

## **FINDING OF NO SIGNIFICANT IMPACT FOR FINAL IMPLEMENTATION PLAN FOR O‘AHU TRAINING AREAS: SCHOFIELD BARRACKS MILITARY RESERVATION, SCHOFIELD BARRACKS EAST RANGE, KAWAILOA TRAINING AREA, KAHUKU TRAINING AREA, AND DILLINGHAM MILITARY RESERVATION, O‘AHU, HAWAI‘I**

**Authority.** Pursuant to the Council on Environmental Quality (CEQ) Regulations (40 CFR Parts 1500-1508) for implementing the procedural provisions of the National Environmental Policy Act (42 USC 4321 et seq.), Army Regulation (32 CFR 651), and Chapter 343 of the Hawai‘i Revised Statutes, the US Army Garrison, Hawai‘i (USAG-HI) prepared a Programmatic Environmental Assessment (PEA) for the O‘ahu Implementation Plan to evaluate the potential environmental and socioeconomic effects of implementing conservation measures outlined in the O‘ahu Implementation Plan and subsequent amendments.

**Proposed Action.** USAG-HI proposed to implement certain natural resource management activities to stabilize the OIP target species. Management activities include: pedestrian and aerial surveying; monitoring; specimen collection; phytosanitation; aerial rodenticide and herbicide application; manual rodenticide and insecticide application; weed control; invasive snail and slug control using dogs; invasive reptile/bird control; construction of ungulate exclusion fences (including helicopter drop zones and landing zones) and ungulate control; construction of snail enclosures; construction of cabins, camp sites, water catchments, and weather stations; construction of small radio antennae; and unexploded ordnance (UXO) removal. The purpose of implementing the natural resource management actions is to control the threats to target endangered species and help these species achieve stabilization. The need for the proposed action is to meet conditions stipulated in the 2003 non-jeopardy Biological Opinion (BO) and subsequent amendments issued by the U.S. Fish and Wildlife Service (USFWS).

**Alternatives Considered.** The No Action Alternative was evaluated in addition to the Proposed Action. Several alternative management strategies were considered in development of the Mākua Implementation Plan and the OIP, but were eliminated from further study as they would not meet the project objectives. No additional effective means of meeting the project objectives are known at this time.

**Summary of Findings.** The attached PEA evaluated the potential impacts associated with the Proposed Action and the No Action Alternative on environmental resources. The following summarizes the anticipated environmental impacts of the proposed action.

**Topography and Soils:** Fence construction, removal of alien plant species, and native plant reintroductions would involve limited disturbance of soils. Skirting would be used around fence edges. No significant impacts to runoff or percolation are anticipated as a result of the proposed action.

**Surface Water Resources:** No significant impacts to water resources are expected. Management activities which may have or contribute to impacts to groundwater or surface water resources include anticipated from aerial rodenticide application, manual rodenticide application, weed control, aerial herbicide application, and fence construction. The programmatic EA includes the

aerial application of rodenticide in the Proposed Action because the Army may include this action as part of OIP management activities; however, as this management strategy is still in early stages of study for its applicability, it is anticipated that further environmental review will need to be conducted. Application of aerial rodenticide within the MUs included in this EA will be evaluated under supplemental NEPA documentation when project-specific details are available.

**Air Quality:** No significant impacts are anticipated, as the existing conditions would not change as a result of the actions associated with implementing the plan. Emissions generated from the use of helicopters or hand-held power tools would be intermittent and short term, and would not cause an exceedance of either State or Federal ambient air quality standards.

**Noise Quality:** Impacts to the noise environment due to helicopter operations, small power tools, UXO detonation, and hunting would be temporary and short in duration. No significant impact is anticipated.

**Vegetation:** Implementation of the proposed action is intended to benefit native vegetation. Removal of native plants during fence construction would be minimized by aligning the route to avoid native species. Herbicides would be applied as specified by the product manufacturer and would be applied in a manner to ensure non-target species are not damaged. Strict gear cleaning procedures would be implemented prior to entering native areas to prevent the introduction or spread of alien plant species. Noxious plant species would be removed. A period of amplified damage could occur from ungulates trapped within the enclosure. Intensive control efforts would be implemented to eliminate the ungulates following fence completion. It is anticipated that there will be no significant impacts with the implementation of the mitigation measures.

**Threatened and Endangered Species:** Actions planned in the OIP are intended to control threats to listed species within the proposed management units and increase the quality of their habitat. It is anticipated that the proposed project would have long-term benefits to all listed threatened and endangered species within the proposed management units.

**Cultural Resources:** Implementation of the proposed action is not anticipated to have significant impacts on historical and archaeological resources. Site-specific cultural resource surveys have been or will be conducted along proposed fence line routes and outplanting sites. Archaeological sites, if encountered, will be avoided. Section 106 consultations with the State Historic Preservation Division and Native Hawaiians in accordance with the National Historic Preservation Act have been completed.

**Land Use:** No significant impacts to hunting and hiking are anticipated as a result of the proposed action. Part of the MUs fall within public hunting areas. The fence units would be located in areas that are used infrequently for hunting due to limited public access. The Army would also make every effort to design the fence lines so they do not cross existing trails. Should it be necessary to cross existing trails, the Army would consult with local hiking clubs (such as Hawaiian Trail and Mountain Club) and install fence crossovers or gates as feasible.

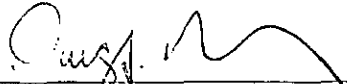
**Socioeconomic Environment:** The proposed action is not expected to affect job opportunities, population structure, or the use of public facilities; therefore no impacts to the social or economic welfare of the nearby communities are anticipated.

**Environmental Justice and Protection of Children:** Activities associated with the proposed action would be located away from residential communities. Disproportionately high and adverse human health or environmental impacts on minority and low-income populations and children are not anticipated.

**Public Comments:** A notice of availability of the PEA and draft Finding of No Significant Impact (FNSI) for the proposed action was published in the State of Hawai'i Department of Health, Office of Environmental Quality Control publication, *The Environmental Notice* on April 8, 2010, for a 30-day public review and comment period. Copies of the PEA and draft FNSI were also provided to public libraries on O'ahu. Three written comment letters were submitted. Letters were received from the State Department of Land and Natural Resources Office of Coastal and Conservation Lands (OCCL), the Department of Land and Natural Resources SHPD, and the HTMC. The OCCL stated that a Conservation District Use Application (CDUA) would be needed for actions on Conservation District land outside the Forest Reserve. A CDUA will be prepared by the USAG-HI. SHPD concurred with the Army's determination that the proposed action will not result in significant adverse impacts to cultural and historic resources, and had no objections to the findings in the PEA. HTMC supports the proposed action, and requested that the Army consult with them prior to constructing fences which may inhibit access to hiking trails, and also consider the use of stiles or gates to allow hiking access to public areas. The Army believes that the PEA appropriately addressed the potential impacts to hiking trail access in Sections 4.1.1 and 6.7.1 and would provide fence crossovers where public hiking trails would be intersected. The Army will also contact HTMC prior to fence construction to discuss fence alignment in the vicinity of hiking trails.

**Conclusion:** The PEA concluded that the proposed management actions will not have any unmitigable significant direct, indirect, or cumulative adverse impacts on the natural or human environment. As such, the proposed action does not require the completion of an Environmental Impact Statement, as defined by the Council of Environmental Quality regulations (40 CFR 1500-1508) and Army Regulation (32 CFR Part 651).

APPROVED BY:

  
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28 JUN 2010  
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PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

for the Final Implementation Plan for O‘ahu Training Areas:  
Schofield Barracks Military Reservation, Schofield Barracks East Range,  
Kawailoa Training Area, Kahuku Training Area, and Dillingham Military Reservation

O‘ahu, Hawai‘i

Proposed by

U. S. Army Garrison, Hawaii

March 2010

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DEPARTMENT OF THE ARMY  
US ARMY GARRISON, HAWAII

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O'ahu, Hawai'i

March 2010

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**ACRONYMS AND ABBREVIATIONS**

AA	Action Area	LD50	Lethal Dose to 50% of population
ACHP	Advisory Council on Historic Preservation	LZ	Landing Zone
Army	United States Army	mg/L Cl-	milligrams per liter chloride
BA	Biological Assessment	MIP	Mākua Implementation Plan
BO	Biological Opinion	MMR	Mākua Military Reservation
CEQ	Council on Environmental Quality	MU	Management Unit
CFR	Code of Federal Regulations	NAAQS	National Ambient Air Quality Standards
CPC	Center for Plant Conservation	NARS	Natural Area Reserves System
CWA	Clean Water Act	NHPA	National Historic Preservation Act
CZMA	Coastal Zone Management Act	NPDES	National Pollutant Discharge Elimination System
dBA	decibels on an A-weighted scale	NRHP	National Register of Historic Places
DMR	Dillingham Military Reservation	OANRP	O‘ahu Army Natural Resources Program
DOH	Department of Health	OE	Ordnance and Explosives
DPW	Directorate of Public Works	OIP	O‘ahu Implementation Plan
DZ	Drop Zone	OISC	O‘ahu Invasive Species Committee
EA	Environmental Assessment	OPEP	O‘ahu Plant Extinction Program
EIS	Environmental Impact Statement	PEA	Programmatic Environmental Assessment
EOD	Explosives Ordnance Disposal	PTA	Pōhakuloa Training Area
EPA	U.S. Environmental Protection Agency	REC	Record of Environmental Consideration
ESA	Endangered Species Act	SBER	Schofield Barracks East Range
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act	SBMR	Schofield Barracks Military Reservation
FNSI	Finding of No Significant Impact	SHPD	State Historic Preservation Division
GPS	Global Positioning System	SHPO	State Historic Preservation Officer
HAR	Hawai‘i Administrative Rules	SLN	Special Local Needs
HDOA	Hawai‘i Department of Agriculture	sp.	species
HRPRG	Hawai‘i Rare Plant Restoration Group	SRAA	South Range Acquisition Area
HRS	Hawai‘i Revised Statutes	TNC	The Nature Conservancy
IWFMP	Integrated Wildland Fire Management Plan	TPL	Trust for Public Land
KLOA	Kawailoa Training Area	USAG-HI	United States Army Garrison, Hawai‘i
KMWP	Ko‘olau Mountains Watershed Partnership	USC	United States Code
KS	Kamehameha Schools	USFWS	United States Fish and Wildlife Service
KTA	Kahuku Training Area	UV	ultraviolet
LC50	Lethal Concentration to 50% of population	UXO	Unexploded Ordnance

# 1 PROJECT SUMMARY

**Project Name:** Programmatic Environmental Assessment for the Final Implementation Plan for O‘ahu Training Areas: Schofield Barracks Military Reservation, Schofield Barracks East Range, Kawaihoa Training Area, Kahuku Training Area, and Dillingham Military Reservation

**Proposing Agency:** U.S. Army Garrison, Hawaii

**Project Location:** Various land, Ko‘olau and Wai‘anae Mountains, O‘ahu  
TMKs O‘ahu: 3-6-04:04; 4-6-15:03; 4-7-08:01; 4-7-51:01; 4-8-13:01;  
5-1-07:01; 5-2-01:01; 5-3-11:01; 5-3-11:09; 5-4-06:01; 5-5-06:01;  
5-5-07:02; 5-7-04:01; 5-8-02:06; 5-9-06:06; 6-3-01:01; 6-7-03:18;  
6-7-03:22; 6-7-03:23; 6-7-03:24; 6-7-03:25; 7-2-01:06; 7-6-01:01;  
7-7-01:01; 8-4-02:01; 8-4-02:14; 8-4-02:65; 9-2-05:13; 9-5-04:02;  
9-6-06:01; 9-7-26:01; 9-7-26:02; 9-9-11:02

**Property Owner:** United States of America, State of Hawai‘i, City and County of Honolulu, Bishop Estate Trust (Kamehameha Schools), Hawaii Reserves Inc., Kualoa Ranch, Manana Valley Farm

**LU Classification:** Conservation, Subzone P (Protective) and R (Resource)

## Anticipated Determination of Environmental Assessment:

A Finding of No Significant Impact (FNSI) is anticipated for the project.

## Agencies Consulted During EA Preparation:

(Asterisk (\*) denotes agencies consulted during preparation of the O‘ahu Implementation Plan)

### Consulted Parties:

Federal: U. S. Department of Defense - U. S. Army Garrison, Hawaii\*

State: Department of Business, Economic Development, and Tourism-Coastal Zone Management Office

### Members of the O‘ahu Implementation Team:

US Army Garrison, Hawaii Directorate of Public Works

U.S. Fish and Wildlife Service

Pacific Rim Conservation

State of Hawaii Department of Land and Natural Resources Division of Forestry and Wildlife

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University of Hawaii (Brenden Holland, Ph.D., Center for Conservation Research and Training

City and County of Honolulu Board of Water Supply

U.S. Geological Survey, Pacific Islands Ecosystems Research Center (James Jacobi, Ph.D.)

State of Hawaii Department of Land and Natural Resources, O‘ahu Plant Extinction Prevention Program

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## 1.1 Introduction

Pursuant to the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508) implementing the National Environmental Policy Act (NEPA; 42 U.S. Code [USC] §§44321 to 4370) and the U.S. Army's rule governing NEPA, Environmental Effects of Army Actions (32 CFR Part 651), this document was prepared to evaluate potential environmental impacts of the Final Implementation Plan for O'ahu Training Areas: Schofield Barracks Military Reservation, Schofield Barracks East Range, Kawaihoa Training Area, Kahuku Training Area, and Dillingham Military Reservation (O'ahu Implementation Plan [OIP, October 2008]). This Programmatic Environmental Assessment (PEA) evaluates potential individual direct, indirect and cumulative impacts of conducting the conservation and management activities identified in the OIP on existing environmental resources. This document, which was prepared in accordance with NEPA and Chapter 343 of Hawai'i Revised Statutes, is programmatic in nature and scope, and evaluates the broad impacts associated with the Proposed Action. The PEA describes the alternatives evaluated, identifies management measures incorporated into the Proposed Action to minimize potential impacts, then identifies potential impacts and evaluates the potential significance of those impacts. Based on the information gathered during preparation of this PEA, the U.S. Army Garrison, Hawaii (USAG-HI) will determine whether the Proposed Action would result in significant impacts and will evaluate the mechanisms by which those impacts will be mitigated if necessary. The PEA also identifies management activities proposed in the OIP for which sufficient detailed information is not currently available to evaluate environmental impacts, and for which appropriate supplemental NEPA analysis may need to be completed in the future. Subsequent NEPA analysis will be tiered under this PEA, and will be prepared where site specific conditions require more detailed analyses.

## 1.2 Background

In 1998, the U.S. Army (Army) initiated formal consultation under section 7 of the Endangered Species Act (ESA; 16 USC 1531 et seq.) with the U.S. Fish and Wildlife Service (USFWS) to determine if routine military training at Mākuā Military Reservation (MMR) would jeopardize the continued existence of 41 endangered species. The USFWS issued a non-jeopardy biological opinion (BO) in July 1999 for impacts from ongoing military training activities at MMR to the 41 endangered species. The BO was based on an agreement that the Army manage 27 endangered plant species and one endangered snail species to stability. This first consultation resulted in the creation of the Mākuā Implementation Plan (MIP), a comprehensive 30 year conservation plan to stabilize each of those species (MIT 2003). The species would be considered stabilized when they have achieved a minimum number of individuals at a minimum number of populations defined for each listed taxon. A PEA for the MIP was completed in March 2006.

In 2003, the USFWS issued a BO for the Oahu Training Areas, including Dillingham Military Reservation (DMR), Kahuku Training Area (KTA), Kawaihoa Training Area (KLOA), Schofield Barracks Military Reservation (SBMR), Schofield Barracks East Range (SBER), and South Range Acquisition Area (SRAA). The USFWS BO concluded that the routine military training and the conservation measures identified by the Army in its O'ahu Biological Assessment (BA) (Army 2001) would not jeopardize the continued existence of endangered species found within the action area. The conclusion of no jeopardy was based on preparation and implementation of a

wildland fire management plan and preparation and implementation of an O'ahu Implementation Plan (OIP) for listed species within the O'ahu training areas. In 2007, additional consultation resulted in a new BO. Current management priorities and plans are based on the 2007 BO.

### 1.3 OIP Goals and Framework

The OIP is the result of the 2003 USFWS consultation. The OIP consultation included endangered plant, bird, and tree snail species that may be affected by military training activities on the above referenced O'ahu Army installations. The consultation used an action area (AA; area potentially affected by military training) that was larger than the actual installation boundary to account for the potential impact from military training on the listed species. The OIP identifies additional management actions beyond those the Army was already implementing or agreed to implement in the BA to stabilize the target species. The focus of the OIP is management of the endangered species for which either a significant portion of the populations occur within the AA or for which no populations are considered stable. While stabilization is only a step toward eventual recovery of these endangered species, recovery of the species is beyond the Army's responsibilities under section 7 of the ESA.

The OIP outlines the stabilization of 23 plant species, one bird species, and 10 snail species (four snail species are not currently known to be extant, or in existence; however, the OIP outlines extensive surveying efforts that may result in rediscovery of these species). To stabilize the target species, each must be maintained with sufficient numbers of populations to ensure their long-term viability. Additionally, threats to the managed and reproducing individuals in each population must be controlled, and each species must be adequately represented in *ex situ* (out of the wild) collections.

The OIP is based largely on the MIP, with several major and minor modifications generally acknowledging (1) valuable lessons learned from implementation of the MIP, (2) the differences in habitat quality and species rarity between the Ko'olau and Wai'anae AAs, and (3) the level of threat to the target species from military training, specifically in the Ko'olau AAs.

The major features of the OIP are as follow.

- Identification of areas either within the O'ahu AAs or off-site for priority species stabilization.
- Gross-scale estimation of minimum viable populations for each species considered likely to be jeopardized by the Army's activities (i.e., target number of individuals for stabilization).
- Definition of success for stabilization of each species.
- Determination of habitat management requirements for each species.
- Identification of areas to be surveyed within the O'ahu AA and off-site stabilization areas for incipient weeds.
- Determination of methods for monitoring, data tracking, analysis, and feedback.
- Development of a schedule for completing implementation actions and a cost estimate for implementation.

While development of the OIP was based on the potential for threats to target species from military training at the O'ahu Training Areas, this document does not evaluate the impact of military training activities. Separate Environmental Impact Statements (EISs) have been prepared to evaluate the impact of military training activities on O'ahu. Those documents contain information on military training impacts.

## **1.4 Geographic Scope of the OIP**

The O'ahu AA encompasses six different training areas: SBMR, SBER, KLOA, KTA, SRAA, and DMR. These training areas occur in both the Wai'anae and Ko'olau Mountains. In some cases the AA surrounding each of these training areas extends beyond the actual installation boundary due to the potential risk of damage or destruction from military activities originating from within the respective training areas. The geographic scope of the OIP includes the AA surrounding each training area plus the portions of the natural geographic ranges of the target species considered necessary to achieve stability of the species. Therefore, the proposed OIP management actions are not restricted to within the AA, but encompass some population units in other portions of both the Wai'anae and Ko'olau Mountains. However, due to lower risk from military training in the KLOA, SBER, and upper KTA, most of the Ko'olau management actions are proposed within the AAs. Management Units (MUs) were developed to manage designated populations of each target species and appropriate habitat. Management actions described in the OIP would occur in these MUs. MUs are the focal point for OIP and MIP management actions, and typically equate to fenced, ungulate free areas. MUs where management activities would occur are identified in Section 3 of this document.

### **1.4.1 Wai'anae Region**

Most of the rare species involved in the consultation for SBMR in the Wai'anae Mountains are associated with native-dominated vegetation in mesic (moderately moist) habitats to wet boggy forest at the summit of Ka'ala. At SBMR, the AA follows the installation boundary along the south and west sides. On the north and north east sides, the AA extends beyond the installation boundary, to account for the potential fire threat from live-fire training. Figures 1a and 1b show the AA and specific MUs in the Wai'anae Mountains.

### **1.4.2 Ko'olau Region**

The Ko'olau Mountain region within and adjacent to the O'ahu Training Areas AA consists of mesic and wet mesic native forests with large portions of relatively intact habitat. The lower elevations within KTA, KLOA, and SBER are composed of mixed introduced and native mesic vegetation. The upper elevations and summit areas of these training areas are dominated by native wet forests. These areas represent some of the most intact native forest areas on O'ahu.

The KTA AA extends beyond the north and east installation boundaries. The KLOA and SBER AAs follow the installation boundaries except along the summit areas in the east, where the AA extends approximately 100 meters beyond the installation to account for potential weed introduction caused by military foot maneuvers along the summit trail. The AA boundaries and proposed MUs in the Ko'olau Mountains are shown on Figures 2a and 2b.

## **1.5 Public Involvement**

The Army provides opportunities for the public to participate in the NEPA process. Persons and organizations having potential interest in the proposed action are encouraged to participate in the



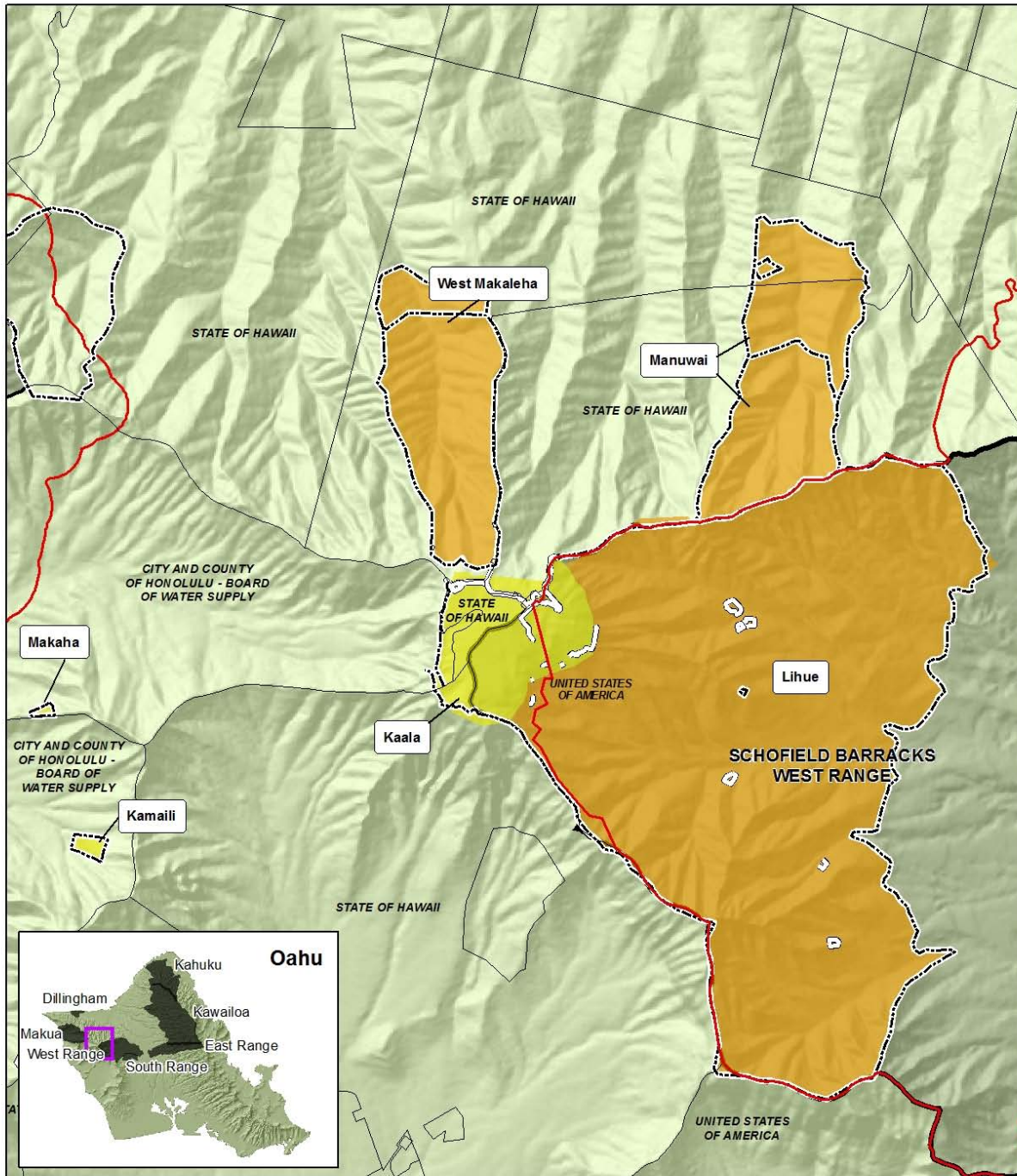
environmental analysis process. The public may review and provide comments during a 30-day review period for the final Environmental Assessment (EA) and draft FNSI. A notice of availability of the EA and draft FNSI will be published in the State of Hawai‘i Office of Environmental Quality Control’s twice-monthly bulletin, *The Environmental Notice*. In addition, copies of the final EA will be provided to local libraries and will be mailed upon request to interested individuals, organizations, and agencies. Comments received during the public comment period will be reviewed by USAG-HI and will be factored in to the Army’s decision making process described in Section 1.6 below.

## **1.6 Decisions to be Made**

The Army will use this EA and other appropriate documents to determine if:

1. The proposed management actions, as described, might have significant impacts requiring analysis in an Environmental Impact Statement (EIS);
2. No action should be taken to stabilize the species; or
3. The Army should conduct the proposed O‘ahu Implementation Plan management actions as described.

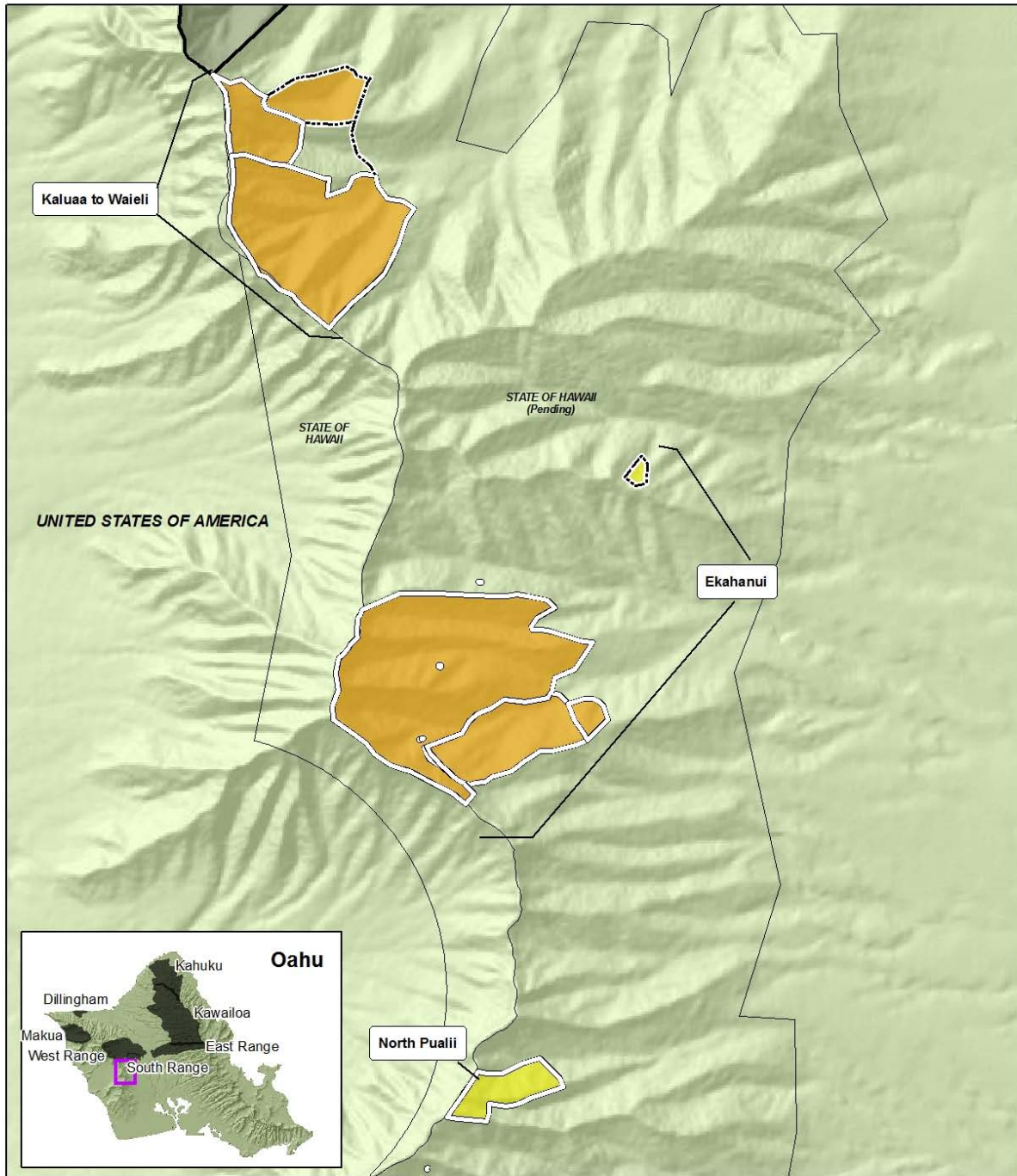
This EA will be in effect for the life of the O‘ahu Implementation Plan, unless either the proposed action is so modified and/or new information is available that the effects would be different than those anticipated and documented in this EA. If the effects would be different, then supplemental documentation would need to be prepared.



**Oahu Implementation Plan Management Unit Locations  
Northern Waianae Mountains**



**Figure 1a. OIP Management Units in the Northern Wai‘anae Mountains**



**Oahu Implementation Plan Management Unit Locations  
Southern Waianae Mountains**

**Legend**

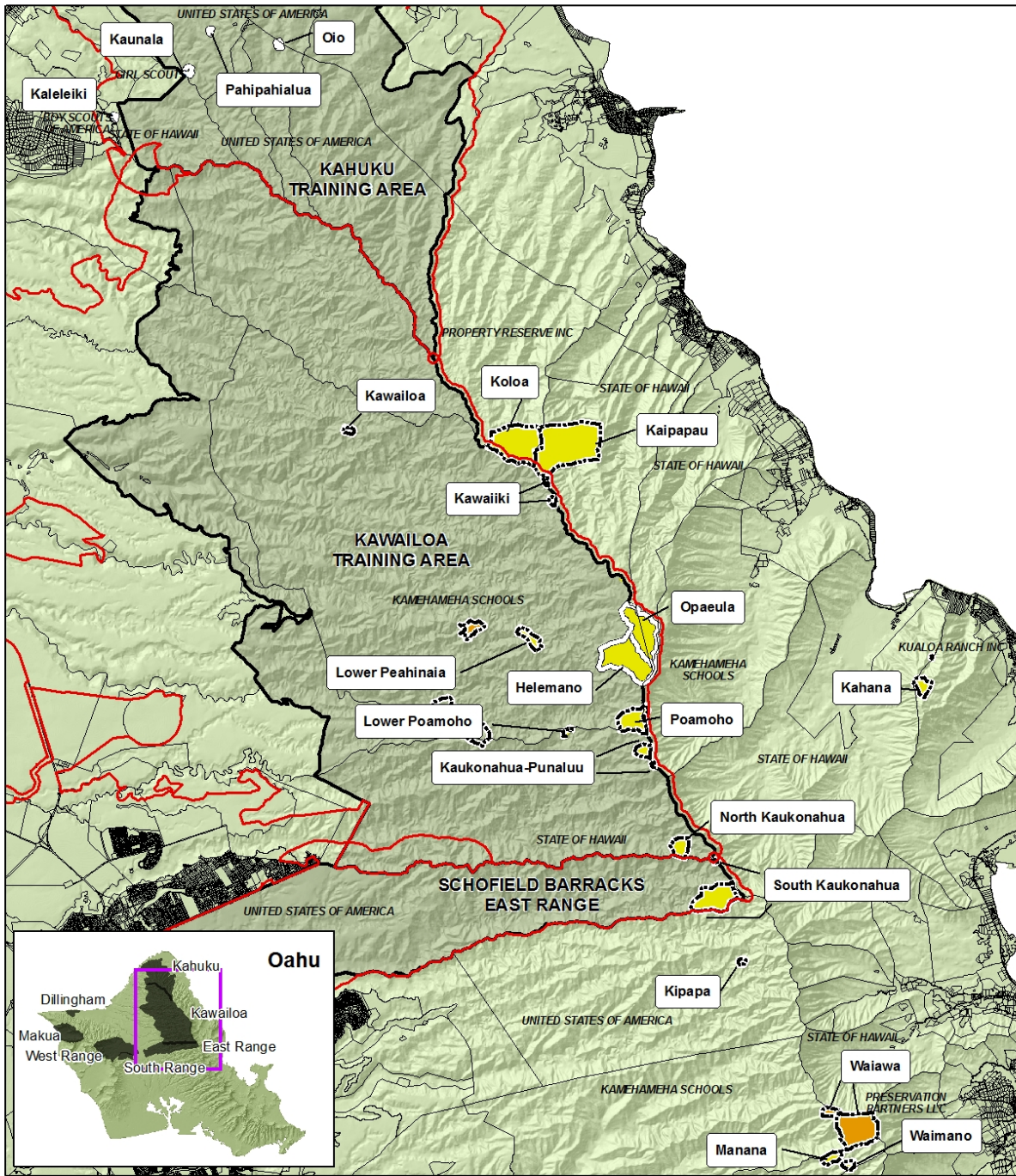
-  OIP MUs
-  MIP & OIP MUs
-  Existing Fence
-  Proposed Fence

0 500 1,000 Meters

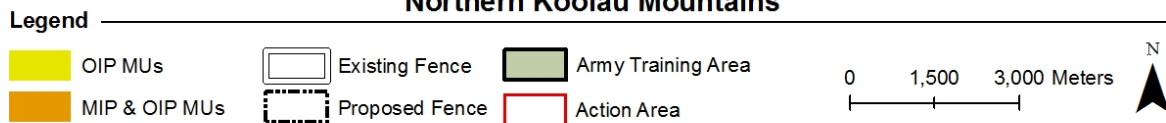


**Figure 1b. OIP Management Units in the Southern Wai'anae Mountains**





**Oahu Implementation Plan Management Unit Locations  
Northern Koolau Mountains**



**Figure 2a. OIP Management Units in the Northern Ko'olau Mountains**



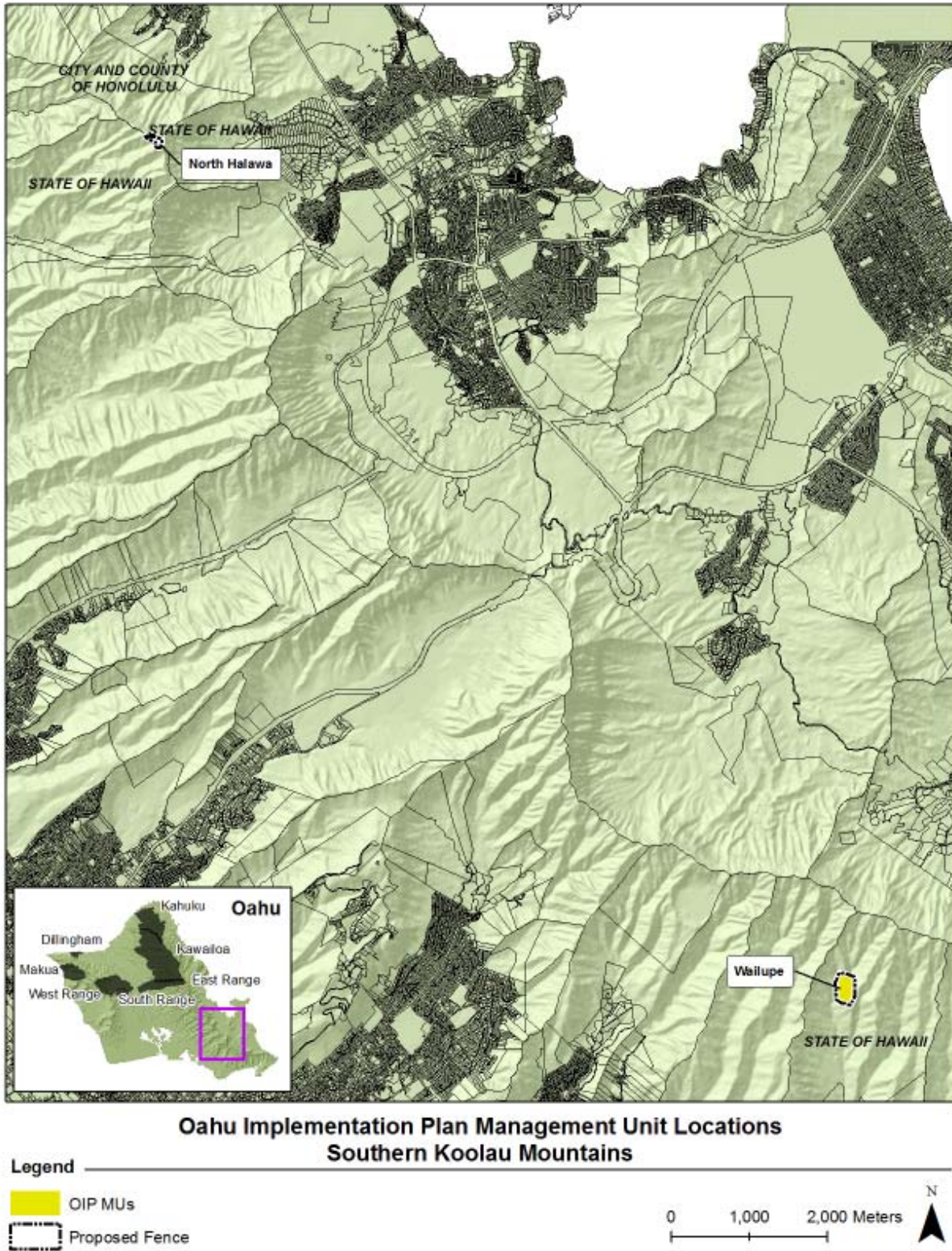


Figure 2b. OIP Management Units in the Southern Ko'olau Mountains

## 2 PURPOSE OF AND NEED FOR ACTION

### 2.1 Summary of Proposed Action

USAG-HI proposes to implement certain natural resource management activities to stabilize the OIP target species. Management activities include: pedestrian and aerial surveying; monitoring; specimen collection; phytosanitation; aerial rodenticide and herbicide application; manual rodenticide and insecticide application; weed control; invasive snail and slug control using dogs; invasive reptile/bird control; construction of ungulate exclusion fences (including helicopter drop zones and landing zones) and ungulate control; construction of snail enclosures; construction of cabins, camp sites, water catchments, and weather stations; construction of small radio antennae; and unexploded ordnance (UXO) removal. Detailed descriptions of these management measures are provided in Section 3. Table 1 provides a list of the proposed locations of these management actions. Note that some management activities, such as cabin construction or aerial rodenticide application, may be considered in the future for MUs where the activity is not presently proposed. This Programmatic EA provides as much information as presently available, and may be supplemented as needed with appropriate environmental review documentation in the future.

**Table 1. Proposed Management Actions and Locations**

Activity Proposed	Specific Actions	Location
Natural Resources Management	Aerial surveying	All MUs
	Pedestrian surveying	All MUs
	Monitoring	All MUs
	Specimen collection	All MUs
	Phytosanitation	Greenhouse/Nursery
	Aerial rodenticide application	SBMR
	Manual rodenticide application	All MUs
	Weed control	All MUs
	Aerial herbicide application	All MUs
	Invasive snail/slug control using dogs	All MUs
	Invasive reptile and bird control	All MUs
	Ungulate control	All MUs
Construction	Construct ungulate exclusion fence, with associated drop zones and landing zones	Kahana, Kaipapa‘u, Kamailei, Kaukonahua-Punalu‘u, Kawai Iki, Kawailoa, Kipapa, Koloa, Lihue, Lower ‘Ōpae‘ula, Lower Peahinā‘a II, Lower Poamoho, Manana, North Hālawā, North Kaukonahua, Poamoho, Poamoho Pond, South Kaukonahua I and II, Waiawa I and II, Wailupe, and Waimano
	Construct snail enclosure	All MUs
	Construct cabins	Helemano, Koloa, Waimano
	Construct DZs, LZs, campsites, water catchments	All MUs
	Construct weather station	All MUs
	Construct radio antennae	All MUs
Unexploded Ordnance Removal	Detonation in place of unexploded ordnance	Lihue

The OIP identified a tiered system for management developed by the Army based on the actual threat of military training versus the perceived threat. Due to the current and historical low level of impact to federally listed species by military training in the summit areas of KLOA and SBER (where most of the OIP target species are located in these training areas), the Army is proposing a three-tiered approach to species stabilization in these areas. The three tiers are based on (1) live-fire and active ground maneuvers, (2) foot maneuvers on trails, and (3) foot maneuvers off trails. Implementation of Tier 1 action is triggered by the finalization and approval of the OIP EA. Year 1 of Tier 2 would begin after the initiation of military training along major trails in KLOA or SBER. Year 1 of Tier 3 would begin after the initiation of military training both on and off major trails in KLOA and SBER.

## 2.2 Purpose and Need

Successful implementation of the OIP ensures that the Army is in compliance with the ESA and can still accomplish its training mission. The overall purpose of the Proposed Action is to meet the management objectives of the OIP by implementing natural resource management actions and controlling threats to the target endangered species. The need for the proposed action is to meet conditions stipulated in the non-jeopardy BO issued by the USFWS. Management actions involve minimizing threats that can hamper the stabilization of each species. Fire ignition and introduction of alien and invasive<sup>1</sup> species, such as weeds and pest animals, are the most important of the threats in the O'ahu AA, and have been characterized in the O'ahu Biological Assessment (CEMML 2003). In many cases, the threats that are not training-related are held in common among the target species. For example, feral ungulates such as goats and pigs are primary threats to both habitat and individual rare species. Other threats are particularly important for certain target species (e.g., powdery mildew affects many of the target plants in the mint family such as *Phyllostegia* species [sp.] and *Stenogyne kanehoana*). The OIP includes a detailed discussion of the threats to each target species and population units.

Specific threat categories for which management activities are needed to protect the target species and habitat include alien plants, erosion, feral ungulates, fire, human activities, invertebrate pests, pathogens, and vertebrate pests. Field experts, including Army natural resources staff, determined the level of threat posed by each category to each target species. The development of this threat information helped to guide the recommendations within the stabilization plans in the OIP.

## 2.3 Regulatory Overview

The following is a discussion of the Federal laws and consultations that may be relevant to implementing the Proposed Action.

### 2.3.1 National Environmental Policy Act

This document was prepared by USAG-HI in accordance with the National Environmental Policy Act of 1969, as implemented by CEQ regulations at 40 CFR 1500-1508 and the U.S.

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<sup>1</sup> Executive Order 13112 defines an alien species as “any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to [a respective] ecosystem,” and invasive species as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” Therefore, in this EA, the term “invasive” will be used to mean any nonnative species introduced into an area that causes ecological harm.

Army’s rule governing NEPA, Environmental Effects of Army Actions (32 CFR Part 651). This PEA analyzes the potential impact of the Proposed Action in order to determine whether to prepare a FNSI or an EIS.

### **2.3.2 Endangered Species Act**

The ESA, as amended (16 USC 1531 *et seq.*), establishes a process for identifying and listing plant and animal species as endangered or threatened. It requires Federal agencies to implement programs for conservation of Federally listed endangered and threatened plants and animals. It also prohibits actions by Federal agencies that would likely jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. Section 7 of the ESA requires Federal agencies proposing actions that may affect listed species or critical habitats to first consult with USFWS to ensure they do not jeopardize listed species or destroy critical habitat. Section 9 of the ESA prohibits the “taking” of listed species by causing harm or harassment. The USAG-HI actions in implementation of the OIP are in accordance with the requirements for Federal agency compliance with the ESA.

### **2.3.3 National Historic Preservation Act**

The National Historic Preservation Act (NHPA) of 1966, as amended (16 USC 470), established both a national policy for preservation of historic properties as well as the National Register of Historic Places (NRHP). Section 106 of the NHPA requires Federal agencies to take into account the effects of Federal actions on historic properties, and affords the Advisory Council on Historic Preservation (ACHP) and State Historic Preservation Officer (SHPO) a reasonable opportunity to comment on such undertakings. The Section 106 process (36 CFR §800) provides for the identification and evaluation of historic properties, for determining the effects of undertakings on such properties, and for developing ways to resolve adverse effects in consultation with appropriate parties. Hawai‘i Revised Statutes (HRS) Chapter 6E, Historic Preservation, implements the NHPA in Hawai‘i, under the jurisdiction of the Hawai‘i Department of Land and Natural Resources (DLNR), State Historic Preservation Division (SHPD). The state law requires that before any agency or officer of the State or its political subdivisions commences any project which may affect historic property, aviation artifacts or a burial site, the agency or officer shall advise the department and allow the department an opportunity for review of the effect of the proposed project, consistent with Section 6E-43 [prehistoric and historic burial sites], especially those on the Hawai‘i register of historic places. Surveys for archaeological or historic properties which may be affected by the implementation of the Proposed Action have been conducted as part of the Section 106 process.

### **2.3.4 Clean Water Act**

The Clean Water Act (CWA) of 1972 is the primary Federal law that protects the nation’s waters, including lakes, rivers, and coastal areas. The primary objective of the CWA is to restore and maintain the integrity of the nation’s waters. Jurisdictional waters of the United States are subject to Federal authority under Section 404 of the CWA. This term is broadly defined to include navigable waters (including intermittent streams), impoundments, tributary streams, and wetlands. Projects that require a Federal permit (Section 404) or involve dredge or fill activities that may result in a discharge to waters of the United States must have a CWA Section 401 Water Quality Certification verifying the project activities will comply with state water quality standards.



The National Pollutant Discharge Elimination System (NPDES) program regulates the discharge of pollutants from point sources into surface waters pursuant to Section 402 of the CWA. The State of Hawai'i Department of Health (DOH) administers the NPDES program in Hawai'i.

### **2.3.5 Coastal Zone Management Act**

The purpose of the Coastal Zone Management Act (CZMA) of 1972, as amended (16 USC §1451 *et seq.*), is to encourage coastal states to manage and conserve coastal areas as a unique, irreplaceable resource. Federal agency activity within or outside the coastal zone that affects land or water use or natural resources of the coastal zone shall be carried out in a manner which is consistent, to the maximum extent practicable, with the enforceable policies of approved State management programs. However, land subject solely to the discretion of the Federal government such as federally owned property without spillover impacts, is excluded from the coastal zone. As the Proposed Action would consist of a Federal action taking place on State-owned land, it would be subject to CZMA. A programmatic consistency review with the Hawaii Coastal Zone Management Office was underway at the time of this PEA.

### **2.3.6 Federal Insecticide, Fungicide, and Rodenticide Act**

The proposed action involves use of the rodenticide diphacinone for controlling and eradicating invasive rodents, and various insecticides for controlling invertebrate pests. The use of rodenticides and registered pesticides in the United States is regulated by the U.S. Environmental Protection Agency (EPA) under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA; 7 USC §136). Pursuant to that law, general or specific use of a particular rodenticide formulation for meeting particular rodent research, control or eradication objectives, sometimes even in a particular location using identified methods, must be formally approved by the EPA, with specific use requirements and restrictions identified on the label. An entity must apply to the EPA for approval and registration of such labels for specific uses of specific rodenticides.

Currently, conservation uses in Hawai'i are allowed under a FIFRA Section 24(c) registration for diphacinone in bait stations (Ramik® Mini Bars, 0.005% diphacinone) and a nationwide label under Section 3 for all application methods, including aerial broadcast (Ramik® Green 0.005% diphacinone, a 1/2 inch pellet). In addition, a Section 24(c) registration package has been submitted to the Hawai'i Department of Agriculture (HDOA) for broadcast application of diphacinone (Ramik Green 0.005% diphacinone, a 3/4 inch pellet) for conservation purposes.

### **2.3.7 Executive Order 13112, Invasive Species**

Executive Order 13112 of February 3, 1999, requires Federal agencies whose actions may affect the status of invasive species to, subject to the availability of appropriated funds and within Administrative budgetary limits, use relevant programs and authorities to:

- Prevent the introduction of invasive species;
- Detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner;
- Monitor invasive species populations accurately and reliably;
- Provide for restoration of native species and habitat conditions in ecosystems that have been invaded;
- Conduct research on invasive species and develop technologies to prevent introduction of and provide for environmentally sound control of invasive species; and
- Promote public education on invasive species and the means to address them.

The natural resource management actions described within the proposed action for this project assist the Army in compliance with this Executive Order.

### **2.3.8 Executive Order 12898, Environmental Justice**

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires the Army to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. Effects of the proposed project on these populations are evaluated in this document.

## **3 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES**

The proposed action, as summarized in Section 2.1 and described in detail in Section 3.2, is to conduct management actions for threatened and endangered species in the O‘ahu AA potentially affected by military training at O‘ahu Army training installations (except Mākua, evaluated in the MIP PEA). The ultimate goal of the plan is to stabilize the target species. Stabilization involves removing feral ungulates including pigs (*Sus scrofa*) and goats (*Capra hircus*) from within the fenced management units, securing the sections as natural ecosystems, providing habitat for rare plants, snails, and birds, and serving as a site for rare species outplanting, reintroductions, and augmentations. Management actions would include threat abatement actions such as installing ungulate control fencing; conducting physical, mechanical, and chemical control for ungulates, alien plants, small mammals, birds, reptiles, and alien invertebrates; genetic collection of endangered plants; fire control; and construction of support facilities such as cabins, camp sites, landing zones, drop zones, and water catchments.

Section 3.3.1 describes in detail the process for refining management alternatives undertaken by the teams tasked with developing both the MIP and the OIP. Several alternative management strategies were considered in development of the MIP, and subsequently that decision making process informed the O‘ahu Implementation Team during the development of the OIP. These alternatives were eliminated from further study as they would not meet the project objectives. The No Action Alternative, in which no management action would be taken, is considered in this document, and described in Section 3.3.

### **3.1 Programmatic Nature of the Proposed Action**

This PEA addresses the broad range of implementation measures proposed to comply with the 2003 BO stipulations that the Army manage 23 plant species, one bird species, and ten snail species to stability. Use of a programmatic approach for analysis of the management actions can reduce or eliminate redundant analyses and effectively address cumulative effects. While some management actions are well-known and impacts can be fully evaluated in this document, some proposed management actions are still in early planning and/or research stages. Therefore, the specific details needed to accurately assess potential impacts are not available at this time, and supplemental NEPA analyses will be used as appropriate to evaluate future management actions and keep this document current. Table 2 provides a list of currently proposed management measures for which future supplemental analyses may be required. Other management measures not currently considered may be proposed in the future, and a determination of the level of supplemental analysis needed will be made at that time.

**Table 2: Possible Future Actions with Supplemental Analysis**

Management Action	Current Status	Anticipated Supplemental Analysis
Aerial Rodenticide Application	Under State-wide review for multi-agency conservation use; Army considering use at SBMR	Supplemental EA followed by FNSI or EIS
Manual Rodenticide Distribution (hand broadcast)	Proposed for future implementation, no planning underway to date	Supplemental EA followed by FNSI or EIS

In addition to supplementing this PEA for future types of management actions that cannot be fully evaluated at this point, supplemental NEPA analysis would be conducted as appropriate if major changes to the OIP were proposed; for example, extensive changes to the target taxa or management goals which would affect the locations of the MUs, or construction of new MUs in locations that have not been evaluated as part of this PEA.

## 3.2 OIP Management Actions (Proposed Action)

The Proposed Action involves conducting a variety of management actions within some or all of the 33 MUs in the O‘ahu AA. Description of the Proposed Action in this section occurs in three steps: (1) identify the geographic locations where proposed management activities would take place (Section 3.1.1 Management Unit Descriptions); (2) describe the classes of proposed management activities, how they would be conducted, and measures intrinsic to the activity to minimize environmental impacts (Section 3.1.2, Proposed Management Activities); and (3) identify the timeline in which the proposed management activities would occur (Section 3.1.3, Stabilization Prioritization for the OIP).

### 3.2.1 Management Unit Descriptions<sup>2</sup>

Figures 1a, 1b, 2a, and 2b, which show the location and physical setting of each of the MUs described in this section, are located at the end of Section 1.

#### 3.2.1.1 East Makaleha

East Makaleha MU consists of approximately 274 acres of State-owned land in the State Forest Reserve and State Public Hunting Area on the windward side of the Wai‘anae Range. The majority of the MU is within the Protective subzone of the Conservation District, with elevations from 1,040 to 3,800 feet. The MU is comprised of moderate to steep-sided ridge slopes and gentle to moderate gulch bottoms, with steeper slopes near the summit. Natural communities consist of dry-mesic to wet native forest and shrubland, along with alien-dominated dry-mesic to wet-mesic shrubland and forest.

#### 3.2.1.2 ‘Ēkahanui Subunits I, II, and III

‘Ēkahanui MU is located in the central portion of the Honouliuli Preserve on the slopes of the Wai‘anae Range, and is comprised of three subunits. Subunits I and II, which were included in the MIP, are adjacent and total 214 acres in size. Subunit III is a smaller area (approximately 2.3 acres) to the north of Subunits I and II. Fences have been constructed around these subunits, and

<sup>2</sup> Note that MU acreages in this document do not always correspond exactly to MU acreages listed in the OIP. Since publication of the OIP, additional GPS surveying has been conducted, and MU boundaries have been refined.

impacts of natural resources management at these MUs and within the Honouliuli Preserve were evaluated in previously completed EAs (MIP EA, and EA for Natural Resources Management at the Honouliuli Preserve, completed by The Nature Conservancy (TNC) in 1997 [TNCH 1997]). The majority of Subunits I and II, and all of Subunit III, are located in the Resource subzone of the Conservation District, while the upper elevations of Subunits I and II are located within the Protective subzone. All three subunits are located on moderate to steep-sided ridge slopes and gentle to moderate gulch bottoms at elevations from 1,720 to 3,130 feet in mesic alien-dominated forest and shrubland with some mesic to wet native-dominated areas. They are on land recently sold by the James Campbell Co. to the Trust for Public Land (TPL), being managed by TNC via a conservation easement. It is anticipated that the land will be turned over to the State in early 2010, and the current Honouliuli Preserve would be incorporated into the State Forest Reserve.

### **3.2.1.3 Helemano**

Helemano is a 150-acre MU located in the Ko‘olau Mountains at elevations from 2,400 to 2,700 feet in wet native forest. An ungulate exclusion fence which has been constructed around this MU was evaluated in a separate EA (Kamehameha Schools 2003). The Helemano MU, located on land in the Protective subzone of the Conservation District owned by the BP Bishop Estate Trust (Kamehameha Schools [KS]) and currently leased by the U.S. Army, shares a boundary with the adjacent ‘Ōpae‘ula MU. The Helemano MU is located mostly within KLOA.

### **3.2.1.4 Ka‘ala**

The Ka‘ala MU is located at the plateau and surrounding cliffs of Ka‘ala peak in the Wai‘anae Mountains (elevation 3,400 to 4,020 feet) within the Protective subzone of the Conservation District. The MU is sited in a bog and montane wet community, with moderate to steep slopes and cliffs. The land ownership of this 184-acre MU is divided between the City and County of Honolulu, the State of Hawai‘i, and the United States of America. Facilities atop the Ka‘ala summit are jointly managed by the Federal Aviation Administration and US Army National Guard. The northern portion is managed by the State as part of the Natural Area Reserve System. Some existing strategic fencing has been constructed for ungulate control.

### **3.2.1.5 Kahana**

Kahana is a 22.5-acre MU in the Ko‘olau Mountains on land owned by Kualoa Ranch. The MU is located in an area of steep ridges and a gulch at elevations ranging from 1,600 to 2,000 feet, within the Resource subzone of the Conservation District. Natural communities include native mesic to wet forest mixed with aliens (*Schefflera actinophylla* and *Heliocarpus popayanensis*).

### **3.2.1.6 Kaipapa‘u**

Kaipapa‘u is a 268-acre MU in the northern Ko‘olau Mountains at elevations ranging from 1,000 to 2,600 feet. The majority of the MU is located on land owned by the State as part of the Kaipapa‘u Forest Reserve, with a small area in the western part of the MU located in land owned by KS. The MU is proposed for land that is within the Conservation District, part in the Protective subzone and part in the Resource subzone. The natural communities include wet native forest on steep slopes and ridges.

### **3.2.1.7 Kaleleiki**

Kaleleiki is part of a group of four small MUs (Kaunala, Pahipahi‘ālua, ‘Ō‘io, and Kaleleiki) managed for an endangered plant. It is located on State land in the Conservation District

Resource subzone near KTA. Natural communities include lowland mesic mixed native and introduced forest. Kaleleiki consists of approximately two acres on moderate sloping ridges and gulches at elevations from 800 to 1,000 feet. Ungulate exclusion fences were built at all four of these MUs.

### ***3.2.1.8 Kalua‘ā and Wai‘eli I, II, and III***

Kalua‘ā and Wai‘eli Subunits I, II, and III MUs are located on Conservation District Resource subzone land in the Honouliuli Preserve currently owned by TPL, expected to be transferred to State ownership in the future. Ungulate exclusion fences for Subunit I (107 acres) and Subunit II (24 acres) were constructed in conjunction with TNC, for which an EA was prepared in 1997. Ungulate exclusion fence for Subunit III (23 acres), also evaluated in the 1997 EA, is under construction. These MUs are located on the windward side of the Wai‘anae Range, at elevations from 1,520 to 2,850 feet in moderate to steep-sided ridge and gulch systems. Natural communities include alien-dominated forest and shrublands, with some native dominated-areas.

### ***3.2.1.9 Kamaili***

Kamaili is a small (6 acre) MU on the rocky ridges and cliff faces of the leeward slopes of the Wai‘anae Range at elevations of 1,500 to 1,800 feet. The MU is located on land owned by the City and County of Honolulu, primarily within the Resource subzone of the Conservation District. Natural communities include mixed mesic alien forest and shrubland, with some patches of native dominated areas.

### ***3.2.1.10 Kaukonahua – Punalu‘u***

The Kaukonahua-Punalu‘u MU was identified in the OIP as Poamoho III. This small (1.3 acre) MU is located partially on State-owned land in the Ewa Forest Reserve and partially on land owned by KS. The MU is within the Protective subzone of the Conservation District, at approximately 2,600 feet elevation in an area of moderate to steep gulch slopes and windswept summit areas. The natural communities include wet native forest and mixed native windswept shrubland along the summit.

### ***3.2.1.11 Kaunala***

Kaunala is part of a group of four small MUs (Kaunala, Pahipahi‘ālua, ‘Ō‘io, and Kaleleiki) managed for an endangered plant. It is located on Federal land near KTA comprised of lowland mesic mixed native and introduced forest. Kaunala consists of approximately 5 acres on moderate sloping ridges and gulches at elevations from 600 to 650 feet. Ungulate exclusion fences were built at all four of these MUs.

### ***3.2.1.12 Kawai Iki I and II***

Kawai Iki I and II were identified as Kaipapa‘u II and III in the OIP. Kawai Iki I is 4 acres in size, and Kawai Iki II is 5 acres. Both subunits are located in Conservation District Protective subzone land owned by KS near the KLOA in the northern Ko‘olau Range. Elevations range from approximately 2,400 to 2,600 feet along steep slopes and ridges. Natural communities consist primarily of wet native forest.

### ***3.2.1.13 Kawailoa***

The Kawailoa MU is located on 6.5 acres of land owned by KS in the northern Ko‘olau Range. The MU is within the Resource subzone of the Conservation District, at elevation ranges from

2,400 to 2,600 feet on and near the summit crest. The topography is composed of moderate slopes and ridges, and the natural communities consist of wet native forest.

#### ***3.2.1.14 Kipapa***

Kipapa is a 3.7 acre MU located on Conservation District Protective subzone land owned by the USFWS, managed as the O‘ahu Wildlife Refuge, in the central Ko‘olau Mountains. The MU is located at elevations ranging from 1,850 to 2,000 feet of moderate sloping ridges. Natural communities consist of mixed native wet shrubland.

#### ***3.2.1.15 Koloa***

The Koloa MU comprises 164 acres Conservation District Protective subzone land in the northern Ko‘olau Mountains near KLOA and adjacent to the Kaipapa‘u MU. Koloa MU is located on land owned by Hawaii Reserves Inc., and the MU is located in wet native forest at elevations ranging from 2,000 to 2,400 feet. The terrain is moderate, with moderate to steep sloped gulches.

#### ***3.2.1.16 Lihue***

Lihue is a large MU, comprising 1,764 acres at Schofield Barracks West Range. Previously identified MUs at Schofield Barracks including North Haleauau, South Haleauau, and Mohiakea have been incorporated into the new Lihue MU. The MU is within the Schofield Barracks Forest Reserve, at elevations ranging from 2,000 to 3,500 feet on the windward side of the Wai‘anae Range. The majority of the MU is within the Resource subzone of the Conservation District, with areas in the upper elevations in the Protective subzone. Topography includes ridges and gulches running up to the Ka‘ala summit and northern ridges with moderate to steep slopes on the ridges and gentle to moderate slopes in the gulches. Natural communities include mesic to wet mixed native and introduced forest in the lower elevations, with native wet forest in the higher elevations.

#### ***3.2.1.17 Lower ‘Ōpae‘ula***

Lower ‘Ōpae‘ula MU is also identified as Lower Peahinaī‘a I in the OIP. The MU comprises 25 acres of Conservation District Protective subzone land owned by KS in the north-central Ko‘olau Mountains at KLOA. Elevations range from 2,100 to 2,500 feet in complex gulch and ridge systems, with moderate to steep gulch sides. Natural communities consist of wet native forest.

#### ***3.2.1.18 Lower Peahinaī‘a Subunit II***

Lower Peahinaī‘a II is also identified as Lower ‘Ōpae‘ula II in the OIP. The MU comprises 24 acres on Conservation District Protective subzone land owned by KS in the north-central Ko‘olau Mountains at KLOA. Elevations range from 2,100 to 2,500 feet in complex gulch and ridge systems, with moderate to steep gulch sides. Natural communities consist of wet native forest.

#### ***3.2.1.19 Lower Poamoho***

Lower Poamoho is a small (4.2 acres) MU in a moderately sloping gulch off the Poamoho Trail. Elevations range from 1,800 to 1,860 in wet native forest and mixed native windswept shrubland along the summit. The MU is on State owned Conservation District Protective subzone land near KLOA.

### **3.2.1.20 Mānana**

Mānana is an 18-acre MU in the central Ko‘olau Mountains at elevations ranging from 1,950 to 2,200 feet. It is located within a moderate to steep-sided gulch at the headwaters of Mānana Valley Stream on Conservation District Protective subzone land owned by Mānana Valley Farm. Natural communities include wet forest and shrubland.

### **3.2.1.21 Manuwai I and II**

Manuwai is located in the Wai‘anae Mountains on State owned Conservation District Protective subzone land adjacent to Schofield Barracks West Range. The MU is comprised of two subunits. Subunit 1 (164 acres) was included in the MIP, and impacts of constructing an ungulate exclusion fence were identified in the MIP PEA. Subsequently, Subunit II (137 acres) was added to the scope of the MU. The expansion of the MU was evaluated in a supplemental EA to the MIP PEA, completed in December 2009. Elevations for the MU range from 1,400 to 2,600 feet, and topography consists of windward ridge and gulch systems running up to the ridge crest. Ridge sides are moderately to steeply sloped, with steeper slopes near the summit. The natural community in the MU includes dry-mesic to mesic alien forests and mesic native forest. Portions of the MU are in a State Natural Area Reserve and a Forest Reserve.

### **3.2.1.22 North Hālawā**

North Hālawā is a small (3.7 acres) MU located on State of Hawai‘i Department of Transportation-owned land. This MU is located within the Protective subzone of the Conservation District in the central Ko‘olau Mountains. Elevations range from 2,600 to 2,700 feet on moderately sloping terrain. Natural communities include windswept mixed wet shrubland.

### **3.2.1.23 North Kaukonahua**

The North Kaukonahua MU consists of approximately 30 acres of State-owned Conservation District Protective subzone land near the summit of North Kaukonahua Valley in the northern Ko‘olau Mountains. Elevations range from 1,850 to 2,100 feet in moderate to steep sided gulch and ridge systems at KLOA. Natural communities include wet native forest. The area is a restricted military training area, and the Schofield-Waikane hiking trail runs along the southern MU boundary.

### **3.2.1.24 North Puali‘i**

North Puali‘i MU encompasses approximately 19 acres of mostly steep ridges within the Honouliuli Preserve in the Wai‘anae Mountains. The majority of the MU is within the Protective subzone of the Conservation District, with a small area at the lower elevations in the Resource subzone. The land is owned by TPL, to be turned over to the State Forest Reserve, and is used as a biodiversity preserve. The elevation ranges from 1,800 to 2,700 feet; lower elevations are alien-dominated forest and shrublands while the upper elevations have some native-dominated areas. An ungulate exclusion fence had previously been constructed by TNC Hawai‘i at this MU.

### **3.2.1.25 ‘Ō‘io**

‘Ō‘io is part of a group of four small MUs (Kaunala, Pahipahi‘ālua, ‘Ō‘io, and Kaleleiki) managed for an endangered plant. It is located on Federally-owned Conservation District Resource subzone land in the northern Ko‘olau Mountains near the Kahuku Training Area. ‘Ō‘io

consists of approximately 3.3 acres of lowland mesic mixed native and introduced forest on moderate sloping ridges and gulches at elevations from 600 to 650 feet. Ungulate exclusion fences were built at all four of these MUs. While the OIP identifies the MU as 0.9 acres in size, it was determined that the 3.3 acres would better encompass important habitat for management.

#### **3.2.1.26 ‘Ōpae‘ula**

‘Ōpae‘ula is a 122-acre MU located at 2,400 to 2,700 feet elevation in the Conservation District Protective subzone of the Ko‘olau Mountains. Topography consists of moderately steep gulches containing wet native forest. An ungulate exclusion fence which has been constructed around this MU was evaluated in a separate Environmental Assessment (Kamehameha Schools 2003). The ‘Ōpae‘ula MU, located on parcels owned by the State and KS, shares a boundary with the adjacent Helemano MU.

#### **3.2.1.27 Pahipahi‘ālua**

Pahipahi‘ālua is part of a group of four small MUs (Kaunala, Pahipahi‘ālua, ‘Ō‘io, and Kaleleiki) managed for an endangered plant. It is located on Federal land in the northern Ko‘olau Mountains near KTA. Pahipahi‘ālua consists of approximately 1.5 acres of lowland mesic mixed native and introduced forest on moderate sloping ridges and gulches at elevations from 600 to 650 feet. Ungulate exclusion fences were built at all four of these MUs. While the OIP identifies the MU as 17.1 acres in size, it was determined that 1.5 acres would be an appropriate area for this MU.

#### **3.2.1.28 Poamoho**

Poamoho is an approximately 60-acre MU located at 2,200 to 2,600 feet elevation in the Conservation District Protective subzone within the Northern Ko‘olau Mountains. The majority of the MU is within KLOA. The MU is on land owned by KS near the summit and headwaters of the south fork of Helemano Stream. Topography in the MU consists of moderate to steep gulch slopes and windswept summit areas. Natural communities include wet native forest and mixed native windswept shrubland along the summit.

#### **3.2.1.29 Poamoho Pond**

Poamoho Pond, identified in the OIP as Poamoho Subunit II, is a 17.8-acre MU located south of the Poamoho MU in the Northern Ko‘olau Mountains. The MU is located on State land slated for inclusion in a Natural Area Reserve. Elevations range from 2,200 to 2,600 feet within the Protective subzone of the Conservation District, and topography consists of moderate to steep gulch slopes and windswept summit areas. Natural communities in the MU include wet native forest and mixed native windswept shrubland along the summit.

#### **3.2.1.30 South Kaukonahua Subunits I and II**

South Kaukonahua MU consists of two subunits comprising 93.5 acres (Subunit I) and 0.9 acres (Subunit II) in the Ko‘olau Mountains at Schofield Barracks East Range. Elevations range from 1,800 to 2,400 feet within the Conservation District Protective subzone, and topography consists of moderate to steep gulches encompassing the headwaters of both north and south forks of South Kaukonahua Stream. Natural communities include wet mixed native forest and windswept shrubland along the summit areas.



### ***3.2.1.31 Waiawa Subunits I and II***

The Waiawa MU consists of two adjacent subunits located on KS land in the upper central Ko‘olau Mountains. The MU is located within the Protective subzone of the Conservation District. Elevations range from 1,800 to 2,725 feet in complex gulch and ridge systems with moderate and steep-sloped topography. Subunit I encompasses 124 acres, and Subunit II encompasses about 12 acres, both consisting of wet native forest and shrubland, and mixed fern and shrub assemblages.

### ***3.2.1.32 Wailupe***

Wailupe MU is located in the southern Ko‘olau Mountains, on State-owned Conservation District Resource subzone land between 1,100 and 1,600 feet in elevation. The topography of the 21-acre MU consists of a moderate to steep sided gulch, and natural communities include mixed alien and native mesic to wet forest. Hiking trails are present in the area, and hunting occurs in the State Forest Reserve.

### ***3.2.1.33 Waimano***

The Waimano MU is located south and east of the Manana MU, on KS-owned Conservation District Protective subzone land in the central Ko‘olau Mountains. The 8-acre MU is made up of moderate sloping terrain from 2,600 to 2,700 feet in elevation. Natural communities include windswept mixed wet shrubland.

## **3.2.2 Proposed Management Activities**

This section provides details on the proposed management activities to be used to achieve the stabilization plans outlined in the OIP, and how they would be conducted. These management activities would be conducted in the same manner as those under the MIP. Impacts from MIP management activities have been evaluated in the MIP PEA and supplemental documents.

### ***3.2.2.1 Pedestrian and Aerial Surveys***

Surveys would be conducted for several purposes, including (1) mapping vegetation types to define and map distribution of major plant communities, (2) determining distribution and general abundance of target species within a MU or in areas outside the MUs, (3) determining distribution and general abundance of target species in areas outside but adjacent to MUs prior to fenceline construction, (4) determining distribution and general abundance of selected, highly invasive and damaging alien plant and animal species in areas between the designated MUs, (5) detecting the presence of invasive alien plant species that may become established along roads, trails, fencelines, or transects as a result of human use of the area, (6) monitoring feral goat and pig numbers, and (7) spot fenceline checks and surveys.

Pedestrian surveys would be conducted by small teams, including Natural Resources staff and/or volunteers. Participants would either hike in to the survey location or, in the case of remote areas, be transported via helicopter to an established landing zone (see Section 3.2.2.12 for description of landing zones). Survey participants would walk predetermined transects or routes, and would be briefed beforehand about minimizing impacts to native species by trampling or breakage. Ropes may be used to allow staff access to areas of steep terrain to complete surveys. Natural Resource staff would complete rappel training prior to being allowed to use ropes. All items brought to the MU would be packed out at the end of the work day.

In order to reduce weed spread by Natural Resource staff personnel during pedestrian surveys, the Oahu Army Natural Resource Program (OANRP) has instituted several sanitation policies, described below, which are carried out by Natural Resources staff and volunteers.

- **Vehicles.** All vehicles are washed at the end of the week. If a vehicle goes to a site known to have particularly invasive weeds, it is washed at the end of the day. An example of such a site is KTA, which receives heavy military use and is home to a number of habitat-altering invasive weeds including *Pennisetum setaceum*, *Melochia umbellata*, and *Acacia mangium*. Another is observation point Halo in Schofield Barracks, South Range where there is *Senecio madagascariensis*, an agricultural threat that is considered an ecosystem threat by environmental workers at Pōhakuloa Training Area.
- **Footwear.** Footwear is washed at the end of each work day. Each Natural Resource staff has two sets of tabis, one dedicated for Wai'anae and one for Ko'olau Mountain work.
- **Personal gear.** Natural Resource staff maintain a regular schedule for washing backpacks and other personal gear vectors to prevent spreading weeds.

For especially invasive species, Natural Resource staff perform aerial (helicopter) surveys to identify the extent of infestations that cannot be mapped from the ground. Staff visually inspect canopy cover from helicopters which may hover as close as ten to twenty feet above the canopy. While performing aerial surveys, a Global Positioning System (GPS) is used to map individuals. These maps direct plant removal on the ground and facilitate navigation to outlying targets. Helicopter surveys would generally occur once every one to three years at each MU. Flights usually last between one and two hours; if additional time is needed for a survey, the helicopter would be refueled. Basic helicopter safety training would be completed by Natural Resource staff prior to conducting helicopter operations.

### ***3.2.2.2 Monitoring***

Monitoring would be conducted for several purposes, including: (1) assessment of the distribution and status of alien plant and animal species within the MUs and in the vicinity of the population units (PUs), (2) assessment of the status and stability of native plant, snail, and bird communities within an MU, (3) assessment of efficacy of alien species population levels relative to control methods, (4) assuring greenhouse plants designated for out-planting are not contaminated with pathogens or other pests of concern, (5) evaluating native plant populations to determine when collection of propagules is probable, (6) inventory for pathogens in outplanting sites and outplanted individuals, (7) assessment of germination, survival, growth, reproduction and phenology of outplanted individuals, (8) bird banding, (9) snail mark and recapture, and (10) pig and goat collaring and tracking.

Field monitoring activities would incorporate the same management measures as pedestrian surveys (above) to prevent damage to the environment through weed introduction or trampling. Monitoring protocols are spelled out in OIP Chapters 6 (plants) and 9 (snails). Care would be taken when searching for ground snail shells to limit disturbance to native plants.

### ***3.2.2.3 Specimen Collection***

The goal of collection from the wild is to ensure that material is available for future reintroductions or augmentation efforts. Protocols for plant propagule collection were based on

the guidelines of the Center for Plant Conservation (CPC) and the Hawai‘i Rare Plant Restoration Group (HRPRG), and are the same as those outlined in the MIP. Both of the above groups have worked with rare Hawaiian plant species and developed specific, recommended protocols for propagule collection. In the collection guidelines, a balance was struck between the need to remove seed or other living material in sufficient quantity to serve the purposes of stabilization while not harming wild plants or unduly reducing potential natural regeneration. Given the small number of populations and the small size of the populations of the endangered plants in the OIP, it was recommended that collections be made from all populations, and from up to 50 individuals per population. In order to allow for natural regeneration in the field, it was recommended that only 20 percent of the available seed should be collected from each plant, unless fewer than 10 plants remain in the population. If that is the case, the amount of seed collected is up to the discretion of the permitted collector. Collections of plant propagules would be conducted by Army Natural Resources Staff. In addition to specimen collection for future reintroduction and augmentation efforts, specimens of native and alien plants and animals are also collected if further identification is needed or for submission to the Bishop Museum herbarium.

#### ***3.2.2.4 Reintroductions and Augmentations***

Reintroduction and augmentation involves taking plants grown offsite (typically in the greenhouse) and planting them back into the wild. Given the historical trend of reduction in geographic range, numbers of populations, and numbers of individuals of endangered species in Hawai‘i, one of the strategies in the stabilization of the OIP target species is reintroduction of individuals into suitable managed habitat within the known historical range or likely suitable habitat of a species. Reintroduction involves establishing a number of individuals into a geographic area within a species’ historic range that is currently not known to contain the species, with express purpose of establishing a sustained or growing population. Augmentation is adding individuals that have been grown off site (in a greenhouse) into a site currently occupied by the species. Great care would be taken to preserve the genetic integrity of the natural populations whenever augmentation is conducted. A strict sanitation protocol would be followed by the greenhouse staff to ensure that non-native weeds or other pests are not introduced into pristine areas. The Army would follow the HRPRG’s reintroduction guidelines for plants.

#### ***3.2.2.5 Phytosanitation***

Appendix 1.4 of the OIP identifies phytosanitation standards and guidelines in place to prevent the introduction of foreign organisms into the wild during reintroductions or augmentations. Threats that are monitored and controlled in the nursery setting include arthropods, alien plant species, nematodes, mollusks, pathogens, and small mammals and other pests. Plants are inspected by OANRP horticultural staff prior to outplanting. A plant must remain in quarantine for a minimum of two weeks; three if the plants show susceptibility to disease. The Army is responsible for transporting plants from the nursery to the outplanting site or quarantine facility in vehicles for which a standard vehicle sanitation protocol has been conducted. If a plant fails a nursery inspection, the plant is removed from the growing area and immediately treated with the appropriate control method to prevent further infestation. If the plant is infected with a virus, it is disposed completely.

### 3.2.2.6 Aerial Rodenticide Application

Aerial application of rodenticide has been, and continues to be, investigated in Hawai‘i to eradicate rats from remote areas, particularly off-shore islands, where hand distribution of the pelletized rat bait is impossible. The Army is considering future aerial application of rodenticide on SBMR, in the Lihue MU. This PEA provides a general description of how aerial rodenticide application would occur; however, this management activity is proposed future implementation, and supplemental analysis of this action, tiered under this PEA, would need to be conducted prior to implementation.

Rat bait with the anticoagulant rodenticide diphacinone (0.005 percent active ingredient) has been approved for such aerial distribution by the U.S. EPA and the HDOA. According to the Extension Toxicology Network<sup>3</sup>, diphacinone has a low potential to leach in soil, and is rapidly decomposed in water by sunlight. Diphacinone is slightly toxic to birds. The oral lethal dose to half the exposed subjects (LD50) for diphacinone in mallard ducks is 3,158 mg/kg, and in bobwhite quail is 1,630 mg/kg. Diphacinone is moderately toxic to fish species. The 96-hour lethal concentration for half the exposed subjects (LC50) for diphacinone in channel catfish is 2.1 mg/L, in bluegills is 7.6 mg/L, and in rainbow trout is 2.8 mg/L. The 48-hour LC50 in Daphnia, a small freshwater crustacean, is 1.8 mg/L. Studies with cattle indicate a high degree of tolerance for the compound. Ramik, the rodenticide most commonly used by Natural Resource staff, contains 0.005 percent diphacinone. The Section 24(c) registration that allows aerial broadcast for conservation uses in Hawai‘i specifies a 6.5-gram pellet be used. The pellet size was selected to ensure the pellets are large enough to penetrate the dense canopy and reach the forest floor.

Aerial distribution would occur when rat reproduction is low or nonexistent and rat abundance is lowest (typically winter months). This preferred time of year is also the beginning of ‘elepaio breeding season, and when there is lowest seasonal abundance and diversity of alternative foods available for rats, such as seeds, invertebrates, and vulnerable ‘elepaio eggs and chicks. A helicopter, using a specialized bucket hung from the base of the aircraft, would fly along predetermined Global Positioning System (GPS)-plotted transects as the bait is distributed in several foot wide swaths. The number and duration of flights would be dependent on the size of the bucket available. The length of time to complete the application at the 1,764-acre Lihue MU would depend on the how long bucket loading and application operations require, but it is anticipated that it could be completed in two to three days. A second distribution would occur in the same area approximately seven to 10 days after the first application. Conditions may be imposed on the action by USFWS, the State Department of Agriculture, and other agencies with jurisdiction, possibly including but not limited to ensuring the enclosure is secure allowing no ingress and egress; soil, water, and/or animal tissue sampling; or other mitigation measures that may be determined during supplemental NEPA review.

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<sup>3</sup> Extension Toxicology Network is a pesticide information project of cooperative extension offices of Cornell University, Oregon State University, the University of Idaho, and the University of California at Davis and the Institute for Environmental Toxicology, Michigan State University funded by USDA. <http://extoxnet.orst.edu/pips/diphacin.htm>. Accessed October 13, 2009.

### **3.2.2.7 Manual Toxicant and Insecticide Application**

Where small mammals, including mice, rats, or mongoose, have been identified as a threat, small mammal control, in the form of trapping and the use of toxicants, would be implemented within the MU. The toxicant currently used for rat control is diphacinone, an anticoagulant described above.

Small mammal control would be focused in the vicinity of PUs and proposed reintroductions and augmentations of target species shown to be sensitive to small mammal predation (e.g. plants eaten by rats). Natural Resource Staff use Ramik, a brand of rat bait containing diphacinone that is not formulated with seeds, but rather with cracked corn, milled grain, and wax. None of these components are a potential source of weeds. Bait boxes are currently approved for use in residential and conservation applications, as the toxicant is kept out of contact with rain, soil, or non-target organisms. As with aerial distribution of rodenticide, hand broadcast would be evaluated as appropriate in a supplemental document tiered under this programmatic EA.

Specific management tools are currently not available for insect pests such as two-spotted leafhopper (*Sophonia rufofascia*), black twig borer (*Xylosandrus compactus*), and Chinese rose beetle (*Adoretus sinicus*). Under certain conditions, it may be necessary to apply systemic insecticide to individual plants, which might control alien pest plants. Additionally, slugs prey on seedlings and young plants of many endangered Hawaiian species, and there is currently no toxicant approved for use in natural areas. With guidance from USFWS and HDOA, OANRP has worked with the manufacturer of the organic molluscicide, Sluggo (Neudorff, Germany), to expand its use as a conservation tool under a Special Local Needs (SLN) label. Such labeling would allow for expanded use of Sluggo outside of agricultural and residential areas within the State of Hawai'i. In support of an SLN label, OANRP has conducted field studies under an Experimental Use Permit granted by HDOA in 2007 and current through February 2010. Research to date shows Sluggo is effective against the target pest and safe to use in a forested setting. No new research is required from HDOA for the SLN label. USFWS is awaiting a draft label for review, after which they will proceed with a Section 7 consultation. OANRP is in contact with Sluggo company representatives to produce a draft SLN label for USFWS review in early 2010. If effective systemic insecticides or slug toxicants become available for use in natural areas the Army may use these within the MUs in order to protect affected endangered plant species. If the Army decides at a later time to use systemic insecticides or slug toxicants, application would be consistent with an approved label. In the event further environmental review is needed, the decision regarding the appropriate level of supplemental review documentation would be made based on specific information not currently available.

### **3.2.2.8 Weed Control**

Weed control aims to eliminate, either in one or repeated treatments, target weed species from a natural area. Control of weeds is conducted using a number of techniques, including manual, chemical, and biological control. The method of control depends on the growth form of the target species (grass versus shrub versus tree) and the type of weeding project (gradual restoration, active restoration, firebreak, trails or fencelines). Gradual restoration is the approach most often taken since it is efficient in time and effort, and is most useful in areas with at least 80 percent native cover. In more mixed forests, no more than 20 percent of the canopy is removed or opened during a treatment. Removing canopy trees at a higher rate can change the light regime of the forest to a point where invasive understory species are favored. In contrast to canopy weed

control, understory weed control is generally conducted to eliminate target weeds in a single treatment. Active restoration, involving removal of more than 20 percent of the canopy, is not used as often since it is much more labor intensive and has the potential to change the site microclimate drastically. Common native species are often outplanted into active restoration sites. Firebreak construction is done to reduce the fire risk to native shrubland, forest patches and endangered species.

Methods for weed control are continually being improved, and the Army would use the best available control techniques of natural area managers. Manual control (hand-pulling, grass-cutting, girdling, clipping and felling) and chemical control (herbicide application) are often combined. Natural Resource staff undergo state certification for application of restricted use pesticides. The following are definitions of the most common control techniques used by Natural Resource staff:

- **Girdle** - wound cut into the cambium of a tree trunk or shrub encircling its base with a chainsaw or treesaw; herbicide is usually but not always applied to the cut.
- **Cut-stump (Flush Cut)** - tree or shrub trunk severed near the base; herbicide is usually then applied to the stump.
- **Frill-cut** - wound cut with a hatchet or machete into the cambium of a tree trunk or shrub encircling the base, leaving the removed bark attached at the base to act as a trough for herbicide if applied.
- **Basal bark/Thin line** - herbicide is squirted in a ring around the base of a weed trunk or stem.
- **Foliar spray** - herbicide sprayed on the leaves of a plant.
- **Clip and drip** - small stemmed weeds cut with pruners or loppers; herbicide is applied to the cut surface.
- **Weedwhacking** - for grassy species; grass cut low to ground, herbicide is usually applied to new growth.
- **EZJECT** - .22 caliber shells filled with water-soluble systemic herbicide (either Garlon or Round-up) are injected directly into stems or rhizomes; shells pushed into plants using EZJECT injection equipment, hammer, or hand pressure.

Natural Resource staff have relied on other natural area managers' experience or their own set of efficacy control plots to determine products used to kill introduced plant species. Products used by Natural Resource staff include, but may not be limited to:

- **Garlon 3A** - a systemic herbicide diluted with water; applied as either a foliar spray or using a girdle, frill or cut stump method. Active ingredient: 44.4% triclopyr.
- **Garlon 4** - a systemic herbicide diluted in FCO; applied generally as a basal bark treatment. Active ingredient: 61.6% triclopyr
- **Forestry Crop Oil (FCO)** - an oil-based carrier used in thin line treatments with Garlon 4 to improve penetration through bark and other plant tissue.

- **Round-up/Ranger** - a non-specific, systemic herbicide diluted in water; applied generally in low concentrations. Active Ingredient: 41.0% glyphosate.
- **Fusilade** - a grass specific herbicide diluted in water; most frequently applied as a foliar spray. Active ingredient: 24.5% fluazifop-P-butyl.
- **Escort** - a systemic herbicide diluted in water; sprayed on the rhizomes of ginger. Active ingredient: 60% metsulfuron methyl.
- **Biodiesel** - a vegetable-oil based carrier used in thin line treatments with Garlon 4 to improve penetration through bark and other plant tissue.

Herbicides would be used according to the respective label, and handling, application, and disposal methods will comply with guidelines identified in the MIP PEA (appendix) for pesticide application. Pesticide application would be done in accordance with the labeled instructions.

### 3.2.2.9 Aerial Herbicide Application

The herbicide application techniques identified in Section 3.2.2.8 above are widely used management practices for weed control. In addition, herbicide for fuel management is applied at Schofield Barracks West Range (below the firebreak road) using a boom sprayer on a helicopter. This practice may be conducted in other areas where fuel management is a priority for fire prevention. The Army is considering other types of aerial herbicide application to improve the efficacy of natural resource management actions. The following types of aerial application are proposed.

**Aerial Ball Sprayer.** Aerial herbicide spraying is conducted in Hawai‘i in inaccessible areas for controlling discrete populations of invasive species, such as *Miconia*, which has been controlled in areas on Maui using aerial herbicide application since 1994.<sup>4</sup> It was initially envisioned as a holding action to limit seed production of reproductive trees until such time as better access could be provided for ground crews. Helicopter spraying has since developed in this situation to become a primary, cost effective control technique. The helicopter ball sprayer, developed by drug enforcement agents to control marijuana, is attached to a Hughes 500 helicopter by a cable, and is operated by the pilot to deliver controlled doses of the herbicide Garlon 4 mixed with surfactant and dye to specified areas. The dye assists the pilot in judging application rate and identifying treated plants. In the initial trials, about 70 percent of sprayed individuals were killed; others lost leaves and aborted flowers and green fruits, yet recovered and fruited in the next fruiting season (Chimera et al. 2000). Aerial spraying operations would only be conducted when pre-established environmental conditions (such as maximum wind speeds, lack of precipitation, proximity to surface water) could be met to prevent herbicide drift and impacts to non-target individuals. Standard operating procedures for aerial spraying would be developed and implemented prior to aerial operations.

**Aerial Herbicide Ballistic Technology.** Aerial Herbicide Ballistic Technology (HBT) is a relatively new technique to deliver accurate, long range directed herbicide applications to hard to reach weed populations. The basic concept of HBT is to encapsulate aliquots of herbicide into

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<sup>4</sup> Hawaiian Ecosystems at Risk website. <http://www.hear.org/miconiainhawaii/miconiasummarybylll.htm>, Accessed October 21, 2009.

0.68 caliber starch gel projectiles that can be delivered to specific weed targets with a pneumatic applicator from a helicopter. In trials, recreational paintball equipment has been used for application of the projectiles. The first prototype batch of HBT capsules consisted of the herbicide active ingredient imazapyr in a polysaccharide shell and was effective in trials targeting Australian tree fern (*Sphaeropteris cooperi*) and banana poka (*Passiflora mollissima*).

Encapsulated HBT projectiles would eliminate the need for handling and mixing liquid pesticides in the field. Use of the projectiles also reduces the need for water in field operations, which is currently a logistic concern for remote area weed control operations. Improvements in herbicide application result from the ability to treat weed targets with long-range accuracy. Conventional directed applications often require lengthy travel to get within range of each target species. HBT allows for the application of herbicide to multiple targets within a 30 m range from a single point, which increases efficiency and reduces traffic disturbance to a site. Aerial HBT would also be used to target incipient weed populations on steep cliffs and deep ravines, expanding the range of weed targets that would otherwise be untreated. This use of the technology would reduce the need for putting Natural Resource staff at risk during rappelling operations.

OANRP is working in cooperation with a researcher at the University of Hawaii to conduct trials of this technology. Field trials were underway at the time of this publication to determine the herbicide chemistry, rate and application technique for maximum efficacy in eradicating each of these weed target species. Trials will establish treatments for comparing multiple chemistries at different rates and with targeting to various localized areas of the weed. Preliminary studies will also characterize the potential non-target impacts of an HBT application in a controlled environment using model plant indicator systems. Use of aerial HBT as an OIP management action will be evaluated after results from these trials are available. Section 24(c) registration would be required for use of herbicide in HBT capsules.

### **3.2.2.10 Invasive Snail and Slug Control Using Dogs**

*Euglandina rosea*, an invasive snail, is one of the demonstrated predators on extant populations of Hawaiian tree snails, and has been the cause of the local extinction of many populations of *Achatinella*. *Euglandina rosea* was introduced to Hawaii between 1955 and 1956 by the HDOA in an effort to control the African snail (*Achatina fulica*), and has since spread throughout the Ko‘olau and Wai‘anae Ranges.<sup>5</sup>

Between November 2008 and March 2009, Working Dogs for Conservation (WDC) trained three conservation detection dogs to the scent of *Euglandina rosea* under contract to OANRP. WDC is a not-for-profit organization based out of Montana dedicated to developing techniques to use professional dogs and trainers to combat conservation issues worldwide. Training was conducted first in Montana, and subsequent training was on site in the Wai‘anae Range on O‘ahu from February 23 through March 20. This project was a trial to gauge the feasibility of using detection dogs to assist field workers in the detection of *Euglandina rosea*.

Using modified narcotic, forensic, and search and rescue techniques, trainers condition dogs to associate the odor of a target object with a highly-prized reward. In the field, the dog exhibits a

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<sup>5</sup> Hawaiian Ecosystems at Risk website. [http://www.hear.org/species/euglandina\\_rosea/](http://www.hear.org/species/euglandina_rosea/) accessed October 14, 2009.



unique suite of behavior (such as snuffling, tail wagging, change in body position) that indicates to the handler that s/he has detected the target scent and will proceed to pinpoint the precise location of the target. Dogs consistently had to be within 12 inches of the target before they were able to locate the snail. In Montana, the dogs were introduced to scent in controlled scent line up typically used in narcotics training. Training progressed to more complex searches in greenhouses and small area searches outdoors for an average of 70 repetitions for each dog. In Hawaii, training involved simple searches of snails in short grass, proceeding to blind area searches in leaf litter and forest environments for an average of 161 repetitions for each dog. OANRP is continuing to explore the effectiveness of this technique.

The proposed use of this management technique could involve regular searches either hiking or flying the dogs into the MUs. Dogs would be kept with handlers at all times when in the field, and work days would be limited to a maximum number of work hours the dogs would be allowed.

### ***3.2.2.11 Invasive Reptile and Bird Control***

Trapping and hand collection of invasive reptiles (specifically Jackson’s chameleons, *Chamaeleo jacksonii*) that have been determined to predate on native *Achatinella* snails is being considered as a future management activity. In addition, trapping and shooting of invasive birds (e.g., Kalij pheasant [*Lophura leucomelanos*]) may occur in some MUs as needed. These activities would be conducted similar to existing pedestrian surveys, and are not expected to include use of chemical control. Target reptiles would be removed from areas where *Achatinella* snail populations are known.

### ***3.2.2.12 Construction of Ungulate Exclusion Fence and Ungulate Control***

Using fences to create areas targeted for ungulate removal is a well-established practice in managed Hawaiian natural areas (Cory 2000). The fences are designed primarily to prevent further invasion of ungulates such as feral pigs, goats, and cattle. In most cases, the perimeter fences for the MUs would be installed along the MU boundaries. The proposed fence lines depicted in Figures 1a – 2b are approximations only, and subject to a thorough fence line scoping to determine detailed on-the-ground placement that minimizes damage to habitat and rare species, and optimizes protection. Procedures described in Section 5.6.1 to protect cultural resources, and compliance with NHPA Section 106, would eliminate the potential for negative impacts to cultural sites. Fences are expected to last approximately 30 years before replacement may be needed. No additional disturbance would occur from replacement as the new fence would be constructed in the same location as the previous fence.

The standard installation method for fences proposed in the OIP is based on existing fencing methods and is described as follows.

#### **Phase 1: Fence Corridor Construction**

The fence corridor of width approximately 3 m (10 feet) wide will be cleared with hand tools and small power tools. Prior to clearing vegetation along the proposed fence line, standard management measures to protect rare and endangered plants and tree snails would be conducted.

- As part of the proposed action, biologists and botanists would survey the area for rare or endangered plants and tree snails along the proposed route. Only common native vegetation would be cut if necessary for fence line construction. If

necessary, the alignment would be shifted to avoid individual rare plants. Sizeable host trees for endangered tree snails would not be removed.

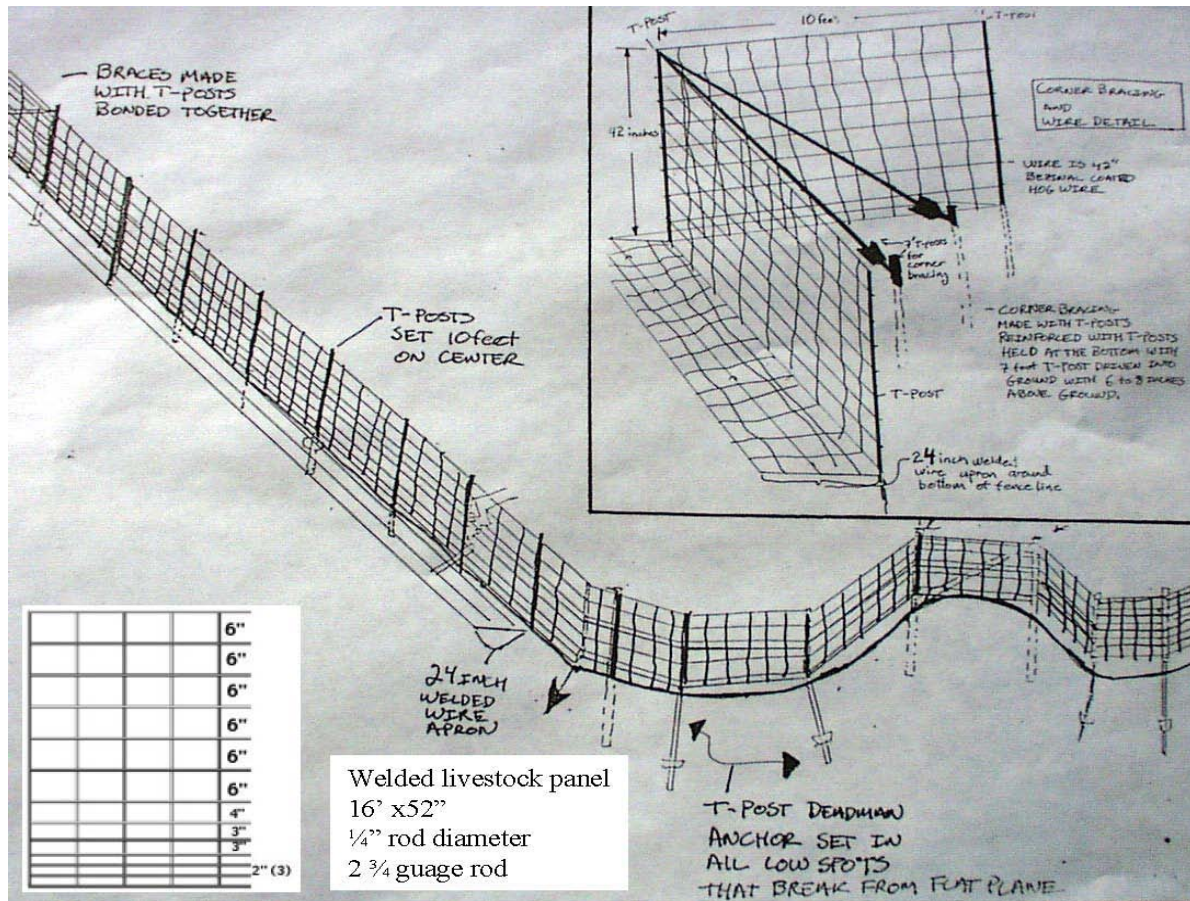
- Trimming or cutting of trees or shrubs would be done only after vegetation has been carefully inspected for snails, and cleared vegetation would be placed upon other native vegetation so that if native snails were present and not detected by personnel, snails would have an opportunity to reach another host without having to cross the ground.

In the event that herbicide is used, handling, application, and disposal methods will comply with labeled instructions for pesticide application, and Federal and State regulations.

### **Phase 2: Fence Installation**

- In most cases, materials will be transported from an off-site staging area to the project site via helicopter to Drop Zones (DZs) along the fence line. In some areas, fencelines would follow existing roads and materials can be transported on the ground. DZs are areas cleared of overhanging vegetation so fencing materials can be lowered to the ground using a long-line connected to the ‘belly’ of a helicopter. To avoid accidental introduction of weeds to the site, sling nets, straps and swivels are washed whenever they appear dirty. Natural Resource staff evaluate each Landing Zone based on the LZ weed list, and have identified LZs with weeds of concern. They are ‘Ōhikilolo (an MIP MU), Pu‘u Palikea (an MIP MU), and Ka‘ala. After use at these sites, sling nets are washed.
- Construction work will be done with hand and small power tools. The proposed fences would be constructed of either livestock panels or hogwire fence. For both methods steel poles would be driven into the ground along the corridor between 6 and 10 feet (2 and 3 m) apart. For construction with panels, the poles would support 52-inch (132 centimeter [cm]) galvanized (anti-corrosive metal alloy) coated livestock panels which would be clipped to the poles with wire clips. Where necessary, anchor posts will be used along the fence. For hogwire fences, the 48-inch (120-cm) high sections of hogwire would be rolled out along the hand-cleared corridor, and attached to the poles with wire clips. For either method, soil disturbance would be minimal.
- Where necessary, hand-tools will be used to scrape a narrow furrow in the ground to bury the base of the panels two to six inches (5 to 15 cm) underground.
- A 36-inch (91.5-cm) horizontal hogwire fence apron will be placed along the ground, attached to the upright fence and secured to the ground with galvanized steel pins or ‘deadmen’ to prevent pigs from digging under the fence.
- Fencing gear, including panels, posts, and fence rolls, is stored in a weed free storage area until needed. Fencing material is not recycled between management areas unless it can first be thoroughly cleaned.

A typical fence section detail is provided in Figure 3. It is expected for each fence that several helicopter trips would be required to complete the transportation of materials to the site. Surveys for endangered species would occur at the DZs prior to transporting material to ensure species are not impacted by downwash generated by the helicopter rotors.



Note: figure not to scale

**Figure 3. Ungulate exclusion fence design details**

In remote project sites, landing zones (LZs) and campsites may need to be established. In general, campsite areas will be selected to exploit natural openings and flat ground. If cutting of vegetation is needed the natural resource staff will limit the amount of cutting to non-native trees, and if possible, to just removing some limbs. The LZs will likely be located on ridge tops, along the fence corridor that has been already cut or in a site that offers a natural opportunity of clear access for the helicopter where very little cutting of vegetation will be needed. The landing “pad” will be established in an area roughly 15 feet by 15 feet, and will be constructed in accordance with the specifications of the Interagency Helicopter Operations Guide (NFES 1885) produced by the Aviation Management Council. Ideally, the LZs will be placed in areas that offer multi-directional landings and takeoffs which offer a larger factor for safety. The LZ may consist of a cleared area on the ground or a raised platform.

Campsites are a necessity for remote backcountry management. In order to conduct multiple management actions in an environmentally and fiscally responsible way, crews have to create campsites. This limits the impact footprint to a small area. Food preparation, pesticide mixing, camping, toilets, etc. would be restricted to this site. Crews practice low-impact camping; i.e., items remaining at the end of the trip (food packaging, supplies) are packed out at the end of the camping trip, no open fires are lit, and rinse water from pesticide mixing is disposed in weedy

areas away from native vegetation, in accordance with the label. Typically crews consist of between two and eight people. Some clearing and leveling may occur to create tent locations at new or infrequently used campsites. Campsites and LZs are monitored for invasive weeds.

### **Phase 3: Feral Ungulate Control and Natural Resource Monitoring and Management (ongoing)**

- Ungulate populations will be monitored to determine population level and removed during the clearing and construction phases.
- If feral ungulates remain within the fenced area upon completion of the fence, Natural Resource staff will employ an appropriate combination of methods to eliminate them, including staff hunting, volunteer hunting in collaboration with community hunters, or traps within the fenced area. Specific control methodology will depend on the number of pigs remaining within the fenced area. The activities of the fence construction crew may drive ungulates from the area and no control may be necessary.
- Following initial control, Natural Resource staff will regularly monitor ungulate activity transects to detect feral ungulate ingress and assess the integrity of the fence.
- Vegetation will be monitored within the enclosures through a series of vegetation monitoring plots. Plots will be read before ungulates are completely removed to obtain a baseline. Plots will be monitored periodically following completion of the fence. Plots will be specifically designed to measure changes in native and non-native vegetation cover before and after fencing to help demonstrate the impacts of feral ungulates and ecosystem level introduced plant removal on native vegetation and guide future management.
- Rare plants have been individually monitored for several years within many of the project areas and will continue to be monitored at least annually once the fence is complete.

Ungulate removal methods are drawn from best available control techniques from natural resource managers at the U.S. Army Directorate of Public Works (DPW) Environmental Division, the National Park Service, USFWS National Refuges, State of Hawai‘i DLNR, and TNC Hawai‘i, and are consistent with Natural Area Reserve System (NARS) ungulate control policies.

#### **3.2.2.13 Other Construction Activities**

Additional construction activities which may occur at the MUs include construction of snail enclosures, cabins, water catchments, weather stations, and radio antennae.

**Snail enclosures.** Several designs for predator exclusion fences have been developed, either by OANRP staff or based on systems developed elsewhere to protect endemic tree snails. The barriers typically consist of rigid rat-proof walls around an area of native snail habitat with various designs to prevent invasive snails from breaching the wall. In one design, a 25-cm shed-like roof extends outward from the top of the fence to cover one or two barriers against the predatory snail *E. rosea*: a 10-cm trough filled with coarse salt (calcium chloride or sodium chloride) and a two-wire electrical barrier. The wires, energized by a battery charged by a solar panel, are attached against the wall, one 8 mm above the other. A snail that contacts both wires would receive an electric shock, which causes it to drop backward off the wall. Other designs

involve: an inverted 15-degree slab of rigid plastic or metal at the top of the wall which prevents the snails from being able to turn at such a severe angle and climb over; a heating coil around the wall heated to approximately 150 degrees F; and strips of copper screening hung upside down from an overhang along the wall placed at a distance small enough that the snails cannot gain enough suction to pass over. The rigid wall of the barrier also serves to deter rats, and this is augmented by placement of diphacinone (rodenticide) bait boxes both inside and outside the barrier. Vegetation is kept cleared from the predator exclusion barrier so that it cannot provide bridges for predators to reach the interior. Modifications to the initial design are often necessary (i.e., a variety of construction materials may be used, including recycled plastic; the salt trough is not useful in remote wet forest areas); however the basic exclusion principles remain the same.

**Cabins.** Small (generally 20 ft by 20 ft) elevated structures may be constructed at the Helemano, Koloa, and Waimano MUs for use by Natural Resource staff on extended overnight work trips. Construction would involve clearing an area slightly larger than the proposed cabin and constructing the roofed wooden platform on posts augered into the ground. Materials would be flown in by helicopter, using the same procedures as for transporting fencing materials. Camping platforms (without walls or roof) or shipping containers may be used instead of cabins.

**Water catchments.** Rainfall catchment structures would be placed on ridges with irrigation hoses to transport water to areas where outplanting of native vegetation would occur. For each surface catchment area and catchment tank, a fiberglass or tin catchment sized depending on site-specific needs would be constructed with a lumber frame and a 500 to 1,500 gallon ultraviolet (UV) resistant plastic tank would be set below the catchment surface and secured to the ground. Natural Resource staff would construct the catchment surface and irrigation system. For remote sites, material would be flown in by helicopter.

**Weather stations.** Weather conditions affect the distribution, survivorship, and reproduction of plants and animals. Data collected from weather stations would be correlated with other types of information to interpret changes in the condition and distribution of target species in the MUs. Weather stations would monitor temperature, relative humidity, solar radiation, rainfall, and windspeed (among other possible variables), with independent data loggers and battery power sources. A less complex system may be used, monitoring temperature, humidity, and solar radiation with internal batteries and data loggers. Weather stations may be constructed at any of the MUs. Weather station sites would be located off trails and placed in areas where native plants would not need to be removed for the installation. In remote areas, materials would be flown in by helicopter. The station footprint would include up to nine "T" posts (approximately two inches in diameter) pounded into the ground with guy wires which would support the tripod holding the instruments. The guy wires would hold the tripod upright and rigid enough for a person to climb. Weather stations would be checked (and, if needed, repaired) on a pre-determined schedule, likely every three to six months.

**Radio antennae.** Small antennae for boosting radio or other transmission signals in terrain consisting of steep ridges and valleys may be constructed to assist Natural Resource staff with communication in remote field locations. The antennae would have small external batteries, and would be approximately ten feet high.

### **3.2.2.14 Fire Control**

The goal of fire control within the MUs is to bring fire threat to zero, or to minimize the threat in those areas where the threat cannot be removed entirely. This can be done by reducing non-native vegetation that carries fires within the MUs and by working with the Army Directorate of Emergency Services, Wildland Fire Program to reduce the fire threat for the MUs that are adjacent to the Schofield Barracks West Range live-fire training area. The Army compiled an Integrated Wildland Fire Management Plan (IWFMP) for the O‘ahu and Pōhakuloa Training Areas in 2003. The IWFMP outlines plans for pre-suppression, fire suppression, and post-fire suppression actions for fires in Army training areas. Pre-suppression actions include education, enforcement, engineering, and ignition control. This includes no large brush piles being left along a cleared fence line in fire-prone areas. The OIP includes cost estimates for preparing fire management plans for high-fire risk MUs.

Some OANRP staff are certified to participate in fire-fighting activities, which allows the program to work in conjunction with Federal and State firefighters when wildfires threaten areas with target taxa. Fire fighting activities typically include water drops from helicopters, clearing vegetation, and ground-based water application.

### **3.2.2.15 Unexploded Ordnance Removal**

Presently, the OANRP uses an Ordnance and Explosives (OE)/Unexploded Ordnance (UXO) specialist to provide OE/UXO avoidance during planning of management activities and entry into areas with known OE/UXO, i.e., at areas of SBMR and MMR. OE/UXO related procedures include, but are not limited to, the identification and marking of subsurface anomalies and the identification and marking of suspected surface OE/UXO. OE includes bombs, missiles, artillery, and other ammunition, demolition charges, pyrotechnics, grenades, containerized and uncontainerized explosives and propellants, military chemical agents and all similar and related items or component, explosive in nature or otherwise designed to cause damage to personnel or material. UXO is an item of explosive ordnance that has failed to function as designed or has been abandoned, discarded, or improperly disposed of and is still capable of functioning and causing damage to personnel or material.

In order to conduct management actions in areas currently inaccessible due to OE/UXO concerns, Explosive Ordnance Disposal (EOD) specialists may be contracted to survey for and remove OE/UXO within the AA. Detonation in place of UXO would be coordinated with cultural resources staff in order to avoid impacts to cultural or archaeological sites. Coordination with the USFWS would also be conducted to ensure that detonations are consistent with requirements of the BOs and conducted in a manner to minimize potential disturbance to threatened and endangered species. Removal and disposal of OE would be accomplished in accordance with EPA requirements.

### **3.2.2.16 Management Actions for Newly Listed Species within AA**

With the recent listing of several native *Drosophila* species the Army has initiated surveys to detect the presence of listed endangered fly species within the Army training areas. So far, the Army has noted *Drosophila aglaia* and *D. substenoptera* from SBMR. The Army is in the process of consultation with the USFWS and the OIT, and will create stabilization plans if required. Management actions for this species are expected to consist of actions to protect the species habitat and host plants, and manage for threats as described above. In the event that

additional types of management actions not already evaluated for other species in this document are determined to be necessary for *Drosophila* management, the need for additional NEPA documentation will be evaluated.

### 3.2.3 Stabilization Prioritization for the OIP

The first tier of stabilization is for species that are threatened by the current level of training on all O‘ahu Army Training Areas (except Mākua). As a result, the 11 species occurring on SBMR and KTA will have stabilization efforts underway starting in year 1 of the OIP. In addition, the O‘ahu Plant Extinction Program (OPEP) species are included in Tier 1. A total of 26 MUs or MU subunits are planned for Tier 1 stabilization efforts. Tier 1 MUs will be the first priority for the OIP. The stabilization of those species would occur in areas with the best habitat available and may be conducted both inside and outside the AA. Tier 1 species include *Abutilon sandwicense*, *Chasiempsis sandwichensis* ssp. *ibidis*, *Cyanea koolauensis*, *C. acuminata*, *C. st-johnii*, *Eugenia koolauensis*, *Gardenia mannii*, *Hesperomannia arborescens*, *Huperzia nutans*, *Labordia cyrtandrae*, *Melicope lydgatei*, *Phyllostegia hirsuta*, *P. mollis*, *Pteris lidgatei*, and *Schiedea trinervis*.

The second tier of stabilization will be activated when training maneuvers occur along hiking trails in the upper boundaries of KLOA or SBER. Tier 2 stabilization will initiate the stabilization of 14 additional species. Seven MUs or MU subunits are planned for Tier 2 stabilization efforts. Tier 2 fences may be constructed prior to the tier being initiated, pending funding, as a proactive management measure. Tier 2 species include *Chamaesyce rockii*, *Cyanea crispa*, *Cyrtandra viridiflora*, *Myrsine juddii*, *Sanicula purpurea*, *Viola oahuensis*, *Achatinella apexfulva*, *A. byronii/decipiens*, *A. curta*, *A. leucorraphe*, *A. lila*, *A. livida*, *A. pulcherrima*, and *A. sowerbyana*.

The third tier of stabilization will be initiated if training maneuvers occur off-trail in the upper reaches of KLOA or SBER action areas. If this type of training were initiated there would be threat of trampling to two additional species. With the initiation of the third tier, all the species covered in the consultation would receive full stabilization actions. The initiation of the third tier would not require the construction of additional MUs as the stabilization of those species is currently planned to occur within existing fenced units or within MUs slated for Tier 1 and Tier 2 stabilization efforts. The two Tier 3 species are *Cyrtandra subumbellata* and *Lobelia gaudichaudii* ssp. *koolauensis*.

## 3.3 Alternatives Considered

### 3.3.1 Basis for Considering only the No Action and Proposed Action Alternatives

This proposed action is based on an extensive framework developed over ten years by both the Mākua and O‘ahu Implementation Teams, with substantial input from participants including the Army, USFWS, the State of Hawai‘i, The Nature Conservancy of Hawai‘i, University of Hawai‘i, U.S. Geological Survey, O‘ahu Plant Extinction Prevention Program, and independent expert botanists and ornithologists. Multiple landowners involved in the proposed management actions were consulted, including the U.S. Army, State of Hawai‘i, the City and County of Honolulu, and private landowners. The decision process leading to the Proposed Action Alternative is, therefore, based on extensive experience with natural resource management actions, in particular threatened and endangered species protection.



The regulations implementing NEPA state that an environmental assessment must include, in addition to the need for action and environmental impacts (40 CFR 1508.9), alternative ways of meeting the need only if the project would involve “unresolved conflicts regarding alternative uses of resources of concern” (section 102(2)(E) of NEPA). Areas where the management actions are proposed are designated for conservation and watershed protection; therefore, there are no unresolved conflicts regarding alternative uses of resources of concern. Other locations for management and management measures were evaluated during the development of the OIP, but were eliminated from consideration prior to the finalization of the OIP for not effectively meeting OIP objectives. No additional effective means of meeting the project objectives are known at this time. Therefore, no additional alternatives except for the “No Action” alternative will be considered in this EA.

### **3.3.2 Alternatives to be Evaluated in this Analysis**

Identification of reasonable locations for management units and viable management methods was conducted during development of the OIP. Therefore, the Proposed Action and No Action Alternatives will be evaluated in this document. The Proposed Action is described in Section 3.2.

#### **3.3.2.1 No Action Alternative**

Under the No Action Alternative, the US Army would not implement the OIP. The opportunity to stabilize OIP target species would be lost, and the opportunity for other management entities to protect populations of non-OIP rare species would be lost. The listed species in the proposed management areas may continue to decline in numbers due to the many threats they face, which could ultimately lead to their extinction. In addition, the Army would fail to comply with the no jeopardy conclusion of the USFWS 2003 BO for the O‘ahu Training Areas, which could alter its plans for training on O‘ahu.

## **4 AFFECTED ENVIRONMENT**

This section describes the existing environment which may be affected by the Proposed Action and No Action Alternative. Since the locations where the Proposed Action would take place includes diverse geographic areas in both the Wai‘anae and Ko‘olau mountain ranges, evaluation of resources in this section will be divided into subsections based on the best description of resources in each project area.

### **4.1 Topography and Soils**

Elevation ranges and topography are described for each MU in Section 3.2.1 and MU locations are shown on Figures 1a – 2b. This section evaluates the soil and topographic characteristics for the geographic regions where the MUs are sited.

#### **4.1.1 Ko‘olau MUs**

Topography in the KTA area is highly variable, from gently sloping plains to almost vertical bluffs and stream drainage basins. The common soil types that occur in the area of KTA where the Kaleleiki, Kaunala, Pahipahi‘ālua, and ‘Ō‘io MUs are located are Kapaa silty clay (KIG) and Paumalu Badland Complex (PZ). Soil erosion can be locally significant in areas where natural drainage and gulches occur. However, dry climate and lack of permanent streambeds, as well as less-developed soil areas of exposed lava, may also reduce the risk of erosion (USSCS 1972 and U.S. Army Hawaii 2001).



The rough, mountainous land of KLOA is deeply transected by streams and waterfalls, and much of the surface is covered by fields of boulders resulting from erosion, while the eastern portion of SBER is rugged and densely forested. In and around KLOA and SBER where the Kawailoa, Koloa, Kaipapa‘u, Kawai Iki I and II, Lower Peahinaī‘a, Helemano, ‘Ōpae‘ula, Poamoho, Lower Poamoho, Kaukonahua-Punalu‘u, North Kaukonahua, and South Kaukonahua MUs are located, soils consist mostly of Rough Mountainous Land (rRT) and Kapaa Silty Clay (KIG) with some areas of Rock Land (rRK). Soil erosion is considered severe in many areas in SBER, while the effects of erosion at KLOA are considered moderate.

Most of the upper elevations of the central and southern Ko‘olaus where the Kahana, Kipapa, Waiawa I, II, and III, Waimano, Mānana, North Hālawa, and Wailupe MUs are located consists of rough mountainous land and rock outcrop.

#### **4.1.2 Wai‘anae MUs**

For the MUs found in the Wai‘anae range near SBMR (Lihue, Ka‘ala, Manuwai, and East Makaleha), Tephrosioides-Dystrandepts (rTP) soils are common in the mountainous areas. Alakai Mucky Peat (rAAE) is found at the Ka‘ala summit, and Rock Land (rRK) is also present at higher elevations. Areas of the Lihue MU consist of Helemano Silty Clay with 30 to 90 percent slopes (HLMG). Soil erosion is locally significant in areas where natural drainage and gulches occur; however, the dry climate and lack of permanent streambeds may reduce the risk of erosion, as well as in areas where soils are not as well developed because of exposed lava.

Soils occurring in the MUs in the southern Wai‘anae Mountains, in and around the Honouliuli Preserve (Kalua‘ā to Wai‘eli I, II, and III, ‘Ēkahanui I, II, and III, and North Puali‘i) include the Tephrosioides-Dystrandepts (rTP) soils and Rock Land (rRK).

## **4.2 Groundwater and Surface Water Resources**

### **4.2.1 Groundwater Resources**

On O‘ahu, there are six groundwater aquifer sectors (Honolulu, Pearl Harbor, Waianae, North, Central, and Windward). Aquifer sectors reflect broad hydrogeological similarities, yet maintain traditional hydrographic, topographic, and historical boundaries. Aquifer systems, subsets of aquifer sectors, are more specifically defined by hydraulic continuity among aquifers in the system (Yuen 1990). MUs overlay aquifer systems in all of the six aquifer sectors, as shown in Table 3.

In Hawai‘i, certain types of characteristics common to all aquifers have been identified, and each aquifer sector and system has been given a unique code which describes it by hydrology, geology, developmental stage, utility, salinity, uniqueness, and vulnerability to contamination. The hydrology of an aquifer is described as either basal (fresh water in contact with seawater) or high level (fresh water not in contact with sea water); and unconfined (water table is the upper surface of the saturated aquifer), confined (an aquifer is bounded by impermeable or poorly permeable formations, top of the saturated aquifer is below the groundwater surface) or uncertain. Geology is divided into six types: flank (horizontally extensive lavas), dike (aquifers in dike compartments), indistinguishable between flank or dike, perched on an impermeable layer, indistinguishable between dike or perched, or sedimentary (in nonvolcanic lithology).

The developmental stage of an aquifer identifies whether it is currently used, has the potential for use, or has no potential use. The utility is defined as either for drinking water, ecological

importance, or neither. Salinity is divided into fresh (less than 250 milligrams per liter chloride [mg/L Cl<sup>-</sup>]), low (250 – 1,000 mg/L Cl<sup>-</sup>), moderate (1,000 to 5,000 mg/L Cl<sup>-</sup>), high (5,000 to 15,000 mg/L Cl<sup>-</sup>) or seawater (greater than 15,000 mg/L Cl<sup>-</sup>). Uniqueness is defined as either irreplaceable or replaceable, and the vulnerability to contamination is ranked between high, moderate, low, or none. All of the aquifer systems which are overlain by the OIP MUs share the characteristics of being fresh water, irreplaceable, and highly vulnerable to contamination. Table 3 identifies the unique characteristics of the aquifer sectors and systems that are related to the OIP MUs.

**Table 3. Aquifer Sectors and Systems Related to OIP MUs**

<b>Aquifer Sector</b>	<b>Aquifer System</b>	<b>Overlying MU</b>	<b>Aquifer Characteristics *</b>
Honolulu (01)	Waiialae (05)	Wailupe	High level, unconfined, dike, potential utility for drinking water
Pearl Harbor (02)	Waimalu (01)	Waiawa I and II, Waimano, Mānana, North Hālawā	High level, unconfined, dike, potential utility for drinking water
	Waiawa (02)	Kipapa, South Kaukonahua	High level, unconfined, dike, potential utility for drinking water
Waianae (03)	Makaha (04)	Kamaili, Ka‘ala (portion)	High level, uncertain, dike, currently used for drinking water
North (04)	Mokuleia (01)	East Makaleha, Manuwai I and II, Ka‘ala (portion), Lihue (portion)	High level, unconfined, dike, potential utility for drinking water
	Kawailoa (03)	Kaleleiki, Kaunala, Pahipahi‘ālua	Basal, unconfined, flank, currently used for drinking water
Central (05)	Wahiawa (01)	Lihue (portion), Kalua‘ā and Wai‘eli I, II, III,	High level, unconfined, dike, currently used for drinking water
	Koolau (02)	Kawailoa, Kawai Iki II, Helemano, ‘Ōpae‘ula, Lower Peahina‘a II, Lower ‘Ōpae‘ula, Lower Poamoho, Poamoho, Poamoho Pond, North Kaukonahua	High level, unconfined, dike, currently used for drinking water
Windward (06)	Koolauloa (01)	‘Ō‘io, Pahipahi‘ālua, Kaunala, Koloa, Kaipapa‘u	High level, unconfined, dike, potential use for drinking water
	Kahana (02)	Kahana	High level, unconfined, dike, currently used for drinking water

\* All aquifers overlain by OIP MUs share the characteristics of being fresh, irreplaceable, and highly vulnerable to contamination.

#### **4.2.2 Surface Water Resources**

There are many ephemeral drainages and intermittent streams which flow from upper elevations through the MUs in the Wai‘anae and Ko‘olau mountains. These streams generally flow during and for a short period after precipitation events. Streams and drainageways that originate at higher elevations typically commingle at lower elevations with other streams or drainageways in the same watershed into a single or few outlets into the Pacific Ocean. Watersheds in which the OIP MUs are located and the ultimate point of surface water discharge to the Pacific Ocean are identified in Table 4. Figures 4-6 show watershed boundaries and surface waters below the MUs.

**Table 4. OIP MU Surface Waters and Watersheds**

<b>Watershed Name</b>	<b>MUs in Watershed</b>	<b>Streams/Drainageways</b>	<b>Receiving Water location</b>
Helemano	Poamoho	Tributaries of Helemano Stream, Paukauila Stream	Kaiaka Bay, Waialua
	Helemano		
	Lower ‘Ōpae‘ula (port.)		
Opaepala	Lower ‘Ōpae‘ula (port.)	‘Ōpae‘ula Stream, Paukauila Stream	Kaiaka Bay, Waialua
	Lower Peahinaī‘a		
Kawainui	Kawai Iki I, II	Kawainui Stream, Anahulu River	Waialua Bay, Hale‘iwa
	Kawailoa		
Kaipapau	Kaipapa‘u	Kaipapa‘u Stream	Pacific Ocean, Hau‘ula
Koloa	Koloa	Kōloa Gulch	Pacific Ocean, Lā‘ie
Paumalu	Kaleleiki	Kaleleiki Stream, Paumalū Gulch	Pacific Ocean, Sunset Beach
	Kaunala	Kaunala Gulch	Pacific Ocean, Sunset Beach
	Pahipahi‘ālua	Pahipahi‘ālua Gulch	Pacific Ocean, Waiale‘e Beach
Oio	‘Ō‘io	‘Ō‘io Stream, ‘Ō‘io Gulch	Pacific Ocean, near Kahuku Point
Honouliuli	North Puali‘i	Honouliuli Stream	Pearl Harbor West Loch
Waikele	‘Ēkahanui	‘Ēkahanui Gulch, Huliwai Gulch, Poliwai Gulch, Kipapa Stream, Waikele Stream	Pearl Harbor West Loch
	Kalua‘ā to Wai‘eli		
	Kipapa		
Wailupe	Wailupe	Wailupe Gulch	Pacific Ocean, Aina Haina
Halawa	North Hālawa	North Hālawa Stream	Pearl Harbor East Loch
Waiawa	Waiawa I, II	Waimano Stream, Mānana Stream, Waiawa Stream	Pearl Harbor Middle Loch
	Mānana		
	Waimano		
Kahana	Kahana	Kawa Stream	Kahana Bay
Kaukonahua	North Kaukonahua	Mohiakea Gulch, Haleauau Gulch, N. Fork Kaukonahua Stream, S. Fork Kaukonahua Stream, Wahiawa Reservoir, Kaukonahua Stream, Ki‘iki‘i Stream	Kaiaka Bay, Waialua
	South Kaukonahua		
	Kaukonahua-Punalu‘u		
	Lihue		
	Manuwai I, II		
	Ka‘ala (portion)		
Poamoho	Poamoho Pond	Poamoho Stream, Ki‘iki‘i Stream	Kaiaka Bay, Waialua
	Lower Poamoho		
Makaleha	East Makaleha	Makaleha Stream	Pacific Ocean, Mokulē‘ia
Kapuni	Ka‘ala (portion)	Hiu Stream, Honua Stream, Kaupuni Stream	Pōka‘i Bay, Waianae
Makaha	Ka‘ala (portion)	Mākaha Stream	Pacific Ocean, Mākaha
	Kamaili		

The State of Hawaii DOH Clean Water Branch is responsible for assigning surface water quality standards based on the CWA requirements set by the USEPA. Water quality standards are promulgated at Hawai‘i Administrative Rules (HAR) 11-54. Surface waters, generally ephemeral streams, in the uppermost portions of the Wai‘anae and Ko‘olau mountains are classified as Class 1 (Inland Freshwater) water (HAR 11-54-3). The objective of Class 1 waters is that the waters remain in their natural state as nearly as possible with an absolute minimum of pollution from human-caused source. Waste discharge into these waters is prohibited, and conduct which results in a demonstrable increase in levels of point or nonpoint source contamination is

prohibited. Construction activities which disturb one acre or greater of soil would need to obtain NPDES permit coverage.



**Figure 4. Watersheds of the Northern Ko'olau Mountain MUs**



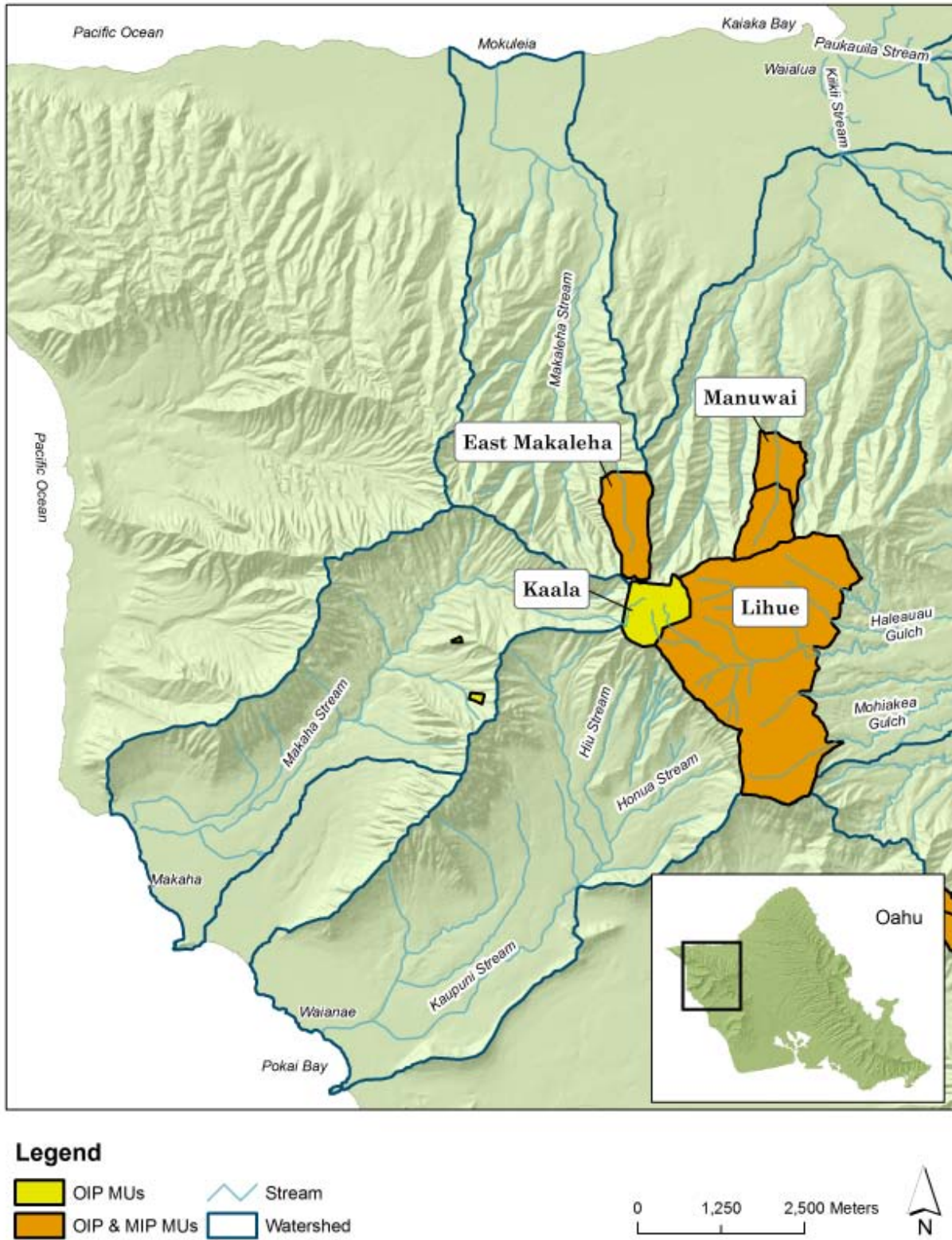
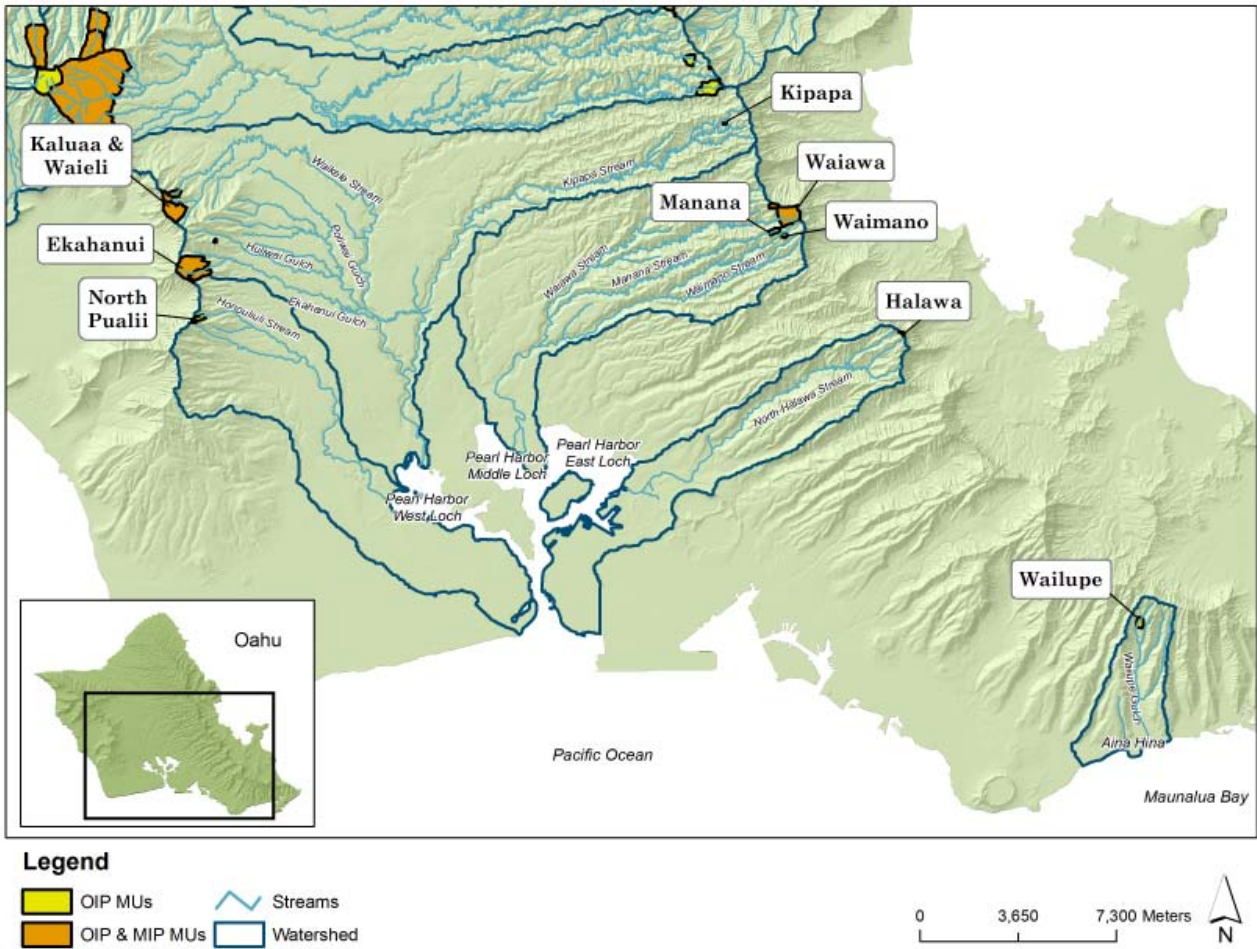


Figure 5. Watersheds of the Northern Wai'anae Mountain MUs



**Figure 6. Watersheds of the Southern Ko‘olau and Wai‘anae Mountain MUs**

### 4.3 Climate/Air Quality

The State of Hawai‘i DOH Clean Air Branch monitors the ambient air in the state of Hawai‘i for gaseous and particulate air pollutants. The USEPA has set national ambient air quality standards (NAAQS) for six criteria pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, ozone, and particulate matter (40 CFR Part 50), and Hawai‘i has established state standards for the criteria pollutants plus hydrogen sulfide (HAR 11-59) which are as stringent or more stringent than the NAAQS. The island of O‘ahu is an attainment area for the NAAQS and state standards. The nearest air monitoring stations on O‘ahu are in industrial areas on the south and southwest coast of the island. The proposed managed areas are natural forest, and there are no man-made structures or emission sources.

## 4.4 Noise Environment

The State of Hawaii DOH Indoor Radiological Health Branch has promulgated Community Noise Control rules (HAR 11-46) which define maximum permissible sound levels for various zoning districts. The MUs are located in Class A zoning areas, which includes lands zoned residential, conservation, preservation, public space, open space, or similar. Maximum permissible sound levels in dBA (decibels on the A-weighted scale) for Class A zoning districts are 55 dBA daytime (0700 to 2200) and 45 dBA nighttime (2200 to 0700), measured at the property line. According to HAR 11-46-4(c), noise levels shall not exceed the maximum permissible sound levels for more than ten percent of the time within a twenty minute period, except by permit or variance.

Generally, little ambient noise is produced from within the MUs, as they are far removed from residential or agricultural areas, and there are no man-made structures or sensitive noise receptors (such as schools, hospitals, or churches). MUs adjacent to training areas may receive occasional noise from vehicles, aircraft, artillery, and human activity. Federal Aviation Administration equipment at the summit of Mt. Ka‘ala which produces noise from generators and electrical equipment may contribute some ambient noise in the Ka‘ala MU.

## 4.5 Biological Resources

Biological resources (endangered plants, birds, and snails) for which the OIP was developed to manage to stability are described in extensive detail in the OIP. The descriptions of these resources in this document are derived from the OIP.

### 4.5.1 Flora

A variety of native species and habitats exist in both the Wai‘anae and Ko‘olau mountains. The Wai‘anae mountains contain a significant portion of the number of rare plant taxa in the Hawaiian Islands. The OIP target plants are federally endangered species endemic to the Hawaiian Islands (see Table 5), and the majority of the target species are endemic to O‘ahu alone. Several species have current distributions restricted to within the action area. Many species are endemic to their respective mountain range and are also some of the State’s rarest species. Most of the rare species involved in the consultation for SMBR in the Wai‘anaes are associated with native-dominated vegetation in mesic habitats to wet boggy forest at the summit of Ka‘ala.

The Ko‘olau Mountain region within and adjacent to the AA consists of mesic and wet mesic native Hawaiian forests with large portions of the habitat relatively intact. The lower elevations within KTA, KLOA, and SBER are composed of mixed introduced and native mesic vegetation. The upper elevations and summit areas of these training areas are dominated by native mesic and wet mesic forests. These areas represent some of the most intact native forest areas on O‘ahu.

**Table 5. Target Plant Species of the O‘ahu Implementation Plan**

Scientific name	Hawaiian name	Action Area	Current Range*
<i>Abutilon sandwicense</i>	-	SBMR, MMR	W
<i>Alectryon macrococcus</i> var. <i>macrococcus</i> <sup>1</sup>	<i>Māhoe, ‘Ala‘alahua</i>	SBMR, MMR	W
<i>Chamaesyce rockii</i>	<i>‘Akoko</i>	KLOA, SBER	K
<i>Cyanea acuminata</i>	<i>Hāhā</i>	SBMR, KLOA, SBER	K, W
<i>Cyanea crispa</i>	<i>Hāhā</i>	KLOA	K
<i>Cyanea grimesiana</i> ssp. <i>obatae</i> <sup>1</sup>	<i>Hāhā</i>	SBMR, MMR	W
<i>Cyanea koolauensis</i>	<i>Hāhā</i>	KTA, KLOA, SBER	K
<i>Cyanea st.-johnii</i>	<i>Hāhā</i>	KLOA	K
<i>Cyrtandra dentata</i> <sup>1</sup>	<i>Ha‘iwale</i>	MMR, KLOA	K, W
<i>Cyrtandra subumbellata</i>	<i>Haiwale</i>	SBER	K
<i>Cyrtandra viridiflora</i>	<i>Ha‘iwale</i>	KLOA, SBER	K
<i>Delissea subcordata</i> <sup>1</sup>	-	SBMR, MMR	W
<i>Eugenia koolauensis</i>	<i>N‘oi</i>	KTA	K, W
<i>Flueggea neowawraea</i> <sup>1</sup>	<i>Mēhamehame</i>	SBMR, MMR	W
<i>Gardenia mannii</i>	<i>Na‘u, Nānū</i>	SBMR, KTA	K, W
<i>Hesperomannia arborescens</i>	-	SBMR, KLOA, SBER, KTA	K, W
<i>Hesperomannia arbuscula</i> <sup>1</sup>	-	SBMR, MMR	W
<i>Huperzia nutans</i>	-	KLOA, SBER	K
<i>Labordia cyrtandrae</i>	<i>Kāmakahala</i>	SBMR	K, W
<i>Lobelia gaudichaudii</i> ssp. <i>koolauensis</i>	-	KLOA, SBER	K
<i>Melicope lydgatei</i>	<i>Alani</i>	KLOA	K
<i>Myrsine juddii</i>	<i>Kōlea</i>	KLOA, SBER	K
<i>Phyllostegia hirsuta</i>	-	SBMR, KLOA, SBER	K, W
<i>Phyllostegia kaalaensis</i> <sup>1</sup>	-	SBMR, MMR	W
<i>Phyllostegia mollis</i>	-	SBMR	W
<i>Plantago princeps</i> <sup>1</sup>	<i>Ale</i>	SBMR, MMR	K, W
<i>Pteris lidgatei</i>	-	KLOA, SBER	K, WMA
<i>Sanicula purpurea</i>	-	KLOA, SBER	K, WMA
<i>Schiedea kaalae</i> <sup>1</sup>	-	SBMR, MMR	K, W
<i>Schiedea trinervis</i>	-	SBMR	W
<i>Stenogyne kanehoana</i>	-	SBMR	W
<i>Tetramolopium filiforme</i> <sup>1</sup>	<i>Pāmakani</i>	SBMR, MMR	W
<i>Viola chamissoniana</i> ssp. <i>chamissoniana</i> <sup>1</sup>	<i>Pāmakani</i>	SBMR, MMR	W
<i>Viola oahuensis</i>	-	KLOA, SBER	K

\*Current Range abbreviations: W = Waianae, K=Koolau, WMA = West Maui

<sup>1</sup> Stabilization Plans for these taxa are found in the MIP

#### 4.5.2 Fauna

Target faunal species of the OIP are listed in Table 6 below. Animal life in the upper elevations of the Ko‘olau and Wai‘anae mountains generally consists of a majority of non-native and a few native bird species, and large and small mammals such as feral pigs, feral goats, mongooses, and rats. Native bird species such as the ‘amakihi (*Hemignathus flavus*) ‘i‘iwi (*Vestiaria coccinea*) and ‘apapane (*Himatione sanguinea*), members of the honeycreeper family, have been observed at high elevations in the Wai‘anae mountains, and may be present in the MUs.



**Table 6. Target Animal Species of the O‘ahu Implementation Plan**

Scientific name	Hawaiian name	Action Area	Current Range*
<i>Chasiempis sandwichensis</i> ssp. <i>ibidis</i>	O‘ahu ‘elepaio	SBMR	K, W
<i>Achatinella apexfulva</i> <sup>2</sup>	Pupu kaneoe, Pupu kuahiwi, Kahuli	KLOA	K
<i>Achatinella bulimoides</i> <sup>2</sup>	Pupu kaneoe, Pupu kuahiwi, Kahuli	KLOA	K
<i>Achatinella byronii/decipiens</i>	Pupu kaneoe, Pupu kuahiwi, Kahuli	KLOA, SBER	K
<i>Achatinella curta</i> <sup>2</sup>	Pupu kaneoe, Pupu kuahiwi, Kahuli	KLOA	K
<i>Achatinella leucorraphe</i> <sup>2</sup>	Pupu kaneoe, Pupu kuahiwi, Kahuli	KLOA, SBER	K
<i>Achatinella lila</i>	Pupu kaneoe, Pupu kuahiwi, Kahuli	KLOA	K
<i>Achatinella livida</i>	Pupu kaneoe, Pupu kuahiwi, Kahuli	KLOA	K
<i>Achatinella mustelina</i> <sup>1</sup>	Pupu kaneoe, Pupu kuahiwi, Kahuli	SBMR, MMR	W
<i>Achatinella pulcherrima</i> <sup>2</sup>	Pupu kaneoe, Pupu kuahiwi, Kahuli	KLOA	K
<i>Achatinella sowerbyana</i>	Pupu kaneoe, Pupu kuahiwi, Kahuli	KLOA	K
<i>Drosophila aglaia</i>	-	SBMR	
<i>Drosophila substenoptera</i>	-	SBMR	K, W

\*Current Range abbreviations: W = Waianae, K=Koolau

<sup>1</sup> Stabilization Plans for these taxa are found in the MIP

<sup>2</sup> These species are not currently known from extant populations. Extensive surveys are planned for these species.

The O‘ahu ‘elepaio (*Chasiempis sandwichensis* ssp. *ibidis*) is a native forest bird endemic to O‘ahu which has been in decline for decades due to low adult survival and low reproductive success resulting mainly from nest predation by rats and introduced diseases such as avian pox virus. In 2000, USFWS granted the O‘ahu ‘elepaio endangered species status under the federal Endangered Species Act and designated critical habitat on O‘ahu for the ‘elepaio in 2001.

The *Achatinella* genus of snail is endemic to O‘ahu. A total of 41 species have been identified in this genus. *Achatinella* snails are arboreal and generally nocturnal, preferring cool and humid conditions. The snails graze on fungi growing on the surfaces of leaves and trunks, and are generally found at higher elevations in the Ko‘olau and Wai‘anae mountain ranges. Invasive snails (such as *Euglandina rosea*), slugs, and reptiles such as Jackson’s chameleons which have been introduced to the O‘ahu forests pose a threat to the *Achatinella* snails.

*Drosophila aglaia* and *D. substenoptera* are endemic to O‘ahu. *D. aglaia* are typically found in dry to mesic, lowland, ohia, koa, and *Diospyros* sp., forest between the elevations of 1,865-2,985 feet (ft) (568-910 meters (m)). *Drosophila substenoptera* are typically found in mesic to wet, lowland to montane, ohia and koa forest between the elevations of 1,920-4,030 ft (585-1,228 m).

#### 4.6 Cultural, Historic and Archaeological Resources

Known or recorded archaeological sites and/or cultural resources are present at areas on O‘ahu designated for the military. Sites, including prehistoric and contact period sites as well as historic era features, have primarily been identified at lower-elevation flat lands and stream gulches. Historic settlement (as early as AD 100 to 800) typically started along the coastline, with the

population relying on the wealth of marine resources for subsistence. Travel into the valleys would occur for short duration trips to gather upland resources. As populations and subsistence demands (and methods) increased, settlements expanded inland to take advantage of upland resources and more reliable water sources. Archaeological resources known from various training areas are diverse and may include heiau (religious structures), ko‘a (small shrines), fishponds, stone markers, fishing shrines, habitation sites, caves and rock shelters, mounds, burial platforms, earth ovens, stone walls and enclosures, agricultural terraces, canals or ditches, rock art sites, and trails (Tomonari-Tuggle 2002, as cited in Tetra Tech 2004). Historic period archaeological sites may include gun emplacements, concrete structures and bunkers, concrete walls, wooden structural remains, masonry platforms, concrete revetments, bermed depressions, berms and rock piles, tunnels, miscellaneous feature complexes, road beds, railroad remnants, and trash deposits.

Consultation with the SHPD under Section 106 of the NHPA has been initiated for activities which may involve surface or sub-surface disturbance under this project by the USAG-HI Environmental Division, and will continue as the construction activities are phased in. Currently, Section 106 consultation has been completed for the Waimano and Manuwai fences; Cultural Resource Specialists from the Environmental Division, DPW, USAG-HI have also initiated consultation for the Lihue and Ka‘ala fences and various outplanting areas. See Appendix A for correspondence with SHPD and concurrence letter for completed consultations. No cultural resources were observed at either the Waimano or Manuwai fence locations. Pedestrian and/or aerial surveys of locations where surface disturbance may occur (i.e., fencelines, outplanting locations) are being conducted as appropriate prior to commencement of construction, and site-specific information on cultural, historic, or archaeological resources that may be identified during those surveys will be provided to the SHPD as part of the Section 106 consultation process.

#### **4.7 Land Use/Recreational Resources**

Management for native plant and animal species is underway in much of the Wai‘anae and Ko‘olau mountains. Portions of the Wai‘anae mountains, including some of the MU areas, are designated as reserves of the State NARS, where the land is managed primarily to protect and preserve native ecosystems and species. The reserves have active programs of ungulate and weed management, native vegetation restoration, native species reintroduction, and other protective management.

State Forest Reserves occur in both the Wai‘anae and Ko‘olau mountains and provide protective conservation zoning and programs for public hunting. Additionally, the State has proposed to turn the Poamoho portion of the Ewa Forest Reserve into a NAR. Board of Water Supply lands in the Wai‘anae mountains are designated as protected watershed with limited public access. A portion of the former land holdings of the James Campbell Co. in the southern Wai‘anae mountains, currently in the process of being turned over to State ownership via TPL, has been managed by TNC Hawai‘i as the Honouliuli Preserve, and is dedicated to native species and ecosystem protection. The Honouliuli Preserve parcel was purchased by the TPL from the James Campbell Co. TPL intends to transfer ownership of the preserve to the State of Hawai‘i, Department of Land and Natural Resources, in early 2010. A large portion of the purchase price was put forward by the Army Compatible Use Buffer Program. Additional funding came from the State of Hawaii, City and County of Honolulu and the U.S. Fish and Wildlife Service. TNC

Hawai‘i still has a conservation easement for management of Honouliuli which will end upon transfer to the State. TNC Hawai‘i ended their field program at Honouliuli in May 2009. Currently, the Army communicates with TNC Hawai‘i Honolulu Office for work conducted in the preserve.

OANRP is operating under a signed 3-year license agreement with KS for work in the MUs on KS lands. KS staff are preparing a 15-year license agreement to include Army fencing projects on KS lands. This agreement is expected in the first half of 2010 and will pave the way for some OIP MU construction projects. OANRP also develops Right of Entry agreements with other private landowners to conduct management activities on private land where MUs are located.

Active programs for rare plant and snail protection (including fencing, ungulate control, weed control, and predator control) are underway, as well as some native vegetation restoration projects. The Army’s environmental program is engaged in a variety of active management programs in SBMR and other selected areas of the Wai‘anae mountains. In the Ko‘olau mountains, the Ko‘olau Mountains Watershed Partnership (KMWP) has facilitated conservation projects across the range and continues to secure funding for long-term conservation efforts. A Wai‘anae Mountains Watershed Partnership, in which the Army will partner, is currently being organized. OPEP also works in partnership with the Army, the KMWP, the State, and USFWS in the conservation of some of the island’s most endangered plant species. The O‘ahu Invasive Species Committee (OISC) actively manages O‘ahu’s most incipient invasive species, some of which occur in the AA. The Army has also worked with the State to purchase land within Moanalua Valley that contains ‘elepaio habitat, using Army Compatible Use Buffer funds.

Na Ala Hele, the State of Hawai‘i Trail and Access Program, is administered by DLNR’s Division of Forestry and Wildlife. The program’s primary management objective is to construct, restore, and maintain trails and access roads, some of which are present in the vicinity of the MUs. Hiking and hunting are the primary recreational uses within the project areas. Na Ala Hele trails<sup>6</sup> which traverse through or adjacent to MUs include:

- Poamoho Access Road Trail (through Lower Poamoho and Poamoho MUs) – Because of a lease agreement with the Army for use of the Ewa Forest Reserve for military training, recreational access is only allowed during weekends and State and Federal holidays. Access is granted through Department of Forestry and Wildlife permit, and a maximum of twenty permits are issued for each weekend day or holiday.
- Schofield-Waikane Trail (adjacent to the southern edge of the North Kaukonahua MU) – this trail is accessible by Division of Forestry and Wildlife hiking permit only, and permits are granted for weekend and Federal holidays only. Access to the trail through SBER requires written permission from the USAG-HI DPW.
- Manana Trail (adjacent to the southern edge of the Manana and Waiawa MUs). This trail is open and no permit is required. Part of the trail traverses a Public Hunting Area.

Some areas where management actions are proposed in the OIP are within Public Hunting Areas. Game allowed to be taken in the Public Hunting Areas includes wild pigs and wild goats, and

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<sup>6</sup> Information about Na Ala Hele trails is available at the Na Ala Hele website: <https://hawaiitrails.ehawaii.gov/island.php?island=Oahu> . Accessed November 6, 2009.

birds including ring-neck pheasant, green pheasant, California valley quail, Japanese quail, Gambel's quail, Erckel's francolin, gray francolin, black francolin, chukar partridge, barred dove (small dove), and spotted dove (large dove). Permitted hunting methods include rifles, shotguns, handguns, knives, spears, and bows and arrows. Dogs are permitted but must be kept under physical restraint and control except when actually hunting. Hunting is allowed in a portion of the Mokulei'a Forest Reserve and in the Ka'ala NAR when an entry permit is granted by the O'ahu NARS manager. Hunters must be accompanied in the FR and NAR by a staff member of the Division of Forestry and Wildlife.

The majority of the MUs are located on land classified as Conservation by the State Land Use Classification. Conservation District subzones include P (Protective), L (Limited), R (Resource), G (General), or S (Special), with the Protective subzone representing the most environmentally sensitive areas (omitting the Special subzone). The Special subzone is applied in special cases specifically to allow a unique land use on a specific site. The objective of each subzone is identified in HAR 13-5 Subchapter 2, and allowable uses vary by subzone. Identification of the subzone in which each MU is located is provided in the MU descriptions in Section 3.2.1. Army management activities in the NARS are covered under a Special Use Permit which is issued by the State of Hawai'i DLNR for a one-year period and must be renewed annually. Army management activities on State land in the Conservation District are consistent with the DLNR management policies, and Conservation District Use Permits are not required (pers. comm. OANRP and Mr. Dave Smith, DLNR, December 14, 2009). A Memorandum of Agreement between the Army and the State DLNR for Army natural resources management on State land is under development.

#### **4.8 Socioeconomic Environment**

The proposed MUs are located in undeveloped natural areas owned by the State, Federal government, City and County of Honolulu, and private landowners. Generally, commercial activities or activities which contribute to the local economy do not occur within the proposed MUs. Population centers near the proposed MUs include the towns of Wai'alua, Hale'iwa, Wahiawa, Schofield Barracks, Wai'anae, Kahuku, and Mililani.

#### **4.9 Visual and Aesthetic Resources**

Visual resources are usually defined as the visual quality or character of an area, consisting of both the landscape features and the social environment from which they are viewed. Visual characteristics of the project areas and surrounding regions include undeveloped forested land, mountain ridges, military training areas and views of the Pacific Ocean. Views from within the project areas can include local unique landforms, sweeping views of mountain ridges, and panoramic coastal views. Scenic vistas and viewplanes of the areas from public settings include views of the undeveloped mountains.

The project locations include unique settings and areas of high scenic quality. Examples of the visual resources, both in the proposed MUs and viewplanes from the MUs, are provided in Appendix B.

#### **4.10 Environmental Justice and Protection of Children.**

See section 5.10.

## 5 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION AND NO ACTION ALTERNATIVE

This section describes the potential environmental consequences associated with the proposed action and the no action alternative. The proposed action is described in Section 3. This section has been organized by resource area to provide a comparative framework for evaluating the impacts of the proposed action and the no action alternative on individual resources. Table 7 summarizes the impacts of the proposed action on the relevant resource areas of the affected environment.

**Table 7. Summary of Environmental Impacts of Proposed Action**

Environmental Impacts		Management Actions											
		Surveying/Monitoring	Specimen Collection/Reintro/Augment	Phytosanitation	Aerial Rodenticide Application	Manual Toxicant Application	Weed Control	Aerial Herbicide Application	Snail/Slug Control with Dogs	Invasive Reptile Control	Construction	Fire Control	UXO Removal
~	no impact												
o	potential negative insignificant impact												
+	potential positive impact												
⊕	both potential negative insignificant and positive impacts												
X	subject to supplemental evaluation to determine impacts and significance												
Environmental Resources	Topography and Soils	~	~	~	X	X	⊕	o	~	~	⊕	o	o
	Groundwater/Surface water	~	~	~	X	X	o	o	~	~	⊕	⊕	o
	Air Quality	o	~	~	o	~	~	o	~	~	o	+	~
	Noise Environment	o	~	~	o	~	~	o	~	~	o	~	o
	Biological Resources	+	+	~	X	X	+	⊕	+	+	⊕	⊕	⊕
	Cultural/Historical/Archaeological Resources	~	~	~	~	~	~	~	~	~	+	~	~
	Land Use/Recreation	~	~	~	~	~	~	~	~	~	o	~	~
	Socioeconomic Environment	~	~	~	~	~	~	~	~	~	~	~	~
	Visual/Aesthetic Resources	~	~	~	~	~	~	~	~	~	o	~	~
	Environmental Justice	~	~	~	~	~	~	~	~	~	~	~	~

### 5.1 Topography and Soils

The Proposed Action and No Action Alternative were evaluated to determine the significance of change to the topography and soil resources. Generally, such impacts can be avoided or minimized if proper construction techniques and erosion control measures are incorporated into the project development.

Factors considered in determining whether the proposed action would have a significant impact on topography and soils include the extent to which its implementation would do the following:

1) cause a substantial loss of soil, such as through increased erosion; 2) increase the likelihood of slope failure; or 3) alter the function of the landscape, such as altering drainage patterns.

### 5.1.1 Proposed Action

No significant impacts to topography or soils would occur from the Proposed Action. Management activities that could result in some surface disturbance include some weed control activities; clearing associated with fence construction; construction of cabins, campsites, water catchments, and weather stations; and UXO removal.

**Weed Control.** Areas where active restoration or firebreak projects may be conducted have the greatest potential for exposing soil or contributing to erosion. Management measures to minimize impacts to soils or topography that are incorporated into project planning include restricting the total area that may be cleared at one time and leaving stumps and roots in the soil for stability.

Significant impacts to soil from herbicide application are not anticipated. Herbicides used by Natural Resource staff vary in their persistence in soils, with average half lives varying from one week to several months (Tu *et al.* 2001). Warm, moist conditions such as those found in Hawaii forest environments generally promote more rapid degradation of herbicide. Photodegradation and microbial action are the primary means for breakdown of these compounds. Herbicides are applied by Natural Resource staff directly to target plants, and contact with soil is minimal. Herbicides are not applied in rainy conditions to avoid the potential for washing off the target plants onto the soil. Standard practices described in Section 3.2.2.8 minimize the potential for herbicide migration off of targeted individuals and into contact with soil.

**Fence Construction.** Cutting a fence corridor is necessary to permit efficient installation of the fence and remove hazards to work crews. In this process, some soil disturbance and removal/destruction of native vegetation is unavoidable. Soil disturbance could include an approximately six-inch (15-cm) wide, six-inch deep furrow along the route of each fenceline in addition to an approximately 10-foot (3-m) wide swath of hand-cleared vegetation along the fenceline exposing soil. Construction would consist of 24 fences, which would range from lengths of less than 1,000 linear feet to approximately 12,000 linear feet. Fence construction includes helicopter LZs and DZs, which could include placement of wood beams on the cleared ground to provide stable landing areas. These narrow swaths of disturbance would be widely distributed over geography and time, and local impacts of constructing each fence would be minimal. Soil disturbance is expected to be short term with no significant impacts expected and no changes in the normal run-off or percolation are expected. Skirting of the fences would prevent run-off along the edges.

**Cabin, Campsite, Water Catchment, and Weather Station Construction.** These construction activities would have similar impacts on soils and topography. An area of vegetation would be cleared to place the footings for the structures. In the case of the largest structures (cabins), the footprint would be no larger than 250 square feet. Some minor grading by hand to level the construction area may occur. These discrete areas of impact would be widely distributed over geography and time. Soil disturbance is expected to be short term with no significant impacts expected and no changes in the normal run-off or percolation are expected.

**Unexploded Ordnance Removal.** Localized impacts would occur to soils from detonation in place of unexploded ordnance. The area which would be affected would depend on the size of

the round being detonated. Removal of unexploded ordnance would be conducted according to relevant regulations and guidance, and would be conducted by EOD specialists.

### 5.1.2 No Action Alternative

No significant impacts to topography or soils would occur from the No Action Alternative. Under this alternative the feral ungulate exclusion fences would not be constructed as proposed in the OIP and the feral ungulate populations would continue to cause destruction to both the native and non-native vegetation in the areas proposed for management under the Proposed Action, resulting in exposed areas of soil susceptible to erosion and increased surface runoff.

## 5.2 Groundwater and Surface Water Resources

The evaluation of potential impacts on water resources is based on the project's potential to contribute to lower water quality. The proposed action and no action alternatives were considered to have a significant impact on the resource if they were to result in the following: 1) cause a substantial increase in sedimentation; or 2) degrade water quality in a manner that would reduce the existing or potential beneficial uses of the water.

### 5.2.1 Proposed Action

No significant impacts to groundwater or surface water resources are expected from the Proposed Action. Management activities which may have or contribute to impacts to groundwater or surface water resources include aerial rodenticide application, manual rodenticide application, weed control, aerial herbicide application, and fence construction.

This programmatic EA includes the aerial application of rodenticide in the Proposed Action because the Army may include this action as part of OIP management activities; however, as this management strategy is still in early stages of study for its applicability, it is anticipated that further environmental review will need to be conducted. Application of aerial rodenticide within the MUs included in this EA will be evaluated under supplemental NEPA documentation when project-specific details are available.

**Aerial Rodenticide Application.** The label for Ramik allows for application of diphacinone for conservation purposes. It is not expected that there would be a significant impact to groundwater or surface water resources from the Army's aerial application of rodenticide at SBMR. Diphacinone has low solubility in water and binds tightly to organic material in soil. Water sampling conducted after aerial application of diphacinone pellets to Mokapu Island in February 2008 found no diphacinone residues in the seawater samples. This low water solubility decreases the likelihood of exposure of aquatic organisms to dissolved rodenticides. Supplemental NEPA analysis may be conducted as necessary for specific impacts from this management action as project-specific details become available.

**Manual Rodenticide Application.** Impacts from hand-broadcast of diphacinone would be similar to those from aerial application, and are not expected to be significant. During application, Natural Resource staff would ensure that rodenticide is kept away from surface waters and drainage ways, and hand broadcast applications would only occur during periods of dry weather. Note that this action differs from hand-baiting using rodenticide in bait boxes, an existing management measure. If it is determined that additional analysis of the impacts of this management action is necessary, supplemental review would occur prior to implementation, when project-specific details are available.

**Weed Control.** It is anticipated that there would be no significant impacts to groundwater and surface water resources from the use of herbicides within the MUs. Topical herbicide application would be controlled to prevent migration of the herbicide off of the targeted individual in order to reduce the potential for herbicide to reach groundwater or surface water sources. Herbicide application would be conducted using methodology described in Section 3.2.2.8 and in accordance with labeled instructions and Army standards developed for the MIP. Application of herbicide would be suspended in the event of rain, minimizing the potential for herbicide to be washed off the targeted individual. Application rates of herbicides are very low, methods of application allow for minimal run-off, and selected herbicides have a high rate of breakdown in the environment. The project would also increase public awareness of the importance of watershed protection through participation and education of school groups, hula halau, and other volunteers, as well as protecting native Hawaiian ecosystems and endangered species for future generations.

**Aerial Herbicide Application.** Significant impacts to groundwater or surface water from aerial herbicide application, including ball spraying, are not anticipated, and would be similar to those from manual herbicide application. Measures to control the potential for herbicide drift from specific targeted areas would be implemented, including restricting application to days when wind speeds are within a range determined to prevent drift, establishing a buffer zone between application areas and surface waters, and applying herbicide with as large a droplet size as possible.

Potential impacts from aerial HBT include the potential for the projectile of encapsulated herbicide to miss its target and the herbicide being released in the vicinity of surface waters. This potential impact could be minimized by implementation of a buffer zone between areas where aerial HBT is conducted and surface waters. The technology for HBT is still under development; therefore, potential impacts will be reconsidered when project-specific details become available. The need for supplemental NEPA analysis will be evaluated at that time.

**Fence Construction.** No significant impacts to surface waters are anticipated from fence construction. Vegetation would be hand-cleared, with stumps and roots remaining in the ground to prevent soil disturbance. In the event that fencelines are constructed adjacent to surface waters, surrounding vegetation would remain in place to prevent runoff from feral ungulates traversing the outside of the fenceline. No fence posts would be placed below a stream's high water mark, so no structures would be placed in the stream. A flexible fabric skirt would hang below the fenceline across the stream to prevent feral ungulate ingress while allowing stream flow to move freely.

In the long term, water quality would be improved by reducing erosion and limiting the input of disease-causing organisms into stream water by feral animals. Controlling the population of feral mammals would likely reduce the incidence of Leptospirosis and other diseases carried by these animals into the receiving waters.

### **5.2.2 No Action Alternative**

No significant impacts are expected from the No Action Alternative. This alternative would allow feral animals to remain in the proposed MUs. As a result, stream water quality would continue to be affected by disease-causing urine and fecal matter originating from the areas



slated for ungulate removal under the Proposed Action. Additionally, erosion and subsequent soil runoff would continue to contribute to the degradation of water quality.

### **5.3 Climate/Air Quality**

Potential air quality impacts from the alternatives were assessed by evaluating emissions generated from vehicular use and construction activities. The likelihood of exceeding Federal or State ambient air quality standards was considered in determining whether the proposed action would have a significant impact on air quality.

#### **5.3.1 Proposed Action**

No significant impacts to air quality are expected from the Proposed Action. Emissions from the engine exhaust system of helicopters would be generated during the transport of workers and materials to the work sites. Implementation of the proposed action would include regular helicopter trips of one to two hours in duration for transport of materials and personnel to work sites. Emissions generated from the use of helicopters or hand-held power tools would be intermittent and short term, and would not cause an exceedance of either State or Federal ambient air quality standards.

Some fugitive dust may be generated during construction of the fence lines and UXO removal. Construction would involve minimal soil disturbance and would be accomplished using hand tools and small hand-held power tools, while UXO removal would occur over a very small geographic area; therefore, dust emissions would be negligible.

#### **5.3.2 No Action**

No significant impacts are anticipated from the No Action Alternative. Potential sources of air quality impacts (helicopter transport, fugitive dust from construction) would not be generated.

### **5.4 Noise Environment**

Potential effects of the Proposed Action and No Action Alternative on noise were evaluated by examining the typical noise that would be generated due to construction, transport, and UXO removal operations. Factors considered in determining whether an alternative would have significant impacts include the extent to which its implementation would do the following: 1) generate new sources of substantial noise; 2) increase the intensity or duration of noise levels to sensitive receptors; or 3) expose people to high levels of noise.

#### **5.4.1 Proposed Action**

No significant impacts to the noise environment are anticipated from the Proposed Action. Sources of noise associated with the Proposed Action include helicopters, small power tools, detonations of UXO, and occasional gunfire from hunting activities. Helicopters would be used to transport workers and materials associated with implementing the plan. Helicopter use would result in a small increase in noise; however, helicopter use would be both short in duration and intermittent, and operations would be spread out over geography and time. In addition the proposed action would take place away from populated areas. Construction activities would be accomplished using mostly hand tools which would not cause a perceptible increase in noise levels. Occasional use of small hand-held power tools would contribute to short-term temporary noise increases. Gunfire from hunting activities would contribute intermittent occasional noise

sources; however, this noise source would be consistent with existing sources in nearby public hunting areas.

**Unexploded Ordnance Removal.** Short-term, temporary noise from detonation of UXO would be generated at SBMR and MMR; however, this would be consistent with existing use of the live-fire ranges in the area and is not expected to be significant.

#### 5.4.2 No Action Alternative

No significant impacts to the noise environment are anticipated from the No Action Alternative. There would be no sources of noise associated with OIP implementation under this alternative.

### 5.5 Biological Resources

Impacts on biological resources were assessed based on whether or not the activities would be consistent with applicable natural resource statutes, executive orders, permits, and regulations. An action is considered to have a significant impact on a biological resource if it would result in the following: 1) harm, harassment, or destruction of any endangered, threatened, or rare species, its habitat, migration corridor, or breeding area; 2) cause a reduction in the population of a sensitive species; or 3) introduce or increase the prevalence of undesirable nonnative species.

#### 5.5.1 Proposed Action

No significant impacts to biological resources are anticipated from the Proposed Action. The management plan is a result of close coordination between the USFWS and the Army and thus the continued existence and benefit to listed endangered species is the core goal of the OIP. Actions planned in the OIP are expected to result in a long-term net benefit to the listed threatened and endangered species within the proposed MUs, which would far outweigh potential short term negative impacts. The management plan would result in control of the threats to the listed species in the area, which should lead to an increase in the number of individuals of these species and an increase in the quality of their habitat.

Negative impacts that could occur will be minimized through management measures that are incorporated into the Proposed Action. Potential impacts which will be minimized through management measures include the statements in bold below, followed by the appropriate management measures.

**Increase in foot traffic associated with implementing the plan that could inadvertently lead to the introduction of additional non-native plant species.** To ensure this does not happen, personnel would follow a strict gear cleaning procedure prior to entering native areas. In the case of accidental non-native plant introductions, the natural resource staff would conduct monitoring surveys and remove any species identified as being noxious.

**Potential for removal of native elements when clearing vegetation for fence construction.** When delineating the fence, cabin, campsite, or water catchment locations, the natural resource staff would choose the locations with the least number of native plants.

**Immediately after fencing, the amount of damage to the native vegetation caused by ungulates may increase due to changes in their normal movement patterns.** This impact would be temporary. To reduce the potential for this type of damage, intensive control efforts would be implemented as part of the Proposed Action and both prior to and immediately after fence construction to eliminate those ungulates remaining in the enclosed area. Fencing and

ungulate control would lead to the reestablishment of native plant species once ungulates are removed from the fenced enclosures.

**Chemicals used to control non-native plants may drift onto native vegetation and cause damage.** Natural resource staff would only apply chemical control under non-windy, clear weather conditions. In addition, a sticking agent would be used to reduce the amount of drift. This action should ultimately lead to a healthier, more native forest by controlling the alien plant species known to replace the natives.

**Potential impacts may occur from rodenticides on non-target species (i.e., pigs); either from accidental direct consumption or consuming affected rodents.** Both primary (direct consumption) and secondary hazards (consuming a poisoned rodent) can occur from rodenticide use. Hand-broadcast and aerial rodenticide application would occur only in MUs where ungulate exclusion fencing has been constructed, and will be applied according to the approved label. To reduce the hazard of consumption, intensive control efforts would be implemented as part of the Proposed Action both before and after fence construction is completed. Rodent control work would use tamper proof bait boxes placed off the ground in areas with animal ingress.

**Potential impacts to native forest bird nesting and breeding from low-elevation helicopter surveys and UXO detonation.** To reduce or eliminate this type of impact, aerial surveys would not be conducted in known ‘elepaio breeding areas during nesting and breeding seasons (January through May). The Army funded a noise study associated with ‘elepaio nest disturbance at SBMR. Findings from this study show little to no impact on ‘elepaio from UXO detonation. The potential for UXO detonation to start a fire which would negatively impact forest birds would be minimized by planning and coordination with the USFWS to implement fire prevention measures.

**Potential impacts to native forest bird nesting and breeding from fenceline clearing.** Tree felling and brush removal would not be done in known actively breeding ‘elepaio areas during the nesting season.

### 5.5.2 No Action Alternative

Introduced plant species (weeds) threaten endangered species and native ecosystems by altering habitat and disrupting community structure. Weedy species out-compete natives for light, space and nutrients. Left unchecked, weedy species replace the native forest, and are therefore one of the primary focuses of natural resource programs in Hawai‘i.

Impacts to biological resources from the fencing and management activities that would occur under the No Action Alternative are anticipated to be greater than those under the Proposed Action, as a smaller area and fewer individuals of target species would be managed. Feral ungulates would continue to pose a threat to OIP species. In addition, ungulates would continue to consume and destroy understory plants, creating conditions favoring non-native plant establishment and infestation, prevent the establishment of native plants, and disrupt soil nutrient cycling. Pig wallows would continue to create breeding areas for mosquitoes, which transmit avian malaria and pox virus to native forest birds. Additionally, rare plant populations outside the original MU boundaries would continue to decline from predation and habitat loss. As a result, the long-term impacts would be the continued degeneration and eventual extirpation of endangered species populations within the expanded MU, and deterioration of the native forest.

## 5.6 Cultural, Historical and Archaeological Resources

The evaluation of impacts on historic and archaeological resources were based on identifying cultural resources within the proposed project area and determining the direct and indirect impacts that may affect these resources. Impacts to historical and archaeological resources are considered significant if 1) prehistoric or historic resources that are listed or potentially eligible for listing on the National Register of Historic Places are disturbed or destroyed; 2) Native Hawaiian resources are physically desecrated or destroyed; or 3) access to traditional areas is affected.

### 5.6.1 Proposed Action

No significant impacts to cultural, archaeological or historic resources are anticipated from the Proposed Action. Aerial and pedestrian archaeological surveys are being conducted prior to construction or management activities which may involve surface disturbance. In the event that resources are identified during the surveys, fencelines or other disturbance activities will be re-routed or relocated within the vicinity of the resource to avoid potential impacts. Construction projects would be implemented over the course of several years. Consultation will be conducted as project specific details develop. Based on literature reviews and surveys previously conducted of the proposed MU areas, known resources are present at SBMR within the Lihue MU, and may be present within other MUs. Additional site-specific information regarding potential cultural, archaeological, or historic resources in the vicinity of proposed construction or management activities will be provided after cultural resource surveys are completed. As described above, sites would be avoided and where possible included inside fenced areas. The Cultural Resources Specialists conducting the surveys look for natural and constructed features on the proposed fence line routes and other areas where ground disturbance is proposed. Table 8 identifies areas where cultural surveys are being conducted, the status of those surveys, and the estimated timeframe for construction activities.

**Table 8. Programmed Cultural Surveys for Proposed Construction Activities**

MU	Activity	Survey Status	Planned/Completed Implementation
East Makaleha	Perimeter fence	Pending	2010
‘Ēkahanui I, II, III	Perimeter fence	Completed <sup>1</sup>	Subunit I, II completed; subunit III estimated January 2010
Helemano	Perimeter fence Cabins	Completed Pending	2007 2010
Ka‘ala	Strategic fence	Completed	2010
Kahana	Perimeter fence	Pending	2018
Kaipapa‘u	Perimeter fence Campsites	Pending Pending	2011 2011
Kaleleiki	Perimeter fence	none	1998 (built by State of Hawaii)
Kalua‘ā and Wai‘eli I, II, III	Perimeter fence	Completed	2010
Kamaili	Perimeter fences	Pending	2010
Kaukonahua-Punalu‘u	Perimeter fence	Pending	2014
Kaunala	Perimeter fence	Completed	2006
Kawai Iki I and II	Perimeter fence	Pending	2017

MU	Activity	Survey Status	Planned/Completed Implementation
Kawailoa	Perimeter fence	Pending	2011
Kipapa	Perimeter fence	Pending	2019
Koloa	Perimeter fence	Pending	2010
Lihue	Perimeter fence	Completed	2010
Lower 'Ōpae'ula	Perimeter fence	Completed <sup>2</sup>	2011
Lower Peahinaī'a II	Perimeter fence	Pending	2016
Lower Poamoho	Perimeter fence	Pending	2015
Mānana	Perimeter fence	Pending	2012
Manuwai I and II	Perimeter fence	Completed <sup>2,3</sup>	2010
North Hālawā	Perimeter fence	Pending	2015
North Kaukonahua	Perimeter fence Campsite	Pending Pending	2014 2014
North Puali'i	Perimeter fence	Completed <sup>1</sup>	2004 (built by TNC)
'Ō'io	Perimeter fence	Completed	2006
'Ōpae'ula	Perimeter fence	Completed	2005
Pahipahi'ālua	Perimeter fence	Completed	2006
Poamoho	Perimeter fence	Pending	2015
Poamoho Pond	Perimeter fence	Pending	2016
South Kaukonahua I and II	Perimeter fence Campsite	Pending Pending	2013, 2015 2013
Waiawa I and II	Perimeter fence Campsite	Pending Pending	2017, 2019 2017
Wailupe	Perimeter fence	Pending	2019
Waimano	Perimeter fence	Completed	2010

<sup>1</sup>Completed as part of 1997 TNC EA for Honouliuli Preserve

<sup>2</sup>Completed as part of MIP EA

<sup>3</sup>Manuwai Subunit II survey completed in 2009, included in the Manuwai Supplemental EA

The natural resources staff who would construct the fence are trained on archaeological site sensitivity issues. In the event of an inadvertent discovery of archaeological resources during implementation of the proposed action, work will cease and the DPW cultural resources staff will be notified. Cultural resources staff will follow the USAG-HI reporting and documentation protocol in the event of any inadvertent discoveries.

### 5.6.2 No Action Alternative

No significant impacts to cultural, archaeological, or historic resources are anticipated from the No Action Alternative. No fenceline or other construction activities would occur; therefore no cultural resources would be impacted and no consultation would be required. Potential protection from feral ungulates that may be provided by exclusion fences would not be realized.

## **5.7 Land Use and Recreational Resources**

Impacts on land use were assessed based on whether or not the proposed activities were consistent with the site-specific and surrounding land uses. The evaluation of potential impacts on land use was based on the project’s consistency with the following: 1) existing and planned land uses; and 2) unique characteristics of the geographical area.

### **5.7.1 Proposed Action**

The proposed MUs are within Federal, State, and privately-owned land designated for conservation. Some of the MUs are within State Public Hunting Areas. Ungulates would be excluded from the proposed MUs, but not from the adjacent hunting areas. The proposed new fencing within the Public Hunting Areas would cover approximately 3.8 percent of the approximately 25,000 acres of currently available hunting areas on O‘ahu; hunting would still be conducted on State land. Removal of ungulates is consistent with NARS management policies, which include preservation of natural resources.

In areas where proposed MUs would intersect existing public hiking trails, fence crossovers would be constructed at the trail intersections to allow hikers to traverse the fenced area. Areas where application of aerial herbicide may be considered would typically be restricted to inaccessible areas away from public hiking and hunting areas. In the event that aerial herbicide application would be considered for locations near public hiking or hunting areas, the Army would work with the landowner to identify appropriate means of public notification prior to beginning aerial herbicide application.

### **5.7.2 No Action Alternative**

No significant impacts to land use are anticipated from the No Action Alternative. Existing land use would not change under the No Action Alternative.

## **5.8 Socioeconomic Environment**

Factors considered in determining whether an alternative would have a significant impact on socioeconomics include the extent or degree to which its implementation would change the following: 1) population; 2) employment; 3) demand for housing; or 4) demand on public services.

### **5.8.1 Proposed Action**

No significant impacts to socioeconomics are anticipated from the Proposed Action. The Proposed Action is not expected to affect job opportunities, population structure, housing availability, or the use of public facilities. Therefore, no impacts to the social or economic welfare of nearby communities are anticipated from the management actions proposed for the OIP.

### **5.8.2 No Action Alternative**

Impacts to socioeconomics from the No Action Alternative could result from the inability of the Army to use the O‘ahu Training Areas if the requirements of the 2003 BO are not met.

## **5.9 Visual and Aesthetic Resources**

Preserving open space and scenic beauty is a priority for projects that may affect mountainous areas. The General Plan for the City and County of Honolulu states that scenic resources and the open space character of the area should be preserved and protected for future generations.

### **5.9.1 Proposed Action**

The proposed MUs would be located in a remote areas and potential impacts from clearing and management activities would be minimized by utilizing existing tree canopies to conceal the corridors. Therefore, no significant impacts are anticipated to the visual quality or aesthetics of the proposed MU areas. Fenceline corridors and other new structures such as campsites or water catchments would likely not be visible from populated areas. If visible at all, the visual impact would be temporary until regrowth of the understory. Fences which cross or traverse along public hiking trails will be visible to those hiking on the trails.

### **5.9.2 No Action Alternative**

No significant impacts are anticipated. No changes to existing visual resources would occur.

## **5.10 Environmental Justice and Protection of Children**

Factors considered in determining whether an alternative would have a significant impact on environmental justice and protection of children included the extent or degree to which its implementation would result in the following: 1) change in any social, economic, physical, environmental, or health conditions so as to disproportionately affect any particular low-income or minority group; or 2) disproportionately endanger children.

### **5.10.1 Proposed Action**

No significant impacts to environmental justice are anticipated from the Proposed Action. The activities associated with the OIP would be located away from residential communities. Disproportionately high and adverse human health or environmental impacts on minority and low-income populations and children are not anticipated. Opportunities for children and community groups to participate in management actions are available through the OANRP volunteer outreach program. Volunteer activities would be limited to those which would not pose serious risk to the health or safety of volunteers under normal conditions, and would be supervised by qualified Natural Resource staff.

### **5.10.2 No Action Alternative**

No significant impacts to environmental justice are anticipated from the No Action Alternative. Changes to economic conditions which may be associated with changes to military training would not disproportionately impact low-income or minority groups or disproportionately endanger children.

## **6 CONSISTENCY WITH FEDERAL, STATE, AND LOCAL PLANS, POLICIES, AND APPROVALS**

The approach of this project is consistent with the objectives of many entities. It is in accord with USFWS policy for the management of natural communities using an “ecosystem approach” and with the Hawai‘i Natural Area Reserve Law, which states a system of reserves be established to “...preserve in perpetuity specific land and water areas which support communities, as

unmodified as possible, of the natural flora and fauna...” (Chapter 195D, Hawaii Revised Statutes). Protection and enhancement of endangered species is also mandated by both Federal and State Endangered Species Acts (16 USC 1531-1543, as amended; Chapter 195, Hawaii Revised Statutes). It is also in alliance with the State of Hawaii’s long-term environmental policies, goals and guidelines outlined in Hawaii Revised Statutes, Chapter 344. Watershed protection is an identified land use for Conservation District Protective (“P”) subzone (the most environmentally sensitive subzone) and exclusion of pigs will enhance the areas’ functionality as watersheds by reducing vegetation damage and alteration caused by feral pig activity. This project is consistent with a second designated land use of the “P” subzone: “preserving natural ecosystems of native plants, fish and wildlife, particularly those which are endangered” (HAR, 13-5-11-4). The project is consistent with the goals of the Ko‘olau and Wai‘anae Mountain Watershed Partnerships.

The project also strives toward the provisions of the City and County of Honolulu General Plan Objectives and Policies, Chapter III, Objective A, Policies 1-11, by “protect[ing] and preserv[ing] the natural environment (Objective A)” as well as the “plants, birds, and other animals that are unique to the State of Hawaii and the Island of Oahu (Policy 8).”

## **7 CUMULATIVE IMPACTS**

Cumulative impacts were analyzed for each resource category by examining past, present, and reasonably foreseeable future actions along with the Proposed Action. In determining cumulative impacts of the Proposed Action, fence construction and MU management actions were taken into consideration for all MUs over the life of the OIP. Anticipated cumulative impacts of the Proposed Action to the affected environment are discussed below.

### **7.1 Topography and Soils**

Clearing activities for construction of fences, LZs, cabins, water catchments, and campsites would result in the loss of vegetative cover, thereby exposing soil and increasing the potential for erosion and surface water runoff. However, soil disturbance associated with the Proposed Action would be minimal and short-term, and the net effects are expected to be positive. Construction of the fences would provide a positive impact as the area within the fenced MUs would be protected from the damaging effects of ungulate digging and associated continuing erosion. Implementation of past and reasonably foreseeable future actions include fencing activities for ungulate control in other areas in the Wai‘anae and Ko‘olau ranges that would occur as part of the MIP, State, County, or private actions. Reasonably foreseeable future actions would also involve minor vegetation removal for reintroduction/augmentation of rare plant species as part of the MIP. The potential impacts of these future actions would resemble those from the Proposed Action, resulting in a net positive effect on the immediate and surrounding habitat within the fences. As a result, the cumulative effects of the Proposed Action would provide a positive impact both alone and in combination with reasonably foreseeable future actions.

### **7.2 Surface Water**

Increase in sedimentation and runoff that could be generated during proposed construction activities would be temporary and short in duration. Reasonably foreseeable future projects such as MIP-related construction or additional fence lines or endangered species collections work by other agencies may occur in nearby locations. Additionally, the chemical control of alien plants



or animals within the MUs is not anticipated to be of sufficient volume to have a significant effect on water resources. Cumulative impacts of multi-agency aerial rodenticide application will be evaluated in future NEPA documents prepared by the project proponents; in the case of OIP-related aerial rodenticide application, the need for supplemental NEPA documentation would be evaluated after project-specific planning is conducted.

As a result, the proposed project would not significantly affect water resources individually, nor would it contribute to the cumulative impacts of reasonably foreseeable future actions. Positive impacts to water resources could occur by reducing erosion and runoff related to ungulate damage in the MUs.

### **7.3 Biological Resources**

Potential negative impacts from the Proposed Action to biological resources and specifically endangered species would be minimized by implementing control measures and reliable work practices. As a result, significant adverse impacts are not anticipated. Reasonably foreseeable future projects such as MIP management actions or additional fence lines or endangered species collections work conducted by other agencies may occur in nearby locations. However, it is expected that future projects would utilize similar mitigation actions. Consequently, the proposed project would not adversely affect the ecosystems and biological resources, individually, nor would it contribute to the cumulative effects of reasonably foreseeable future actions. Instead, the Proposed Action and reasonably foreseeable future actions are expected to provide a net positive effect at the ecosystem and species levels.

Cumulative impacts of multi-agency aerial rodenticide application will be evaluated in future NEPA documents prepared by the project proponents; in the case of OIP-related aerial rodenticide application, the need for supplemental NEPA documentation would be evaluated after project-specific planning is conducted.

Positive impacts of the Proposed Action include habitat protection within fenced ungulate enclosures, common native plant species regeneration and proliferation in the absence of ungulate pressure, endangered species protection from predators and invasive plant species.

### **7.4 Visual and Aesthetic Resources**

The proposed MUs would be located in remote areas and potential impacts from clearing and management activities would be minimized by utilizing existing tree canopies to conceal the fence corridors and man-made structures. Other past, present, and reasonably foreseeable actions that could contribute to visual impacts of the proposed MU construction include MIP-related MU construction, and ungulate exclusion fences in the Wai‘anae and Ko‘olau mountains undertaken by other agencies or landowners. These projects would be separated geographically, and are not expected to have significant impacts. Therefore, no significant cumulative impacts are anticipated to the visual quality or aesthetics of any of the proposed MU areas. Fenceline corridors would likely not be visible from roadways or other populated areas. If visible at all, the visual impact would be temporary until the understory regrows.

### **7.5 Air Quality and Noise**

Increase in emissions and noise generated during the Proposed Action of fence construction around the MUs would be temporary and short in duration. Reasonably foreseeable future projects such as additional fence lines or endangered species collections work for the MIP or by

other agencies may occur in nearby locations. Overall, cumulative impacts would not be significant since the proposed project and reasonably foreseeable future actions would occur at different times and in geographically separate locations.

## **7.6 Archaeological and Historic Resources**

Known archaeological and historical resources would not be adversely affected by the proposed project, as fence lines and management actions would avoid all sites. The proposed MU fencelines and other construction areas are in the process of being surveyed by the cultural resources staff and the routes have been or will be adjusted so as to avoid all archaeological sites. As a result, the cumulative effects of the Proposed Action would not be significant either alone or in combination with reasonably foreseeable future actions.

## **8 OTHER REQUIRED NEPA ANALYSES**

In addition to the analyses discussed above, NEPA requires additional evaluation of the project’s impacts with regard to the relationship between local short-term uses of the environment and long-term productivity, and any irreversible or irretrievable commitment of resources.

### **8.1 Relationship Between Local Short-term Uses of the Environment and Long-term Productivity**

Short-term impacts to the environment from the proposed action would be limited, and include impacts to soils from construction activities, impacts to the noise environment and air quality from helicopter and small hand-held motor tools, and impacts to surface water from temporary increased erosion from construction activities. No significant impacts were identified. Long-term productivity would be enhanced by improving watershed function, reducing damage from feral ungulates, and improving habitat for endangered and threatened species.

### **8.2 Irreversible and Irretrievable Commitment of Resources**

NEPA requires an analysis of the extent to which the proposed action’s primary and secondary effects would commit nonrenewable resources to uses that would be irretrievable to future generations. Implementation of the proposed action would commit nonrenewable energy and material resources in the form of:

- fuel for helicopters and equipment used to transport personnel and materials,
- materials necessary to construct fences, LZs, cabins, catchments and support facilities,
- materials used to formulate and dispense rodenticide, herbicide, and insecticide, and
- the resources necessary to maintain and operate the management units included in the proposed action.

## **9 FINDINGS AND REASONS SUPPORTING THE ANTICIPATED DETERMINATION**

The goal of the Army’s proposed conservation actions outlined in this document is to provide long-term protection and enhancement of native Hawaiian ecosystems and protection and stabilization of plant and animal species potentially affected by military training at the O‘ahu Training Areas.

The anticipated Finding of No Significant Impact is based on criteria outlined in Chapter 200 (Environmental Impact Statement Rules) of Title 11, Administrative Rules of the State Department of Health (§11-200-12). The proposed project is discussed in relation to these criteria below.

**1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;**

The proposed action will not negatively impact any natural or cultural resource. Rather the proposed action is expected to positively impact both the surrounding environment and the longevity of the affected threatened and endangered species within the proposed managed areas. Cultural resources which may be located within the areas to be fenced would be protected from further degradation from ungulate activity and invasive species over growth.

**2) Curtails the range of beneficial uses of the environment;**

The proposed action will not curtail the beneficial uses of the environment. It is located in areas designated for conservation. The proposed action will provide long-term protection for native Hawaiian ecosystems against the threats posed by alien plants and animals. The proposed action will improve the condition and function of the watersheds in which the MUs are located.

**3) Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in chapter 344, Hawai'i Revised Statutes, and any revisions thereof and amendments thereto, court decisions or executive orders;**

The proposed action is consistent with the long-term environmental policies, goals and guidelines of the state of Hawai'i and with the State's mandate to conserve threatened and endangered species, as required by Chapter 195D, Hawai'i Revised Statutes.

**4) Substantially affects the economic or social welfare of the community or state.**

The proposed action will not substantially affect the economic or social welfare of the community or the state. The project is located far from man-made structures or areas commonly used by the public.

**5) Substantially affect public health.**

Public health will not be adversely affected by the proposed action. Instead, the proposed action may have a positive impact on public health by reducing the density of rats and feral ungulates in the proposed managed areas and enhancing the watersheds in which the MUs are located. Projects for which there is a concern about future impacts to public health from rodenticide application will undergo additional NEPA review to determine the potential extent of impacts and mitigation or minimization measures to reduce the impact to insignificant.

**6) Involves substantial secondary impacts, such as population changes or effects on public facilities.**

Substantial secondary impacts are not anticipated.

**7) Involves a substantial degradation of environmental quality.**

The proposed action is not anticipated to result in any substantial degradation of environmental quality. Rather, environmental quality is expected to increase following the implementation of the proposed action in each proposed managed area as native biota are protected and enhanced

and alien plants and animals are controlled.

**8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;**

The proposed action is expected to have a positive effect on native Hawaiian ecosystems and the watershed. The proposed action was planned with a long-term commitment to ecosystem preservation and stabilization of threatened and endangered species.

**9) Substantially affects a rare, threatened or endangered species, or its habitat;**

The proposed action is anticipated to *positively* affect the rare, threatened or endangered species in the proposed managed areas by protecting them from feral ungulates and weed threat. Numerous rare plants in each proposed managed area will be protected and the surrounding environment will be enhanced.

**10) Detrimentially affects air or water quality or ambient noise levels;**

Some noise will be generated during initial fence construction and periodic surveys from helicopter drop off of materials and personnel, and from small power equipment and hand tools. However, proposed MUs are remote from any residential areas and in the long-term there is expected to be no impacts to air or noise quality. Potential impacts to water quality from application of rodenticide will be addressed in future supplemental documentation; however, rodenticide application is not expected to detrimentally affect water quality. Overall, a positive impact to water quality is expected from the proposed action.

**11) Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.**

The proposed action was designed to protect environmentally sensitive areas from further degradation by feral ungulates and alien plant species.

**12) Substantially affects scenic vistas and view planes identified in county or state plans or studies.**

The proposed action will not substantially affect scenic vistas or view planes of the area. MUs will be far removed from residential areas, and fences or other structures built at the MUs are not likely to be visible from populated areas. Fences visible from portions of hiking trails would not substantially affect scenic vistas or viewplanes.

**13) Requires substantial energy consumption.**

Substantial energy consumption is not anticipated. However, small amounts of energy will be used during fence construction through the use of small hand-held power tools and transportation of materials and crew to proposed managed areas.

## **10 CONCLUSION**

The long-term benefits of fencing; ungulate control; alien plant, animal, and invertebrate control; alien invertebrate exclusions; genetic collection of endangered snails and plants; reintroductions/augmentations; and erosion control far outweigh the limited short-term negative effects of these management actions.

Potential insignificant negative impacts include: short-term temporary impacts to air quality, soils, noise environment, visual resources, and recreational resources associated with construction activities; potential for impacts to surface water from herbicide application; potential localized and short-term impacts to soils from UXO removal; and potential impacts to biological resources associated with construction and fire control. Impacts associated with aerial rodenticide application will be evaluated as needed in appropriate supplemental NEPA documentation.

Installation of the ungulate exclusion fences will help to more efficiently and effectively control feral animals in the project area. Feral pigs and goats pose the greatest threat to existing intact native mesic forest areas. The cumulative effects of feral pigs and goats are the deterioration of intact native forest ecosystems, including the decline of threatened and endangered plants and invertebrates. Removal of feral pigs and goats has been demonstrated to result in the recovery of native vegetation (Stone, Cuddihy, and Tunison 1992). Feral pig and goat removal also controls or reduces the spread of alien plants. Additionally, alien invertebrate control and enclosures will help to preserve endangered plants and snails in their native habitat.

The possibility for introduction of new weed species as a result of human activity exists. Ensuring that the equipment, tools, and construction materials are clean and free of weed seeds can minimize this. Natural resource management and fence construction crews will follow protocols to prevent weed distribution involving their personal gear and movements. This protocol will be strictly enforced.

The genetic collection of endangered snails and plants coupled with reintroductions and augmentations will help to ensure the continued survival of these species in protected, native habitats. Over time the Army hopes that these collection and reintroduction/augmentation efforts will result in the stabilization of these species.

Fire and erosion control efforts in and around the proposed project areas will serve to protect and enhance the natural environment as native ecosystems will be protected. Fire and erosion in native Hawaiian ecosystems often result in a further degradation as alien plants generally replace native vegetation after this type of significant disturbance.

Based upon the available information, this EA has concluded that the proposed action does not constitute a major federal action that would significantly negatively affect the quality of the environment. Therefore, an environmental impact statement is not required. A FNSI will be prepared and public notice given in the State of Hawai'i Office of Environmental Quality Control (OEQC) Bulletin.

## **11 EA PREPARATION INFORMATION**

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## 12 REFERENCES

- Center for Environmental Management of Military Lands (CEMML). April 2003. Programmatic Biological Assessment for Routine Military Training and Transformation of the 2<sup>nd</sup> Brigade 25<sup>th</sup> Infantry Division (Light), U.S. Army. Oahu, Hawaii
- Chimera, C.G., A.C. Medeiros, L.L. Loopel, R.H. Hobody. 2000. Status of Management and Control Efforts for the Invasive Alien Tree *Miconia Calvescens* DC (Melastomataceae) in Hana, East Maui. <http://www.botany.hawaii.edu/faculty/duffy/techr/128.pdf>. Accessed October 21, 2009.
- Cory, C. 2000. Scientific research relating to the effects of management of pigs in the native Hawaiian ecosystems. The Nature Conservancy of Hawai'i, Honolulu, Hawai'i. Unpublished.
- Gagne, W.C. and L.W. Cuddihy, 1999. Vegetation. Pp. 45-114 in W.H. Wagner, D.R. Herbst, and S.H. Sohmer. Manual of Flowering Plants of Hawai'i. University of Hawai'i Press and Bernice P. Bishop Museum Press, Honolulu, HI.
- Hawai'i Department of Health. 2004. Administrative Rules, Title 11, Chapter 54: Water Quality Standards. Honolulu, Hawai'i.
- Hawai'i Department of Health, Office of Environmental Planning. 1997. Water Quality Standards Map of the Island of O'ahu. October 1997.
- Kamehameha Schools. July 11, 2003. Final Environmental Assessment for the Helemano Watershed Management Project, O'ahu, Hawai'i.
- Mākua Implementation Team (MIT). 2003. Implementation Plan: Mākua Military Reservation, Island of O'ahu. Prepared for the U.S. Army Garrison, Hawaii. Schofield Barracks, Hawai'i.
- Stone, C. P., L.W. Cuddihy, and, J.T. Tunison. 1992. Responses to Hawaiian Ecosystems to Removal of Feral Pigs and Goats. In *Alien Plant Invasions in Native Ecosystems of Hawaii: Management and Research*. (C.P. Stone, C.W. Smith, and J.T. Tunison Eds.). University of Hawai'i at Mānoa, Cooperative Park Resources Studies Unit. pp. 666-704.
- Tetra Tech, Inc. 2004. Final Environmental Impact Statement, Transformation of the 2nd Brigade, 25th Infantry Division (L) to a Stryker Brigade Combat Team in Hawai'i.
- The Nature Conservancy of Hawaii. October 1997. Final Environmental Assessment for Honouliuli Nature Preserve.
- Tomonari-Tuggle, M.J. 2002. *The US Army in Hawai'i: An Historic Context for Cultural Resources on US Army Garrison, Hawai'i Installations*. Ms., prepared for CEMML and US Army Garrison, Hawai'i. International Archaeological Research Institute, Inc., Honolulu, Hawai'i. As cited in Tetra Tech, Inc. 2004. Final Environmental Impact Statement, Transformation of the 2nd Brigade, 25th Infantry Division (L) to a Stryker Brigade Combat Team in Hawai'i.
- Tu, M., C Hurd, J.M. Randall. April 2001. Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas. The Nature Conservancy Wildland Invasive Species Team. <http://www.invasive.org/gist/handbook.html> Accessed November 3, 2009.

- U.S. Army Garrison Hawaii. 2001. Oahu Biological Assessment.
- U.S. Army Hawaii. 2001. Integrated Natural Resources Management Plan and Environmental Assessment/Finding of No Significant Impact 2002-2006, Oahu.
- U.S. Army Hawaii. 2006. Final Programmatic Environmental Assessment for the Mākua Implementation Plan, O‘ahu, Hawai‘i.
- U.S. Fish and Wildlife Service (USFWS). 1999. Biological opinion of the U.S. Fish and Wildlife Service for Routine Military Training at Mākua Military Reservation. Honolulu, Hawai‘i. 41pp+ attachments.
- U.S. Fish and Wildlife Service (USFWS). 2007. Reinitiation of the 1999 Biological Opinion of the U.S. Fish and Wildlife Service for U.S. Military Training at Mākua Military Reservation. Honolulu, Hawai‘i. 639pp+ attachments.
- United States Soil Conservation Service. 1972. Soil Survey of the Islands of Kauai, O‘ahu, Maui, Molokai, and Lanai, State of Hawai‘i. Washington DC.
- Yuen, G.A.L and Associates. 1990. Commission on Water Resources Management, Department of Land and Natural Resources, State of Hawaii. Water Resources Protection Plan Volumes 1&2. (<http://www.state.hi.us/dlnr/cwrp/planning/wrpp1990.pdf>) Accessed August 31, 2009.

## **APPENDIX A**

### **NHPA Section 106 Consultation Letters and MU Survey Enclosures (Waimano and Manuwai), August 19, 2009**



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**APPENDIX B**  
**Photos of Typical OIP Views and Management Actions**



Typical constructed helicopter LZ



Typical constructed helicopter LZ (fenceline)



Typical viewplane, Northern Ko'olaus



Typical viewplane, Northern Ko'olaus



Typical viewplane to coastline, Northern Ko'olaus



Typical viewplane of MU to coastline, Northern Ko'olaus





Typical viewplane to coastline, Wai'anae Mountains



Typical view of cabin (wooden cabin construction)



Typical view of cabin (platform tent construction)



Close up view of cabin (platform tent construction)





Typical view of fenceline



Typical view of fenceline