.

Site characterization activities include geophysical surveys, sub-bottom sampling, and biological surveys. Site assessment activities include installation of meteorological towers and meteorological buoys, data collection, and decommissioning of the towers and buoys.

Most impacts would occur during the construction phase, which involves the highest amount of vessel traffic, noise generation, seafloor disturbance (especially from transmission cabling), and air emissions; however, ongoing impacts would occur from vessel and turbine strikes; moderate operational noise; disturbance of nesting areas; alteration of key habitat; or potential fuel, oil, or dielectric fluid spills. Potential population-level impacts on marine mammals, fish, birds, and sea turtles would be mitigated in site-specific environmental review and permitting processes. In particular, impacts on sea turtles could be minor to moderate because of the technologies' potential to impede sea turtle movement and the potential of trapping sea turtles in overtopping devices. Additionally, if related onshore facilities are located in nesting areas, operation could cause minor to moderate adverse impacts on sea turtles due to hatchling disorientation from lighting, with possible major impacts if turtle nests or aggregates of hatchings are destroyed. During operation there is a risk of increased turbine strike of seabirds. Proper siting and design and other mitigation measures would minimize potential impacts on coastal sediment transport processes, marine navigation, commercial shipping, fishing activities, seafloor habitats, marine mammals, sea turtles, areas of special concern, archaeological sites, and U.S. DoD training and exercise activities.

4.3.2.9 Recreational Fishing

From 2010 through 2014, recreational fishers caught over 19 million fish in marine and estuarine waters in Hawaii. Recreational fishing includes impacts from vessel traffic (strike, noise, water pollution, marine debris) and can compound impacts on fish stocks already experiencing exploitation. Recreational fishing and boat traffic usually occurs nearshore rather than in the deeper open ocean, and recreational traffic typically frequents popular locations, which can concentrate damage in these areas from anchors or other bottom-disturbing equipment.

4.3.2.10 Commercial Fishing

Twenty major fisheries in Hawaiian waters include tuna, billfish, bottom fish, other species of pelagic fish, and a smaller invertebrate fishery. These fisheries all have gear, seasonal, and geographical prohibitions depending on the ecological conditions of the area and the target species. The NMFS issues fishing vessel, dealer, and commercial operator permits and fishing authorizations as required under the various Federal Fishery Regulations.

Commercial fishing can adversely affect fish populations, non-target species, and habitats. Bycatch includes the unintentional capture of fish, marine mammals, sea turtles, seabirds, and other non-targeted species that occur incidental to normal fishing operations. Fisheries bycatch has been identified as a primary driver of population declines in several groups of marine species, including sharks, mammals, seabirds, and sea turtles (Wallace et al., 2010). Commercial fishing often includes the use of mobile fishing gear, such as bottom trawls, which increases turbidity, alters surface sediment and bottom habitats, removes prey (leading to declines in predator abundance), removes predators, and generates marine debris. Ghost fishing occurs when lost and abandoned fishing gear, such as gill nets, purse seines, and long-lines, continue to ensnare fish and other marine animals without human oversight and removal. Lost gear fouls and disrupts bottom habitats and has the potential to entangle, or be ingested by, marine animals.

4.3.2.11 Maritime Traffic

The Hawaii coasts are heavily traveled by commercial, recreational, and government marine vessels with commercial ports near Navy OPAREAs. The United States has grown increasingly dependent on international trade over the past 50 years. Primary environmental concerns regarding increased

maritime traffic include vessels striking marine mammals and sea turtles, introduction of non-native species through ballast water, and underwater sound from ships and other vessels. Additionally, air and water quality in busy ports can be diminished due to engine emissions and fuel leaks. Secondary impacts include maintenance of port infrastructure, which often include dredging requirements to maintain channel depths and habitat loss and degradation in coastal habitats.

4.3.2.12 Coastal Land Development and Tourism

Coastal land development adjacent to the training study area is both intensive and extensive, including development of homes, businesses, recreation, vacation, and ship traffic at port facilities and marinas. The training study area coastline also includes extensive coastal tourism (hotels, resorts, restaurants, food industry, and vacation homes) and its supporting infrastructure (retail businesses, marinas, fishing tackle stores, dive shops, fishing piers, recreational boating harbors, beaches, and recreational fishing and whale watching). New development in the coastal zone requires a permit from the state or local government per the CZMA.

Tourism is the single biggest industry in Hawaii, and on any given day, over 200,000 visitors are in Hawaii. Significant activities include Self-Contained Underwater Breathing Apparatus (SCUBA), snorkeling and whale watching.

Coastal development intensifies use of coastal resources through dune and nearshore habitat loss and disturbance, point and nonpoint source water pollution, entrainment in outflows and other structures, and air quality degradation. SCUBA and snorkeling has the potential to degrade reef systems through disturbance and collecting, and collisions between whale watching ships and whales are common.

4.3.2.13 Undersea Communications Cables

Submarine cables provide the primary means of voice, data, and Internet connectivity between the United States and the rest of the world. The Federal Communications Commission grants licenses authorizing cable applicants to install, own, and operate submarine cables and associated landing stations in the United States. Cables are installed by specialized boats across flat ocean surfaces and dug into the seabed in shallow areas. Over 550,000 miles of cables currently exist in the world's oceans.

Potential impacts of installation and maintenance activities would include noise and vessel strikes from boat traffic and increased seafloor disturbance and sedimentation in localized areas where the cable is installed. Likewise, electromagnetic fields are generated by some cables that may be sensed by and affect the migration behavior of some fish, sharks, rays, and eels.

4.3.2.14 Aquaculture

Aquaculture is the farming of aquatic organisms such as fish, shellfish, and plants. Globally, 29 percent of stocks are fished at biologically unsustainable levels, and aquaculture helps meet demand and offsets stress to wild populations. Aquaculture production reached an all-time high of 97 million metric tons in 2013 and is the fastest growing form of food production, at 6 percent per year globally. Forty-seven percent of aquaculture operations occur in the Pacific Ocean.

The threats of aquaculture operations on wild fish populations include reduced water quality, competition for food, predation by escaped or released farmed fishes, spread of disease and parasites, and reduced genetic diversity. These threats become apparent when farmed fish escape and enter the natural ecosystem. The Marine Aquaculture Policy provides direction to enable the development of sustainable marine aquaculture.

4.3.2.15 Academic Research

Wide-scale academic research is conducted in the training study area by federal entities, such as both the Navy and National Oceanic and Atmospheric Administration/NMFS, and State and private entities and other partnerships.

Although academic research aims to capture data without disturbing the ambient conditions of the ocean environment, vessels contribute traffic, noise, and strike hazard; seismic activity contributes noise; and various other collection methods, such as trawling, could be disruptive to the ecosystems under observation. Impacts from academic research operations can be similar to the impacts expected from oil and gas air gun survey activities.

4.4 Cumulative Impact Analysis

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 where possible. The analytical methodology presented in Chapter 3 (Affected Environment and Environmental Consequences), which was used to determine potential impacts on the various resources analyzed in this document, was also used to determine cumulative impacts.

4.4.1 Air Quality

4.4.1.1 Description of Geographic Study Area

The area of analysis refers to the region around the Study Area for which cumulative air quality impacts must be accounted for. For this project, the area of analysis is considered to be the air basin encompassing the State of Hawaii, which is designated as being in attainment for all criteria pollutants.

4.4.1.2 Relevant Past, Present, and Future Actions

Actions that are relevant to cumulative impacts on air quality in the area of analysis include Pali Kilo Beach Cottages Expansion, T-Pier Demolition at Marine Corps Base Hawaii Kaneohe Bay, Long Range Strike Weapon Systems Evaluation Program, Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, Cove Outdoor Recreation Center and Marina Improvements, HSTT Training and Testing, USCG Training Activities in Hawaii, Photovoltaic and Battery Energy Storage Systems, Commercial Wind Energy Development, Recreational Fishing, Commercial Fishing, Maritime Traffic, Coastal Land Development and Tourism, Undersea Communications Cables, Aquaculture, and Academic Research.

4.4.1.3 Cumulative Impact Analysis

The ambient air quality is the result of all the processes, both natural and anthropogenic, that pollute or clean the air. The PSD thresholds take into account these processes and determine whether an action would have an appreciable impact on the ambient air quality in addition to other activities, meaning a cumulative analysis is inherently performed. Generally, PSD thresholds are only applicable to stationary sources of emissions, which there are none of in the Proposed Action. Although this means that the PSD program does not apply to this action, the significance thresholds that it establishes are still useful as a reference point to demonstrate whether an action will have an impact on the ambient air quality. In this case, the PSD thresholds are used as a reference to illustrate how cumulative impacts from the Proposed Action would be less than significant. Therefore, implementation of proposed training

activities under Alternative 1 or Alternative 2, combined with the past, present, and reasonably foreseeable future projects, would not result in significant cumulative impacts within the area of analysis since the neither alternative emits pollutants above the PSD thresholds.

4.4.2 Land Use-Recreation

4.4.2.1 Description of Geographic Study Area

The land use-recreation area of analysis contains the training study area, which includes geographic regions including five Oahu regions (JBPHH, South, Windward, North, and West), the Island of Hawaii, Kauai, Maui, Lanai, and Molokai.

4.4.2.2 Relevant Past, Present, and Future Actions

Actions that are relevant to the cumulative impacts on land use and recreational resources in the area of analysis include Photovoltaic and Battery Energy Storage Systems, Commercial Wind Energy Development, and Coastal Land Development and Tourism.

4.4.2.3 Cumulative Impact Analysis

Cumulative land use impacts from past, present, and future actions within the area of analysis would be less than significant because implementation of Alternative 1 or Alternative 2 would not restrict the ability of individuals to use or access recreational areas for purposes of hiking, hunting, fishing and boating/beach recreation on non-federal or federal lands. Training would be localized, infrequent, and brief in duration. Training would be consistent with the existing land use of the area for federal and non-federal lands, with trainees swimming in the water, moving across the beach, and walking on trails. Training would only occur on non-federal property if proper consent was given. Training activities utilizing aircraft would have no effect on recreational activities as they are proposed to be conducted on federal property in designated areas consistent with other military activities. Drop zone and landing zone training activities are not co-located with public recreational activities. Therefore, implementation of proposed training activities under Alternative 1 or Alternative 2, combined with the past, present, and reasonably foreseeable future projects, would not result in cumulative impacts within the area of analysis.

4.4.3 Biological Resources

4.4.3.1 Description of Geographic Study Area

The area of analysis for biological resources includes both the terrestrial and marine portions of the training study area, which includes geographic regions of five Oahu regions (JBPHH, South, Windward, North, and West), the Island of Hawaii, Kauai, Maui, Lanai, and Molokai.

4.4.3.2 Relevant Past, Present, and Future Actions

Actions that are relevant to the cumulative impacts on biological resources in the area of analysis include:

- T-Pier Demolition at Marine Corps Base Hawaii, Kaneohe Bay
- Long Range Strike Weapon Systems Evaluation Program
- Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
- Pali Kilo Beach Cottages Expansion

- Cove Outdoor Recreation Center and Marina Improvements
- HSTT EIS/OEIS
- USCG Training Activities in Hawaii
- Photovoltaic and Battery Energy Storage Systems
- Commercial Wind Energy Development
- Recreational and Commercial Fishing
- Maritime Traffic
- Coastal Land Development and Tourism
- Undersea Communications Cables
- Aquaculture
- Academic Research

4.4.3.3 Cumulative Impact Analysis

The ongoing actions and actions that may reasonably occur in the foreseeable future listed above introduce similar stressors analyzed in this EA on biological resources (i.e., physical presence, physical disturbance and strike, and acoustic stressors), as well as additional stressors not part of this proposed action. These additional stressors include potential habitat degradation associated with coastal development and construction projects, recreational and commercial fishing activities, and construction of infrastructure in nearshore environments associated with industrial-grade energy production (planned wind energy projects in nearshore waters of Hawaii) and communication infrastructure (e.g., undersea cables). The proposed training activities discussed in this EA would have minor and temporary impacts, without long-term consequences for terrestrial and marine wildlife resources. Any effects associated with proposed training activities are anticipated to be insignificant and discountable, and therefore would not adversely affect ESA-listed species or habitats. Because potential impacts from the proposed training activities would be minor and temporary, the proposed action is not expected to contribute to any cumulative impacts on terrestrial and marine biological resources.

Cumulative biological resource impacts from past, present, and future actions within the training study area would be less than significant because of the reasons stated above. Therefore, implementation of the proposed training activities under Alternative 1 or Alternative 2, combined with the past, present, and reasonably foreseeable future projects, would not result in cumulative impacts on terrestrial and marine biological resources within the area of analysis.

4.4.4 Cultural Resources

4.4.4.1 Description of Geographic Study Area

The area of analysis for cultural resources includes the APE. The APE consists of the training study area, which includes geographic regions including five Oahu regions (JBPHH South, Windward, North, and West), the Island of Hawaii, Kauai, Maui, Lanai, and Molokai.

4.4.4.2 Relevant Past, Present, and Future Actions

Actions that are relevant to the cumulative impacts on cultural resources in the area of analysis include Pali Kilo Beach Cottages Expansion, Introduction of the P-8A Multi-Mission Maritime Aircraft into the U.S. Fleet, Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, Cove Outdoor Recreation Center and Marina Improvements, HSTT Training and Testing, USCG Training Activities in Hawaii, Photovoltaic and Battery Energy Storage Systems, Commercial Wind Energy Development, Coastal Land Development and Tourism, Undersea Communications Cables, Aquaculture, and Academic Research.

4.4.4.3 Cumulative Impact Analysis

Cumulative impacts on cultural resources from past, present, and future actions within the area of analysis would be less than significant because training activities would be low impact as trainees operate with the goal to leave no trace during or after a training event throughout the area of analysis. Proposed training would follow the appropriate protocols established under existing approved SOPs, and protective measures that are in place to avoid and minimize the potential for impact on archaeological resources. When applicable, proposed training also would follow protocols established as part of the Section 106 consultation, which may result in specific minimization and avoidance measures. Therefore, implementation of proposed training activities under Alternative 1 or Alternative 2, combined with the past, present, and reasonably foreseeable future projects, would not result in cumulative impacts within the area of analysis.

4.4.5 Noise

4.4.5.1 Description of Geographic Study Area

The noise area of analysis contains the training study area, which includes geographic regions including five Oahu regions (JBPHH, South, Windward, North, and West), the Island of Hawaii, Kauai, Maui, Lanai, and Molokai.

4.4.5.2 Relevant Past, Present, and Future Actions

Actions that may interact with the affected noise areas of the training study area include activities such as the Pali Kilo Beach Cottages Expansion, T-Pier Demolition at Marine Corps Base Hawaii Kaneohe Bay, Long Range Strike Weapon Systems Evaluation Program, Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, Cove Outdoor Recreation Center and Marina Improvements, HSTT Training and Testing, USCG Training Activities in Hawaii, Photovoltaic and Battery Energy Storage Systems, Commercial Wind Energy Development, Maritime Traffic, and Coastal Land Development and Tourism. These construction activities would add noise to the environment on a short-term, intermittent basis. Other training activities and maritime traffic would add noise to the ocean environment, however that noise would be short term and intermittent and spread out over a wide area that only intersects with the area of analysis for short-term events. Finally, while the basing of MV-22 and H-1 aircraft decreased the noise in the area of analysis compared to the previous aircraft operating in the area of analysis, the operation of MV-22 and H-1 aircraft still contribute to the daily noise environment.

4.4.5.3 Cumulative Impact Analysis

There are points of interest throughout the training study area. While a school (Lehua Elementary School) is present within the JBPHH Region of the training study area, training is not proposed to occur during school facility activities or hours of operation. The measures described in Chapter 3 (Affected

Environment and Environmental Consequences) to minimize naval special operations training interaction with the public would further avoid potential impacts on the public's use of points of interest, including schools. Generally, training activities would occur away from residential zoned areas in nearshore areas and on public or federal lands, in natural settings. In cases where points of interest are proximate to training activities, operational conditions (such as aircraft typically operating above 2,000 feet) minimize received noise levels at residences or other points of interest. Cumulative noise impacts from past, present, and future actions within the area of analysis would be less than significant because the primary purpose of training activities would be to remain undetected and not make noise. Therefore, implementation of proposed training activities under Alternative 1 or Alternative 2, combined with the past, present, and reasonably foreseeable future projects, would not result in cumulative noise impacts within the area of analysis.

4.4.6 Public Health and Safety

4.4.6.1 Description of Geographic Study Area

The public health and safety area of analysis contains the training study area, which includes geographic regions including five Oahu regions (JBPHH, South, Windward, North, and West), the Island of Hawaii, Kauai, Maui, Lanai, and Molokai.

4.4.6.2 Relevant Past, Present, and Future Actions

Past, present, and future actions that could add to impacts on public health and safety are those actions that contribute further to maritime traffic such as the HSTT Training and Testing, USCG Training Activities in Hawaii, and recreational and commercial fishing. Recreational and commercial fishing activities increase the number of vessels in the water, which increases the chance of hazardous spills or discharges. No current or foreseeable projects would require the use of local police for traffic control and therefore would not impact public health and safety.

4.4.6.3 Cumulative Impact Analysis

Cumulative public health and safety impacts from past, present, and future actions within the area of analysis would be less than significant because increases in vessel traffic associated with proposed training activities under Alternative 1 and Alternative 2 are negligible and any spills or discharges that take place during training events would be cleaned up in accordance with Navy protocols. Proposed training activities would not require assistance from local law enforcement for traffic or pedestrian control. NSWC would coordinate with local law enforcement when necessary. Given local law enforcement is not typically needed to support naval special operations training, first responders would not be affected by proposed training. All training events would be conducted in accordance with military training procedures, approved SOPs, and protective measures, including OPNAVINST 5100.23G, *Navy Safety and Occupational Health Program Manual* (2011) and FAA safety regulations when UAS or when naval special operations training activities are conducted in conjunction with other DoD service aircraft assets. To further maintain safety during training activities, the Navy would coordinate with USCG to inform mariners on safety of navigation. Therefore, implementation of proposed training activities under Alternative 1 or Alternative 2, combined with the past, present, and reasonably foreseeable future projects, would not result in cumulative impacts within the area of analysis.

5 Other Considerations Required by NEPA

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

In accordance with 40 C.F.R. 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
Antiquities Act (16 U.S.C. sections 431–433)	In accordance with Navy procedures, the Proposed Action is consistent with the Act's objectives for protection of archaeological and historical sites and objects, preservation of cultural resources, and the public's access to them. On 26 April 2017, Executive Order (EO) 13792, *Review of Designations Under the Antiquities Act*, was issued and directed the Secretary of the Interior to review designations of national monuments made since 1996. See Section 3.4 (Cultural Resources) for the assessment.
Clean Air Act (CAA) (42 U.S.C. section 7401 et seq.)	The Proposed Action is within an attainment area for NAAQS, thus a Conformity Determination is not required. In addition, prevention of significant deterioration thresholds are not applicable to training activities since there are no stationary sources associated with the Proposed Action. Criteria pollutant emissions would not be generated in significant enough quantities to affect the attainment status of the region and would be sufficiently dispersed to not appreciably impact the local air quality.
Clean Water Act (33 U.S.C. 1251 et seq.)	The Proposed Action does not require a permit pursuant to sections 401, 402, or 404 of the Clean Water Act, as the Proposed Action does not include construction or demolition activities.
Comprehensive Environmental Response and Liability Act (CERCLA) (42 U.S.C. section 9601 et seq.)	One CERCLA site is present within the training study area, Pearl Harbor Naval Complex. The Navy is not disturbing sites where the contamination is and the Navy is allowed to walk across the sites but will not be digging. The Navy would report any spill or release of hazardous substance of a quantity equal to or greater than the reportable quantity.
Endangered Species Act (16 U.S.C. section 1531 et seq.)	In accordance with section 7 of the ESA, the Navy has prepared Biological Evaluations that assesses the potential impacts of the Preferred Alternative on terrestrial and marine ESA-listed species and designated critical habitat. The analysis in the Biological Evaluations indicates that the Proposed Action may affect, but is not likely to adversely affect ESA listed species and critical habitat. The Navy is currently conducting informal consultation with USFWS and NMFS regarding potential effects of the Preferred Alternative on ESA-listed species and designated critical habitat (see Section 3.3, Biological Resources).
Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (16 U.S.C. section 1801 et seq.)	The Navy concluded the Proposed Action would not adversely affect Essential Fish Habitat (EFH) (see Section 3.3, Biological Resources).

Table 5-1: Principal Federal and State Laws Applicable to the Proposed Action (continued)

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	Status of Compliance
Marine Mammal Protection Act (MMPA) (16 U.S.C. section 1361 et seq.)	The Proposed Action is not expected to result in injury or harassment of any marine mammal as defined by the MMPA.
Migratory Bird Treaty Act (MBTA) (16 U.S.C. section 703–712)	The Proposed Action is not anticipated to result in adverse effects on migratory bird populations and would be in compliance with the MBTA.
National Environmental Policy Act (NEPA) (42 U.S.C. section 4321 et seq.); CEQ NEPA implementing regulations (40 C.F.R. parts 1500-1508); Navy procedures for Implementing NEPA (32 C.F.R. part 775)	This Environmental Assessment (EA) has been prepared in accordance with NEPA, CEQ regulations implementing NEPA, and Navy NEPA procedures. Public participation and review are being conducted in compliance with NEPA.
National Historic Preservation Act (54 U.S.C. section 306108 et seq.)	The Proposed Action is consistent with the national policy for the preservation of historic sites, buildings, archaeological sites, and objects of national significance. The Navy has initiated the Section 106 consultation process with the SHPD and key stakeholders, including Native Hawaiian organizations. See Appendix A for correspondence between the Navy and key stakeholders.
Native American Graves Protection and Repatriation Act (25 U.S.C. 3001 et seq.)	In the event human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered, the Navy would consult with Native Hawaiian organizations.
Rivers and Harbors Act (33 U.S.C. section 407)	No permit is required under the Rivers and Harbors Act as no construction in navigable waterways is proposed.
Submerged Lands Act of 1953 (43 U.S.C. sections 1301–1315)	The Proposed Action is consistent with regulations concerning the Submerged Lands Act.
Sunken Military Craft Act (Public Law 108–375, 10 U.S.C. section 113 Note and 118 Stat. 2094–2098)	The Sunken Military Craft Act does not apply to actions taken by, or at the direction of, the United States. See Section 3.4 (Cultural Resources) for the assessment.
Hawaii Administrative Rules, Title 11, Chapter 59	The Proposed Action would not cause an exceedance of the State's ambient air quality standards since criteria pollutant emissions would be distributed across the entire state and would not include point sources releasing large amounts of emissions in a localized area. Therefore, the Proposed Action is in compliance with Title 11, Chapter 59, *Ambient Air Quality Standards*.
Hawaii Administrative Rule, Chapter 13-107	The Proposed Action is consistent with Chapter 13-107, *Threatened and Endangered Plants*. The Proposed Action is consistent with this chapter to the maximum extent practicable. In accordance with section 7 of the ESA, the Navy has prepared a Biological Evaluation, and the Navy is conducting informal consultation with USFWS regarding potential effects of the Preferred Alternative (Alternative 2) on ESA-listed plant species and associated critical habitat. As this consultation will occur on a federal level it also will apply to the state (see Section 3.3, Biological Resources).

Table 5-1: Principal Federal and State Laws Applicable to the Proposed Action (continued)

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	Status of Compliance
Hawaii Administrative Rule, Chapter 13-124, Exhibit 2 and Hawaii Revised Statutes, section 195D	The Proposed Action is consistent with Chapter 13-124, *Indigenous wildlife, endangered and threatened wildlife, injurious wildlife, introduced wild birds, and introduced wildlife*. The Proposed Action is consistent with this chapter to the maximum extent practicable. In accordance with section 7 of the ESA, the Navy has prepared two Biological Evaluations and is conducting informal consultation with USFWS and NMFS regarding potential effects of the Preferred Alternative (Alternative 2) on ESA-listed terrestrial and marine species. As this consultation will occur on the federal level it would also apply at the state level (see Section 3.3, Biological Resources).
Hawaii Administrative Rule, Chapter 13-275	The Proposed Action is consistent with Chapter 13-275, *Rules Governing Procedures for Historic Preservation Review for Governmental Projects covered under Sections 6E-7 and 6E-8, HRS*, as the Navy has initiated Section 106 consultation with the SHPD and key stakeholders and followed the governing procedures to the maximum extent practicable. This federal consultation process applies also to the state. See Appendix A for correspondence between the Navy and key stakeholders.
Hawaii Revised Statutes, section 6E-8	The Proposed Action is consistent with section 6E-8, *Review of effect of proposed state projects*, as the Navy has initiated Section 106 consultation with the SHPD and key stakeholders. This federal consultation process applies also to the state. See Appendix A for correspondence between the Navy and key stakeholders.
Hawaii Revised Statutes, sections 183D-1-66	The Proposed Action may impact state property in which state-listed threatened and endangered species are present that may be affected by the Proposed Action. The Proposed Action is consistent with these Statutes to the maximum extent practicable. In accordance with section 7 of the ESA, the Navy has prepared two Biological Evaluations and is conducting informal consultation with USFWS and NMFS regarding potential effects of the Preferred Alternative (Alternative 2) on ESA-listed terrestrial and marine species and designated critical habitat. As this consultation will occur on the federal level it would also apply at the state level (see Section 3.3, Biological Resources).
EO 11988, Floodplain Management	The Proposed Action would not impact the 100-year floodplain.
EO 12088, *Federal Compliance with Pollution Control Standards*	All necessary actions would be taken for the prevention, control, and abatement of environmental pollution.
EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*	The Proposed Action would not result in any disproportionately high and adverse human health or environmental effects on minority or low-income populations.
EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*	The Proposed Action would not result in environmental health risks and safety risks that may disproportionately affect children.

Table 5-1: Principal Federal and State Laws Applicable to the Proposed Action (continued)

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	Status of Compliance
EO 13089, Coral Reef Protection	The Navy concluded the Proposed Action would not adversely affect coral reefs. See Section 3.3 (Biological Resources).
EO 13783, *On Promoting Energy Independence and Economic Growth*	The Proposed Action is consistent with the policy and immediate review of all agency actions that potentially burden the safe, efficient development of domestic energy resources. This EO revokes EO 13653, *Preparing the United States for the Impacts of Climate Change*.

Notes: C.F.R. = Code of Federal Regulations, CEQ = Council on Environmental Quality, ESA = Endangered Species Act, NAAQS = National Ambient Air Quality Standards, NEPA = National Environmental Policy Act, NAAQS = National Ambient Air Quality Standards, NMFS = National Marine Fisheries Service, SHPD = State Historic Preservation Division, USFWS = U.S. Fish and Wildlife Service, U.S.C. = United States Code

5.1.1 Coastal Zone Management Act

Through the CZMA, Congress established national policy to preserve, protect, develop, restore, or enhance resources in the coastal zone. This Act encourages coastal states to properly manage use of their coasts and coastal resources, prepare and implement coastal management programs, and provide for public and governmental participation in decisions affecting the coastal zone. To this end, CZMA imparts an obligation upon federal agencies whose actions or activities affect any land or water use or natural resource of the coastal zone to be carried out in a manner consistent to the maximum extent practicable with the enforceable policies of federally approved state coastal management programs. However, federal lands, which are “lands the use of which is by law subject solely to the discretion of the Federal Government, its officers, or agents,” are statutorily excluded from the State's “coastal uses or resources.” If, however, the proposed federal activity affects coastal uses or resources beyond the boundaries of the federal property (i.e., has spillover effects), the CZMA Section 307 federal consistency requirement applies.

Portions of the training study area are located within the coastal zone of the State of Hawaii. The State of Hawaii Office of Planning is the lead agency for coastal management and is responsible for enforcing the State's federally approved Coastal Zone Management program (State of Hawaii, 2017). The Proposed Action is expected to have insignificant direct or indirect (cumulative and secondary) coastal effects. Activities on most federal properties should not be subject to further review by the Hawaii Coastal Zone Management Program per the “Navy/Marine Corps *De Minimis* Activities Under the CZMA” List (Department of Business Economic Development and Tourism, 2009). The Navy will comply with project mitigation and general conditions in accordance with General Condition 12 (Military Training and Testing) of the Navy/Marine Corps *De Minimis* Activities List. Federal project areas that are not covered by the Navy/Marine Corps *De Minimis* List will be evaluated by the Hawaii Coastal Zone Management Program via a Negative Determination. The Navy will complete a Federal Consistency Determination for activities that will occur on non-federal lands.

5.2 Irreversible or Irretrievable Commitments of Resources

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of non-renewable resources such as metal and fuel, and natural or cultural resources. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered an

irretrievable resource. Another impact that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

For the Proposed Action, most resource commitments would be neither irreversible nor irretrievable. Most impacts are short term and temporary, or long lasting but negligible. Since there would be no building or facility construction, the consumption of materials typically associated with construction (e.g., concrete, metal, sand) would not occur. Energy usage typically associated with construction activities would not be expended and irreversibly lost. Fuel expended by vehicles, vessels, and aircraft during training activities would be irreversibly lost.

The Proposed Action would not result in loss of habitat for plants or animals. The Proposed Action may affect, but is not likely to adversely affect, threatened or endangered species. As part of the rigorous training, the trainees learn skills needed to avoid detection along with the goal of leaving no trace of their presence during or after training activities, which diminishes the likelihood of any physical disturbance to cultural resources. There would be no changes in land use within the training study area.

The amount of materials required for any training-related activities and energy used during the Proposed Action would be small. Although the proposed activities would result in some irreversible or irretrievable commitment of resources such as various metallic materials, minerals, and labor, this commitment of resources is not significantly different from that necessary for many other Navy training activities carried out over the past several years. Proposed activities would not commit natural resources in significant quantities.

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

The 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 proposed training activities under the Proposed Action would be minimal. Naval special operations training activities under the Proposed Action would be consistent with the existing land use of the area for federal and non-federal lands, with trainees swimming in the water, moving across the beach, and walking on and off trails. The Proposed Action does not include construction on undeveloped lands or permanent ground-disturbing activities over an undisturbed area. In addition, part of the rigorous training is for the trainees to learn skills needed to avoid detection along with the goal of leaving no trace of their presence during or after training activities. Implementation of the Proposed Action would result in less than significant impacts on sensitive resources. Thus, the Proposed Action 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 List of Preparers

This EA was prepared collaboratively between the Navy and contractor preparers.

6.1 U.S. Department of the Navy

Barbara Prine (Naval Facilities Engineering Command)
M.S., Environmental-Agricultural Education
B.S., Natural Resources and Environmental Sciences
Years of Experience: 12
Responsible for DOPAA, Public Health and Safety, Land Use and Recreation

Julie Zimmerman (Naval Facilities Engineering Command)
B.A., Environmental Studies and English
Years of Experience: 10
Responsible for Project Management

Norma Creps (Naval Facilities Engineering Command)
Zoology w/MOP Certificate (Marine Option Program)
Years of Experience: 15
Responsible for Biological Resources /Terrestrial Consultation

Jean Pan (Naval Facilities Engineering Command)
Ph.D., Plant Sciences/Ecology, Evolution, & Behavior
B.S., MS Biology
Years of Experience: 15
Responsible for Marine Biological Resources

Coral Rasmussen (Naval Facilities Engineering Command)
M.A., Maritime History and Underwater Archaeology
Years of Experience: 28
Responsible for Cultural Resources

6.2 Contractors

Karen Waller (ManTech International Corporation)
M.B.A., Environmental Management
B.S., Public Affairs
Years of Experience: 28
Responsible for Content Review, Technical Editing, and DOPAA

Meagan Ostrem (ManTech International Corporation)
B.S., Environmental Science/Environmental Law and Policy
Years of Experience: 14
Responsible for DOPAA, Land Use-Recreation and Public Health and Safety

Rick Spaulding (ManTech International Corporation)
M.S., Wildlife and Fisheries Science
B.A., Biological Sciences
Years of Experience: 33
Responsible for Biological Resources

Danny Heilprin (ManTech International Corporation)
M.S. Marine Sciences
B.A. Aquatic Biology
Years of Experience: 30
Responsible for Biological Resources

Larry Wolski (ManTech International Corporation)
M.S. Marine Sciences
B.S. Biology
Years of Experience: 20
Responsible for Noise and Air Quality

Marya Samuelson (ManTech International Corporation)
M.B.A., Project Management
B.A., Environmental Studies
Years of Experience: 6
Responsible for Cultural Resources

Lucas Griswold (ManTech International Corporation)
B.S., Environmental Engineering
Years of Experience: 1
Responsible for Air Quality

Kelsey Kaehler (ManTech International Corporation)
B.S., Environmental Science
Years of Experience: 1
Responsible for Land Use-Recreation

7 Distribution List

This EA was distributed to the following agencies/people.

7.1 Federal Agencies

Dr. Mary Abrams, Field Supervisor
U.S. Fish and Wildlife Service
Pacific Islands Field Office
300 Ala Moana Boulevard, Box 50088
Honolulu, HI 96850-5000

Gerry Davis, Assistant Regional Administrator
Habitat Conservation Division
National Marine Fisheries Service
Pacific Islands Region Office
1845 Wasp Blvd., Building 176
Honolulu, HI 96818

Ann Garrett, Assistant Regional Administrator
Protected Resources Division
National Marine Fisheries Service
Pacific Islands Region Office
1845 Wasp Blvd., Building 176
Honolulu, HI 96818

7.2 State Agencies

Dr. Alan Downer, Administrator
Hawaii State Historic Preservation Office
Kakuhihewa Building
601 Kamokila Blvd., Suite 555
Kapolei, HI 96707

Suzanne Case, Chairperson
Hawaii State Department of Land and Natural Resources
Kalanimoku Building
1151 Punchbowl St.
Honolulu, HI 96813

Scott Glenn, Director
Office of Environmental Quality Control
235 S. Bertetania Street, Suite 702
Honolulu, HI 96813

John Nakagawa
Hawaii Coastal Zone Management Program
Office of Planning, State of Hawaii
PO Box 2359
Honolulu, HI 96804

7.3 City and County of Honolulu

Michele K. Nekota, Director
City and County of Honolulu
Department of Parks and Recreation
1000 Uluohia St.
Kapolei, HI 96707

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Appendix A: Correspondence for Naval Special Operations Training in Hawaii

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Appendix A Agency Correspondence

A.1 Request for Concurrence on Species List to U.S. Fish and Wildlife Service

DEPARTMENT OF THE NAVY
COMMANDER
NAVY REGION HAWAII
850 TICONDEROGA ST STE 110
JBPHH, HAWAII 96860-5101

5090
Ser N45/0660
December 21, 2017

CERTIFIED NO: 7015 0640 0002 4677 9602

Dr. Mary Abrams
Field Supervisor
U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard
Room 3-122
Honolulu, HI 96850

Dear Dr. Abrams:

SUBJECT: REQUEST FOR CONCURRENCE ON SPECIES LIST IN SUPPORT OF AN ENVIRONMENTAL ASSESSMENT RELATED TO THE PROPOSED NAVAL SPECIAL WARFARE COMMAND TRAINING ACTIVITIES IN THE STATE OF HAWAII

The United States (U.S.) Naval Special Warfare Command (Navy) proposes to conduct small unit intermediate and advanced land, air, and maritime training activities. The proposed training would take place in coastal nearshore waters and selected shoreline and inland locations throughout the State of Hawaii. Training activities in the water, on the land, or in the air could occur as a single or separate event, or in many cases would be combined together to be performed sequentially to meet the training objectives. Naval Facilities Engineering Command, Pacific (NAVFAC PAC) is preparing an environmental assessment (EA) and a biological evaluation (BE) for the EA's preferred alternative.

Commander, Navy Region Hawaii is requesting your office's concurrence on the attached list of threatened and endangered species and designated critical habitat that may occur within the proposed project area for analysis in the BE (see Attachment 1). The proposed training activities would occur at selected locations, including federal, State, and private property pending appropriate approvals through land-use and real estate agreements (see Attachment 2). Federal properties where training events may be scheduled include: Joint Base Pearl Harbor Hickam, Marine Corps Base Hawaii's Puuloa Range Training Facility, Marine Corps Base Hawaii, Kaneohe Bay, Kahuku Training Area, Dillingham Military Reservation, Kaena Point Satellite Tracking Station, Makua Military Reservation, Lualualei Annex, the U.S. Coast Guard Station at Barbers Point, and Barking Sands/Pacific Missile Range Facility. For the purpose of operational security, more detailed maps and site descriptions can be shared with your office, preferably in "face-to-face" meetings with NAVFAC PAC's subject matter experts and Navy personnel, upon request.

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Ser N45/0660
December 21, 2017

On land, the proposed training would include small-unit training activities for purposes of teaching trainees the skills to remain undetected (silent and unseen) and to leave no trace of their presence during or after the training activity. Land-based training events are identified as personnel transiting over the beach on foot, simulating building clearance activities using simulated munitions (used only in limited locations), high angle climbing, and special reconnaissance operations (move into a structure, conduct clearance from room to room, and engage in role-play). Air-based training would include the use of unmanned aircraft systems or naval special operations personnel utilizing drop zones, landing zones, or conducting rope suspension training activities from helicopters.

We look forward to receiving your concurrence on the attached list of species and critical habitat units to be included in the BE. Although a timeframe for responding to this request is not mandated by regulation, according to the *Endangered Species Act Consultation Handbook, Procedures for Constructing Section 7 Consultations and Conferences*, a response is typically received within 30 calendar days of the species list request. We would appreciate adherence to this timeframe.

For questions regarding this consultation and any modifications to the list, please correspond directly with Ms. Norma Creps, Wildlife Biologist, NAVFAC PAC, at norma.creps@navy.mil or (808) 472-1408.

Sincerely,

R. D. HAYES, III
Captain, CED, U.S. Navy
Regional Engineer
By direction of the
Commander

Attachments: 1. ESA Listed Species and Critical Habitat Units within the Proposed Action Area
2. Proposed Training Location Maps

2

Attachment 1

ESA Listed Species and Critical Habitat Units within the Proposed Action Area

Common Name	Federal Listing Status	Species Present within Training Locations			Critical Habitat within Training Locations		
		Kauai	Oahu	Hawaii	Kauai	Oahu	Hawaii
Lau'ehu *Panicum niihauense*	Endangered	-	-	-	X	-	-
'Ohai *Sesbania tomentosa*	Endangered	-	-	-	X	-	-
Hawaiian hoary bat *Lasiurus cinereus semotus*	Endangered	X	X	X	-	-	-
Hawaiian goose *Branta sandvicensis*	Endangered	X	-	X	-	-	-
Hawaiian stilt *Himantopus mexicanus knudseni*	Endangered	X	X	-	-	-	-
Hawaiian coot *Fulica alai*	Endangered	X	X	-	-	-	-
Hawaiian moorhen *Gallinula chloropus sandvicensis*	Endangered	X	X	-	-	-	-
Hawaiian duck *Anas wyvilliana*	Endangered	X	X	-	-	-	-
Newell's shearwater *Puffinus newelli*	Threatened	X	-	-	-	-	-
Band-rumped storm petrel *Oceanodroma castro*	Endangered	X	-	-	-	-	-
Hawaiian petrel *Pterodroma phaeopygia sandwichensis*	Endangered	X	-	-	-	-	-
Yellow-faced bee (*Hylaeus* spp.)	Endangered	X	X	-	-	-	-
Orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*)	Endangered	-	X	-	-	-	-
Green sea turtle *Chelonia mydas*	Threatened	X	X	X	-	-	-
Hawksbill sea turtle *Eretmochelys imbricata*	Endangered	X	X	X	-	-	-
Olive ridley sea turtle *Lepidochelys olivacea*	Endangered	-	X	-	-	-	-

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Attachment 2: Training Location Maps

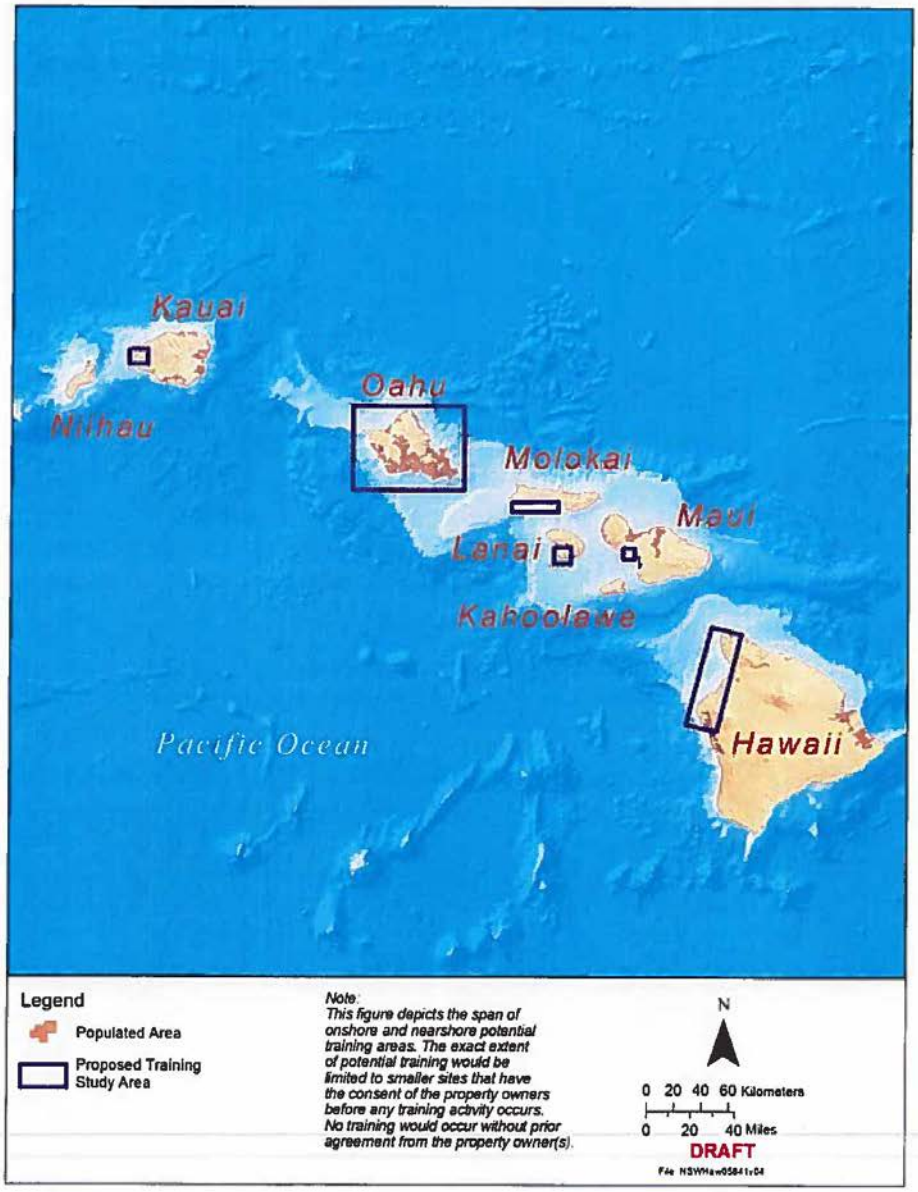

Figure 1: Location Overview – Training Study Area

Note: Islands of Molokai, Lanai and Maui do not include onshore training. Training near these islands is water-based.

1

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Attachment 2: Training Location Maps

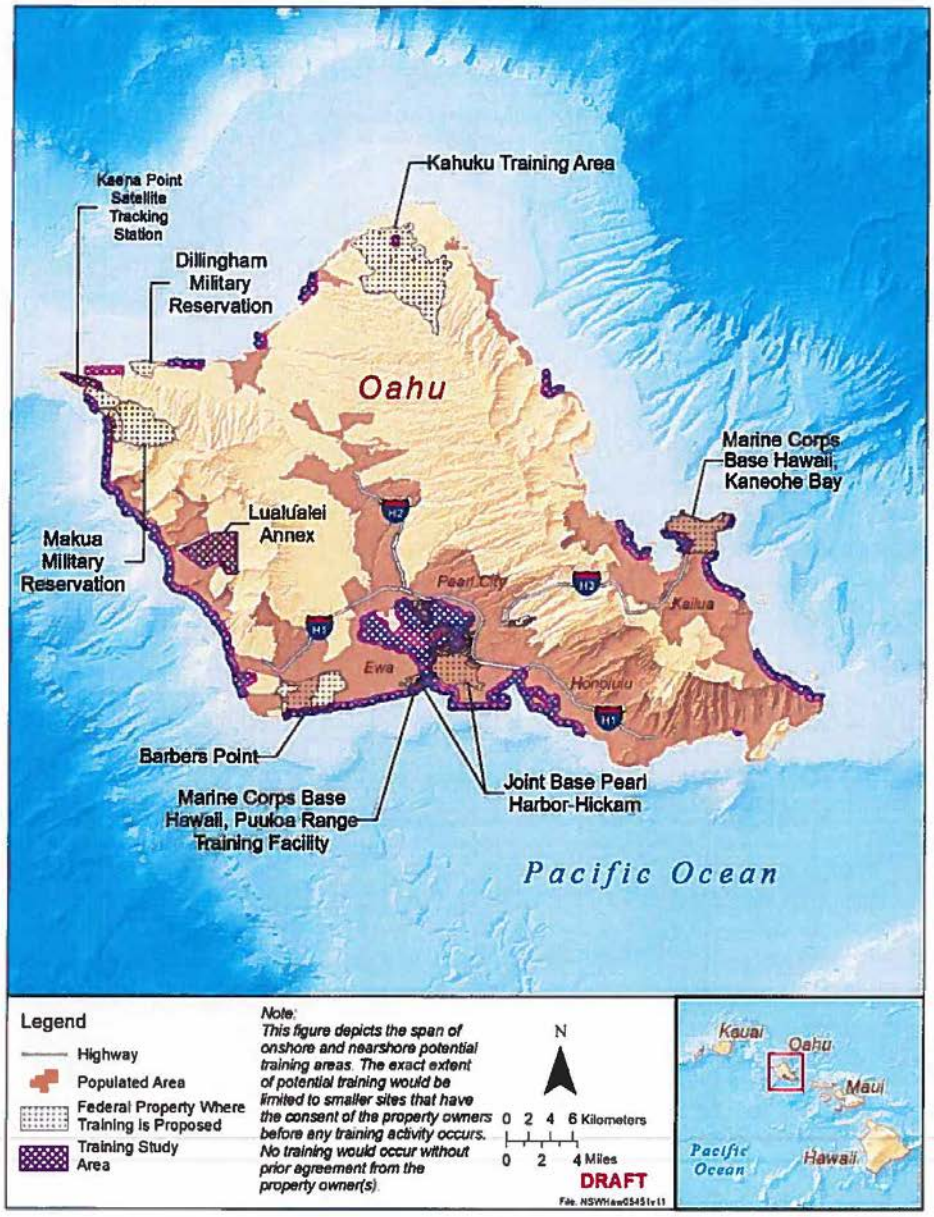

Figure 2: Oahu Island Training Study Area

2

"FOR OFFICIAL USE ONLY": May Be Exempt From Release Under FOIA

Attachment 2: Training Location Maps

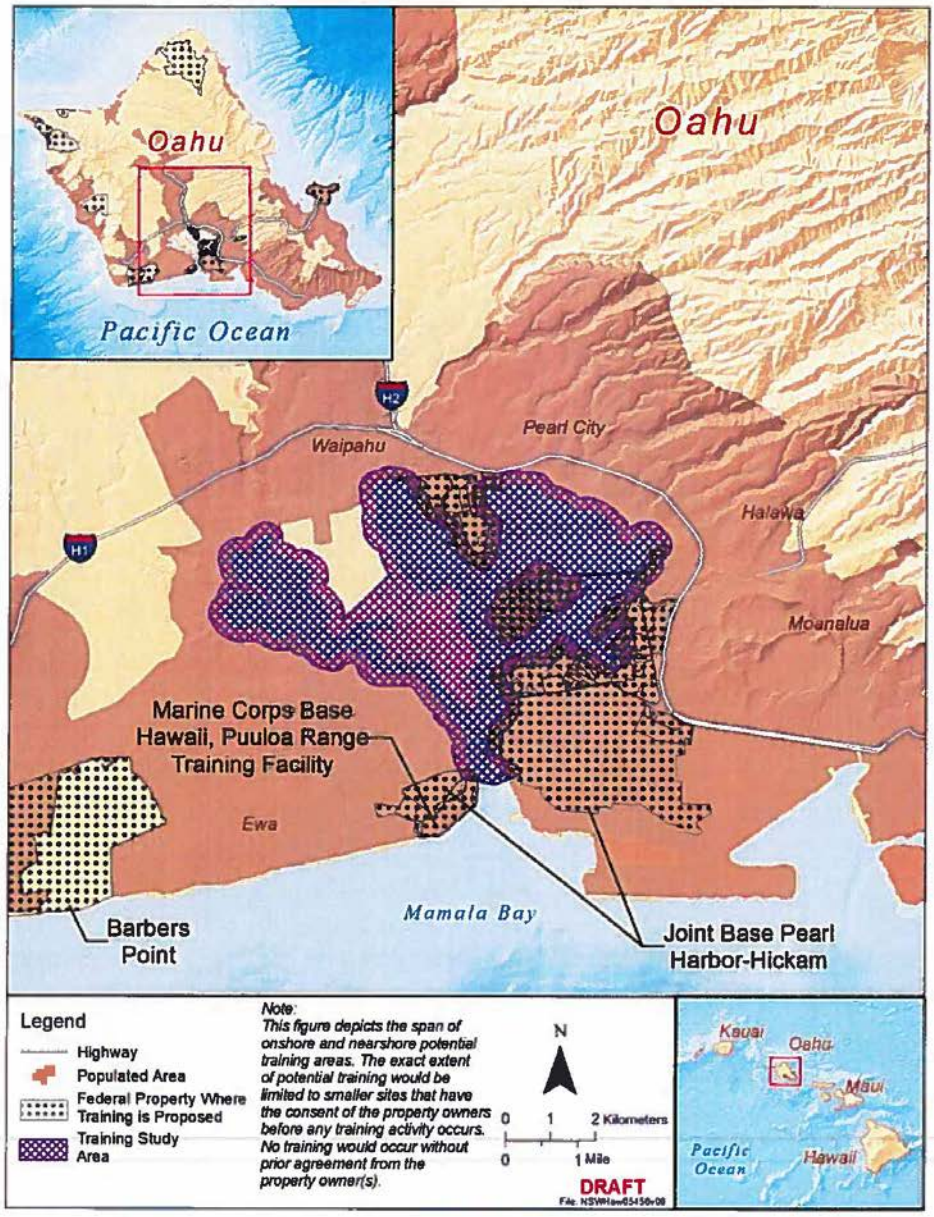

Figure 3: Oahu Joint Base Pearl Harbor-Hickam Training Study Area

3

"FOR OFFICIAL USE ONLY": May Be Exempt From Release Under FOIA

Attachment 2: Training Location Maps

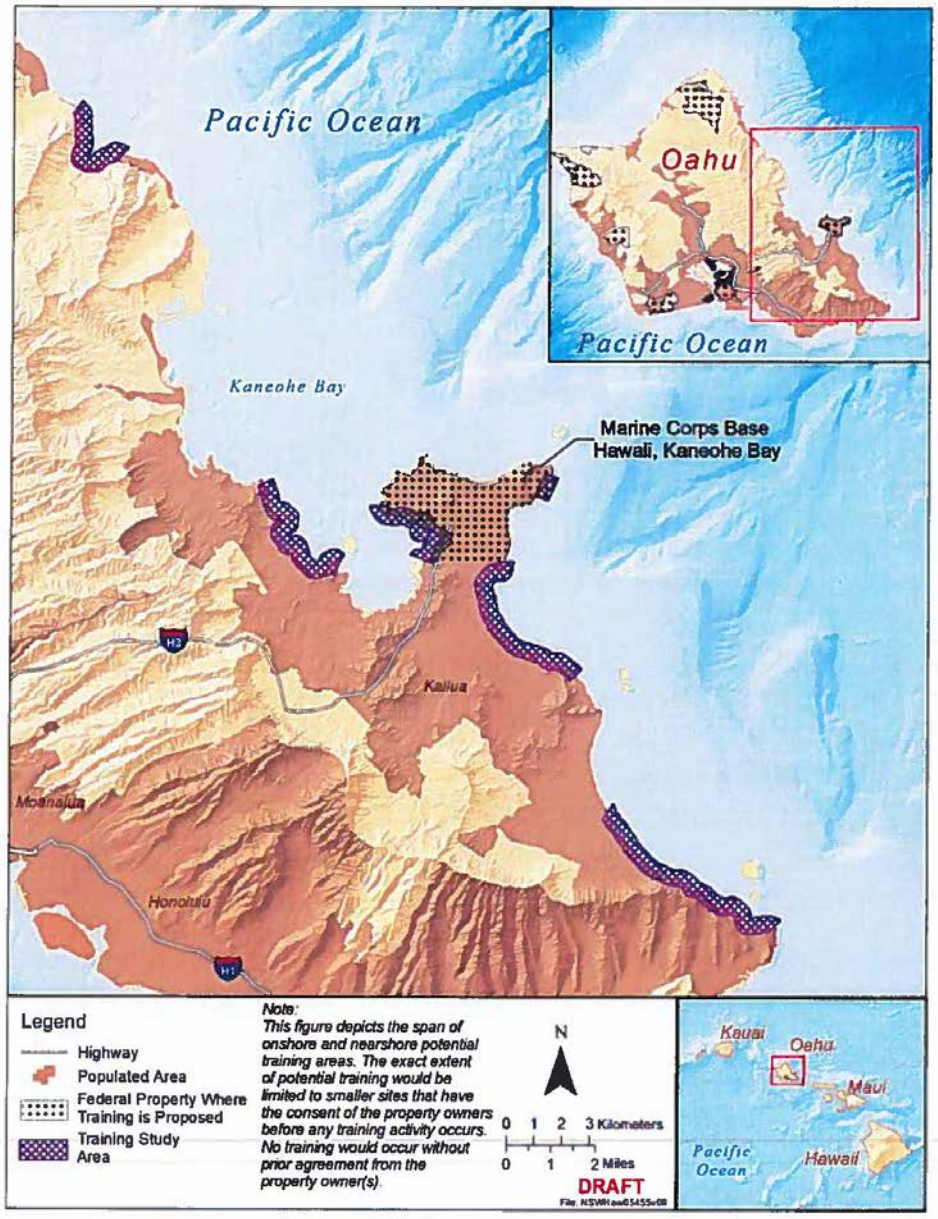

Figure 4: Oahu Windward Region Training Study Area

4

"FOR OFFICIAL USE ONLY": May Be Exempt From Release Under FOIA

Attachment 2: Training Location Maps

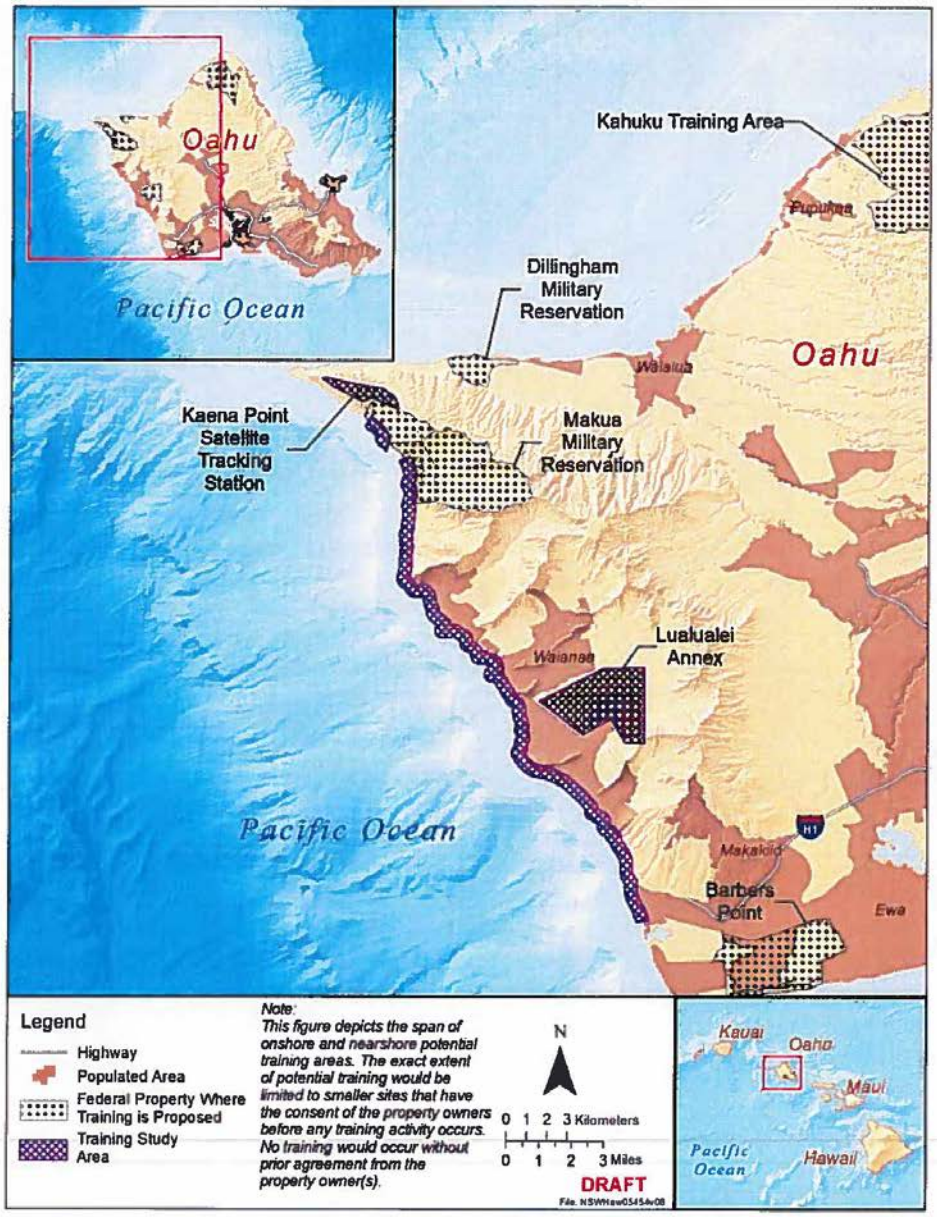

Figure 5: Oahu West Region Training Study Area

5

"FOR OFFICIAL USE ONLY": May Be Exempt From Release Under FOIA

Attachment 2: Training Location Maps

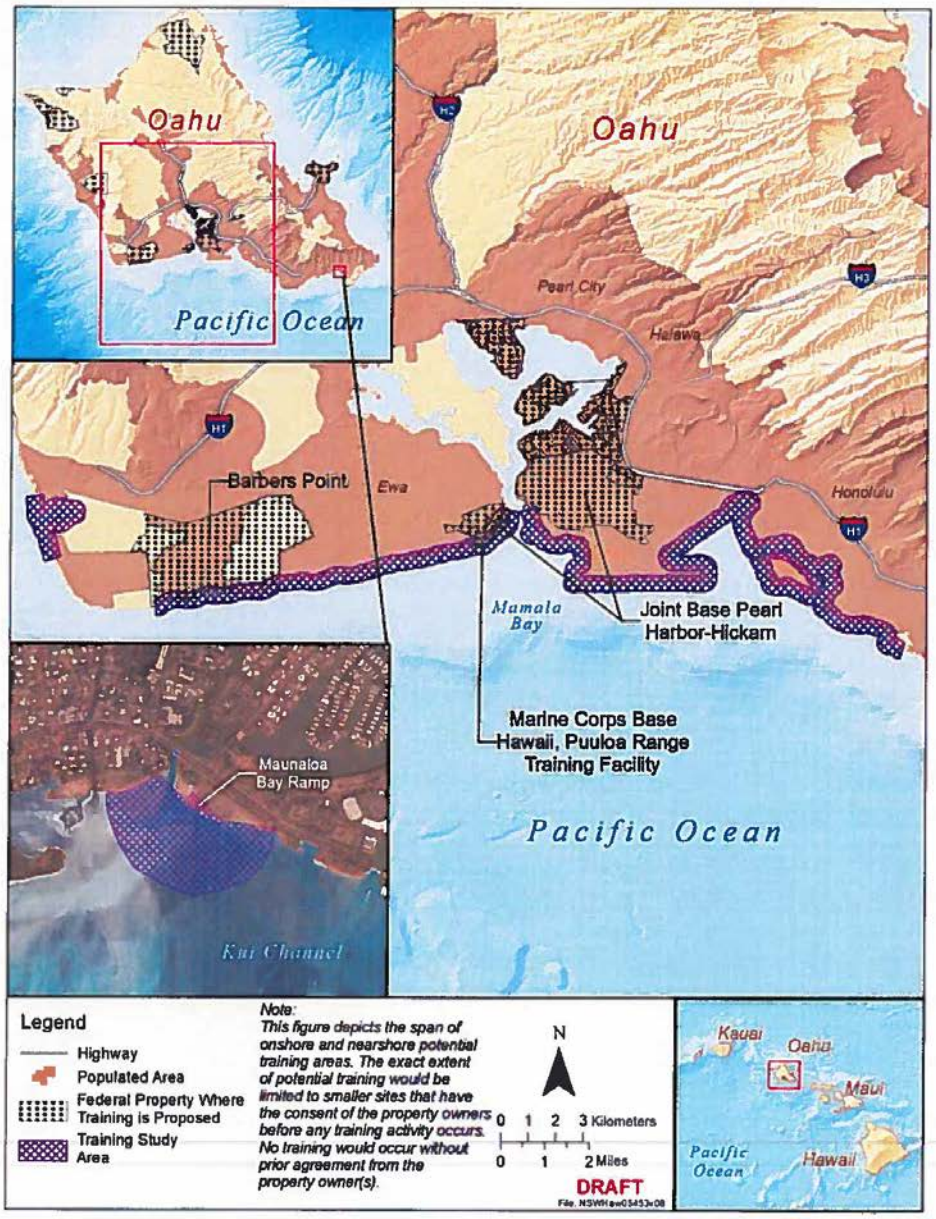

Figure 6: Oahu South Region Training Study Area

6

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Attachment 2: Training Location Maps

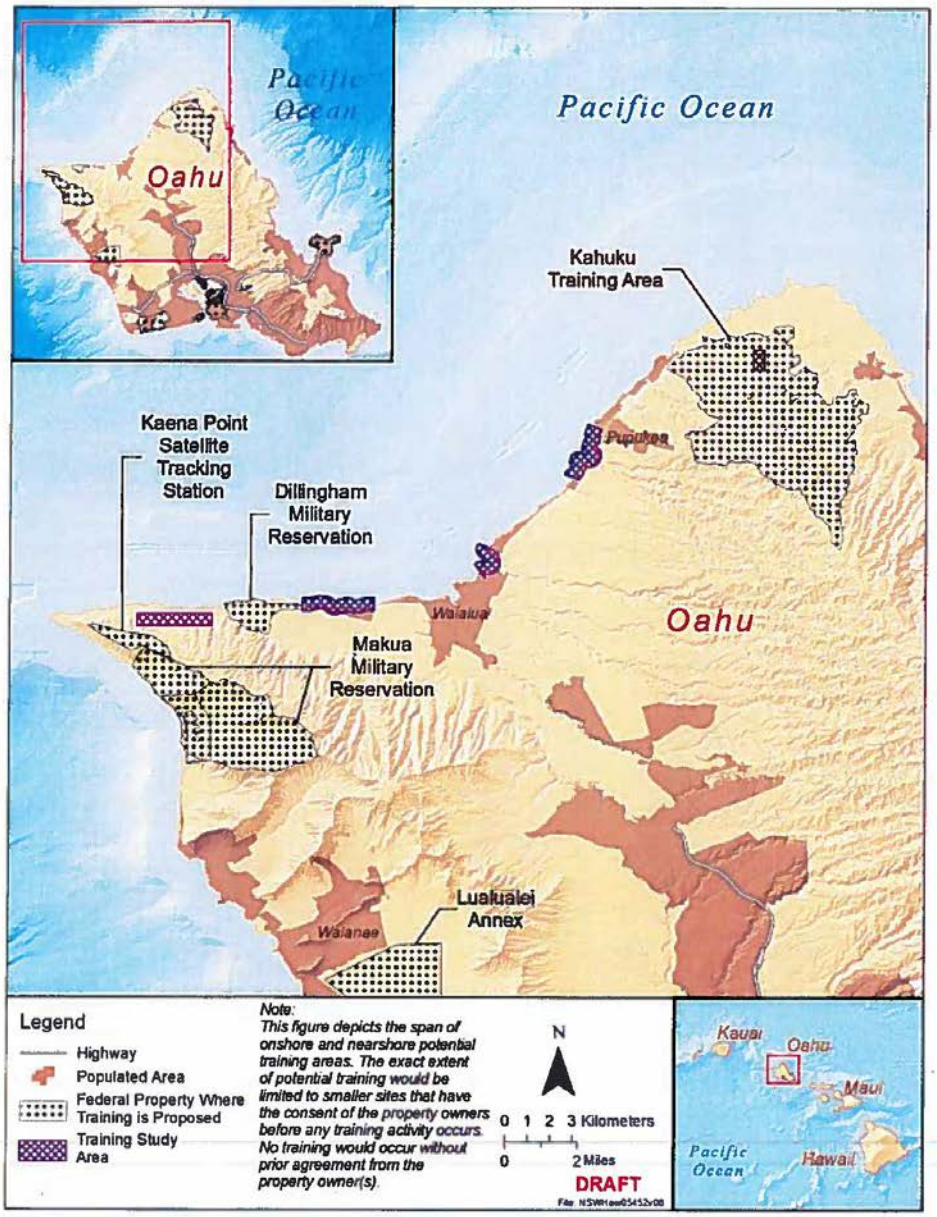

Figure 7: Oahu North Region Training Study Area

7

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Attachment 2: Training Location Maps

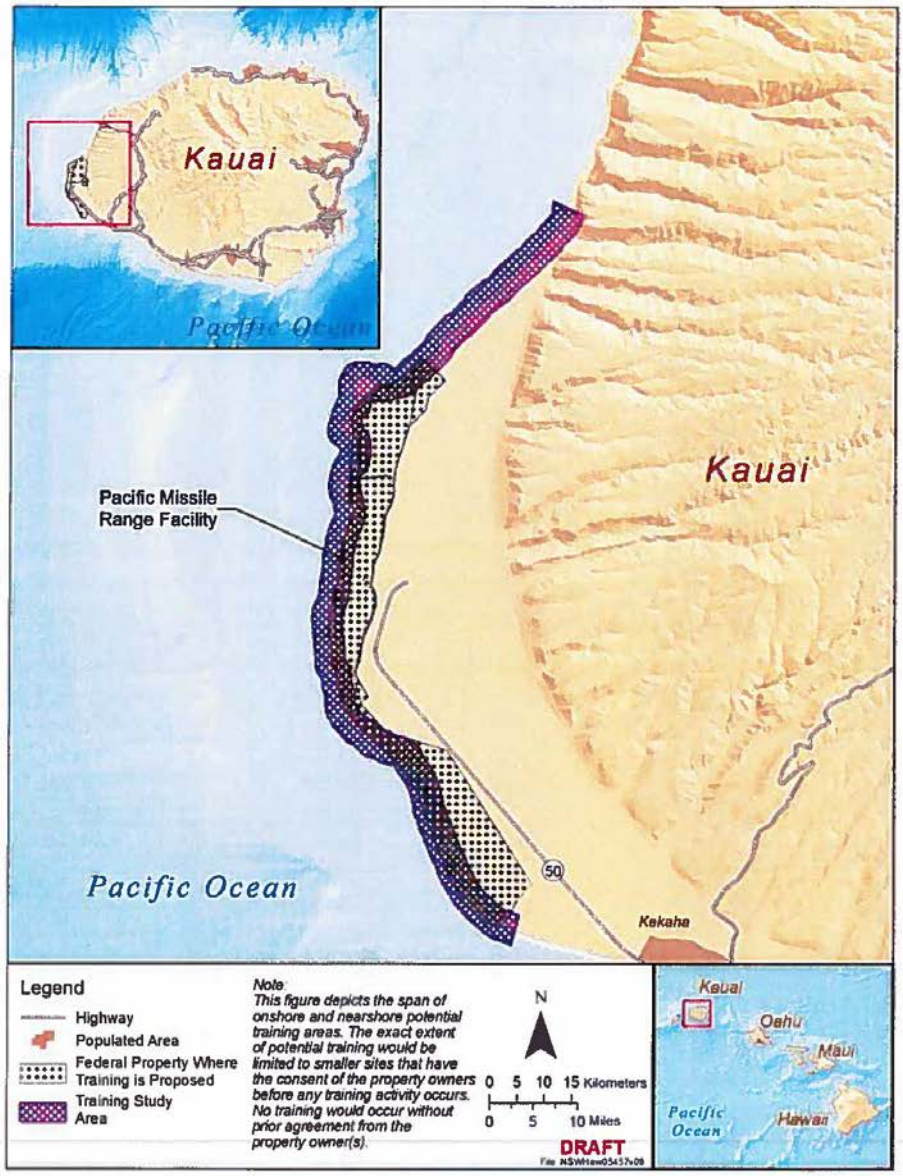

Figure 8: Kauai Training Study Area

Attachment 2: Training Location Maps

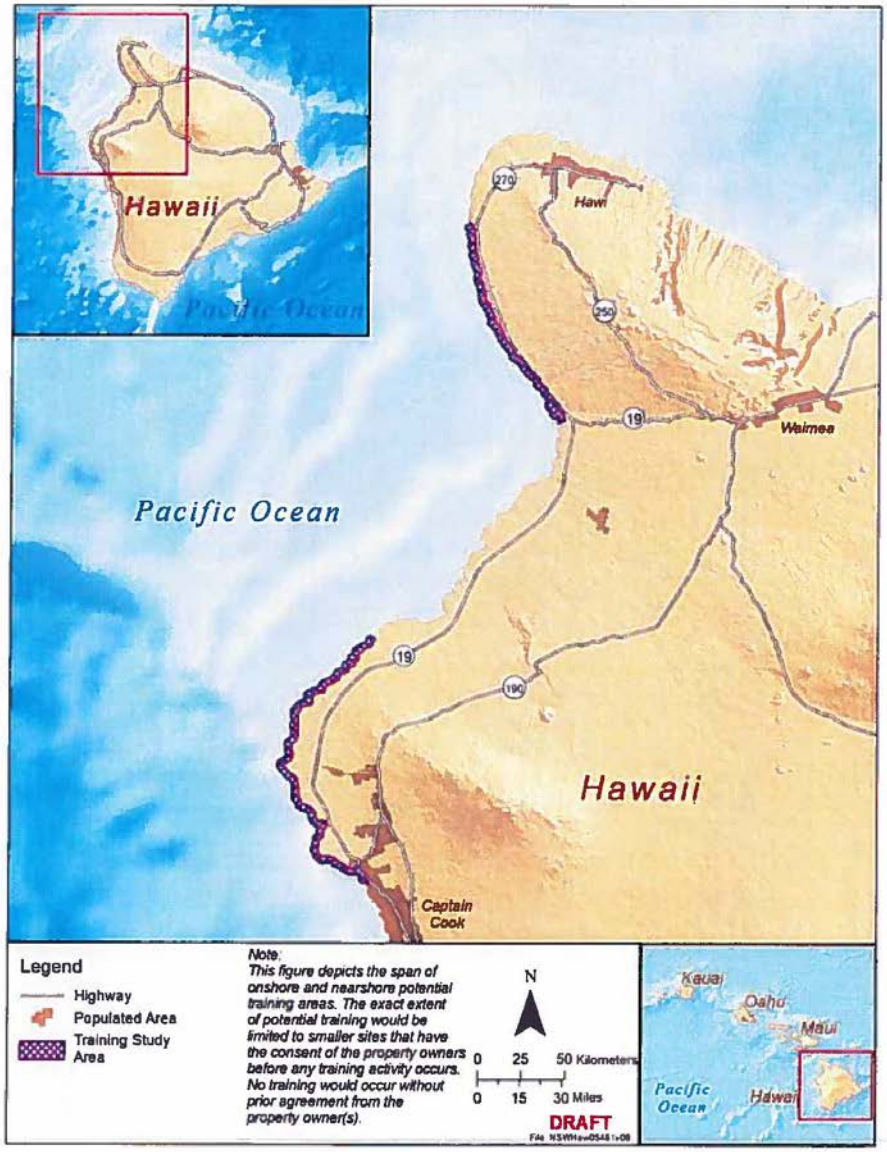

Figure 9: Island of Hawaii Training Study Area

A.2 U.S. Fish and Wildlife Service Response to Request for Species List and Critical Habitat

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai'i 96850

In Reply Refer To:
01EPIF00-2018-SL-0133

MAR 0 7 2018

R.D. Hayes
Captain, CED, U.S. Navy
Regional Engineer
Navy Region Hawaii
850 Ticonderoga St., Ste. 110
JBPHH, Hawaii 96860-5101

Subject: Request for Species List and Critical Habitat for the Proposed Naval Special Warfare Command Training Activities on the Islands of Kauai, Oahu, and Hawaii

Dear Captain Hayes:

The U.S. Fish and Wildlife Service (Service) received your letter on January 10, 2018, requesting information regarding the presence of federally listed and proposed endangered or threatened species or critical habitat within the potential training areas of the U.S. Naval Special Warfare Command's proposed small unit intermediate and advanced land, air, and maritime training activities. The proposed training activities would occur at selected locations, including federal, State, and private property pending approvals through land-use and real estate agreements. The letter requested concurrence on a list of threatened and endangered species and critical habitat developed by Navy Region Hawaii for the preparation of an environmental assessment (EA) and a biological evaluation (BE) of the EA's preferred alternative.

On January 26, 2018, Naval Facilities Engineering Command, Pacific (NAVFAC PAC) staff provided ArcGIS map files of the potential training areas to the Service to assist in our response. The proposed action area in the map files limited the scope of the proposed training activities to areas on the islands of Kauai, Oahu, and Hawaii.

We offer the following comments for your consideration. Our comments are provided under the authorities of the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*), as amended (ESA); Fish and Wildlife Coordination Act of 1934 (16 U.S.C. 661 *et seq.*; 48 Stat. 401); and Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. 703-712), among others.

We have reviewed the information you provided and pertinent information in our files, including data compiled by the Hawai'i Biodiversity and Mapping Program. Enclosure 1 lists the federally listed species that may occur or transit through the vicinity of the potential training areas.

Captain R.D. Hayes 2

Enclosure 2 identifies federally designated critical habitat that is within the vicinity of the potential training areas.

We hope this information assists you in your planning effort and aides in the conservation of listed species. If you would like to request additional information or have questions regarding these comments, please contact James Kwon, Fish and Wildlife Biologist (phone: 808-792-9400, email: james_kwon@fws.gov). When referring to this project, please include this reference number: 01EPIF00-2018-SL-0133.

Sincerely,

Lorena Nada

For Kristi Young
Deputy Field Supervisor
Programmatic Division

Enclosures

Enclosure 1. Species List for the Proposed Naval Special Warfare Command Training Activities on the Islands of Kauai, Oahu, and Hawaii. Species listed were identified using the information provided in the Navy's letter and ArcGIS Files, pertinent information in our files, including data compiled by the Hawai'i Biodiversity and Mapping Program. **Islands** and **Potential Training Area Region** listed indicate the areas where the species may occur or transit through the vicinity of the potential training areas.

Scientific Name	**Common Name**	**Federal Status**	**Island(s)**	**Potential Training Area Region(s)**
Mammals				
Lasiurus cinereus semotus	Hawaiian hoary bat	Endangered	Hawaii Kauai Oahu	All Kauai All
Reptiles				
Chelonia mydas	Green sea turtle Central North Pacific DPS	Threatened	Hawaii Kauai Oahu	Kona, Kohala Kauai Oahu North Oahu South Oahu West Oahu Windward
Erectmochelys imbricata	Hawksbill sea turtle	Endangered	Hawaii Kauai Oahu	Not in TAs Not in TAs Oahu Windward
Lepidochelys olivacea	Olive ridley sea turtle	Endangered	Oahu	Oahu Windward
Birds				
Anas wyvilliana	Hawaiian duck	Endangered	Kauai Oahu	All All
Branta sandvicensis	Hawaiian goose	Endangered	Hawaii Kauai Oahu	Kohala, PTA Kauai Oahu North Oahu West
Fulica americana alai	Hawaiian coot	Endangered	Hawaii Kauai Oahu	Kona Kauai Oahu Pearl Harbor Oahu North Oahu West Oahu Windward
Gallinula galeata sandvicensis	Hawaiian gallinule	Endangered	Kauai Oahu	Kauai Oahu Pearl Harbor Oahu North Oahu West Oahu Windward

Scientific Name	Common Name	Federal Status	Island(s)	Potential Training Area Region(s)
Himantopus mexicanus knudseni	Hawaiian stilt	Endangered	Hawaii Kauai Oahu	Kona Kauai Oahu North Oahu South Oahu Pearl Harbor Oahu West Oahu Windward
Loxioides bailleiui	Palila	Endangered	Hawaii	PTA
Oceanodroma castro	Band-rumped storm-petrel	Endangered	Hawaii Kauai Oahu	PTA Kauai Historic
Pterodroma sandwichensis	Hawaiian petrel	Endangered	Hawaii Kauai	PTA Kauai
Puffinus auricularis newelli	Newell's shearwater	Threatened	Hawaii Kauai Oahu	Hawaii Kauai
Insects				
Hylaeus anthracinus	Yellow-faced bee	Endangered	Hawaii Oahu	Kona Oahu Oahu Windward
H. assimulans	Yellow-faced bee	Endangered	Oahu	Historic
H. kuakea	Yellow-faced bee	Endangered	Oahu	
H. longiceps	Yellow-faced bee	Endangered	Oahu	
H. mana	Yellow-faced bee	Endangered	Oahu	
Megalagrion xanthomelas	Orangeblack damselfly	Endangered	Hawaii Kauai Oahu	Kona Historic Oahu Pearl Harbor Oahu West Oahu Windward
Crustaceans				
Procaris hawaiiana	Anchialine pool shrimp	Endangered	Hawaii	Kona
Plants				
Abutilon menziesii	Ko'oloa'ula	Endangered	Oahu	Oahu West
Achyranthes splendens var. *rotundata*	'Ewa hinahina	Endangered	Oahu	Oahu South Oahu South Barbers Point Oahu West
Bidens amplectens	Ko'oko'olau	Endangered	Oahu	Oahu West
Bidens micrantha subsp. ctenophylla	Ko'oko'olau	Endangered	Hawaii	Hawaii
Chamaesyce skottbergii var. *skottsbergii*	'Akoko	Endangered	Oahu	Oahu South Barbers Point
Cyperus trachysanthos	Pu'uka'a	Endangered	Oahu	Oahu Windward

Scientific Name	**Common Name**	**Federal Status**	**Island(s)**	**Potential Training Area Region(s)**
Euphorbia (Chamaesyce) celastroides var. kaenana	ʻAkoko	Endangered	Oahu	Oahu West
Hibiscus brackenridgei subsp. mokuleianus	Mao hau hele	Endangered	Oahu	Oahu West
Kadua (Hedyotis) st.-johnii	No common name	Endangered	Kauai	Kauai
Lepidium arbuscula	ʻAnaunau	Endangered	Oahu	Oahu West
Lipochaeta lobata subsp. leptophylla	Nehe	Endangered	Oahu	Oahu West
Marsilea villosa	ʻIhiʻihi	Endangered	Oahu	Oahu West
Melanthera tenuifolia	Nehe	Endangered	Oahu	Oahu West
Panicum niihauense	Lauʻehu	Endangered	Kauai	Kauai
Schiedea apokremnos	Maʻoliʻoli	Endangered	Kauai	Kauai
Sesbania tomentosa	ʻOhai	Endangered	Hawaii Kauai Oahu	Kona Kauai Oahu Windward Oahu West
Silene hawaiiensis	No common name	Threatened	Hawaii	PTA
Spermolepis hawaiiensis	No common name	Endangered	Oahu	Oahu West
Wilkesia hobdyi	Iliau, dwarf	Endangered	Kauai	Kauai

Enclosure 2. Critical Habitat (CH) within potential areas for the Naval Special Warfare Command Training Activities on the Islands of Kauai, Oahu, and Hawaii. CH units listed were identified using the information provided in the Navy's letter and ArcGIS Files, and the Service's final CH designations. **Potential Training Area Region(s)** are identified for the potential training areas that occur within final CH designations.

Scientific Name	Critical Habitat Unit	*Federal Register* Citation	Island	Potential Training Area Region(s)
Birds				
Loxioides bailleui	Palila	42 FR 40685	Hawaii	PTA
Plants				
Panicum niihauense	14-Panicum niihauense-a 15-Panicum niihauense-b 16-Panicum niihauense-c 17-Panicum niihauense-d	68 FR 9116	Kauai	Kauai Kauai Kauai Kauai
Sesbania tomentosa	14-Sesbania tomentosa-b	68 FR 9116		
Oahu Ecosystem Units				
Multiple species	Coastal - Unit 01	77 FR 57647	Oahu	Oahu West Oahu North
Multiple species	Coastal - Unit 15	77 FR 57647	Oahu	Oahu South Oahu South Barbers Point
Multiple species	Lowland Dry - Unit 08	77 FR 57647	Oahu	Oahu South

Appendix B: Air Quality Calculations

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APPENDIX B AIR QUALITY CALCULATIONS B-1

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Appendix B Air Quality Calculations

The following is a list of assumptions used when calculating the amount of emissions that would be produced under each alternative of the Proposed Action:

1. All ground vehicle diesel engines would use ecodiesel fuel.
2. Emissions factors for small watercraft were calculated based on the 3 August 2012 boat inventory from the CBSS21 database.
3. 30 horsepower (hp) motor will only be used if the 55 hp motor is malfunctioning. Therefore, it is assumed that a 55 hp motor would be used for the entire duration. It is also assumed that the 30 hp motor would produce less emissions than the 55 hp motor.
4. Emissions factors for the 55 hp motor are based on emissions factors derived for 50 hp motors used on Combat Rubber Raiding Craft vessels.
5. MV C-Commando emissions factors are based on emissions factors for the Dolores-Chouest which were generated by the Navy and Military Sealift Command Marine Engine Fuel Consumption & Emission Calculator.
6. Assume that all ground vehicles would drive an average of 10 miles per day.
7. The sulfur content of fuel was taken from the AESO Memorandum Report No. 2012-01E.
8. Emissions factors for the C-17 aircraft are assumed to be larger than AC-130 emissions factors and so flights that could use either aircraft are assumed to use a C-17.
9. Emissions factors for the C-17 aircraft were taken from AESO Memorandum Report No. 2017-13.
10. Emissions factors for the mission operations performed by the MV-22 were taken from AESO Memorandum Report No. 9965 Revision C.
11. Emissions factors for landing and takeoff cycles and cruise mode for the MV-22 were taken from AESO Memorandum Report No. 9946 Revision G.
12. Emissions generated under the No Action Alternative originate from activities that are covered under four-event based Categorical Exclusions that were approved to support naval special operations on non-Federal lands. The Categorical Exclusions did not include an air quality impacts analysis. However, it was assumed that current equipment usage equaled approximately 45 percent of what is proposed for Alternative 1 except for aircraft, which were not included in the Categorical Exclusions. Therefore, using the same emissions factors for watercraft and ground vehicles, an estimate for the annual criteria pollutant emissions under the No Action Alternative was generated. The following tables (Table B-1– Table B-9) show the emissions calculations for the No Action Alternative, Alternative 1, and Alternative 2.

Table B-1: Annual Criteria Pollutant Emissions Under the No Action Alternative

	Tons of Emissions per Year					
	VOC	NO_X	CO	$PM_{2.5}$	PM_{10}	SO_2
Ground Vehicles	0	5	3	0	0	0
Watercraft/Aircraft	205	16	500	0	0	1
Total	205	21	503	1	1	1

Notes: VOC = Volatile Organic Compound, NO_x = nitrogen oxides, CO = Carbon Monoxide, $PM_{2.5}$ = Particulate matter less than 2.5 microns, PM_{10} = Particulate matter less than 10 microns, SO_2 = sulfur dioxide

Table B-2: Annual Criteria Pollutant Emissions Under Alternative 1

	Tons of Emissions per Year					
	VOC	NO_X	CO	$PM_{2.5}$	PM_{10}	SO_2
Ground Vehicles	1	12	6	0	0	0
Watercraft/Aircraft	455	43	1110	2	2	2
Total	455	55	1117	2	2	2

Notes: VOC = Volatile Organic Compound, NO_x = nitrogen oxides, CO = Carbon Monoxide, $PM_{2.5}$ = Particulate matter less than 2.5 microns, PM_{10} = Particulate matter less than 10 microns, SO_2 = sulfur dioxide

Table B-3: Annual Criteria Pollutant Emissions Under Alternative 2

	Tons of Emissions per Year					
	VOC	NO_X	CO	$PM_{2.5}$	PM_{10}	SO_2
Ground Vehicles	1	12	6	0	0	0
Watercraft/Aircraft	503	48	1228	2	2	3
Total	504	60	1234	3	3	3

Notes: VOC = Volatile Organic Compound, NO_x = nitrogen oxides, CO = Carbon Monoxide, $PM_{2.5}$ = Particulate matter less than 2.5 microns, PM_{10} = Particulate matter less than 10 microns, SO_2 = sulfur dioxide

Table B-4: Annual Watercraft Emissions Under the No Action Alternative

Equipment/ Vehicle	Engine Power (hp)	Number of Vessels	Number of Engines per Vessel	Engine Use		Number of Operations per Year	Engine Emission Factors (lb./hp-hr)						Tons of Emissions from Engines per Year					
				Hours Idling	Hours Under Power		VOC	NO_X	CO	$PM_{2.5}$	PM_{10}	SO_2	VOC	NO_X	CO	$PM_{2.5}$	PM_{10}	SO_2
11-Meter SSC	200	1	2	0.5	10	81	0.5099	0.0177	1.2416	0.0007	0.0007	0.00006	86.73399	3.01077	211.1962	0.11907	0.11907	0.010206
	250	1	2	0.5	10	81	0.5099	0.0177	1.2416	0.0007	0.0007	0.00005	108.4175	3.76346	263.9952	0.148838	0.148838	0.010631
MV C-Commando SSC	2000	1	2	8	2	37	0.00104	0.03587	0.001548	0.000156	0.000156	0.001827	0.07696	2.65438	0.114552	0.011514	0.011514	0.135198
				8	2	37												
Small Inflatable Boats	55	1	1	0.5	4	27	1.0199	0.0354	2.4833	0.0015	0.0015	0.00008	3.407741	0.11828	8.297326	0.005012	0.005012	0.000267
Jet Ski	235	1	1	0.5	4	41	0.2656	0.0177	0.6467	0.0004	0.0004	0.00003	5.757876	0.38371	14.01965	0.008672	0.008672	0.00065

Notes: hp = horsepower, VOC = Volatile Organic Compound, NO_x = nitrogen oxides, CO = Carbon Monoxide, $PM_{2.5}$ = Particulate matter less than 2.5 microns, PM_{10} = Particulate matter less than 10 microns, SO_2 = sulfur dioxide, lb. = pound, op = operation, hr = hour, LTO = Landing and Takeoff

Table B-5: Annual Emissions from Ground Vehicles Under the No Action Alternative

Equipment/Vehicle	Number of Vehicles	Fuel	Vehicle Model	Hours Idling per Day (Average)	Miles Driven each Trip (Average)	Number of Trips per Day (Average)	Number of Days per Year	Tons of Emissions per Year					
								VOC	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2
Passenger Van	1	Gas	Ford 15pax	0	10	2	60	0.005166	0.074488	0.020446	0.000102	9.4E-05	0.000526
Emergency Response Vehicle	1	Gas	Chevy Suburban	0	10	4	180	0.007688	0.086681	0.027152	0.003385	0.003239	0.001673
Emergency Response Vehicle	1	Diesel	Chevy 3500	0	10	4	180	0.030995	0.446928	0.122679	0.000613	0.000564	0.003158
Pick-up Truck	3	Diesel	Chevy 3500	0	10	4	180	0.179027	0.781807	3.189084	0.030823	0.02949	0.006285
Pick-up Truck	2	Diesel	Dodge 3500	0	10	4	180	0.061989	0.893856	0.245357	0.001226	0.001128	0.006316
Passenger Van	1	Gas	Chevy 15pax	0	10	2	180	0.015497	0.223464	0.061339	0.000307	0.000282	0.001579
Stake Truck	2	Diesel	CXT	0.25	10	2	140	0.081276	0.20918	1.08562	0.038587	0.036918	0.003147
Stake Truck	1	Diesel	Dodge 5500	0	10	2	140	0.045632	0.116723	0.588413	0.022129	0.021172	0.001571

Notes: VOC = Volatile Organic Compound, NO_x = nitrogen oxides, CO = Carbon Monoxide, $PM_{2.5}$ = Particulate matter less than 2.5 microns, PM_{10} = Particulate matter less than 10 microns, SO_2 = sulfur dioxide

Table B-6: Annual Watercraft and Aircraft Emissions Under Alternative 1

Equipment/ Vehicle	Engine Power (hp)	Number of Vessels	Number of Engines per Vessel	Engine Use		Number of Operations per Year	Engine Emission Factors (lb./hp-hr)						Tons of Emissions from Engines per Year					
				Hours Idling	Hours Under Power		VOC	NO_X	CO	$PM_{2.5}$	PM_{10}	SO_2	VOC	NO_X	CO	$PM_{2.5}$	PM_{10}	SO_2
11-Meter SSC	200	1	2	0.5	10	180	0.5099	0.0177	1.2416	0.0007	0.0007	0.00006	192.7422	6.6906	469.3248	0.2646	0.2646	0.02268
	250	1	2	0.5	10	180	0.5099	0.0177	1.2416	0.0007	0.0007	0.00005	240.9278	8.36325	586.656	0.33075	0.33075	0.023625
MV C-Commando SSC	2000	1	2	8	2	83	0.00104	0.03587	0.001548	0.000156	0.000156	0.001827	0.17264	5.95442	0.256968	0.02583	0.02583	0.303282
				8	2	83												
Small Inflatable Boats	55	1	1	0.5	4	60	1.0199	0.0354	2.4833	0.0015	0.0015	0.00008	7.572758	0.26285	18.4385	0.011138	0.011138	0.000594
Jet Ski	235	1	1	0.5	4	90	0.2656	0.0177	0.6467	0.0004	0.0004	0.00003	12.63924	0.84230	30.77484	0.019035	0.019035	0.001428
	Fuel Use per Operation (lb./op)	**Number of Vessels**	**Number of Engines per Vessel**	**Operation Type/Engine Mode**	**Hours per Operation**	**Number of Operations per Year**	**Engine Emission Factors (lb./op)**						**Tons of Emissions from Engines per Year**					
MV-22	527	1	2	Special Personnel Insertion and Extraction	N/A	240	0.01	6.93	0.32	0.83	0.83	1.31 (per 1,000 lb. fuel)	0.0012	0.8316	0.0384	0.0996	0.0996	0.08284
	776	1	2	Landing w/Break	N/A	41	0.05	6.13	3.07	1.05	1.05	1.31 (per 1,000 lb. fuel)	0.001025	0.12567	0.062935	0.021525	0.021525	0.02084
	801	1	2	Vertical Takeoff Conversion Mode	N/A	41	0.04	6.79	2.45	1.12	1.12	1.31 (per 1,000 lb. fuel)	0.00082	0.13920	0.050225	0.02296	0.02296	0.02151
	3820 (lb./hr)	1	2	Cruise	6	41	0.05	53.82	1.99	6	6	1.31 (per 1,000 lb. fuel)	0.00615	6.61986	0.24477	0.738	0.738	0.46986
	Fuel Flow Rate (lb./hr)	**Number of Vessels**	**Number of Engines per Vessel**	**Phase of LTO Cycle**	**Minutes per Phase**	**Number of LTO Cycles per Year**	**Engine Emission Factors (lb./1,000 lb. of fuel)**						**Tons of Emissions from Engines per Year**					
C-17	978	1	4	Idle	15.7	9	0.37	3.76	22.7	8.75	10.67	1.06	0.000426	0.00433	0.026141	0.010076	0.012288	0.00122
	13905	1	4	Take-off	0.4	9	0.01	35.04	0.32	0.05	0.06	1.06	4.17E-06	0.01462	0.000133	2.09E-05	2.5E-05	0.00044
	10408	1	4	Climbout	1.2	9	0.04	32.72	0.32	1.42	2.31	1.06	3.75E-05	0.03065	0.0003	0.00133	0.002164	0.00099
	4645	1	4	Approach	5.1	9	0.05	15.49	0.51	5.1	5.53	1.06	8.88E-05	0.02752	0.000906	0.009061	0.009825	0.00188

Notes: hp = horsepower, VOC = Volatile Organic Compound, NO_x = nitrogen oxides, CO = Carbon Monoxide, $PM_{2.5}$ = Particulate matter less than 2.5 microns, PM_{10} = Particulate matter less than 10 microns, SO_2 = sulfur dioxide, lb. = pound, op = operation, hr = hour, LTO = Landing and Takeoff

Table B-7: Annual Emissions from Ground Vehicles Under Alternative 1

Equipment/Vehicle	Number of Vehicles	Fuel	Vehicle Model	Hours Idling per Day (Average)	Miles Driven each Trip (Average)	Number of Trips per Day (Average)	Number of Days per Year	Tons of Emissions per Year					
								VOC	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2
Passenger Van	1	Gas	Ford 15pax	0	10	2	60	0.011479	0.165529	0.045437	0.000227	0.000209	0.00117
Emergency Response Vehicle	1	Gas	Chevy Suburban	0	10	4	180	0.017083	0.192625	0.060337	0.007523	0.007198	0.003718
Emergency Response Vehicle	1	Diesel	Chevy 3500	0	10	4	180	0.068877	0.993173	0.272619	0.001363	0.001254	0.007018
Pick-up Truck	3	Diesel	Chevy 3500	0	10	4	180	0.397838	1.737349	7.086854	0.068496	0.065533	0.013967
Pick-up Truck	2	Diesel	Dodge 3500	0	10	4	180	0.137754	1.986346	0.545238	0.002725	0.002507	0.014036
Passenger Van	1	Gas	Chevy 15pax	0	10	2	180	0.034438	0.496587	0.13631	0.000681	0.000627	0.003509
Stake Truck	2	Diesel	CXT	0.25	10	2	140	0.180612	0.464844	2.412488	0.085749	0.082039	0.006993
Stake Truck	1	Diesel	Dodge 5500	0	10	2	140	0.101405	0.259385	1.307585	0.049176	0.047049	0.003492

Notes: VOC = Volatile Organic Compound, NO_x = nitrogen oxides, CO = Carbon Monoxide, $PM_{2.5}$ = Particulate matter less than 2.5 microns, PM_{10} = Particulate matter less than 10 microns, SO_2 = sulfur dioxide

Table B-8: Annual Watercraft and Aircraft Emissions Under Alternative 2

Equipment/ Vehicle	Engine Power (hp)	Number of Vessels	Number of Engines per Vessel	Engine Use		Number of Operations per Year	Engine Emission Factors (lb./hp-hr)						Tons of Emissions from Engines per Year					
				Hours Idling	Hours Under Power		VOC	NO_X	CO	$PM_{2.5}$	PM_{10}	SO_2	VOC	NO_X	CO	$PM_{2.5}$	PM_{10}	SO_2
11-Meter SSC	200	1	2	0.5	10	200	0.5099	0.0177	1.2416	0.0007	0.0007	0.00006	214.158	7.434	521.472	0.294	0.294	0.0252
	250	1	2	0.5	10	200	0.5099	0.0177	1.2416	0.0007	0.0007	0.00005	267.6975	9.2925	651.84	0.3675	0.3675	0.02625
MV C-Commando SSC	2000	1	2	8	2	83	0.00104	0.03587	0.001548	0.000156	0.000156	0.001827	0.17264	5.95442	0.256968	0.02583	0.02583	0.303282
				8	2	83												
Small Inflatable Boats	55	1	1	0.5	4	60	1.0199	0.0354	2.4833	0.0015	0.0015	0.00008	7.572758	0.262845	18.4385	0.011138	0.011138	0.000594
Jet Ski	235	1	1	0.5	4	90	0.2656	0.0177	0.6467	0.0004	0.0004	0.00003	12.63924	0.842299	30.77484	0.019035	0.019035	0.001428
	Fuel Use per Operation (lb./op)	**Number of Vessels**	**Number of Engines per Vessel**	**Operation Type/Engine Mode**	**Hours per Operation**	**Number of Operations per Year**	**Engine Emission Factors (lb./op)**						**Tons of Emissions from Engines per Year**					
MV-22	527	1	2	Special Personnel Insertion and Extraction	N/A	320	0.01	6.93	0.32	0.83	0.83	1.31	0.0016	1.1088	0.0512	0.1328	0.1328	0.110459
	776	1	2	Landing w/Break	N/A	58	0.05	6.13	3.07	1.05	1.05	1.31	0.00145	0.17777	0.08903	0.03045	0.03045	0.02948
	801	1	2	Vertical Takeoff Conversion Mode	N/A	58	0.04	6.79	2.45	1.12	1.12	1.31	0.00116	0.19691	0.07105	0.03248	0.03248	0.03043
	3820	1	2	Cruise	6	58	0.05	53.82	1.99	6	6	1.31	0.0087	9.36468	0.34626	1.044	1.044	0.66468
	Fuel Flow Rate (lb./hr)	**Number of Vessels**	**Number of Engines per Vessel**	**Phase of LTO Cycle**	**Minutes per Phase**	**Number of LTO Cycles per Year**	**Engine Emission Factors (lb./1,000 lb. of fuel)**						**Tons of Emissions from Engines per Year**					
C-17	978	1	4	Idle	15.7	12	0.37	3.76	22.7	8.75	10.67	1.06	0.000426	0.00433	0.026141	0.010076	0.012288	0.001221
	13905	1	4	Take-off	0.4	12	0.01	35.04	0.32	0.05	0.06	1.06	4.17E-06	0.014617	0.000133	2.09E-05	2.5E-05	0.000442
	10408	1	4	Climbout	1.2	12	0.04	32.72	0.32	1.42	2.31	1.06	3.75E-05	0.030649	0.0003	0.00133	0.002164	0.000993
	4645	1	4	Approach	5.1	12	0.05	15.49	0.51	5.1	5.53	1.06	8.88E-05	0.027521	0.000906	0.009061	0.009825	0.001883

Notes: hp = horsepower, VOC = Volatile Organic Compound, NO_x = nitrogen oxides, CO = Carbon Monoxide, $PM_{2.5}$ = Particulate matter less than 2.5 microns, PM_{10} = Particulate matter less than 10 microns, SO_2 = sulfur dioxide, lb. = pound, op = operation, hr = hour, LTO = Landing and Takeoff

Table B-9: Annual Emissions from Ground Vehicles Under Alternative 2

Equipment/Vehicle	Number of Vehicles	Fuel	Vehicle Model	Hours Idling per Day (Average)	Miles Driven each Trip (Average)	Number of Trips per Day (Average)	Number of Days per Year	Tons of Emissions per Year					
								VOC	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2
Passenger Van	1	Gas	Ford 15pax	0	10	2	60	0.011479	0.165529	0.045437	0.000227	0.000209	0.00117
Emergency Response Vehicle	1	Gas	Chevy Suburban	0	10	4	180	0.017083	0.192625	0.060337	0.007523	0.007198	0.003718
Emergency Response Vehicle	1	Diesel	Chevy 3500	0	10	4	180	0.068877	0.993173	0.272619	0.001363	0.001254	0.007018
Pick-up Truck	3	Diesel	Chevy 3500	0	10	4	180	0.397838	1.737349	7.086854	0.068496	0.065533	0.013967
Pick-up Truck	2	Diesel	Dodge 3500	0	10	4	180	0.137754	1.986346	0.545238	0.002725	0.002507	0.014036
Passenger Van	1	Gas	Chevy 15pax	0	10	2	180	0.034438	0.496587	0.13631	0.000681	0.000627	0.003509
Stake Truck	2	Diesel	CXT	0.25	10	2	140	0.180612	0.464844	2.412488	0.085749	0.082039	0.006993
Stake Truck	1	Diesel	Dodge 5500	0	10	2	140	0.101405	0.259385	1.307585	0.049176	0.047049	0.003492

Notes: VOC = Volatile Organic Compound, NO_x = nitrogen oxides, CO = Carbon Monoxide, $PM_{2.5}$ = Particulate matter less than 2.5 microns, PM_{10} = Particulate matter less than 10 microns, SO_2 = sulfur dioxide

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