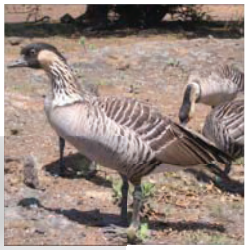
U.S. Army Garrison Hawai'i

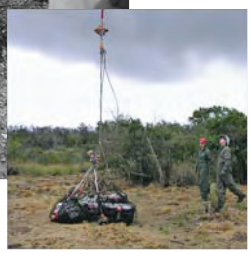
# Integrated Natural Resources Management Plan

2010-2014

Island of Hawai'i

# Pōhakuloa





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Island of Hawai‘i

# PŌHAKULOA

July 2010

This Integrated Natural Resources Management Plan was prepared by the Center for Environmental Management of Military Lands, Colorado State University, Fort Collins, Colorado 80523. The project was completed under a Cooperative Research Agreement with the USDA Forest Service, Rocky Mountain Research Station (07-CR-11221611-038).

## Citation:

U.S. Army Garrison, Hawai‘i. 2010. Integrated Natural Resources Management Plan, 2010-2014, Island of Hawai‘i. Pōhakuloa. Prepared for the Directorate of Public Works, Environmental Division, Natural Resources Section by the Center for Environmental Management of Military Lands, Colorado State University, Fort Collins, Colorado.

# U.S Army Garrison, Hawai'i

# INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN 2010-2014

**This Integrated Natural Resources Management Plan meets the requirements of the Sikes Act (16 U.S. C 670a et seq.) as amended.**

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## Purpose

This Integrated Natural Resources Management Plan (INRMP) guides implementation of U.S. Army Garrison's, Hawai'i (USAG-HI) integrated natural resources management program at Pōhakuloa from 2010 through 2014. This INRMP complies with the Sikes Act Improvement Act as amended through 2003 (Public Law 108-136), which requires the preparation, implementation, update, and review of an INRMP for each military installation in the U.S. with significant natural resources. This plan is prepared in cooperation with the U.S. Fish and Wildlife Service (USWFS) and the state fish and wildlife agency, in this case, the Hawai'i Department of Land and Natural Resources (DLNR).

This INRMP provides for the conservation and rehabilitation of natural resources and the sustainable multipurpose use of USAG-HI resources subject to safety requirements and military security. It provides for "no net loss" in the capability of installation lands to support the military mission and other activities as considered appropriate to the military. At the same time, this document provides for wildlife and land, wildlife enhancement and modification, establishment of natural resource management objectives and time frames, sustained use by the public of natural resources to the extent that such use is not inconsistent with other needs, and public access where appropriate, as well as the enforcement of natural resource laws and regulations.

This INRMP is designed to support the military mission, manage USAG-HI's natural resources, and to ensure compliance with related environmental laws and regulations. The plan ensures the maintenance of quality training land, thereby supporting USAG-HI in accomplishing its critical military missions.

## Scope

This plan applies to organizations internal and external to USAG-HI that are involved with, or interested in, the management and/or use of USAG-HI's land and natural resources for military and nonmilitary purposes. This plan applies to active duty units, National Guard and Reserve components, Installation Management Command garrisons, directorates, private groups, and individuals. This Integrated Natural Resources Management Plan applies to Pōhakuloa Base Operations. A separate INRMP exists for the major Army installations on the Island of O'ahu. This plan is an integral part of the U.S. Army Hawaii's Range Development Plan, as well as USAG-HI's Master Plans and Range & Training Land Program Development Plans.

## Relationship to the Military

U.S. Army, Pacific provides combat training for Army Soldiers in Hawai'i. These Soldiers are among the most specialized military professionals in the world, and they train in some of the world's harshest environments. This INRMP supports the military mission by conserving, managing, and enhancing training lands on which the mission is critically dependent. It also highlights recreational opportunities associated with natural resources, thus supporting USAG-HI's commitment to both the Quality of Life and the Army Communities of Excellence programs. Impacts of military activities on natural resources and means to mitigate these impacts are described in this plan. However, this INRMP does not evaluate U.S. Army Hawaii's military missions, nor does it replace any need or requirement for environmental documentation of those missions.

## Environmental Compliance

This INRMP is required by the Sikes Act (16 USC 670a et seq.), Department of Defense Instruction 4715.3 (*Environmental Conservation Program*) and Army Regulation (AR) 200-1 (*Environmental Protection and Enhancement*). This plan describes how USAG-HI will implement provisions of AR 200-1, 200-3, and local regulations. This INRMP helps USAG-HI comply with federal and state laws, most notably laws associated with environmental documentation, endangered species, and wildlife management.

This INRMP has the signatory approval of the USFWS, acknowledging USAG-HI's compliance with the Endangered Species Act and Migratory Bird Treaty Act. This INRMP has the signatory approval of the Hawai'i Department of Land and Natural Resources as required by the Sikes Act.

The National Environmental Policy Act (NEPA) requires federal agencies to consider the environmental consequences of proposed major federal actions. Installations are directed by 32 CFR Part 651 (Army Regulation 200-2, *Environmental Analysis of Army Actions*) and National Environmental Policy Act to integrate environmental analysis as much as practicable with other environmental reviews, laws, directives, and executive orders.

Three installation specific documents drive many of the natural resource program goals and resulting projects noted in this INRMP:

- *Biological Opinion of the U.S. Fish and Wildlife Service for Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light), U.S. Military Installations, Island of Hawai'i*. 23 December 2003

- *Reinitiation of Formal Section 7 Consultation for Additional Species and New Training Actions at Pōhakuloa Training Area, Hawai'i* (12 December 2008)

- Draft Pōhakuloa Implementation Plan (USAG-HI 2010)

## Approach

The structure of this INRMP is closely based on the "Integrated Natural Resources Management Plan (INRMP) Template" issued by the Office of the Under Secretary of Defense (14 August 2006) and distributed by the Office of the Assistant Chief of Staff for Installation Management (18 September 2006). The document is composed of six parts:

**Chapter 1: Overview** details the purpose, scope, approach and management, plan strategy, goals and objective, responsibilities, authority, stewardship, review process, plan integration and unresolved issue.

**Chapter 2: Current Conditions** provides a description of the installation, regional land use, installation history, and operations and activities, as well as a description of the physical environment and ecosystems and the biotic environment.

**Chapter 3: Environmental Management Strategy and Mission Sustainability** describes supporting mission and the natural environment, natural resources consultation requirements, National Environmental Policy Act (NEPA) compliance, partnerships and collaborative resource planning, public access and outreach, encroachment and partnering, and state comprehensive wildlife plans.

**Chapter 4: Program Elements** describes the program elements and integrated goals and objectives for threatened and endangered species management, natural resources law and regulation enforcement, fish and wildlife management, migratory bird management, invasive species management, pest management, land management, geographical information system (GIS) management, outdoor recreation, bird aircraft strike hazard, wildland fire management, natural resources personnel training, and leases.

**Chapter 5: Implementation** discusses preparing management plans that drive objectives, projects, achieving no net loss of training lands, use of cooperative agreements, and funding.

**Appendices** capture all additional information not appropriate for the body of the INRMP. The appendices include a list of acronyms, detailed natural resources plans, list of projects, results of planning level surveys, research requirements, migratory bird management, program benefits to federally listed species, and critical habitat issues.

A number of handbooks and guides were consulted to aid in addressing the various sections, including "A Handbook for the DoD Natural Resources Manager, Resources for INRMP Implementation."

This INRMP includes all the DoD required elements for natural resource management applicable to Pōhakuloa on the Island of Hawai'i. This plan also includes the U.S. Fish and Wildlife Service's required conservation measures and actions (see Section 1.9, *Integration with Other Plans*).

# Ecosystem Status

## Pōhakuloa

Pōhakuloa is located in the north central portion of the Island of Hawai'i and is the single largest U.S. Army holding in the state of Hawai'i at 53,340 ha (131,805 ac) of ceded, leased, and fee simple lands. A remote installation, the purchase of the Ke'āmuku Parcel has placed Pōhakuloa in closer proximity to developed areas. There are 22 live-fire and 4 non live-fire ranges, 23 training areas, a centrally located impact area, 1 airfield, and 113 surveyed field artillery and mortar firing points. Twenty-seven ranges and artillery firing points in training areas surround the impact area and are oriented so 28 munitions are fired into the impact area, with the exception of two ranges that direct fire away from the impact area.

Pōhakuloa is the main tactical training area for military Mission Essential Task (METL) training. The installation provides resources for active and reserve component units. Pōhakuloa assets are geared toward live-fire range training, maneuver live fire (e.g., moving and shooting at targets, including combined arms live-fire exercise) on ranges, dismounted maneuver training outside live-fire ranges with no live fire, mounted non-live fire maneuver, and artillery live fire. However, Army training is changing and training on Pōhakuloa is moving from light infantry training to include urban, close in, and complex terrain exercises. Infantry activities continue to center on movements and engagements, utilizing a variety of squad/platoon to company and larger exercises. Engineering, military intelligence, and signal units will be included. Infantry battalion companies will change to combined arms teams, consisting of infantry, a family of light and medium-weight vehicles

Pōhakuloa supports infantry brigades, artillery, aviation brigade, sustainment brigade and other combat support (CS) and combat service support (CSS) units. The 25th ID is the principal fire and maneuver user. Other users include the Hawai'i Army National Guard, U.S. Marine Corps Units, and other Allied Forces.

One federally listed endangered mammal, 1 federally listed endangered bird species, and potentially 2 additional federally listed endangered bird species. In addition, there are 15 federally listed endangered plant taxa, 1 threatened plant taxon, and 2 candidate plant species. Two areas on Pōhakuloa are within the Palila Critical Habitat. There are a number of areas that are designated as sensitive on the installation (e.g., Kīpuka Kālawamauna, Kīpuka ʻAlalā, and others). Many of these areas are fenced and most areas with federally listed species will be fenced.

There are some 33 plant communities on Pōhakuloa, including those on the Keʻāmuku Parcel. These areas range from little to no plant cover (e.g., lava flows) to species-rich kīpukas. The Hawaiian hoary bat is the only native land mammal. Other mammal species (eight or more) are non-native and considered nuisance species. Twelve native bird species are present on the installation, along with some 33 non-native species. Ten of the non-native species are game birds. Twelve bird species are protected by the Migratory Bird Treaty Act (MBTA), half of which are non-native species and must be considered under the MBTA. There are at least 90 species of arthropods and six other invertebrates found in the Pōhakuloa caves and lava tubes. Close to 300 plant taxa have been identified, representing 74 families and nearly 200 genera. Invasive species include 8 plant species, 7 ant taxa, 1 weevil, and 9 mammals are present.

Soils are poorly developed on much of Pōhakuloa due to the recent deposition of a majority of the substrates. Pāhoehoe lava, aʻa lava, and miscellaneous land types (e.g., puʻus) cover approximately 79 percent of the installation. The U.S. Department of Agriculture has broadly classified 10 soil types and 5 land types on Pōhakuloa. Soil water erosion has not been an issue on Pōhakuloa proper due to the limited amount of soil present, but it may be an issue on the Keʻāmuku Parcel.

There are no lacustrine or perennial streams on Pōhakuloa. Typically, precipitation percolates rapidly through cracks in the lava to subterranean areas. Water flow on the Keʻāmuku Parcel is intermittent in gullies.

Army activities affected biological diversity through impacts of fire and other land disturbances that have increased and spread of non-native plants The Army has taken measures to limit these impacts.

Outdoor recreation activities are limited to the hunting of birds and feral ungulates.

## Partnerships

This INRMP cannot be implemented by USAG-HI alone. In accordance with land withdrawal legislation and the ecosystem management philosophy, USAG-HI has forged partnerships with various agencies to manage its natural resources. Major partners in the implementation of this plan are the U.S. Fish and Wildlife Service and the Hawaiʻi Department of Land and Natural Resources. Other partners in this effort include universities, other federal and state agencies, native groups, contractors, and private citizens.

## Unresolved Issues

### Migratory Bird Treaty Act

In 2001, Executive Order 13186 (*Responsibilities of Federal Agencies to Protect Migratory Birds*) directed federal agencies having a measurable negative effect on a migratory bird population to develop and implement a Memorandum of Understanding (MOU) with the USFWS. An MOU was signed July 2006 to promote the conservation of migratory birds (FR 71:51580-51585). The MOU describes specific activities where cooperation between the USFWS and DoD will contribute to the

conservation of migratory birds (e.g., promote collaborative projects, minimize loss of migratory bird habitats, and provide training opportunities on migratory bird issues).

A USFWS Final Rule (February 2007, *Migratory Bird Permits, Take of Migratory Birds by the Armed Forces*, 72 FR 89311) allows Armed Forces to "take" migratory birds without a permit in the course of military readiness activities, as directed by the 2003, National Defense Authorization Act (2 December 2002). An Interim Guidance (*Unintentional Take of Migratory Birds for Actions Other than Military Readiness Activities*, 28 July 2008, DA, IMCOM) focuses on non-military readiness activities that are provide direct and essential support to military readiness activities. These activities (e.g., range construction and maintenance, prescribed burning, fence construction, etc.) must consider management practices and avoid or minimize adverse impacts to migratory birds to the greatest extent possible. An installation's INRMP is required to address migratory management and conservation and to take into consideration activities that cannot be delayed until after the nesting season. Actions that have a significant adverse effect are addressed to the USFWS and conservation measures established to minimize or mitigate these effects. Many of the measures associated with the implementation plans improve and preserve habitat quality for native and migratory species (e.g., removal of feral cats and rats, reduction of non-native species and ecosystem improvement efforts, etc.).

### Grass/Wildland Fire Cycle

The grass/wildland fire cycle is an unresolved issue. Because of the rapid and widespread expansion of non-native invasive species grasses throughout the Island of Hawai'i and the resulting increase in fuel loads, wildland fire now poses a significant threat to native habitats, particularly dry forest systems. Ecological approaches to break the grass/wildland fire cycle are needed. Fire models must be adapted for the Pacific Islands region to predict fire hazards/severity (behavior). Elements of the models should include, but are not limited to, fuel loading, fuel moisture dynamics, live/dead rations, and microclimate and weather. Of particular importance to DoD are self-sustaining means to prevent and control fire in highly vulnerable areas (e.g., military training areas).

## Plan Components

This document guides the natural resources management program at USAG-HI lands on the Island of Hawai'i. It outlines goals, objectives, and policies in five general areas: stewardship, military readiness, quality of life, compliance, and program integration. It explains the USAG-HI military missions in general terms, including the missions' impacts on natural resources. It describes climate, land base, facilities, and natural resources, including a brief legal and administrative history of natural resources management on USAG-HI lands. The plan also lists agencies, organizations, and individuals involved in the implementation of this INRMP.

Ecosystem management is the underlying philosophy of the plan. This approach is consistent with changes in laws and Department of Army policies. The INRMP serves as a tool to help Natural Resources Office (NRO) personnel implement ecosystem management philosophies on USAG-HI lands. Ecosystem management will continue to allow for the use of natural resources on USAG-HI lands for both military and other human-related values and purposes. Ecosystem management protects properties and functions of natural ecosystems. Since these ecosystems often go beyond installation boundaries, management of USAG-HI's natural resources will include more emphasis on partnerships with its neighbors.

## Sikes Act Road Map

The Sikes Act Road Map references the chapters and paragraphs in the Integrated Natural Resources Management Plan, which is cross referenced to the thirteen criteria points required by the Sikes Act. Stakeholder and interested parties can use the road map to check the location and effectiveness of this Integrated Natural Resources Management Plan in meeting Sikes Act requirements. The required Sikes Act criteria can be found in Table ES-1.

**Table ES-1 Sikes Act Road Map.**

| Required Sikes Act Criteria | Location in Integrated Natural Resources Management Plan |
|---|---|
| 1. No net loss in the capability of military installation lands to support the military mission of the installation. | Chapter 1 |
| 2. Establishment of specific natural resource management goals and objectives and time frames for proposed action. | Chapters 1 and 4 |
| 3. Integration of, and consistency among, the various activities conducted under the plan. | Chapter 4 |
| 4. Fish and wildlife management, land management, forest management, and fish and wildlife oriented recreation. | Chapter 4 |
| 5. Fish and wildlife habitat enhancement or modification. | Chapter 4 |
| 6. Provisions for spending hunting and fishing permit fees exclusively for the protection, conservation, and management of fish and wildlife, including habitat improvement, and related activities in accordance with Integrated Natural Resources Management Plan. | Chapter 4 |
| 7. Wetland protection, enhancement, and restoration, where necessary for support of fish and wildlife. | Chapters 2 and 4 |
| 8. Public access to the military installation that is necessary or appropriate for sustainable use of natural resources by the public to the extent that such use is consistent with the military mission and the needs of fish and wildlife resources, subject to requirements necessary to ensure safety and military security. | Chapter 3 and 4 |
| 9. Sustainable use by the public of natural resources to the extent such use is not inconsistent with the needs of fish and wildlife resources management. | Chapter 3 and 4 |
| 10. Enforcement of applicable natural resource laws and regulations. | Chapter 3and 4 |
| 11. Exemption from procurement of services under Office of Management and Budget Circular A-76 and any of its successor circulars. | Chapter 5 |
| 12. Priority for contracts involving implementation of this Integrated Natural Resources Management Plan to state and federal agencies having responsibility for conservation of fish and wildlife. | Chapter 5 |
| 13. Review of this Integrated Natural Resources Management Plan and its effects at least every five years. | Chapters 1 and 5 |

## Ongoing Planning Activities

The 2010–2014 Integrated Natural Resources Management Plan utilizes existing information as a basis to continue and improve natural resources management while planning continues. Annual internal reviews and meetings with the USFWS and the state DLNR will be used to determine future updates or revisions. The current INRMP revision is in effect until the USFWS Regional Director and the appropriate state fish and wildlife agency directory mutually agree on a revision (DAIM-ED, *Guidance for Implementation of the Sikes Act Improvement Act*, 25 May 2006). The INRMP is not a static document; rather, it is a dynamic mechanism to guide program operation for the next five years (2010–2014).

## Changes Compared to the Previous Plan

### Format Change

The format of the USAG-HI INRMP (2010–2014) is different from the previous 2002–2006 version. The current INRMP format meets the proposed U.S. Army Environmental Command and Department of Defense outline guidance, which intended a similar format for all services. Most of the content from the previous version remains intact, with the most notable differences occurring in threatened and endangered species management.

### Leased Lands

In 2005, DoD policy changed the requirement that leased lands be included in INRMPs.

## Benefits and Costs

### Military Mission Benefits

Implementation of this plan will improve the quality of USAG-HI's training lands and will improve long-range planning at USAG-HI. The INRMP will improve mission sustainability by enhancing training areas, as well as providing for more intensive planning of missions.

### Environmental Benefits

The plan provides the basis for the conservation and protection of natural resources. It will reduce vegetation loss and soil erosion due to military activities, reduce the potential for environmental pollution, and provide for biodiversity conservation. Certain sensitive areas and species will be protected from unacceptable damage or degradation. Plan implementation will increase overall knowledge of USAG-HI's ecosystems through surveys and monitoring.

### Other Benefits

Soldier sustainable range awareness will be enhanced for military training at USAG-HI posts. Both community relations and USAG-HI's environmental image will be enhanced. Quality of life for the USAG-HI communities and its neighbors will be improved. Plan implementation will decrease long-term environmental costs and reduce potential liabilities from environmental noncompliance.

### Costs

It will cost about $4,710,000 annually (2010–2014) to implement this INRMP, with most of these dollars used for ESA compliance. Funding will be provided primarily either from environmental conservation funds or training funds designated for implementation of the Integrated Training Area Management program. Other dollars will be from special natural resources funds, and fish and wildlife permit fees. Plan implementation will require staffing at the same level as in recent years, with the exception of additional contract personnel to implement Integrated Training Area Management and other new programs.

## Summary

The actions within this INRMP comply with environmental laws, conserve and protect USAG-HI's natural resources, improve its relationship with the public, and enhance the military mission. While this plan will not resolve all existing and/or future environmental issues, it does provide the guiding philosophy, personnel, and means to work toward resolution of such issues.

# CHAPTER 1

# OVERVIEW

# CHAPTER 1 OVERVIEW

## 1.1 Purpose

The purpose of this document is to review and update the U.S. Army Garrison, Hawai‘i (USAG-HI), Pōhakuloa Integrated Natural Resources Management Plan (INRMP). This INRMP reflects changes to the natural resources management program associated with the biological opinions issued by the U.S. Fish and Wildlife Service (USFWS) that addressed the fielding of a Stryker Battalion Combat Team and the resulting transformation to training by the 2nd Brigade 25th Infantry Division (L). The intent is to integrate land use needs, the military mission, and the management and conservation of natural resources at Pōhakuloa for the next five years (2010 to 2014). An INRMP establishes an approach and actions to accomplish the integration of natural resources conservation and military preparedness, and to meet the natural resource planning and responsibilities of the Sikes Act Improvement Act (SAIA) of 1997 (16 USC §670a et seq.); National Environmental Policy Act (NEPA); Endangered Species Act (ESA); Migratory Bird Treaty Act (MBTA); Department of Defense Instruction (DoDI) 4715.3; and Army Regulations (AR) 200-1, 200-2, and 350-19.

Department of Defense (DoD) lands support military mission-related activities. Future availability of military lands is dependent on the proper integration of land use and natural resources management. This plan helps ensure no net loss of resources that would affect the capability of military lands to support the Army's mission today and in the future. This INRMP integrates all natural resources efforts, programs, and plans to conserve and rehabilitate natural resources, consistent with military preparedness: provides recreational opportunities that contributes to the quality of life for Soldiers, their families, and the public; and is based on scientifically sound conservation procedures, methods, and techniques in the context of an ecosystem management approach. This plan serves to identify funding support required for the successful management of natural resources on military lands.

## 1.2 Scope

The initial Pōhakuloa INRMP described program activities from 2002 to 2006. This updated INRMP reviews, documents, and builds on progress made during the previous plan and outlines natural resources program directions and integrates projects identified in the Pōhakuloa Implementation Plan. Until the final approval of this INRMP, natural resources management program will be continued in accordance with the *Pōhakuloa Training Area Integrated Natural Resources Management Plan* (2002–2006), USAG-HI's Conservation Annual Work Plans (2008– 2009), and the supporting endangered species management plans noted below.

This document is intended to be used as technical guidance for those responsible for land use planning and decision-making and incorporates information and responsibilities outlined in the Pōhakuloa biological opinion *Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light), U.S. Army Installations, Island of Hawai'i* (USFWS 2003), *Reinitiation of Formal Section 7 Consultation for Additional Species and New Training Actions at Pōhakuloa Training Area, Hawai'i* (USFWS 2008a), and the *Pōhakuloa Implementation Plan* (USAG-HI 2010). An INRMP provides the basis and criteria for protecting and enhancing natural resources with an ecosystem perspective, consistent with the military mission. Provisions of the INRMP apply to each directorate, command, tenant units, and others who either directly or indirectly use installation natural resources. Implementation of this INRMP is subject to the availability of annual funding, availability of qualified personnel, and mission requirements.

The INRMP includes input from stakeholders including federal, state and local agency representatives, conservation organizations, and interested individuals. As required under the Sikes Act, this INRMP reflects contributions from the U.S. Fish and Wildlife Service (USFWS) and the Hawai‘i Department of Land and Natural Resources (DLNR).

This INRMP addresses all Pōhakuloa properties. However, leased properties that are occasional use properties and have not been used in the last five years are not included (e.g., Pu‘u Pa).

## 1.3 Document Approach

### 1.3.1 Document Structure

The structure of this INRMP is based on the "Integrated Natural Resources Management Plan (INRMP) Template" issued by the Office of the Under Secretary of Defense (14 August 2006) and distributed by the Office of the Assistant Chief of Staff for Installation Management (18 September 2006). The document is composed of six parts:

**Chapter 1: Overview** details the purpose, scope, approach and management, plan strategy and goals, responsibilities, authority, stewardship, review process, plan integration and unresolved issues.

**Chapter 2: Current Conditions** provides a description of the installation, regional land use, installation history, and operations and activities; as well as a description of the physical environment and ecosystems, and the biotic environment.

**Chapter 3: Environmental Management Strategy and Mission Sustainability** describes supporting mission and the natural environment, natural resources consultation requirements, National Environmental Policy Act (NEPA) compliance, partnerships and collaborative resource planning, public access and outreach, encroachment partnering, and state comprehensive wildlife plans.

**Chapter 4: Program Elements** describes the program elements and integrated goals and objectives for threatened and endangered species management, natural resource law and regulation enforcement, fish and wildlife management, migratory bird management, invasive species management, pest management, land management, geographical information system (GIS) management, outdoor recreation, bird-aircraft strike hazard, wildland fire management, natural resources personnel training, and leases.

**Chapter 5: Implementation** discusses preparing management plans that drive objectives, projects, achieving no net loss of training lands, use of cooperative agreements, and funding.

**Appendices** capture all additional information not appropriate for the body of the INRMP. The appendices include a list of acronyms, detailed natural resources plans, list of projects, results of planning level surveys, research requirements, migratory bird management, program benefits to federally listed species, and critical habitat issues.

A number of handbooks and guides were consulted to aid in addressing the various sections, including "A Handbook for the DoD Natural Resources Manager, Resources for INRMP Implementation."

This INRMP includes all elements of natural resource management applicable to Pōhakuloa. This includes:

- U.S. Fish and Wildlife Service recommended non-discretionary conservation measures and reasonable and prudent measures in the biological opinions (December 2003, *Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light), U.S. Army Installations, Island of Hawai'i* and December 2008, *Reinitiation of Formal Section 7 Consultation for Additional Species and new Training Actions at Pōhakuloa Training Area, Hawai'i*) and the Army's execution of these measures through the Pōhakuloa Implementation Plan.

- Measures related to the realignment of Saddle Road called for fencing Kīpuka 'Alalā as part of a multi-agency mitigation effort to offset loss of palila (*Loxioides bailleui)* critical habitat associated with road construction.

- Establishment of the Kīpuka Kālawamauna Endangered Plants Habitat and the associated training restrictions.

- Integrated Wildland Fire Management Plan (CEMML and Installation Fire and Safety Office, U.S. Army Hawai'i 2003).

- Current efforts toward a Memorandum of Understanding with the State of Hawai'i for the High-Altitude Army Aviation Training Site (HAATS) north of the installation over Mauna Kea.

- Permit with the State of Hawai'i for federally listed plant outplanting.

### 1.3.2 Ecosystem Management

An ecosystem management approach considers the biotic and abiotic components that comprise and govern the behavior of an area. The boundaries of an ecosystem vary by component, so that no one parcel of land is an ecosystem to itself, but rather is a collection of ecosystems and a part of larger ecosystems. Ecosystem management is the deliberate management of an entire regional ecosystem with the intention of maintaining ecological sustainability and integrity. Because ecosystems extend beyond boundaries, ecosystem management requires working across fences with neighbors. Neighbors become partners, and a collaborative vision for desired future condition becomes a shared goal. The goal of an ecosystem approach is to sustain or restore the health, productivity, and biological diversity of an ecosystem through natural resources management and recognizing usage and social factors (Interagency Ecosystem Management Task Force 1995).

A successful ecosystem-based management program (1) maintains and improves native ecosystems; (2) identifies and describes an ecosystem management-based vision for the installation's current and desired future condition that supports and sustains the training mission; (3) identifies goals and objectives to move the natural resources of Pōhakuloa in the direction of this vision; (4) shifts the temporal and spatial management direction from short-term, and an installation, or training area focus, to a long-term and regional view; (5) constructs a scientific foundation that describes components of the ecosystem as well as ecosystem structure and function; (6) provides the foundation for monitoring programs that measure progress using project specific goals and objectives; (7) shares a vision with a broader community (e.g., federal, state, native, and local governments, non-governmental organizations, and the public) that identifies collective responsibilities and stewardship; (8) supports mechanisms for communication; (9) develops greater sensitivity to the social, economic,

and national security needs that are an integral part of ecosystems and their management; (10) is based on flexible and adaptive management to accommodate new information and understandings; and (11) assists in the implementation of installation plans and programs.

An ecosystem management approach supports the Army's vision of sustainable use of training and testing lands. This management strategy enables Pōhakuloa to conduct military training while conserving natural resources. An ecosystem-based approach promotes and sustains native species and habitats diversity and prevents the breakdown of ecosystem integrity, which in turn, maximizes support to the military's training and infrastructure. Compliance with applicable laws and regulations provides oversight and guidance and ensures stewardship of public lands. The Army Strategy for the Environment (2004) recognizes the interdependence between mission, community, and environment, and applies an ecosystem approach to managing natural resources.

The vision of USAG-HI is to maintain itself as a leader in ecosystem management and stewardship. With 19 federally listed species; 2 candidate species, 21 species of concern (species at risk); numerous rare plants, animals, and invertebrates, and critical habitat; Pōhakuloa natural resources management recognizes the benefits of an ecosystem management approach as compared to species-by-species management. An ecosystem approach balances all components (e.g., mission, biological, physical, economic, and human elements), compliance regulations and guidance (e.g., Sikes Act, ESA, DoD and Department of Army), restoration (e.g., exotic species control, erosion control), and program implementation to minimize adverse impacts. Pōhakuloa's ecosystem management is intended to complement and support local and regional conservation efforts, to manage effectively new activities and infrastructure development, and to respect cultural values.

## 1.4 Plan Strategy, Goals and Major Objectives

The Pōhakuloa INRMP strategy is to support USAG-HI's military and non-military activities while maintaining functional, healthy ecosystems. Over the next five years, the programs outlined in this INRMP will be executed within the principles of ecosystem management and refined as new information and ideas become available. Management will be adaptive. The overall goals of the Pōhakuloa INRMP are to:

- Sustain the Army's mission and access to air and land resources.
- Conserve resources for present and future generations by:
    - ♦ Maintaining or restoring native ecosystem types across their natural range when practical and consistent with the military mission.
    - ♦ Maintaining or restoring ecological processes when practical and consistent with the military mission.
    - ♦ Adopting non-discretionary conservation measures and terms and conditions cited in the 2003 and 2008 USFWS Biological Opinions and other applicable biological opinions, memoranda of understanding, and agreements.
    - ♦ Complying with laws and regulations to maintain USAG-HI natural resources.

- ♦ Using regional approaches to implement ecosystem management on Pōhakuloa by collaboration with other DoD components as well as other federal, state, and local agencies, and adjoining property owners.

- ♦ Providing recreational opportunities to the general public when such activities are compatible with military mission activities, ecosystem sustainability, and other considerations such as security, safety, and fiscal soundness.

This strategy was developed with USFWS, the Hawai‘i Department of Land and Natural Resources (DLNR) and resources from various divisions within the Hawai‘i DLNR.

The overall objectives of the USAG-HI Pōhakuloa INRMP are to:

- Implement and complete all NRO Program projects validated and funded for the fiscal years of 2010 to 2014 as per the project descriptions.

- Implement and complete all Integrated Training Area Management Program projects that are validated and funded for the fiscal years of 2010 to 2014 as per the project descriptions. (See Appendix 2, *List of Projects*.)

## 1.5 Responsibilities

The secretary of a military department prepares each INRMP in cooperation with the Secretary of the Interior, acting through the Director of the United States Fish and Wildlife Service (USFWS), and the head of each appropriate state fish and wildlife agency for the state in which the military installation concerned is located. The resulting plan for the military installation reflects the mutual agreement of the parties concerning conservation, protection, and management of fish and wildlife resources.

Mutual agreement with the USFWS and appropriate state fish and wildlife agencies is the goal with respect to the entire plan. Mutual agreement is required only regarding those elements of the plan that are subject to the otherwise applicable legal authority of the USFWS and a state’s fish and wildlife agencies to conserve, protect, and manage fish and wildlife resources. Elements of the Sikes Act are not intended to either enlarge or diminish the existing responsibilities and authorities of the USFWS or a state’s fish and wildlife agencies concerning natural resources management on military lands. At the same time, the USFWS or a state’s fish and wildlife agency cannot change elements in an INRMP outside the scope of its authority.

The INRMP, written by or under the guidance of the installation natural resources managers, is developed in concert with and with significant input from internal installation stakeholders (i.e., any branch, section, department, or activity that would carry out work that would execute, affect, or be affected by the INRMP).

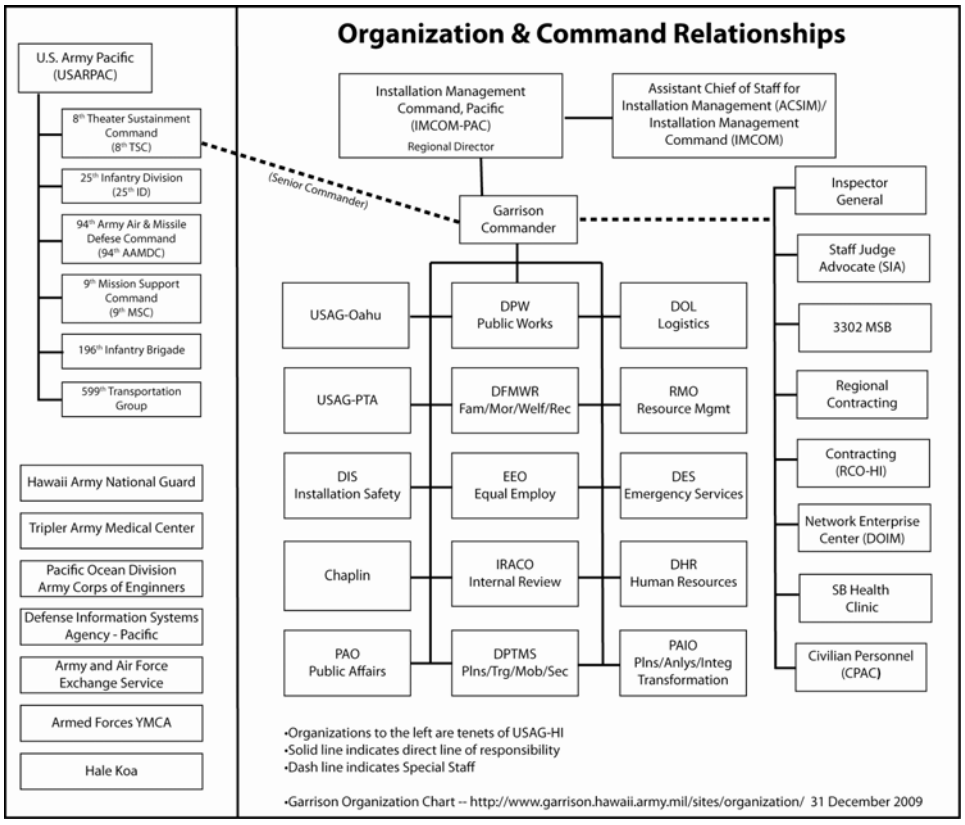



**Figure 1.a U.S. Army Garrison, Hawai‘i, Organizational Chart. Representative Offices at Pōhakuloa Are Identified.**

## 1.5.1 Installation and Department of Army Stakeholders

### 1.5.1.1 U.S. Army Garrison, Hawai‘i

U.S. Army Garrison, Hawai‘i (USAG-HI) supports all active Army forces in Hawai‘i. The Garrison Commander is directly responsible for the operation and maintenance of Army lands in Hawai‘i and therefore is responsible for the preparation, updating, and implementation of Integrated Natural Resources Management Plans under the Sikes Act. USAG-HI provides facilities, services, and logistic functions to enhance combat readiness while maintaining an acceptable quality of life for Soldiers and their families (Figure 1.a).

#### Directorate of Public Works

The Director of Public Works (DPW) is also responsible for the operation and maintenance of Army lands in Hawai‘i and thus is responsible for the preparation, updating, and implementation of the Integrated Natural Resources Management Plan.

- **Environmental Division, Conservation and Restoration Branch, Natural Resources Office, Pōhakuloa**
  The Environmental Division at Schofield Barracks provides oversight, funding, and program support to the Natural Resources Office (NRO) at Pōhakuloa. The on-site Pōhakuloa biologist oversees daily operations of the office and coordinates natural resources use, management, and implementation of this plan. The Pōhakuloa biologist maintains close coordination and cooperation through the Natural Resources Section at Schofield Barracks with other affected organizations and agencies, particularly the USFWS and DLNR. The Pōhakuloa biologist and

the Cultural Resources program manager work closely together to ensure each program is cognizant of the other's needs.

### Directorate of Plans, Training, Mobilization and Safety

The ranges on USAG-HI are managed by the Directorate of Plans, Training, and Mobilization and Security (DPTMS), which is also under the direction of the Garrison Commander. DPTMS is responsible for managing range complexes, coordinating military training, and releasing training areas for land rehabilitation and recreational use.

- **Range Division Hawai'i, G3/DPTM**
  Range Division Hawai'i, G3/Directorate of Plans, Training and Mobilization are located at Schofield Barracks and is responsible for implementing ITAM programs (LRAM and RTLA) at Pōhakuloa (Section 4.21, *Sustainable Range Management and Integrated Training Area Management Programs* ). The Range Officer and ITAM program represent the training community and work with the Environmental Division to address natural resources issues in the training areas. The Range Division at Schofield Barracks, in coordination with the installation's Department of Army Police, controls access to Pōhakuloa for hunting and other activities.

### Directorate of Emergency Services

The Provost Marshal's Office provides general range security and directly controls access for hunting at USAG-HI lands. It also supports, but is not responsible for, the enforcement of laws related to natural resources uses (e.g., the enforcement of the external agency laws and regulations) at Pōhakuloa. Law enforcement is managed by the Directorate of Emergency Services (DES) Detachment, Pōhakuloa.

- **Department of the Army Police, Pōhakula**
  The Department of the Army Police provides general range security and directly control access onto the installation and Range Control determines if and when training areas can be accessed for hunting. The DA police are not responsible for the enforcement of laws of the external agency or their regulations (e.g., state hunting regulations).

- **Fire and Emergency Services, Pōhakuloa**
  The Fire and Emergency Services (FES) has responsibilities for implementing the Wildland Fire Management Plan, developing procedures to reduce the threat of wildland fires, and mitigating the adverse effects of fires. This requires coordination with Range Division Hawai'i and NRO.

## 1.5.1.2 25th Infantry Division

The 25th Infantry Division is the principal land user at Pōhakuloa. Pōhakuloa is geographically remote and serves all branches of the U.S. Armed Forces. The installation is the largest live-fire range and training complex in the Pacific Basin. It is mainly used as a tactical training area and for military Mission Essential Task List (METL) training. This INRMP supports the training land needs of the 25th Infantry Division and other military units.

## 1.5.1.3 U.S. Army Pacific Command

U.S. Army Pacific Command (USARPAC) oversees most Army forces in the Asia-Pacific region with the exception of Korea. USARPAC, located at Fort Shafter, Hawai'i, assists USAG-HI with the development and implementation of conservation programs. This INRMP supports the training land needs of USARPAC. USARPAC has review and approval authority for this INRMP.

### 1.5.1.4 Installation Management Command–Pacific

USAG-HI's higher headquarters is the Installation Management Command-Pacific (IMCOM-PAC) at Fort Shafter, Hawai'i. IMCOM-Pacific assists with the development and implementation of conservation programs. IMCOM-PAC reports to IMCOM Headquarters. IMCOM Headquarters provides environmental funding for the implementation for this INRMP.

### 1.5.1.5 U.S. Army Corps of Engineers, Honolulu Engineer District

U.S. Army Corps of Engineers (USACE), Honolulu Engineer District has responsibility for providing engineering support for USAG-HI. This support includes administering major construction, environmental documentation, natural and cultural resources surveys, and research contracts.

### 1.5.1.6 U.S. Army Environmental Command

U.S. Army Environmental Command (USAEC) is located at Aberdeen Proving Ground, Maryland, and provides oversight, centralized management, and execution of the Army's environmental programs and projects. It provides support capabilities for NEPA, endangered species, natural and cultural resources, ITAM, environmental compliance, and related areas.

## 1.5.2 External Stakeholders

### 1.5.2.1 Federal Agencies

#### U.S. Department of Defense

The U.S. Navy, U.S. Marine Corps, and the U.S. Air Force execute training exercises on Pōhakuloa. Air-to-Ground Gunnery exercises, bombing exercise, and live-fire exercises are conducted. Navy and Marine Corps fighter and attach aircraft crews train using R-3103 airspace. The Air Force also conducts C-17 heavy drops and high-altitude bombing runs.

The Department of Defense (DoD) supports a number of venues for conducting natural resource research on military lands with the intent of sustaining resources and the training environment. Sponsored projects typically include other agencies, universities, and other interested parties.

- **Strategic Environmental Research and Development Program**
  The Strategic Environmental Research and Development Program (SERDP) is the DoD environmental science and technology program, planned and executed in full partnership with the Department of Energy and the Environmental Protection Agency, with participation by numerous other federal and non-federal organizations. The intent of SERDP is to address high priority issues that confront the Army, Navy, Air Force, and Marines. Currently, USAG-HI and the U.S. Forest Service have implemented a study to investigate the grass-fuel model for Hawai'i.

- **Legacy Resource Management Program**
  The Legacy Resource Management Program (Legacy) provides financial assistance for DoD efforts to preserve natural and cultural resources on military lands while supporting military readiness. A number of Legacy projects have been completed on Pōhakuloa, most of which investigated rare plants and wildland fire.

#### U.S. Department of Interior

- **U.S. Fish and Wildlife Pacific Islands Ecoregion**
  The U.S. Fish and Wildlife Service (USFWS) is a major cooperator in the implementation of this INRMP in accordance with the Sikes Act. Specifics of this cooperation are contained in

the Pōhakuloa Implementation Plan. Cooperative efforts with USFWS primarily involve endangered species and critical habitat management and assistance with research and surveys.

- **National Park Service**
  The National Park Service is a cooperative partner with USAG-HI in supporting an environmental education program on the Island of Hawai‘i. The National Park Service is a source of information and experience on a number of topics (e.g., non-native ungulate control, non-native plant control, bird survey techniques for nēnē and ‘io).

- **Geological Survey – Biological Resources Discipline**
  The Biological Resources Discipline (BRD) has considerable biological expertise and is charged with gathering nationwide biological data. The BRD provides assistance in evaluating the effects of fencing, conducting ant and other invertebrate surveys, māmane (*Sophora chrysophylla*) phenology, and palila restoration techniques at Pōhakuloa. The Biological Resources Division will continue to be an important research partner with USAG-HI.

### U.S. Department of Agriculture

- **Agricultural Research Service – National Center for Genetic Resources Preservation**
  Formerly known as the National Seed Storage, the National Center for Genetic Resources Preservation (NCGRP) conserves genetic resources, which is important for conservation and biological diversity. The USAG-HI Natural Resources Branch plans to continue storing federally listed and native plant materials at NCGRP as part of its conservation effort in this INRMP.

- **Natural Resources Conservation Service**
  The Natural Resources Conservation Service (NRCS) is available to provide technical support and information on plant and animal control and plant identification. The NRCS has expertise in soil conservation and erosion control.

- **U.S. Forest Service**
  The U.S. Forest Service (USFS) helped develop the draft Wildland Fire Management Plan for USAG-HI. The USFS provides advanced wildland firefighting training that meets National Wildland Coordinating Group Standards for Army personnel. USFS, Institute of Pacific Islands Forestry office in Hilo, Hawai‘i, is working with the USAG-HI through a Strategic Environmental Research and Development Program (SERDP) grant –*The Potential for Restoration to Break the Grass/Fire Cycle in Dryland Ecosystems in Hawaii*.

- **Animal and Plant Health Inspection Service, Wildlife Services**
  The USDA Animal and Plant Inspection Service (APHIS), Wildlife Services (WS) works to resolve human-wildlife conflicts. As such, the organization has been contracted to animal control services on the Pōhakuloa cantonment.

### U.S. Department of Transportation

- **Federal Highway Administration**
  The Federal Highway Administration is involved with USAG-HI in the realignment of Saddle Road. The realignment of Saddle Road has had significant implications for natural resources management at Pōhakuloa (Section 4.10, *Saddle Road Realignment Support*). An area on Pōhakuloa, Kīpuka ‘Alalā, was fenced as a multi-agency mitigation to offset loss of palila (*Loxioides bailleui)* critical habitat associated with road construction. Pōhakuloa continues to work with agencies in the restoration of Kīpuka ‘Alalā.

#### National Science Foundation

The National Science Foundation (NSF) is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense…" NSF supports science and engineering education, and funding is integrated with education. As such, installation programs can benefit from educationally based projects supported by NSF. An example is provided below.

- **Living Stock Collections**
  The Living Stock Collection (LSC) program supports operation of and improvements in outstanding collections of living organisms used in basic biological research. Proposals come from U.S. colleges, universities, and non-profit organizations.

### 1.5.2.2 State of Hawai'i Agencies

#### Department of Land and Natural Resources

The Hawai'i Department of Land and Natural Resources (DLNR) is a major cooperator in the implementation of this INRMP in accordance with the Sikes Act. Cooperative efforts with DLNR typically fall under the responsibilities of the Division of Forestry and Wildlife (DoFAW) (hunting management and game populations, wildfire prevention and suppression, and wildlife research) and the Division of Conservation Resource Enforcement (natural resources law enforcement). DLNR and Pōhakuloa Natural Resources Office (NRO) staff works together on endangered species and critical habitat issues as well as on various working groups.

#### Department of Agriculture

The Hawai'i Department of Agriculture is involved in pest management at Pōhakuloa. The agency certifies pesticide applicators, inspects storage facilities for pests, and performs similar functions on the installation.

### 1.5.2.3 Other Interested Parties

#### Cooperative Ecosystem Studies Units

The Cooperative Ecosystem Studies Unit is a cooperative of research units established to provide research, technical assistance, and education to resources and environmental managers. The Rocky Mountain, Cooperative Ecosystem Studies Unit works with DoD and the Pōhakuloa Natural Resources Office.

#### Hawai'i Conservation Alliance

The Hawai'i Conservation Alliance is a cooperative partnership of government, education, and non-profit organizations with a strong commitment to the environmental conservation of the Hawaiian Islands through land management, scholarly research, and financial incentives.

#### Hawai'i Biodiversity and Mapping Program

The Hawai'i Biodiversity and Mapping Program (HBMP) (formerly the Hawai'i Natural Heritage Program) plays a fundamental support role for DoD lands in Hawai'i. The HBMP hosts Hawaii's central database on plant and animal species. The HBMP archives data and provides statewide species information to NRO staff at Pōhakuloa, which helps with the execution of this INRMP.

#### Hunting Groups

Pōhakuloa is a popular hunting area on the Island of Hawai'i; as such, many individual hunters and groups of hunters express interest in the management of natural resources at Pōhakuloa, especially

management decisions affecting hunting (Section 4.5, *Wildlife and Game Management*). Three such organizations are the Wildlife Conservation Association of Hawai‘i, Pig Hunters of Hawai‘i, and Hawai‘i Island Archery. Past Pōhakuloa Commanders have been personally involved in these forums and have emphasized the benefit of NRO staff participation. The Army's Office of Public Affairs provides information and responses to hunter questions and inquiries.

### Hawaiian Hoary Bat Research Cooperative

The Hawaiian Bat Research Cooperative is a partnership composed of government agencies, non-profit organizations, and private landowners. The cooperative was formed to prioritize and fund Hawaiian hoary bat research. The cooperative awarded a three-year contract to the USGS Biological Resources Division, Pacific Islands Ecosystems Research Center to begin the initial phases of research. Pōhakuloa is a member.

### Palila Working Group

The Palila Working Group comprises individuals from different state and federal agencies who work for palila recovery by sharing scientific knowledge and management experience. The Palila Working Group assists the Hawai‘i Division of Forestry and Wildlife (DoFAW) and USFWS with their listed species recovery responsibilities. USAG-HI is a member.

### Nēnē Recover Action Group

The Nēnē Recovery Action Group is an organization comprised of federal and state resources agencies. The group was created to enhance communication between agencies with responsibilities for nēnē management. A subset of the group meets regularly on the Island of Hawai‘i.

### The Nature Conservancy

Pōhakuloa shares Island of Hawai‘i natural resources information with The Nature Conservancy as part of the installation's ongoing ecosystem effort.

### University of Hawai‘i

The University of Hawai‘i provides support and interacts with NRO staff through the Research Corporation of the University of Hawai‘i (RCUH). The RCUH provides research expertise in the areas of native species management and non-native species control as well as other areas.

### Colorado State University

Colorado State University provides natural resource specialists through the Center for Environmental Management of Military Lands and the Cooperative Ecosystem Studies Units to Pōhakuloa. These specialists comprise most of the work force who execute the programs and projects described in this INRMP.

## 1.6 Authority

This INRMP is required by the Sikes Act Improvement Act (16 U.S.C. §§ 670a et seq.), Department of Defense Instruction 4715.3 (*Environmental Conservation Program*), Army Regulation 200-1 (Environmental Protection and Enhancement), *Biological Opinion of the U.S. Fish and Wildlife Service for Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light), U.S. Military Installations, Island of Hawai'i* (23 December 2003), and *Reinitiation of Formal Section 7 Consultation for Additional Species and new Training Actions at Pōhakuloa Training Area, Hawai'i* (12 December 2008). This INRMP provides guidance for USAG-HI compliance and implementation of other federal and state laws, most notably laws associated with environmental documentation, endangered species, and wildlife management.

The Sikes Act Improvement Act (SAIA), as amended (16 U.S.C. §§ 670a-670o), requires the secretary of each military department to prepare and implement an INRMP for each military installation in the United States under the jurisdiction of the secretary, unless the secretary determines that the absence of significant natural resources on a particular installation makes the preparation of such a plan inappropriate.

Additional authority and official DoD policy are provided by the Office of the Under Secretary of Defense (OUSD) memoranda, *Implementation of Sikes Act Improvement Act* of 25 May 2006, 10 Oct 2002 and 1 Nov 2004, *Implementation of Sikes Act Improvement Act: Supplemental Guidance Concerning Leased Lands* of 17 May 2005, Department of Defense Instruction 4715.3 (*Environmental Conservation Program*) (https://www.denix.osd.mil/denix/Public/Library/NCR/inrmp.html?fm-natres), Army Regulation 200-1 (*Environmental Enhancement and Protection*, 28 August 2007), and Army Regulation 200-3 (*Natural Resources - Land, Forest, and Wildlife Management*, 28 February 1995).

## 1.7 Stewardship and Compliance

An INRMP is an installation's natural resources strategy that identifies compliance requirements and how these requirements have and will be met. An INRMP establishes stewardship initiatives that demonstrate the Army's commitment not only to sustain training lands, but to sustain the environment. The Department of Defense is required to comply with all federal laws and executive orders. For the purposes of this INRMP, this includes the Endangered Species Act, Sikes Act, Migratory Bird Treaty Act, National Environmental Policy Act, Invasive Species Executive Order, and more. Compliance with these laws and executive orders is a priority.

Stewardship is the responsibility to manage and conserve natural resources for the future. Stewardship is a large component of the military environmental and training ethic. Military lands are actively managed for multiple training and testing missions. The military implements programs/efforts to reduce impacts on such lands and to ensure environmental and mission sustainability.

This INRMP contains projects that are compliance and mission driven, and others that are driven by ecosystem management and good land stewardship. Projects driven by compliance with federal laws and mission sustainability are first order priority for funding. Other projects and programs that enhance an installation's natural resources, promote proactive conservation actions, and support investments that demonstrate environmental leadership and proactive environmental stewardship are prioritized by their importance to support mission goals and to prevent future noncompliance with federal laws and Army regulations. Alternative funding can be sought and used to support stewardship projects. Stewardship projects that are not compliance/mission driven can be accomplished when funding is available or alternative sources for completion are identified. Alternative sources of funding include the Legacy program, Strategic Environmental Research and Development Program (SERDP), DoD Forestry Reserve Account, and Agricultural Outleasing program.

## 1.8 Review and Revision Process

Section 101(b)(2) of the Sikes Act [16 U.S.C. 670a(b)(2)] states that each INRMP "must be reviewed as to operation and effect by the parties thereto on a regular basis, but not less often that every five years."

### 1.8.1 Review for Operation and Effectiveness

Reviews for the operation and effectiveness of an INRMP must be performed no less frequently than every five years by the Commander responsible for the INRMP, the Regional Director of the USFWS, and the Director(s) of the state fish and wildlife agency(ies), in this case, the Hawai‘i Department of Land and Natural Resources (DLNR). If during the review the INRMP is found to be operational and effective; that is, the existing INRMP is being implemented to meet the requirements of the Sikes Act and contributes to the conservation and rehabilitation of natural resources on a military installation, a new INRMP is not required. This review may determine that updates to the INRMP are needed. Updates are modifications to the INRMP to address minor changes in mission or natural resources management activities that are not significant and are not expected to result in biophysical consequences materially different from those anticipated in the existing INRMP.

### 1.8.2 Annual Reviews

Annual reviews verify:

- All “must fund” projects and activities have been budgeted for, and implementation is on schedule.
- All required trained natural resources positions are filled or are in the process of being filled.
- Projects and activities for the upcoming year have been identified and included in the INRMP. An updated project list does not necessitate INRMP revision.
- All required coordination has occurred.
- All significant changes to the installation’s mission requirements or its natural resources have been identified.
- The INRMP goals and objectives are still valid.
- No net loss of training capability has occurred due to implementation of the INRMP in accordance with the Sikes Act.

### 1.8.3 Public Review

The public is given the opportunity to review the INRMP. This criterion is applicable to first time INRMPs and INRMPs with major revisions.

## 1.9 Integration with Other Plans

Integrating the components of natural resources management can be a complex challenge. One of the objectives of ecosystem management in USAG-HI is to develop a process to identify requirements objectively for all species and users of the environment. In addition, natural and cultural resources projects can only be classified as military use (valid expenditures of military funds) if there is a direct link back to military mission. An INRMP is prepared in coordination with the installation’s Master Plan, Range Development and Training Plan, Biological Opinion(s), Implementation Plan, Integrated Cultural Resources Management Plan, Integrated Pest Management Plan, Installation Restoration Plan that address contaminants covered by Comprehensive Environmental Response, Compensation,

and Liability Act and related provisions, and other appropriate plans and offices. The intent is to develop a plant that complements and is compatible with other installation program's goals and objectives. The INRMP is not meant to function as a comprehensive compilation of detailed information on all these related topics. Rather, an INRMP should briefly summarize the key interrelationships with these plans, reference where the plans may be obtained, and describe where more detailed information can be found.

## 1.9.1 Range Related Programs

### 1.9.1.1 Sustainable Range Program

The Army uses the Sustainable Range Program (SRP) to improve the way it designs, manages, and uses ranges and to ensure that current and future doctrinal requirements are met (AR 350-19). The goal of the Sustainable Range Program is to maximize the capability, availability, and accessibility of ranges and training land to support training and testing requirements. It consists of two core programs: the Range and Training Land Program (RTLP), which consists of range modernization and range operations; and the Integrated Training Area Management (ITAM) program, which consists of land management and land maintenance (stewardship) activities. These programs are supported by the SRP GIS, which creates, manages, and distributes authoritative standardized spatial information, products, and services for the execution training strategies and missions on U.S. Army ranges and training lands.

#### Integrated Training Area Management Five-Year Plan

The Integrated Training Area Management (ITAM) Five-Year Plan outlines program goals and objectives as well as the goals and objectives of its four sub-components (Training Requirements Integration, Land Rehabilitation and Maintenance, Sustainable Range Awareness, Range and Training Land Assessment). The plan is designed to support the military mission by protecting and enhancing the training lands that the military is critically dependent upon. ITAM projects are not compliance driven, but rather stewardship initiatives and projects. (See Section 4.21, *Sustainable Range Management and Integrated Training Area Programs.*)

### 1.9.1.2 Range and Training Land Program Development Plan

The U.S. Army Hawai'i Range and Training Land Program Development Plan (RTLPDP) outlines range development requirements for USAG-HI training lands. The RTLPDP creates the framework within which natural resources management occurs (USACE and Nakata Planning Group, LLC. 2002). The INRMP complements the RTLPD by providing information that minimizes impacts to natural resources when siting new range facilities. This RTLPDP is the responsibility of the USAG-HI's Directorate of Plans, Training and Mobilization, Range Division.

### 1.9.1.3 U.S. Army Hawai'i Range Complex Master Plan

The USAG-HI Range Complex Master Plan (RCMP) is under development and will be a sub-component of the RTLPDP. It will depict installation ranges and training land assets, provide general siting of future range complex project requirements, and address installation requirements and constraints that may impact ranges or training lands. This plan is the responsibility of the USAG-HI's Directorate of Plans, Training and Mobilization, Range Division. USAG-HI is working to complete this document.

## 1.9.2 Environmental Management System

The Secretary of Defense is responsible for ensuring that all necessary actions are taken to integrate natural resources accountability into agency day-to-day decision-making and long-term planning

processes across all military missions, activities, and functions. In accordance with E.O. 13148 of April 21, 2000, *Greening the Government through Leadership in Environmental Management*, USAG-HI implements an Environmental Management System (EMS) to ensure that strategies are established to support environmental leadership programs, policies, and procedures, and establish and implement environmental compliance audit programs and policies. This INRMP is a required component of the EMS.

## 1.9.3 Environmental Impact Statements and Biological Opinions

### 1.9.3.1 Final Environmental Impact Statement for Transformation of 2nd Brigade, 25th Infantry Division (Light) to a Stryker Brigade Combat Team in Hawai‘i

In the *Transformation of 2nd Brigade, 25th Infantry Division (Light) to a Stryker Brigade Combat Team in Hawai'i*, the 2nd Brigade Combat Team military mission impacts are addressed (Tetra Tec 2004). This environmental impact statement (EIS) addresses the regular ongoing impacts of the current mission as well as the predicted impacts due to the transformation of the 2nd Brigade 25th Infantry Division into a Stryker Brigade Combat Team.

### 1.9.3.2 Final Environmental Impact Statement for Permanent Stationing of the 2/25th Stryker Brigade Combat Team

The Final Environmental Impact Statement (FEIS) examines a broader range of reasonable alternatives for the permanent stationing of the 2/25th Stryker Brigade Combat Team (SBCT) than were first assessed in the *Final Environmental Impact Statement for Transformation of the 2nd Brigade, 25th Infantry Division (Light) to a Stryker Brigade Combat Team in Hawai'i, 2004* (U.S. Army, AEC February 2008). The FEIS for permanent stationing incorporates information from the 2004 FEIS and examines whether there have been changes in impacts and the affected environment since the 2004 FEIS was prepared. A more comprehensive document, all activities were analyzed (e.g., the fielding of equipment, training, facilities construction, and Soldier and family support).

The FEIS assisted the Army in arriving at the decision to proceed with all facets of stationing permanently at Schofield Barracks Military Reservation (SBMR). Garrison operations will be conducted at SBMR, which includes Schofield Barracks Main Post (SBMP), South Range Acquisition Area (SRAA), and Schofield Barracks East Range (SBER). Training will be conducted at a number of other training areas in Hawai‘i including Dillingham Military Reservation (DMR), Kahuka Training Area (KTA), Kawailoa Training Area (KLOA), Wheeler Army Airfield (WAAF) on the Island of O‘ahu and at Pōhakuloa, Bradshaw Army Airfield (BAAF) and the Ke‘āmuku Maneuver Area (KMA, also referred to as the Ke‘āmuku Parcel) on the Island of Hawai‘i. Training resources will include an assortment of live-fire and non live-fire maneuver training facilities, fixed-position live-fire training facilities, infantry and engineer demolition training facilities, grenade training facilities, and an urban assault course.

The Record of Decision (ROD) notes access control and prevention of new weed establishment as two new mitigation measures to be included with those cited in the 2004 FEIS. All implementation and monitoring plans are to be developed and implemented by April 2009. Mitigation and monitoring measures of the ROD, combined with existing environmental stewardship measures, will aid in avoiding, minimizing, reducing, or rectifying adverse effects.

### 1.9.3.3 Final Environmental Impact Statement for Saddle Road (State Route 200) Māmalahoa Highway (State Route 190) to Milepost 6

In 1999, the Federal Highway Administration, Central Federal Lands Highway Division (FHWA), in cooperation with the State of Hawai‘i Department of Transportation (HDOT) completed an environmental impact statement (EIS) to assess the impacts of the realignment on Saddle Road. One of the goals of the realignment was to remove and redirect public traffic off of the installation. A second goal was to have Saddle Road cross Māmalahoa Highway farther south than the current location, allowing for a more direct movement of traffic into the Kona area.

One outcome from the EIS was that USAG-HI and Military Traffic Management Command joined with the other federal and state agencies in a Memorandum of Understanding (*Regarding Implementation of the Saddle Road Palila Critical Habitat Impact Mitigation*, 1998) to facilitate Palila Critical Habitat mitigation. As such, USAG-HI agreed to support a number of natural resource issues. (See Section 4.10, *Saddle Road Realignment Support.*)

### 1.9.3.4 Final Supplemental Environmental Impact Statement and Final 4(f) Evaluation of Saddle Road (State Route 200) Māmalahoa Highway (State Route 190) to Milepost 41, County of Hawai‘i, State of Hawai‘i

The Federal Highway Administration and Central Federal Lands Highway Division decided to take into consideration alternate routes through the Ke‘āmuku Maneuver Area, rather than the W-3 preferred route identified in 1999 based on the purchase of the Ke‘āmuku Maneuver Area by the U.S. Army. The final EIS was published February 2010. USAG-HI was a cooperating agency with the USDOT and the State of Hawai‘i DOT. The EIS recommends route W-7, which runs along the southern boundary of the Ke‘āmuku Maneuver Area, as opposed to route the preferred route W-3 by the ROD in 1999 (this route segments the parcel by about a third).

## 1.9.4 Biological Opinions

### 1.9.4.1 Biological Opinion of the U.S. Fish and Wildlife Service for Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light)

The USAG-HI requested formal consultation with the USFWS pursuant to Section 7 of the Endangered Species Act of 1973, as amended, in regards to current (Legacy) and potential future (Stryker Brigade Combat Team Transformation) impacts associated with training to 15 federally listed plants, one federally listed mammal, and critical habitat designated for one avian species. The USFWS concluded that the proposed and existing actions were not likely to jeopardize the continued existence of any species covered in the biological opinion or to adversely modify or destroy critical habitat. The reason for this biological opinion was the number of conservation measures the U.S. Army proposed. These measures are included in this INRMP.

### 1.9.4.2 Biological Opinion of the USFWS for Reinitiation of Formal Section Consultation for Additional Species and New Training Actions at Pōhakuloa Training Area, Hawai‘i

In 2008, the Army reinitiated Section 7 consultation of the 2003 Biological Opinion with the U.S. Fish and Wildlife Service (USFWS 2008a). The consultation addressed (1) use of Pu‘u Omaokaoli in the Palila Critical Habitat for helicopter pinnacle training, (2) nēnē (*Branta sandvicensis*) nests located in the Ke‘āmuku Maneuver Area and the reoccurrence of nēnē (*Branta sandvicensis*) at Range 1 and necessary conservation measures at both sites, (3) restructuring of the TA 21fence to include all of the training area and thereby address additional locations of Hawaiian catchfly (*Silene*

*hawaiiensis*) and suitable sites for fragile fern (*Asplenium peruvianum* var. *insulare*), and (4) the fencing of new locations of popolo ku mai (*Solanum incompletum*) east of Kīpuka Road.

### 1.9.5 Wildland Fire Management Plan

An Integrated Wildland Fire Management Plan was implemented in 2003 (25th ID(L) & USARHAW 2006a). The Range Officer, G3/DPTM, Range Division Hawaii, has the overall responsibility for enforcing the provisions of the plan and other applicable training directives and regulations, including restrictions on or the cessation of training activities based on the day's fire danger rating. This representative at Pōhakuloa is the Range Operations Supervisor. The Range Operations Supervisor, who is responsible to the Pōhakuloa Commander and ensures the proper fire prevention measures are taken by the troops. The Pōhakuloa Wildland Fire Program Coordinator is responsible for the coordination and maintenance of the firefighting infrastructure, such as firebreaks and fuel breaks, and maintaining the fire cache. In addition to the assigned Brush Firefighting Vehicles, a contracted helicopter with a trained crew is on-site during training outside of Ranges 1 through 9.

The impetus for an Integrated Wildland Fire Management Plan is the numerous rare plants present on the installation. Extra safety measures began in the late 1980s and continue to this day. While the Army recognizes its responsibility to control fires that might start and could spread due to training, it is the fires that start off the installation that actually cause the greatest threats. In July 1994 and August 1999, fires were ignited on private lands by non-military sources. The fires burned onto the Kīpuka Kālawamauna Endangered Plants Habitat and 1,700 ha (4201 ac) and 1,300 ha (3212 ac), respectively burned (Stevens 2006). While the cause was not military, the fire removed federally listed plants and increased the Army's responsibility for conserving the remaining plants through additional requirements.

## 1.10 Ongoing Issues

Some natural resources issues are at a point where the path to resolution is unknown or uncertain. Reasons for this unsure status include the lack of scientific information, conflicting agendas, costs, or other roadblocks. Difficulties will not prevent USAG-HI and IMCOM-PAC from continuing to work on resolutions. Recognition of and a willingness to deal with such conflicts are part of the process.

### 1.10.1 Breaking the Grass/Wildland Fire Cycle

The grass/wildland fire cycle is an unresolved issue. Because of the rapid and widespread expansion of non-native invasive species grasses and the resulting increase in fuel loads, wildland fire now poses a significant threat to native habitats, particularly dry forest systems. Ecological approaches to break the grass/wildland fire cycle are needed. Fire models must be adapted for the Pacific Islands region to predict fire hazards/severity (behavior). Elements of the models should include, but are not limited to, fuel loading, fuel moisture dynamics, live/dead rations, and microclimate and weather. Of particular importance to DoD are self-sustaining means to prevent and control fire in highly vulnerable areas (e.g., military training areas).

Techniques should include creating barriers to prevent the rapid spread of fire (e.g., green stripping) and developing control and restoration techniques to shift from grass dominated to woody-dominated species, thereby reducing fuel loads (HydroGeologic 2007).

Starting in 2008, the Strategic Environmental Research and Development Program (SERDP) *The Potential for Restoration to Break the Grass/Fire Cycle in Dryland Ecosystems in Hawai'i* was

funded. A collaborative project with the USDA Forest Service, Institute of Pacific Islands Forestry, this project could provide significant information for the restoration of native plant communities and native habitats.

### 1.10.2 Standard Operating Procedures for Hunting on Pōhakuloa and Keʻāmuku

Pōhakuloa recently developed a regulation to establish policies, procedures, and restrictions governing game resources on the installation proper and the Keʻāmuku Maneuver Area (USAG-HI, 2008a).

### 1.10.3 Realignment of Saddle Road

Soon after the Saddle Road EIS was completed (Section 1.9.3.3, *Final Environmental Impact Statement for Saddle Road*), the U.S. Army initiated the EIS process for transformation. Included was evaluating the purchase of the Keʻāmuku Maneuver Area, an area of land west of the installation and essential to the Army meeting acreage requirements. The proposed use was for tactical maneuvers toward the installation and the ranges. The connection between the parcel and the installation is narrow, with a considerable number of endangered species in the southeastern corner of this boundary between the two. This area is crossed by the preferred routes for Saddle Road (W-3).

On 10 December 2007, the Department of Transportation, Federal Highway Administration issued a notice to advise the public that a supplemental environmental impact statement will be prepared for the ongoing project to improve and realign Saddle Road. The USAG-HI is interested in the Department of Transportation considering relocation of the selected alternative (W-3) to maximize its training opportunities and to minimize conflict with the traveling public (72 FR 69726-69727).

In February 2010, a supplemental EIS was published, suggesting an alternate to the W-3 route (W-7), which runs closer to the southern boundary of the installation (Hawaiʻi DOT and U.S. DOT 2010).

### 1.10.4 Migratory Birds Treaty Act

An issue that may be unique to Hawaiʻi is that non-native migratory birds can pose a threat to native bird populations through the transmission of disease and competition of resources. However, a Memorandum of Understanding (MOU) between the DoD and the USFWS promotes the conservation of migratory birds that was developed pursuant to Executive Order (EO) 13186 - *Responsibilities of Federal Agencies to Protect Migratory Birds*, addresses both direct and indirect take of migratory birds. The MOU identifies specific activities where cooperation between USFWS and DoD will contribute substantially to the conservation of migratory birds and their habitats. This MOU does not authorize the take of migratory birds for military non-readiness activities (nMRA), so it is incumbent upon the Army to ensure that impacts of nMRAs on migratory birds are avoided, minimized, or mitigated to the greatest extent possible. In addition, installations should also minimize impacts of activities on migratory birds, with special emphasis on migratory bird species of concern.

Military activities need to be assessed to determine if there is a significant direct or indirect adverse effect on populations of migratory birds (e.g., disruption during nesting vs. removal of resources). If so, the Army needs to confer with USFWS to develop and implement appropriate conservation measures to minimize or mitigate significant adverse effects.

# CHAPTER 2

# CURRENT CONDITIONS AND USE

# CHAPTER 2 CURRENT CONDITIONS AND USE

U.S. Army Garrison, Hawai‘i (USAG-HI) manages eight major training sites on the islands of Hawai‘i and O‘ahu. Pōhakuloa is on Hawai‘i Island, and Schofield Barracks Military Reservation, Schofield Barracks East Range, Mākua Military Reservation, Kahuku Training Area, Kawailoa Training Area, South Range Acquisition Area, and Dillingham Military Reservation are located on O‘ahu. A separate INRMP is being prepared for the O‘ahu installations.

## 2.1 U.S. Army Installation Management Command—Pacific Region

### 2.1.1 Location

U.S. Army Installation Management Command–Pacific Region (IMCOM-PAC) is headquartered at Fort Shafter, Hawai‘i, on the Island of O‘ahu. Globally, the Pacific Region is one of the most diverse areas – geographically, economically, politically, and culturally. The strategic importance of the Pacific is highlighted by the placement of all branches of the U.S. military service on the Island of Oahu (IMCOM-PAC 2008).

### 2.1.2 Infrastructure

IMCOM-PAC has garrisons in Alaska, Japan, and Hawai‘i. The theater of operation for the U.S. Army Pacific Command is a large and complex area, which includes 43 countries, 20 territories and possessions, 10 U.S. territories, and five of the world’s largest foreign armies (IMCOM-PAC 2008).

### 2.1.3 History

The Installation Management Command (IMCOM), a single organization with six regional offices worldwide, was activated on Oct. 24, 2006, to reduce bureaucracy, apply a uniform business structure to the management of U.S. Army installations, sustain the environment, and enhance the well-being of the military community. Three organizations were consolidated three organizations under a single command as a direct reporting unit:

1) Installation Management Agency (IMA).

2) Community and Family Support Center, now called Family and Morale, Welfare and Recreation Command (FMWRC), a subordinate command of IMCOM.

3) Army Environmental Center, now called the Army Environmental Command (AEC) and a subordinate command of IMCOM (IMCOM 2008).

IMCOM-PAC provided funding for and reviewed this Integrated Natural Resources Management Plan.

### 2.1.4 Military Mission

The IMCOM-PAC mission is to provide the Army with installation capabilities and services to: support expeditionary operations in a time of persistent conflict, quality of life for Soldiers and families consistent with their service, success in current operations, the opportunity to perform reset operations to ensure future readiness, and a platform to transform to meet the demands of the 21st

century. This is accomplished by: improving family housing and Soldiers barracks, community facilities, and training facilities; continuing responsible stewardship of our environment and resources; revitalizing our Soldiers and families through the implementation of the Soldier Family Action Plan; offering child care, youth services, religious support, community recreation and community services; operating Soldier Family Assistance Centers and Warrior Transition Units; and focusing on the "voice of our customer" to ensure IMCOM is meeting their needs (IMCOM-PAC 2008).

## 2.2 U.S. Army Garrison, Hawai‘i

### 2.2.1 Location

The U.S. Army Garrison, Hawai‘i (USAG-HI) is headquartered at Schofield Barracks, 25 miles northwest of Honolulu on O‘ahu Island. It also has a support battalion located at Pōhakuloa on the Island of Hawai‘i. USAG-HI higher headquarters is IMCOM – PAC.

### 2.2.2 Infrastructure

USAG-HI manages 22 installations and approximately 188,466 acres (76,269.48 ha) of land within the state of Hawai‘i. Six of those installations, Schofield Barracks Military Reservation (SBMR, including the South Range Acquisition Area), Schofield Barracks East Range, Kawailoa Training Area, Kahuku Training Area, Dillingham Military Reservation, and Mākua Military Reservation, are addressed in the O‘ahu INRMP. This document focuses on USAG-HI Pōhakuloa on the Island of Hawai‘i.

As noted above, the land base for Pōhakuloa is approximately 53,340 ha (131,805 ac). About half of Pōhakuloa proper is impact area and unsuitable for maneuvers. Of the remaining area, rough lava, firing ranges and fans, safety hazard areas, and slopes greater than 30 percent further reduce the acreage available for maneuvers. Acquisition of the Ke‘āmuku Parcel (2006) greatly increased the maneuver area for Pōhakuloa. The 2003 Biological Assessment (USACE 2003) estimates close to 25% of the land base for all of Pōhakuloa has a high probability of supporting off-road vehicle maneuvers. This estimate does not include areas suitable for dismounted maneuvers, established roads, and areas not accessible by established roads and trainings.

### 2.2.3 Installation Management History

U.S. Army Garrison, Hawai‘i traces its history to the District of Hawai‘i, a command formed in 1910 as a sub-element of the Department of California. In 1911, the Hawaiian Department replaced the district reporting directly to the War Department. The department was stationed at Fort Shafter beginning in 1921.

During WWII, the department went through a series of name changes and responsibilities. It was renamed Hawaiian Department Service Force. It became the Army Port and Service Command in 1943 and was given the responsibilities for U.S. Army Forces, Pacific Ocean Area in 1944.

In 1947, the old department was abolished and was established as U.S. Army, Pacific (USARPAC) with base support operations accomplished by several short-lived organizations. In 1957, U.S. Army Hawai‘i (USARHAW)/25$^{th}$ Infantry Division (ID) was established. In 1960, these two commands were separated, and USARHAW assumed the installation support role.

Established in 1973, U.S. Army Support Command, Hawai‘i (USASCH) succeeded USARHAW and was temporarily headquartered at Schofield Barracks. Later in 1973, USARPAC was eliminated as a major command and USASCH returned to Fort Shafter, serving as the command element as well as installation support. In 1979, U.S. Army Western Command assumed the command element and USASCH resumed its traditional role as base support.

In March of 1992, U.S. Army Hawai‘i re-established command over the 25th ID, USASCH, 45th Corps Support Group (Forward) and the U.S. Army Law Enforcement Command. The 25th ID Commander also assumed command as installation commander from the USASCH Commander. U.S. Army Garrison, Hawai‘i was established in 1994 and replaced USASCH. With the establishment of the Installation Management Agency in 2002, USAG-HI was realigned to its Pacific Region Office. In 2006, the Installation Management Command (IMCOM), was formed to reduce bureaucracy, apply a uniform business structure to the management of U.S. Army installations, sustain the environment, and enhance the well-being of the military community. USAG-HI falls under IMPCOM-PAC.

### 2.2.4 Military Mission

USAG-HI mission is to provide installation support and services for Joint-warfighters, their families and the military community. USAG-HI is obligated to provide the best training for our military forces so that they will be ready to defend our nation in times of crisis. USAG-HI goals are to (1) provide quality facilities, infrastructure and information technology services to support the mission; (2) recruit, retain and develop a motivated, efficient and customer-focused workforce; (3) become the Army’s benchmark for well-being, quality of life and community relations; (4) enhance readiness and deployment support; (5) provide a safe and secure environment; and (6) maximize stewardship of resources and the environment.

The 25th Infantry Division is a subordinate command that “prepares to conduct worldwide deployment and conducts military operations as directed.” Two other subordinate commands are the U.S. Army Military Police Brigade - Hawai´i (USAMPB-HI) and the 8th Theater Support Command (TSC). The commander of the USAMPB-HI is the Provost Marshal for U.S. Army, Hawai‘i. The USAMPB-HI provides technical support for military police activities throughout the Pacific, and direct command, control and supervision for military police activities in Hawai‘i. The mission of the 8th TSC is to prepare for worldwide deployment and, when directed, provide combat support and combat service support to 25th Infantry Division and U.S. Pacific Command (USPACOM) forces.

### 2.2.5 Military Operations and Activities

Pōhakuloa is the major training area for USARPAC and is used extensively by USPACOM and Reserve forces in the Pacific for joint and combined training exercises. A sub-installation of USAG-HI, it is the largest U.S.-owned training area in the Pacific that permits the integration of live fire and maneuver in joint and combined arms operations. Military operations and activities are guided by External Standard Operating Procedures that include the protection of natural and cultural resources (USAG-HI 2009).

#### 2.2.5.1 Live-Fire Training[1]

Live-fire training requirements depend on individual and unit mission, weapons assigned, and ammunition available. The individual Soldier qualifies with an assigned weapon and then progresses through squad, platoon, and company level live-fire exercises. Each weapon system and Soldier has

[1] Adapted from USACE 2003.

an assigned annual or semiannual live-fire training requirement that must be met. A single weapon may have several different munitions of the same caliber and different uses. Normally, military weapons are designed for a specific target type (e.g., anti-tank, anti-aircraft, and anti-personnel). Weapons are designated as small arms (up to 0.50 caliber) and heavy weapons (larger than 0.50 caliber). Weapons are classified as individual (weapon operated by one individual) or crew-served (operated by two or more individuals). Lasers are normally treated as weapons.

### 2.2.5.2 Maneuver Training

The extreme roughness of lava flows and administrative and environmental considerations limit the amount of maneuver land present on Pōhakuloa. Maneuver training is a tactical exercise that can include the following activities: movement to contact, offensive operations, defensive operations, withdrawing under enemy pressure (retrograde), and reconnaissance and security. Maneuver training exercises are conducted at all levels (squad to brigade).

Combat effects, such as smoke and obscurants, noise, and simulated nuclear, biological, and chemical conditions, are integrated into training events. At Pōhakuloa, traffic in the training areas is confined to well-traveled road networks and firing position areas, and off-road driving is not authorized. Unit movement may consist of Soldiers in tactical (contact with an enemy is likely) and non-tactical (contact with an enemy is not likely) formations moving in a predetermined direction to accomplish a mission. Individual infantry Soldiers move in non-tactical formations using vehicles (mounted maneuvers), walking in formations on roads or trails often in a dispersed fashion overland (dismounted maneuvers), or by helicopter. Soldiers can move in loose tactical formations, walking in designated directions to accomplish assigned missions. Direction of movement is terrain and scenario-dependent. Due to a risk of ambush, tactical formations often do not follow roads or trails. If engagement with an enemy happens or is likely, Soldiers seek cover from enemy fire. Paratroopers parachute from transport Air Force aircraft into designated drop zones under administrative and tactical scenarios.

At Pōhakuloa, mechanical excavation is limited to specified firing points. During maneuver, Soldiers may sleep in the field. To avoid detection and allow for quick movement, tents are not set up during light infantry maneuvers, which is a different training scenario from bivouac. Soldiers normally eat prepackaged meals, and training units carry out all trash to avoid detection. Units may use blank ammunition and multiple integrated laser engagement system equipment. Field artillery and mortar fires and grenades are simulated by pyrotechnics, providing sound and visual effects, and are restricted to specific areas at Pōhakuloa.

### 2.2.5.3 Reconnaissance Training

Typical reconnaissance training operations involve small groups, squad to platoon strength (3 to 50 Soldiers). Reconnaissance training can take place on any type of terrain, but may be constrained by the extremely rugged terrain and thick vegetation at Pōhakuloa. In many respects, reconnaissance training resembles dismounted maneuver training, but does not have the same type of vehicle support. No live-fire is involved and vehicles are not used. Reconnaissance training may also involve dropping a squad by helicopter in a remote location and having to find their way to a strategic rendezvous point.

### 2.2.5.4 Bivouac

Bivouac consists of setting up camp for rest, resupply/refit, maintenance, and/or to provide support. Training units conduct vehicle/weapons maintenance, fuel and ammunition resupply, medical operations, helicopter landings, and field cooking/messing operations in bivouac areas. Tactical operations may be staged from a bivouac area. Depending on unit size, bivouac sites can contain a

vehicle and weapon maintenance area, vehicle parking area, general supply area, munitions supply area, medical area, helicopter landing zones, and vehicle off-loading area. A bivouac site may consist of a series of tents, temporary structures, and equipment covered with camouflage nets. Tents provide sleeping/living areas, maintenance shops, supply storage, medical facilities, operations/communication areas, and meal preparation sites. Meals are normally prepared in mobile field kitchens. Bivouac is normally done on level or gently rolling areas that provide vehicle and/or aircraft access. Sites are located to accommodate the unit support element, provide communication links and concealment from the enemy, and support maneuver operations. Open fires are not allowed during bivouac. The use of tent heaters (enclosed) and generators is permitted. Munitions used to defend bivouac sites typically consist of grenade and artillery simulators and blank ammunition.

### 2.2.5.5 Deployment Training

Deployment training principally involves moving troops and equipment from Schofield Barracks Military Reservation to Pōhakuloa. Transportation of units consists of a combination of vehicles, sea transport vessels, and aircraft, depending on the type and location of training. Legacy force personnel currently deploy to Pōhakuloa from Hickman Air Force Base or Wheeler Army Airfield using C-17 or C-130 aircraft. Deployed equipment to Pōhakuloa uses approximately 30 Logistics Support Vessel round trips from O‘ahu to Kawaihae Harbor annually. On arrival, troops and vehicles use established roadways to Pōhakuloa. Construction of a tank trail is scheduled to begin in 2009. On completion, troops and vehicles will access Pōhakuloa via public roads or the tank trail.

### 2.2.5.6 Aviation Training

Aviation training consists of aircrew training, maneuver training, and aerial gunnery. Aircrew training pertains to normal aviation flight skills, including take-off and landings, nap-of-the-earth (low-level flight that follows the contours of the terrain to minimize visibility and evade ground fire) and low-level flights, confined and high altitude area landing/take-off, and navigation for helicopters. Air Force and Naval aviation high performance tactical and transport aircraft practice similar tactics at higher altitudes.

Aircrew training tasks include all tactical maneuvers in accordance with each aircraft’s standard aircrew training manual and unit’s standard operating procedures. Maneuver training pertains to the ability of aviation units to transport ground maneuver and combat support/combat service support units to support the tactical battlefield. This type of training requires up to 20 helicopters flying in tactical formations carrying ground troops and equipment to battle areas.

Aviation live-fire training follows the standard Army training methodology. Aviation live-fire training is supported by designated ranges and ground targets, along with scoring systems to determine weapon accuracy and weapon effects. Aerial gunnery is a live-fire task accomplished at fixed ranges. Aerial gunnery pertains to the ability (Army attack, cargo/troop movement helicopters, cavalry units, and Air Force/Naval tactical aircraft) to engage targets with bullets, cannon rockets, missiles, or bombs.

Army and Marine Corps aviation units each utilize Pōhakuloa for major deployment exercises about two to four times annually. The average number of aircraft varies from 15 to 25 per event, but can range up to 50 to 60 per event. The number of sorties (combat training flight missions) at Pōhakuloa averages 50 to 100 annually (USACE 2003). Nighttime aerial gunnery by the aviation brigade occurs semi-annually. Night flying averages 10 flights per month. High altitude flight training takes place in Palila Critical Habitat air space. The Army has measures in place to minimize impacts.

### 2.2.5.7 Landing and Drop Zone Activities

At Pōhakuloa, landing and pickup zones are used for moving artillery pieces, Medevac operations, troop transport, and airborne assault lifts. Troop numbers vary from platoon (40 personnel) to company (150 personnel) size units per event. These events (combined) take place approximately 20 to 30 times a year.

Standard aircraft support packages consist of : (1) 2 UH-60 (Blackhawk) or 1 CH-47 (Chinook) and OH-58D (Kiowa Warrior) for platoon support; (2) 4 UH-60 or 2 CH-47 and 2 OH-58D for company support; and (3) 12 to 18 UH-60, 4 to 8 OH-58D, and 2 to 4 CH-47 for battalion support. Primary users of landing zones are Army and Marine Corps units. Drop zones are used for troop and equipment parachute drops typically from C-130 and C-17 aircraft. Cargo drops take place approximately two to four times per year and personnel drops once a year (if at all) (U.S. Army 2003b). A drop zone team on the ground typically consists of two to four personnel to retrieve the cargo with a HUMVEE, 5-ton Rough Terrain forklifts, and/or five-tone stake bed trucks.

Personnel and equipment drops take place at other approved drop zones, including firing points and position areas outside of Palila Critical Habitat. In addition to firing points, helicopters may land at Landing Zone Rob (Training Area 1), Landing Zone Brad (Training Area 3), all ranges, on Puʻu Ahi, Puʻu Keʻekeʻe, Puʻu Kailua, Puʻu Menehune, Forward Rearming and Refueling Points, and other locations with permission from Range Control and the Natural Resources office. Vehicle support associated with landing zone exercises is confined to existing roads and trails.

### 2.2.5.8 Major Force-on-Force Training

In a major force-on-force scenario, a battalion or brigade engages an opposing force in a non-live fire maneuver over a relatively large area, typically for an extended period (10 or more days) and with the involvement combat service support forces. The elements of a force-on-force training scenario are tailored to fit available resources. A brigade commander exposes subordinate units to phases that could be encountered in actual operations, such as pre-deployment, low intensity conflict, mid-intensity conflict, and evaluation, inspection, and cleanup. In a brigade-sized operation, the battle zone develops into a linear configuration divided into three areas of operations: the forward area or security zone, the main battle area, and the brigade rear.

Specific military activities in a force-on-force exercise normally include cross-country vehicle maneuvers, blackout driving, using pyrotechnics and artillery simulation devices, building hasty/limited defensive positions, emplacing obstacles, and establishing forward/rear support areas or field hospitals. Vehicles are moved on hardened and improved all-weather roads with limited use of unimproved roads and trails. Cross-country travel by wheeled vehicles is not allowed on Pōhakuloa proper except at approved firing positions. Cross-country travel by wheeled vehicles is expected to occur on the Keʻāmuku Parcel.

Support operations consist of setting up camp for rest, resupply/refit, and maintenance, or to provide other services. Units establish support areas under field conditions to stabilize logistics and provide a common site for support operations. Support areas vary depending on unit size and mission. Tactical operations may be staged from support areas.

Depending on unit size, support areas can contain a vehicle and weapon maintenance area, vehicle parking area, general supply area, munitions supply area, medical area, helicopter landing zones, and vehicle off-loading area. A support area typically consists of a series of tents and other temporary structures and equipment covered with camouflage nets. Tents provide sleeping and living areas, maintenance shops, supply storage, medical facilities, operations and communication areas, and meal

preparation areas. Support areas are normally established in level or gently rolling areas that provide vehicle and aircraft access. Sites are chosen to accommodate the unit support element, to provide communication links, to provide concealment from the enemy, and to support maneuver. Open fires are not allowed. Enclosed tent heaters and generators are permitted.

#### 2.2.5.9 Weapons Systems, Munitions, & Vehicles

Weapons are standardized in the U.S. Armed Forces and are normally common among U.S. Allies (see Section 2.2.5.1 *Live-Fire Training* and Section 2.2.5.7 *Landing and Drop Zone Activities*).

## 2.3 Pōhakuloa

### 2.3.1 Location and Neighbors

Pōhakuloa is located in the north central portion of the Island of Hawai‘i (Figure 2.a), west of the Humu‘ula Saddle in an area formed by the convergence of three volcanic mountains: Mauna Kea, Mauna Loa, and Hualālai. The installation's cantonment area is situated 58 km (36 mi) west of Hilo, 40 km (25 mi) south of Waimea, and 80 km (50 mi) east to Kailua-Kona. The populations of Hilo and Kailua Kona are 40,759 and 9,870, respectively, and the population of Waimea and Waikōloa Village are 7,028 and 4,806, respectively (U.S. Census 2000). Waimea and Waikōloa are some 15 km (6 mi) north-west of the installation boundary. Pōhakuloa is 175 nautical miles from O‘ahu, the home station for most assigned forces.

Pōhakuloa is the single largest U.S. Army holding in the state of Hawai‘i at 53,340 ha (131,805 ac) of ceded, leased, and fee simple lands (Table 2.a). The majority of Pōhakuloa was acquired through Presidential Executive Order 11167 (64 percent) and purchases (18 percent). The Ke‘āmuku Parcel, a former Parker Ranch land holding managed by the Richard Smart Trust, was purchased in 2006.

Another 17 percent of the installation is held through a 65-year lease with the State of Hawai‘i, which expires in 2029. The installation is in an unincorporated area. Nearly all neighboring properties are conservation lands (25th Infantry Division (Light) and US Army Hawai‘i 2002) (Figure 2.b).

State of Hawai‘i lands border 68 percent of the Pōhakuloa, and the remaining 32 percent of the boundary neighbors privately held properties. Mauna Kea State Park is northeast of Pōhakuloa. Hawaiian Homelands properties are to the east of Pōhakuloa and share 2.9 percent of the border. Kamehameha Schools land adjoins the installation on its southwestern boundary (8.8 percent). Multiple landowners northwest of Māmalahoa Highway account for 8.9 percent of the boundary. The purchase of the Ke‘āmuku Parcel has placed Pōhakuloa in closer proximity to developed areas. Approximately 26 km (10 mi) from the cantonment area and 13 km (5 mi) from the northwest corner of the installation along State Road 200 is the Waiki‘i Ranch. The Ke‘āmuku Parcel purchase establishes the installation boundary on three sides of the subdivision and an 8.9 percent of share of the installation's boundary. The remainder of adjoining lands to the Ke‘āmuku Parcel belongs to the State of Hawai‘i, and these lands are often subleased to private landowners (e.g., Parker Ranch). Grazing and public recreation are the principal neighboring land uses (25th Infantry Division (L) and U.S. Army Hawai‘i 2002).

### 2.3.2 Infrastructure

#### 2.3.2.1 Ranges and Training Lands

Pōhakuloa has 22 live-fire and 4 non live-fire ranges, 23 training areas, a centrally located impact area, 1 airfield, and 113 surveyed field artillery and mortar firing points (Figure 2.c). The 27 ranges

# *Location of Pohakuloa, Hawaii*

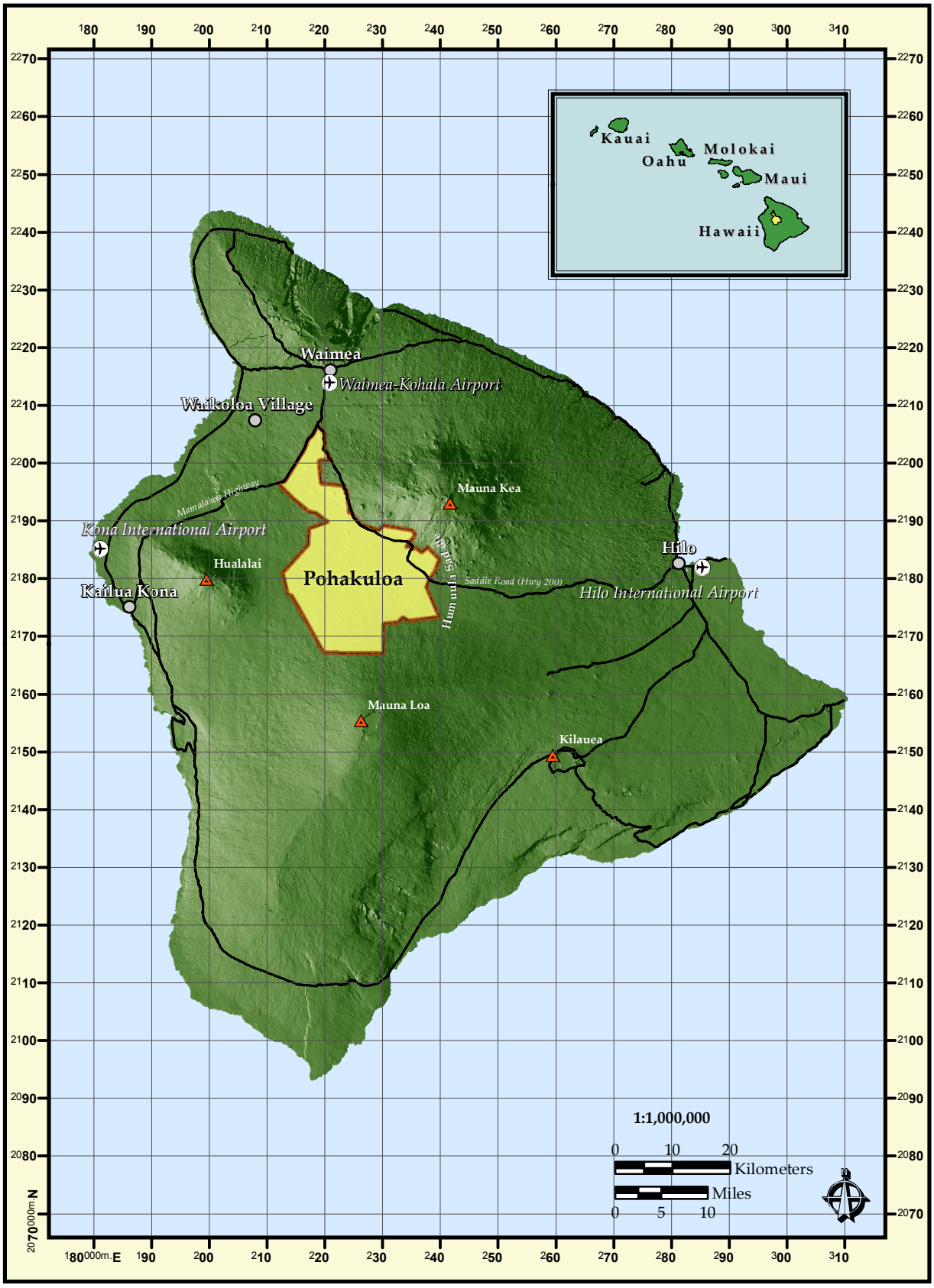



**Figure 2.a**

# *Land Ownership & Neighbors, Pohakuloa*

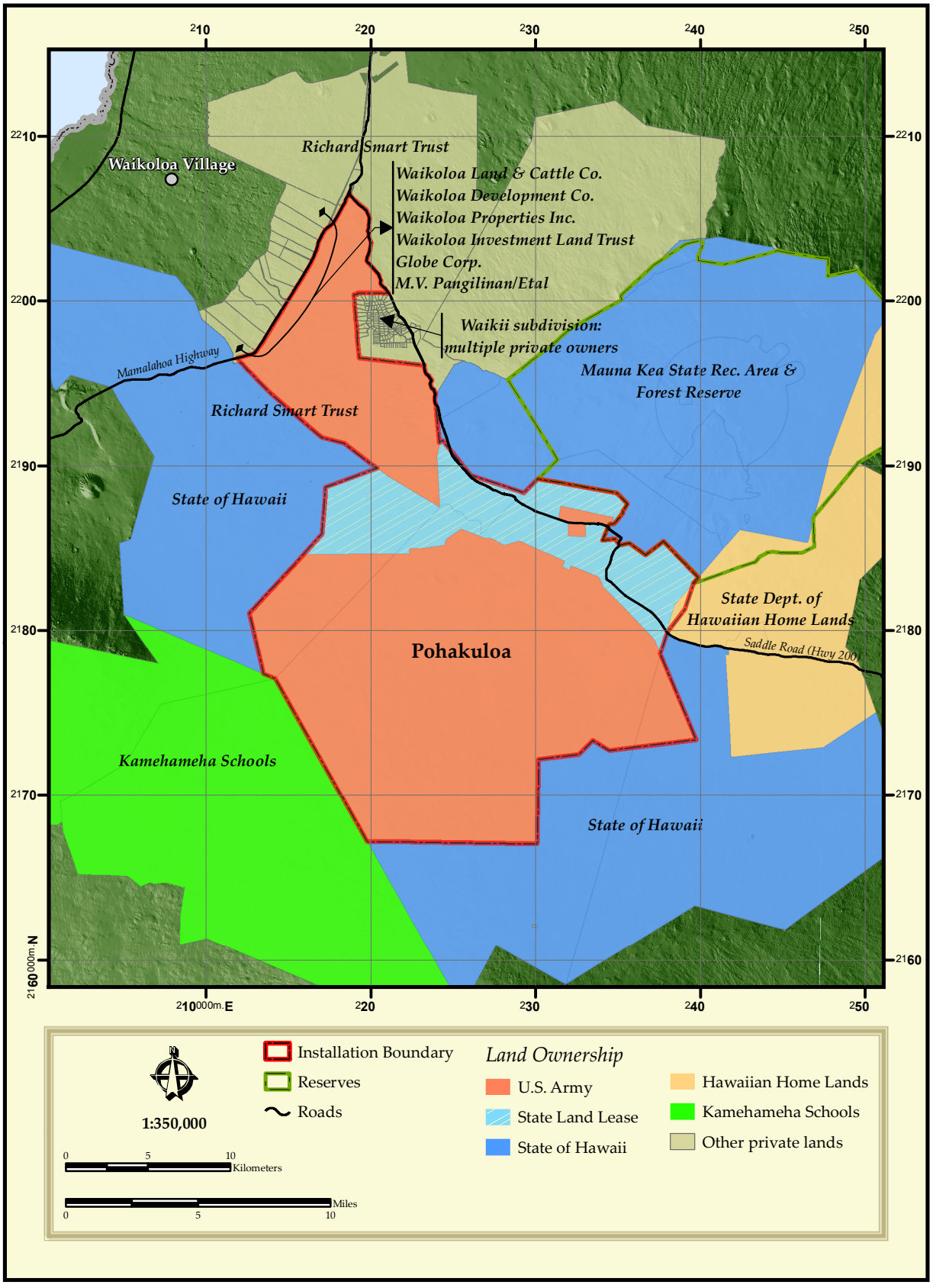



**Figure 2.b**

# *Ranges and Training Areas at Pohakuloa*

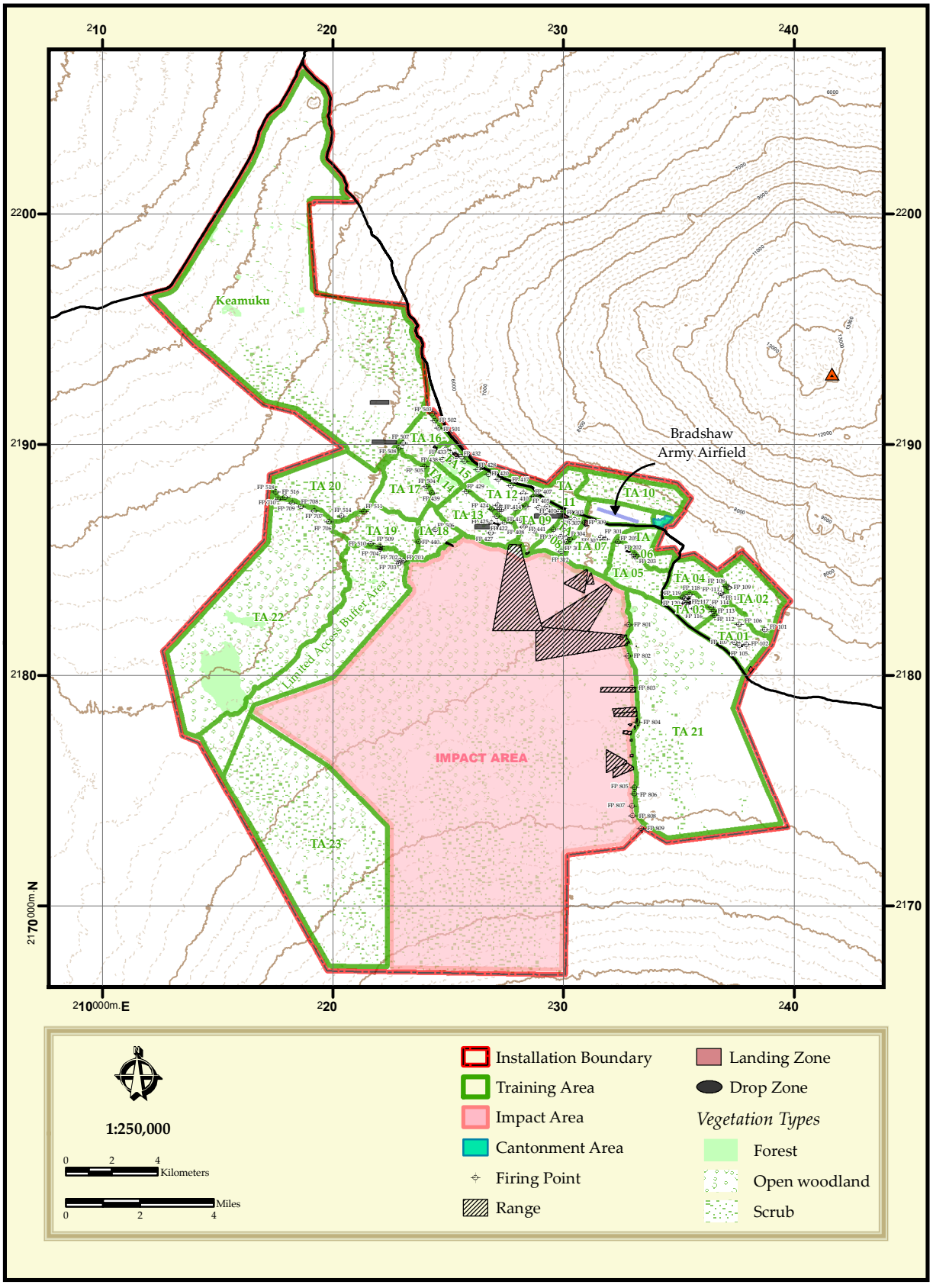



**Figure 2.c**

**Table 2.a Land Ownership, Pōhakuloa, Hawai‘i.**

| Unit Ownership | Reference | Size | | |
|---|---|---|---|---|
| | | Hectares | Acres | Percent |
| Ceded to Army | Governor's Executive Order No. 1719 (26 January 1956) | 306.9 | 758.3 | 0.6 |
| Ceded to Army | Presidential Executive Order No. 11167 (15 August 1964) | 34,016.7 | 84,057.0 | 63.8 |
| State of Hawai‘i | Lease No. DA-94-626-ENG-80 (exp. 16 Aug 2029) | | 22,971.0 | 17.4 |
| Other | Easements and licenses | 2.2 | 5.5 | + |
| Other | Acquired by purchase | 9,717.8 | 24,013.3 | 18.2 |
| | **Land Total** | 53,339.7 | 131,805.1 | |

*Source –USAG-HI Realty (May 2007)*

and artillery firing points are in training areas surrounding the impact area and oriented so 28 munitions are fired into the impact area. There are two exceptions; two ranges currently are oriented to the east along Redleg Trail. The 22 live-fire training ranges are located in the northern and eastern parts of the installation. There are four airborne drop zones capable of personnel and equipment airborne operations.

### Impact Area

In the center of Pōhakuloa is a 20,639-ha (51,000-ac) impact area and dudded areas. A limited access buffer zone extends along the western side of the impact area. An improved convention munitions (ICM) area sits close to the center of the impact area into which munitions are delivered by two or more anti-personnel, anti-materiel, and/or anti-armor submunition warheads or projectiles. Access to the impact area is restricted because of the presence of unexploded ordnance. The U.S. Air Force and Navy train tactical aviation aircraft bombing and strafing. Aircraft stage from remote airfields in Hawai‘i, other areas, and from aircraft carriers to simulate attacking ground targets. The number of aircraft varies from one to four to six. Aircraft engage ground targets with aerial cannons, rockets, missiles, and live or practice bombs.

### Cantonment Area

The cantonment area covers approximately 229 ha (566 ac) and consists of 128 buildings (almost all Quonset huts) including three dining facilities (one is large); two small and one large motor pool; one rations warehouse and freezer; two bulk fuel facilities; and a chapel, theater, recreation club, and medical facility. Four new barracks hold 50 Soldiers each. Three military personnel are permanently stationed at Pōhakuloa (R. Misajon, pers. com. 2008), and some 20,095 troops trained on the installation in 2006. The cantonment area can billet a training deployment of 1,680 personnel. Additional space is available for units supplying their own cots.

### Bradshaw Army Airfield

Bradshaw Army Airfield is used for deploying, redeploying, and resupplying all military units training on the Island of Hawai‘i (DA and USCE Hawai‘i 2004). The airfield covers approximately 211 ha (522 ac), has a 1,126 m (3,696 ft) x 27 m (90ft) runway with a 152-m (500-ft) overrun on each end marked as a displaced threshold. Two panels on the runway support helicopters. The parking ramp can accommodate two C-130s. No permanent aircraft are assigned to Bradshaw Army Airfield. The facility is under the command of Air Traffic Control Services, Wheeler Army Airfield, 25th ID. Current operations are limited to visual flight rules, and approaches and departures are only from the west. Construction is due to begin in 2009 to lengthen the runway to 1707 m (5,600 ft) long with a 91 m (300 ft) overrun at each end. The runway will be 38.5 m (100 ft) wide with 7.6 m (25 ft) paved

shoulders. The runway will be designed to accommodate C-130 and C-17 aircraft under assault landing zone criteria.

#### 2.3.2.2 Other Training Areas/Spaces

##### Ke‘āmuku Parcel

The Ke‘āmuku Parcel will increase off-road maneuvering at Pōhakuloa. Prior to purchase, the Army occasionally leased the parcel from the Richard Smart Trust (Parker Ranch). Construction is limited to roads for this brigade task force maneuver training area. Drop zones are proposed.

##### Restricted Area 3103

Airspace above Pōhakuloa is Restricted Area 3103. Flight corridors are established for R-3103 to control aircraft without interfering with ground-firing weapons systems and to prevent over flight of active firing points. This airspace is under the control of the Range Office at Pōhakuloa. Restricted Area 3103 extends from surface upward to 9,144 m (30,000 ft) above mean sea level, according to an agreement with the Federal Aviation Administration, Honolulu Control Facility, which is the controlling agency of the airspace over Hawai‘i. The using agency is USAG-HI, Schofield Barracks (U.S. Department of Transportation 2007). R-3101 use encompasses firing small arms, field artillery projectiles, and military aircraft. The U.S. Navy uses the area for air-to-surface missile training and for high altitude, laser-guided, inert bombing of targets in the southern part of the Impact Area.

##### Roads

Pōhakuloa has about 21 km (13 mi) of paved roads (Saddle Road and cantonment area), 58 km (36 mi) of unimproved gravel roads with drainage, and 129 km (80 mi) of tank trails and dirt roads. The range road system at Pōhakuloa allows access to most firing ranges as well as maneuver areas on the northern portion of the installation. In addition, there is a relatively good access road to Training Area 23. Access is limited to some parts of Pōhakuloa due to few roads or roads that are difficult to travel. Dust can be a problem on unimproved roads.

Equipment is either driven or trucked to Pōhakuloa via Route 19 to Waimea, Route 190 to the Saddle Road intersection, and then up Saddle Road (SR 200) from the Kawaihae docks. A tank trail will run from the Kawaihae Harbor to the cantonment. This will preclude the need to load vehicles onto trailers for transportation on roadways. The tank trail will cover approximately 54 ha (132 ac) of land held in a perpetual easement. The trail will be 5.5-m (18-ft) wide gravel road with 0.9-m (3-ft) wide gravel shoulders and include a 2.4-m (8-ft) right-of-way on both sides. The total width of the trail will be 12.2 m (40ft). The road will run approximately 43 km (27 mi) and provide access for military vehicles transporting troops, ammunition, and equipment. Public roads will no longer be necessary for troop and vehicle transport from Kawaihae Harbor. Personnel and equipment arriving at either Hilo Harbor or Hilo Airport are transported to Pōhakuloa along Saddle Road (SR 200).

Saddle Road (SR 200) serves Pōhakuloa from the east (Hilo) and west (Kona). A cross-island highway, the State of Hawai‘i and the Federal Highway Administration are widening, improving, and increasing the safety of the road for the entire route. Near Pōhakuloa, the highway runs north along the base of Mauna Kea and no longer runs through this portion of the installation. The new route passes through Palila Critical Habitat B and south of Palila Critical Habitat A. The highway will cross Training Areas 15 and 16 and enter the Ke´āmuku Parcel. The route through the Ke‘āmuku Parcel is being determined and will be addressed in a future environmental impact statement.

##### Commercial/Other Airports

Commercial airports at Hilo (54 km, 34 mi east) and just north of Kona at Keāhole (52 km, 32 mi west) serve the Island of Hawai‘i, handling aircraft up to large commercial jets (Airport Resource Center 2007). A smaller airport is at Waimea-Kohala (30 km, 19 mi Northwest). ‘Upolu Point

Airfield (State owned) is occasionally leased by USAG-HI. ʻUpolu Point Airport is 5 km (3 mi) northwest of the unincorporated town of Hāwā on the northern tip of the Island of Hawaiʻi. It is a single runway with two aircraft parking areas. The runway is 1158 m (3800 ft) long and 23 m (75 ft) wide.

### Shipping Facilities

Docks at Kawaihae in South Kohala are operated by the State of Hawaiʻi, and are suitable for transport ships. Kawaihae Harbor is undergoing expansion in accordance with the Kawaihae Harbor 2020 Plan (Sato & Associates et al. 1996). Most military equipment is delivered to the Island of Hawaiʻi by large sea barges and offloaded at Hilo and Kawaihae harbors. From Kawaihae Harbor, equipment and vehicles can be transport to Pōhakuloa along an improved tank trail. Construction of a proposed tank trail is scheduled to begin in 2009 (DA and USCE Hawaii 2004).

Besides Bradshaw Army Airfield, the installation has numerous helipads, and most of the installation is accessible by helicopter. Military personnel and cargo shipped by air primarily arrive at either Hilo Airport or Bradshaw Army Airfield (Sato & Associates, Inc. et al. 1996).

Bradshaw Army Airfield has a runway and terminal facilities (control tower, airfield operations, weather forecasting/reporting, and crash rescue) to support transient aircraft for refueling, parking, and minor maintenance. Near the airfield are an ammunition and fuel storage facilities. The total built-up area, including cantonment, airfield, fuel storage, etc., is about 622 acres (252 ha).

## 2.3.3 History

### 2.3.3.1 Pre-Military Land Use

Pōhakuloa is part of a large cultural landscape that includes Mauna Kea, Mauna Loa, and the saddle area (U.S. Navy 2008). The area has site types that include traditional activities such as bird hunting for feathers and meat, quarrying volcanic glass, and lithic workshop locations as well as numerous trails used for cross-island movement and between Mauna Kea and Mauna Loa summits. The Ahuaʻumi Heiau on the slopes of Hualalai (southwest of Pōhakuloa) is believed to have been built by the legendary chief "Umi a Liloa" around 1600 and derives some of its importance from its location at the juncture of several of these trails. Cave shelters are abundant due to an extensive natural lava tube system in the area; historically they have been a source of limited water and have provided refuge from the elements (U.S. Navy 2008).

An historical account of the lands of Waikiʻi describes 25,000 sheep at three stations on Mauna Kea in the late 1800s as well as a description of the central plateau as "destitute of water, and sustaining only a miserable scrub of māmane (*Sophora chrysophylla*), stunted ʻōhiʻa (*Metrosideros polymorpha*), pūkeawe (*Styphelia tameiameiae*), ʻōhelo (*Vaccinium reticulatum*), a few composites, and some of the hardiest ferns" (Maly and Maly 2002). A descendent from Mauna Kea recounts a vast tableland (Pu'u Ke'eke'e-Pōhakuloa region) between volcanic domes and "the loneliest, saddest dreariest expanse." The lower elevations of Mauna Kea are described with "forests that skirt his base, [and] are the resort of thousands of wild cattle… [and where] wild black swine…abound." By the 1840s, cattle, sheep, and goats were causing a significant impact to the point of eating thatched homes and consuming agricultural crops. John Parker held a lease in the area of Pōhakuloa from 1876 to 1891and the Waimea Grazing and Agricultural company from 1860-1981(USAEC 2008). The latter completed a wagon road from one of its remote sheep stations near the Saddle Road (at Humuʻula) to Waimea to transport wool to the harbor at Kawaihae. A portion of that road is still visible. By 1891, the Humuʻula lease was held by the Hackfield's Humuʻula Sheep Station Company. After 1900, Parker obtain control of the Humuʻula Sheep Company and controlled most of the saddle (USAEC 2008).

In 1903, the Waikiʻi Ranch Station and village were developed (Maly and Maly 2002). A.W. Carter developed water resources on outlying ranch lands by piping water from the Kohala Mountains to the Holoholoku, Waikiʻi, Puʻu Keʻekeʻe and Puʻu Anuanu sections of the ranch lands he purchased from A.T.K. Parker and Samʻl Parker. This venture led to the development of thousands of cattle paddock acres, and Waikiʻi village is described as the "heartland" and "bread basket" of the ranch. From 1900 and 1957, a number of families—Chinese, German, Hawaiian, Korean, and more lived at Waikiʻi and Keʻāmuku stations. Water brought agriculture to Waikiʻi and the planting of cornfields. Roadways and vehicles changed the way work was done. The Army built Kaūmana Road for military access between the town of Hilo and Waimea (Saddle Road, State Route 200). In 1957, the Waikiʻi Village Station was closed; outlying stations were no longer beneficial to the large ranches. Sheep operations ended in 1964. Around 1960, a deep well installed at Waikiʻi led to the development of the Waikiʻi Ranch.

Approximately 30 percent of Pōhakuloa proper has been surveyed for archaeological resources (U.S. Navy 2008). Typical sites include lava tubes, walls, trails, shelters, lithic scatters, quarries, shrines, cairns, platforms, and pits (Tomonari-Tuggle 2002).

### 2.3.3.2 Installation History

#### Early History

The U.S. Army began training on Pōhakuloa in about 1938, but did not routinely use the area until 1943 (Hays 2002). The Army constructed the Kaumana Road (Saddle Road) in 1942 for military access. The cross-island road was considered imperative to the defense of the island. Road construction ultimately led to the development of the Saddle Training Area, later known as Pōhakuloa (Langlas et al. 1997; U.S DOT 1999).

#### World War II

The area was used during World War II as a Marine Corps artillery live-fire training area (McElroy 2006). The Navy, as well as the Marines Corps, conducted air bombardment and strafing at the emerging installation (S. Troute, per. com. Feb 2007). Tents were the extent of billeting. After the war, the area fell under the control of the Hawaiʻi Territorial Guard (Hays 2002). Limited use of Pōhakuloa may be related to the extent of military training occurring on other parts of the island. Camp Tarawa (aka Camp Waimea) was a huge tent city on Parker Ranch land that trained Soldiers for Iwo Jima. Waikoloa Maneuver Area and Nansay Sites covered over 49,766 ha (123,000 ac) and served as a training camp for 50,000 men in the 2nd and 5th Marine Divisions and the V Amphibious Corps. The site was used as a U.S. Marine Corps combat and artillery firing range as well as for troop maneuvers. Parts of Waikoloa Maneuver Area include the Keʻāmuku Parcel and the area referred to as the 1010 Parcel that the Army purchased from Parker Ranch in 2006.

#### Korean War to Vietnam

The National Guard used Pōhakuloa during the Korean War and the 25th ID deployed to Viet Nam. Training for Viet Nam was similar to Legacy training, only differing in the types of weapons. Temporary tent encampments sporadically identified the training area until 1955, when the site became a permanent installation. Pōhakuloa slowly evolved into an installation and year-round training area was officially established on 27 April 1955. Governor's Executive Order 1719 (26 January 1956) set aside 307 ha (758.26 ac) for the use of the U.S. government and Presidential Executive Order 11167 (15 August 1964) added 34,017 ha (84,057 ac) from the State of Hawaiʻi at no cost. Another 9,303 ha (22,988 acres) were added via 65-year leases from the State of Hawaiʻi (17 August 1964), which expire 16 August 2029.

The first structures were erected prior to the installation's formation in 1955. These shed roof outhouses were demolished in 1962. The Quonset huts that define the landscape of the Pōhakuloa base camp were erected from 1955 to 1961 and used by the National Guard, Army, and Marines (Langlas et al. 1997). Other waves of construction occurred from 1962 to 1969 and in the 1980s. Few of the Quonset huts built at Pōhakuloa have been demolished. Bradshaw Army Airfield has been in service since the 1960s.

#### Post Vietnam to First Gulf War to Present

The 25th ID and 3rd Marines were the principal users of Pōhakuloa into the 1970s. Training changed to light vehicles, and tanks were no longer part of training exercises. Pōhakuloa is the largest live-fire range and training complex in USAG-HI, and is the main tactical training area for military Mission Essential Task List (METL) training. The installation provides resources for active and reserve component units. Pōhakuloa assets are geared toward live-fire range training, maneuver live fire (e.g., moving and shooting at targets, including combined arms live-fire exercise) on ranges, dismounted maneuver training outside live-fire ranges with no live fire, mounted non-live fire maneuver, and artillery live fire. However, Army training is changing, and training on Pōhakuloa is moving from light infantry training to include urban, close in, and complex terrain exercises. Infantry activities continue to center on movements and engagements, utilizing a variety of squad/platoon to company and larger exercises. Engineering, military intelligence, and signal units will be included. Infantry battalion companies will change to combined arms teams, consisting of infantry, a family of light and medium-weight vehicles.

Pōhakuloa supports infantry brigades, artillery, aviation brigade, sustainment brigade and other combat support (CS) and combat service support (CSS) units. The 25th ID is the principal fire and maneuver user. Other users include the Hawai'i Army National Guard, U.S. Marine Corps Units, and other Allied Forces.

### 2.3.3.3 Cultural Resources Management

Some 397 archaeological sites have been recorded on Pōhakuloa, including both prehistoric and historic Native Hawaiian as well as military sites (USAG-HI 2007a). One site, Bobcat Trail Habitation Cave, is listed on the National Register of Historic Places. Most of the other sites (387) are considered potential for listing. Many of the sites are lava tube shelters. Others include caves, enclosures, lithic scatters, lithic quarries, ahu or cairns, C-shaped shelters, shrines, platforms, slab pits, and trails (USAG-HI 2007a).

Cultural resources management is handled by the USAG-HI DPW Environmental Division, Conservation Branch, Cultural Resources Section. USAG-HI is currently in the process of developing an installation Integrated Cultural Resources Management Plan. USAG-HI's NRO staff takes into account that its management practices and actions (undertakings) must comply with the National Historic Preservation Act as amended.

### 2.3.3.4 Natural Resources Management

The Hawai'i Department of Land and Natural Resources (DLNR) had primary responsibility for management of natural resources in the area of the installation prior to its establishment in 1955. With its formation, the Army assumed those responsibilities for Pōhakuloa's natural resources. The DLNR continued to provide technical assistance and to perform most resources management activities on Pōhakuloa through the early 1990s. On 23 July 1965, an Agreement for a Cooperative Plan for the Conservation and Development of Fish and Wildlife Resources between the Department of the Army, Department of Interior, and State of Hawai'i was finalized. The agreement required the preparation

**Table 2.b History of Natural Resources Program Staff at Pōhakuloa.**

| Program Managers | Staff |
|---|---|
| Norm Statland (1990-1994) | 1—soil conservationist |
| Sterling Sam (1994-1995) | 2—soil conservationist, botanist |
| Scott Henderson (1995-2002) | 3 (plus field assistants)—wildlife biologist, botanist, horticulturalist |
| Sean Gleason (2002-2005) | 5 (plus field assistants)—field supervisor, botanist, wildlife biologist, horticulturalist, 2 NR specialists |
| Darryl York (2005-2007) | 10 (plus 17 field assistants)—botanist, wildlife biologist, horticulturalist, weed crew leader, fence crew coordinator (1) and leaders (3), monitoring specialist, NR crew leader |
| Peter Peshut (2008- ) | 57—biologist and assistant (2); coordinators (2); biologists (14); weed crew coordinator, crew leadears and technicians (11); fence crew coordinator, crew leaders, and technicians (23); and fuel break crew leader and technicians (5). |

and development of a Master Fish and Wildlife Management and Habitat Improvement Plan for each Hawai‘i installation. In 1969, a Master Plan was completed and agreed on by the three agencies.

In the early to mid-1990s, the Pōhakuloa NRO staff responsibilities increased as new federal laws arose. A soil conservationist was hired for Pōhakuloa in 1990. The position fell under the Directorate of Public Works, Environmental Division, Conservation Branch, Natural Resources Section (Table 2.b, Figure 2.d).

The natural resources program grew from one soil conservationist to a staff of two around 1994 when a temporary botanist was added through the Oak Ridge Institute of Science and Education (ORISE) program. By early 1996, the Pōhakuloa Natural and Cultural Resources staff included a biologist and six ORISE personnel (two wildlife biologists, two botanical technicians, one botanist, and one archeologist). The U.S. Congress directly funded this growth in part.

In August 1997, the ORISE program was replaced by similar staffing via the Pacific Cooperative Studies Unit, Research Corporation, University of Hawai‘i (RCUH). The RCUH personnel supported the requirements for natural resources management at Pōhakuloa. In 1998, the Army obtained additional support from the U.S. Department of Agriculture, Wildlife Services, with the placement of a full-time position at Pōhakuloa for removal of non-native wildlife species. By 2000, The Wildlife Service staff had grown to two individuals.

In 2002, staffing included the biologist (DA employee), five contracted natural resources positions (field supervisor, botanist, wildlife biologist, horticulturalist, and two natural resources specialists), and two full-time contracted Integrated Training and Management (ITAM) personnel [Land Rehabilitation and Maintenance (LRAM) Coordinator and Land Condition-Trend Analysis (LCTA) Coordinator], along with two USDA Wildlife Service employee positions. Staffing has increased and now includes a biologist (DA employee), 65 or more contracted employees in the Natural Resources Office (NRO), and three contracted employees in the ITAM Office at Pōhakuloa (Figure 2.d) Additional NRO staff members, including two public outreach individuals, have been proposed.

The Pōhakuloa NRO has recently focused on the following issues: (1) drafting an Implementation Plan based on the 2003 and 2008 biological opinions; (2) compliance with DoD, DA, USFWS, and other’s instructions, guidance, policies, regulations, and laws; (3) large-scale fence construction; (4) plant monitoring and inventory of the installation of federally listed species; (5) rare animal surveys

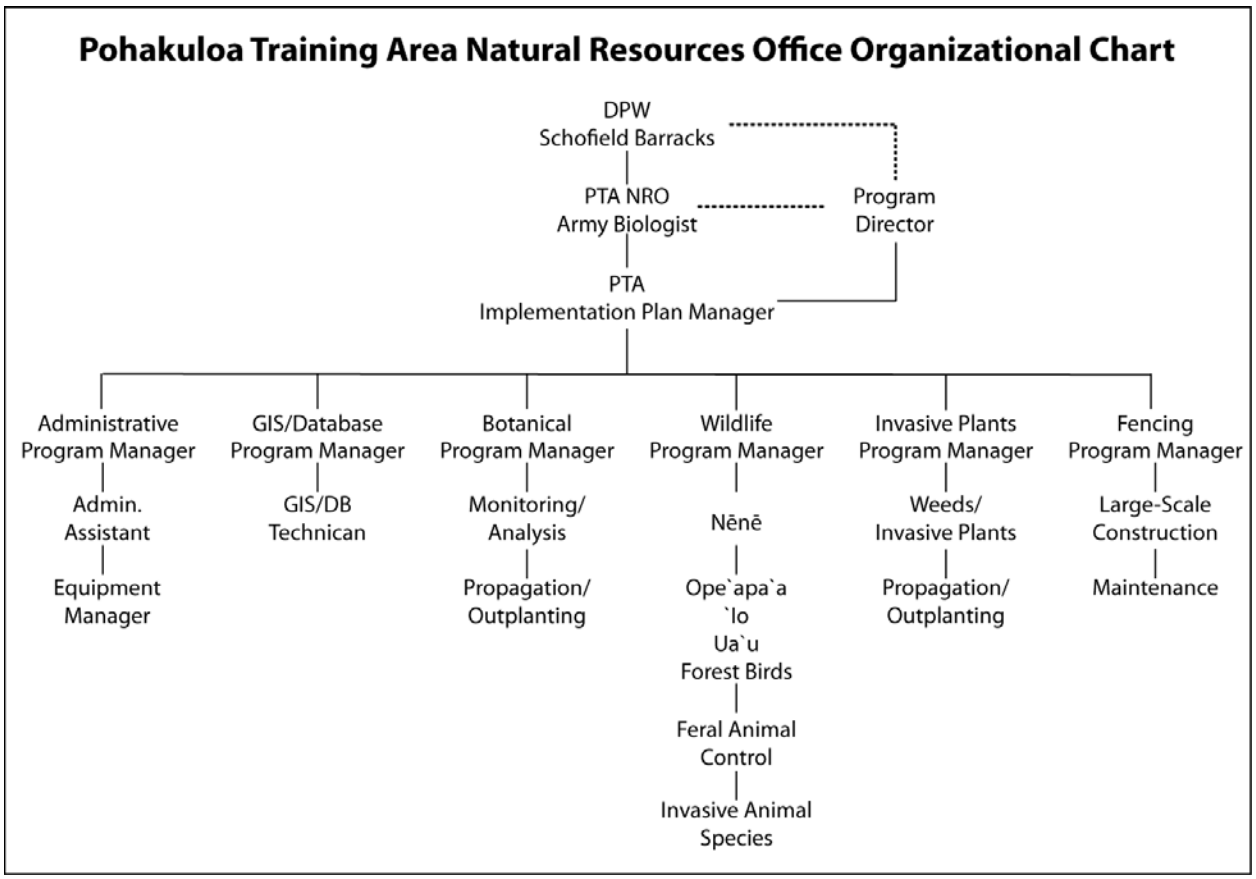



**Figure 2.d Organization of the Natural Resources Office at Pōhakuloa.** Grayed boxes are positions held by Department of Army employees. White boxes are positions held by contractors. Dash line indicates equivalent positions.

and monitoring (including bats); (6) forest bird population monitoring; (7) nēnē (*Branta sandvicensis*) survey, monitoring, and observational research; (8) management efforts in Areas of Species Recovery (ASR, i.e., areas with significant natural resource value); (9) invasive species (plant and animal) control; (10) plant propagation and outplanting; (11) removal of barbed wire; and (12) public outreach (hunting program, volunteers, public involvement). The NRO staff documents its efforts in annual reports (USAG-HI 2007b, 2006, 2003, 2002, 2000, 1998).

Wildland fire is a major concern at Pōhakuloa and for USAG-HI. The Army has been involved in the suppression of wildfires since its earliest days of training at Pōhakuloa. This function was largely an additional duty of the Pōhakuloa Fire Department, an organization whose priorities are the airfield and base camp (cantonment area). Environmental funding bolstered Pōhakuloa's wildland fire response capabilities because of potential fire threats to federally listed species. In 1993, Pōhakuloa purchased two specially equipped HMMWVs to improve its suppression capabilities, and members of the Fire Department received specialized wildland fire fighting training. Range Division Hawai'i has two similarly equipped HMMWVs. Currently, there are two HUMVEEs and two pump-outfitted Ford F 550's (K. Glenn, per. comm. 2008).

### 2.3.3.5 Section 7 Consultations, Environmental Assessments, and Environmental Impact Statements

#### Palila and Palila Critical Habitat

In 1978, the Army requested a formal consultation with the USFWS concerning the possible effects of military training activities on the welfare of the palila and its critical habitat in Training Areas 1 and 6 (now Training Area 10). Based on the results of an on-site investigation, the USFWS opinion was that military activities were causing an adverse modification to the critical habitat in Training Area 1. In Training Area 6, the exclusion of open fires removed the potential adverse effect on Palila Critical Habitat or possible jeopardy to the continued existence of the species.

#### Division Field Training Exercise (FTX '82)

A Section 7 consultation was completed with a biological opinion rendered by USFWS on June 7, 1982 for proposed military training exercises.

#### Palila and Palila Critical Habitat and three Federally Listed Plant Species

Formal consultation was requested regarding the increased usage (number of troops from one company to one battalion and the number of artillery units from one battery to three or four batteries) of Training Area 1 in 1983. USFWS noted that the proposed actions would neither likely jeopardize the continued existence of the palila nor result in the destruction or adverse modification of the Palila Critical Habitat with the changes to training instituted in 1978 (Special Restriction Use).

During the same consultation, the Army noted a plan to increase the maneuver area by 607 ha (1,500 ac). The new maneuver area would be cleared of unexploded ordnance. To facilitate the clearing, controlled burns would be used to clear the vegetation. While no listed or proposed species for listing occurred in the area, the site was west of the Kīpuka Kālawamauna and a known habitat for the honohono (*Haplostachys haplostachya*), creeping mint (*Stenogyne angustifolia* var. *angustifolia*), and nehe (*Lipochaeta venosa*). Given the planned safety procedures with adequate personnel and equipment, the USFWS opinion was that the action would not likely jeopardize the continued existence of the three plant species.

#### Multi-Purpose Range Complex, Pōhakuloa Training Area, Hawai'i

In 1986, the Army prepared an environmental assessment to evaluate the construction and operation of a Multipurpose Range Complex (MPRC) on approximately 486 ha (1,200 ac) in the southwestern corner of Pōhakuloa. In coordination with USFWS, biological reconnaissance surveys were performed. The USFWS acknowledged in a letter (May 27, 1986) that although the 'ope'ape'a, Hawaiian hoary bat (*Lasiurus cinereus semotus*) and 'io (*Buteo solitarius*) occasionally fly through the area, the proposed action would not likely jeopardize the continued existence of any listed/proposed threatened and endangered species. Botanical surveys identified two federal candidate plants, narrow leaf pamakani (*Tetramolopium consanguineum* var. *leptophyllum*) and a'e (*Zanthoxylum hawaiiense* var. *citriodorum*) in the area.

#### Relocated Baseline/Administration Area, Multi-Purpose Range Complex

An environmental assessment was prepared in 1990 to evaluate the consequences of enlarging the Multipurpose Range Complex by approximately 105 ha (260 ac) to enhance the command, control, and safety of the range by providing an unobstructed view of the range and to establish a baseline for firing TOW anti-tank missiles. The USFWS concluded (20 April 1990) that the project would not likely affect any threatened or endangered plant and animal species. The letter concurred with the proposed mitigation measures for the Category 1 candidate endangered Hawaiian catchfly (*Silene hawaiiensis*). Mitigation included the construction of a fence (Kīpuka 'Alalā Fence Unit A) to protect known populations of Hawaiian catchfly (*Silene hawaiiensis*).

### Ecosystem Management Program
The Army prepared an environmental assessment in 1995 to evaluate the impacts of fountain grass control along selected roadways and the construction of three fence exclosures in Puʻu Ka Pele, Kīpuka Kālawamauna and a portion of Kīpuka ʻAlalā; a plant holding shelter; and six, 80,000-gallon dip tanks at Pōhakuloa. The USFWS concurred that the proposed actions would have an overall positive benefit to threatened and endangered species.

### Photovoltaic Project
The Army prepared an environmental assessment to evaluate the consequences of constructing a photovoltaic power system on approximately 3.2 ha (8 ac) along the eastern border of Pōhakuloa. A botanical survey found no listed threatened or endangered species, or species of concern in the area. The USFWS concurred with the Army's determination in September 1995 that the proposed action would not likely adversely affect any listed threatened and endangered species or species of concern.

### Deep Well Construction
An environmental assessment was prepared to evaluate the proposed drilling of a deep well, equipment installation, and facilities for a potable water well at Pōhakuloa. The USFWS did not concur with the draft environmental assessment (September 12, 1996) and did not support a "finding of no significant impact" (FONSI). The Army responded to the USFWS comments, and in a subsequent letter (September 26, 1996), the USFWS stated the proposed action would not likely adversely affect federally listed endangered or threatened species.

### FY95 ECIP Photovoltaic/Hybrid System
The Army prepared an environmental assessment to evaluate potential impacts from the construction of photovoltaic/diesel hybrid power generator systems, which would provide power to target movers at Range 11, pop-up targets at Ranges 2 and 4, control towers and bunkers at 10 ranges, and airfield lighting at Bradshaw Army Airfield. T. Tierney conducted a botanical survey, and no rare plants were encountered. A letter to USFWS on January 29, 1997, provided the survey results, site sketches, and photographs of the surveyed area. Concurrence was received from USFWS (March 10, 1997).

### Range 8
A Section 7 consultation was completed between the Army and USFWS in July 1997 for the expansion of Range 8, an area where Hawaiian catchfly (*Silene hawaiiensis*) is present. The environmental assessment evaluated the effects of construction and operation of two additional firing lanes on several small groupings of Hawaiian catchfly (*S. hawaiiensis*). In the environmental assessment, the *Silene hawaiiensis* numbers were reported to have decreased from 84 plants in May 1995 to 80 plants in April 1996, and to increase to 101 plants in April 1997. During the surveys, no obvious damage from machine gun firing was noted. The vegetation in the immediate area of Range 8 showed moderate to heavy ungulate grazing. As part of mitigation, approximately 50 plants were enclosed in the Kīpuka Kālawamauna Fence Unit. Risk of fire at Range 8 was noted to be low due to the very sparse and patchy nature of vegetation. On July 23, 1997, a biological opinion rendered by USFWS stated the proposed action was not likely to jeopardize the continued existence of Hawaiian catchfly (*S. hawaiiensis*) if proposed mitigation measures were adopted.

### Rock Crusher Operations at Schofield Barracks and Pōhakuloa Training Area, Hawaiʻi
The Army prepared an environmental assessment to evaluate the effects of using a rock crusher to produce rock aggregate for Army road construction projects. The project site for the rock crushing activities was an estimated 229 m (751 ft) away from rare plant habitat containing honohono (*Haplostachys haplostachya*), Hawaiian catchfly (*Silene hawaiiensis*), and akoko (*Chamaesyce olowaluana*). In a letter dated January 23, 1998, the USFWS concurred that the proposed project would have no adverse impact on endangered species.

### Saddle Road Realignment and Improvement Project

In 1998, a Section 7 consultation was completed between the U.S. Department of Transportation, Federal Highways Administration, and USFWS for the Saddle Road Realignment and Improvement Project. In the biological opinion, USFWS stated the realignment of the Saddle Road through Palila Critical Habitat would not jeopardize the existence of the palila or Hawaiian catchfly (*Silene hawaiiensis*), and was not likely to adversely affect the Palila Critical Habitat if the proposed conservation measures were implemented. These included that USAG-HI would (1) commit funding to required fencing and ungulate control and to the restoration of palila (*Lasiurus cinereus semotus*) by cooperating with necessary predator and non-native species control and māmane reforestation or protection, and (2) coordinate fire prevention and suppression activities and planning and cooperate in the development of a comprehensive, interagency fire plan. The location of the palila restoration site was Kīpuka ʻAlalā, the site of the Multipurpose Range Complex. Two fence units were constructed, and public and contracted hunts with the USDA-Wildlife Services (USDA-WS) have resulted in the Kīpuka ʻAlalā Fence Unit 1 (or North) as ungulate-free.

In the biological opinion, USFWS acknowledged the realignment would allow continued use of the area by the military under previously established special environmental restrictions (USFWS 1998). Three alternative routes were proposed through Section 1 (eastern section of the road): the existing Saddle Road, W-2 (utilizing the Waikoloa Road through the Keʻāmuku Parcel), and W-3 (running along the northern boundary of the Keʻāmuku lava flow in the southern portion of the Keʻāmuku Parcel to Māmalahoa Highway). The W-3 route was chosen as the preferred route (D. Gedeon, Federal Highway Administration and N. Sagum, State Department of Transportation, pers. com., 2002).

In 2007, a notice was filed by the Federal Highway Administration and Central Federal Lands Highway Division that a supplemental EIS would take into consideration alternate routes through the Keʻāmuku Parcel rather than the W-3 preferred route identified in 1999. A *Final Supplemental Impact Statement and Final 4(f) Evaluation—Saddle Road (State Route 190) to Milepost 41* was published February 2010. USAG-HI was a cooperating agency in this EIS. The EIS recommends W-7, which runs along the southern boundary of the Keʻāmuku Parcel, as opposed to the preferred route W-3 by the ROD in 1999 (this route segments the parcel by about a third). The W-7 route would likely include an underpass for military traffic. W-7 would create an additional firebreak in Pōhakuloa varying in width from 40 to 52 feet wide.

The Federal Highway Administration, Central Federal Lands Highway Division consulted with USFWS (2010-F-0040, *Reinitiation of Section 7 Consultation for the West Side W-7 alignment, Saddle Road (State Route 200) Improvement Project between Māmalahoa Highway (State route 190) to Milepost 6, Hawai'i*). Implementation of the proposed action was found not to jeopardize the continued existence of *Haplostachys haplostachya*.

### Kīpuka ʻAlalā and *Silene hawaiiensis* Exclosures

The Army prepared a draft environmental assessment in 1998 to evaluate the impacts of two fence exclosures at Pōhakuloa. The Kīpuka ʻAlalā exclosure was to be constructed in Training Area 23 (southwestern Pōhakuloa) to encompass 1,503 ha (3,714 ac) of native habitat. Listed species in the exclosure to be protected from ungulates included fragile fern (*Asplenium peruvianum* var. *fragile*), kioʻele (*Kadua coriacea*), Hawaiian parsley (*Spermolepis hawaiiensis*), and Hawaiian catchfly (*Silene hawaiiensis*). A second proposed exclosure was to be constructed in Training Area 3 (northeastern Pōhakuloa) and would enclose approximately 5,000 individuals of Hawaiian catchfly (*S. hawaiiensis*) within the 1.4-ha (3.55-ac) area. The USFWS concurred that the proposed action would not adversely affect threatened or endangered species. The Army prepared a final environmental assessment and a finding of no significant impact for the project.

### Increased Archery Hunter Access Policy

The Army consulted with USFWS on increased access for archery hunting to weekdays during the months of November through January when military training activities are low. The Army monitored effects on plant populations for four years after each "special" hunting event, expending 31 hours of botanical survey efforts. In a letter dated November 17, 1999, to LTC Owen (Pōhakuloa Commander), the USFWS concurred that the continuation of increased hunter access would not likely adversely affect federally listed endangered or threatened plant species at Pōhakuloa. Further, the Army would not be required to perform further monitoring of archery hunter effects or annual consultation.

### Kīpuka ʻAlalā Terrestrial Arthropod Survey, Pōhakuloa Training Area

The purpose of the arthropod survey is to determine the impacts of ants, yellow jackets, parasitic wasps, and flies on insect foods of the palila and to explore control methods for those species that are deemed a threat to the food resources. The survey was focused in Kīpuka ʻAlalā. In a letter dated November 12, 1999, the USFWS concurred that the proposed project would have no adverse impacts on endangered species.

### Public Hunting in Kīpuka ʻAlalā

The Army requested an informal consultation with USFWS regarding public access to the fenced area in Kīpuka ʻAlalā (2001). The action was to help with the removal of feral ungulates from the area for the enhanced protection of rare plants and their habitat. The hunt would include archery hunters (25 hunters, 22 days) and muzzle-loaded gun hunters (20 hunters, 30 days), with additional time if considered effective. The USFWS concurred with the action.

### Construction of Command and Control Building and Base Camp Access Road

The Army prepared an environmental assessment (2002) to evaluate the consolidation of the Command and Control facilities and related parking, road, infrastructure, and landscaping improvements, and a new access road at the entrance of the base camp for the Saddle Road realignment. The area was surveyed for endangered or threatened plants and none were found in the immediate vicinity of the base camp. A single Hawaiian catchfly (*Silene hawaiiensis*) plant was located 3 km (1.9 mi) to the southwest of the camp. Of the listed birds potentially using the site, none had been seen in the area for at least five years. The environmental assessment noted that ʻopeʻapeʻa, Hawaiian hoary bat (*Lasiurus cinereus semotus*) were present throughout Pōhakuloa, but at low densities. USFWS expressed no concerns for listed species related to this construction project (25 Jan. 2002).

### Biological Opinion of the USFWS for Routine Military Training and Transformation of the 2nd Brigade, 25th Infantry Division (Light), U.S. Army Installations, Island of Hawaiʻi

In 2003, the Army requested a formal consultation with USFWS regarding existing and potential future training activities that could affect federally listed species and their habitats at Pōhakuloa. USFWS said that it would consider the impacts on 15 plants, one mammal, and critical habitat for one bird species. Biological surveys were identified as needed prior to consulting on three additional bird species. The Army proposed a series of conservation measures to reduce the overall project impacts as well as biological studies, additional training restrictions, invasive species control, and the development of a Wildland Fire Management Plan. USFWS recommended additional conservation measures to avoid or minimize adverse effects of the proposed action on listed species or critical habitat. These and other mitigation measures returned a not likely to jeopardize the continued existence of any species covered in this biological opinion or adversely modify or destroy palila critical habitat. (See Section 4.1.1, *Threatened and Endangered Species Management and Species*

*Benefits, Critical Habitat, and Species of Concern Management. Policy and Background,* for a list of conservation measures.)

### High Altitude Flight Training for Helicopter Pilots

The Army requested concurrence that training of helicopter pilots at high altitudes which required passage through Palila Critical Habitat "may affect, but not likely to adversely affect" the species habitat December 2005. A number of measures to minimize the effects of this action were provided. The USFWS determined that pinnacle landing at pu'u Omaokaoli is not likely to adversely affect Palila Critical Habitat (USFWS 2008a).

### Programmatic Environmental Assessment for Construction of Large-Scale Fence Units

The USFWS 2003 Biological Opinion required the construction of one large fence unit and a number of smaller units. USAG-HI submitted a programmatic environmental assessment for the construction and maintenance of fence units to protect threatened and endangered species and their habitats from the destructive impacts of non-native ungulates. The conclusion of the programmatic environmental assessment was that the fence units would not have significant direct, indirect, or cumulative adverse impacts on the natural or human environment (25th ID & U.S. Army, Hawai'i. 2006a).

### Development and Use of Military Training Facilities on Pōhakuloa Training Area

The U.S. Marine Corps prepared an environmental assessment for the development and use of training facilities at Pōhakuloa. The strategy was for the future development of a training complex to support combined arms live-fire and maneuver training, urban warfare training, convoy live-fire training, and weapons training (Jones 2009). A finding of no significance (FONSI) was issued February 2009.

### Final Environmental Impact Statement for Permanent Stationing of the 2/25th Stryker Brigade Combat Team

The Final Environmental Impact Statement (FEIS) examines a broader range of reasonable alternatives for the permanent stationing of the 2/25th Stryker Brigade Combat Team (SBCT) than were first assessed in the *Final Environmental Impact Statement for Transformation of the 2nd Brigade, 25th Infantry Division (Light) to a Stryker Brigade Combat Team in Hawai'i, 2004* (U.S. Army, AEC February 2008). The FEIS for permanent stationing incorporates information from the 2004 FEIS and examines whether there have been changes in impacts and the affected environment since the 2004 FEIS was prepared. All activities were analyzed (e.g., equipment fielding, training, facilities construction, and Soldier and family support), making this a more comprehensive document (USAEC 2008).

The FEIS assisted the Army in arriving at the decision to proceed with all facets of stationing permanently at Schofield Barracks Military Reservation. Garrison operations will be conducted at SBMR, which includes Schofield Barracks Main Post, South Range Acquisition Area, and Schofield Barracks East Range. Training will be conducted at a number of other training areas in Hawai'i, including Dillingham Military Reservation, Kahuka Training Area, Kawailoa Training Area, Wheeler Army Airfield on the Island of O'ahu; and at Pōhakuloa, Bradshaw Army Airfield and the Ke'āmuku Parcel (also referred to as the Western Pōhakuloa Training Area Acquisition Area) on the Island of Hawai'i. Training resources will include an assortment of live-fire and non live-fire maneuver training facilities, fixed-position live-fire training facilities, infantry and engineer demolition training facilities, grenade training facilities, and an urban assault course.

The Record of Decision (ROD) notes access control and prevention of new weed establishment as two new mitigation measures to be included with those cited in the 2004 FEIS. All implementation

and monitoring plans are to be developed and implemented by April 2009. Mitigation and monitoring measures of the ROD, combined with existing environmental stewardship measures, will aid in avoiding, minimizing, reducing, or rectifying adverse effects.

#### Programmatic Environmental Assessment for the Implementation of the Integrated Wildland Fire Management Plan

The Army prepared an environmental assessment for the execution of the planning procedures and ground improvements documented in the Integrated Wildland Fire Management Plan. The plan assists the Army in its capabilities to prevent and suppress wildland fires on Army training lands, thereby protecting natural and cultural resources and the public's safety. The Army reviewed the environmental impacts of the proposed action and concluded that implementation of the plan would not have any significant direct, indirect, or cumulative adverse impacts on the natural or human environment (25th ID & USAG-HI 2006b).

#### Biological Opinion of the USFWS for Reinitiation of Formal Section Consultation for Additional Species and New Training Actions at Pōhakuloa Training Area, Hawai'i.

In 2008, the Army reinitiated Section 7 consultation of the 2003 Biological Opinion with the U.S. Fish and Wildlife Service (USFWS) (USAG-HI 2008b). The consultation addressed (1) use of Pu'u Omaokaoli in the Palila Critical Habitat for helicopter pinnacle training, (2) nēnē (*Branta sandvicensis*) nests located in the Ke'āmuku Parcel and the reoccurrence of nēnē (*Branta sandvicensis*) at Range 1, (3) additional locations of Hawaiian catchfly (*Silene hawaiiensis*) in Training Area (TA) 21 beyond those anticipated in the USFWS 2003 Biological Opinion, (4) advice regarding the Army's inability to meet the requirement of identifying 20 caves occupied by or suitable for fragile fern (*Asplenium peruviana* var. *insulare*) in areas designated by the USFWS 2003 Biological Opinion in TA 21, and (5) new locations of approximately 60 to 70 individuals of popolo ku mai (*Solanum incompletum*) east of Kīpuka Road.

Pu'u Omaokaoli is within the Palila Critical Habitat, but The USFWS determined that the implementation of pinnacle landings on Pu'u Omaokaoli would not likely adversely affect palila critical habitat. (See Section 4.1.1, *Threatened and Endangered Species Management and Species Benefits, Critical Habitat, and Species of Concern Management. Policy and Background* for a list of conservation measures.)

### 2.3.4 Military Mission

The primary Army mission at Pōhakuloa is to provide a safe, modernized, major training area for U.S. Army Pacific Command (USARPAC). Pōhakuloa is used extensively by U.S. Pacific Command (USPACOM) and reserve forces in the Pacific for joint and combined training exercises and as a tactical training area for full-scale live-fire and field training exercises. Pōhakuloa is the main tactical training area for military Mission Essential Task List (METL) training. The installation provides resources and facilities for active and reserve component units. Installation assets are geared toward live-fire range training and maneuver at ranges, dismounted maneuver training, and artillery live fire. Pōhakuloa supports infantry brigades, division artillery, aviation brigades, and other divisional combat support and combat service support units. The 25th ID is the principal fire and maneuver user. Other users include the Hawai'i Army National Guard, U.S. Marine Corps, U.S. Navy, U.S. Air Force, and other Allied Forces. Military operations and activities are guided by External Standard Operating Procedures that include the protection of natural and cultural resources (USAG-HI 2009).

## 2.3.5 Military Operations and Activities that May Affect Natural Resources

There are effects to the ecosystem and landscape that have been influenced by actions other than military activities, including volcanic events, intentional and unintentional grazing (cattle, sheep as well as non-native, feral ungulates), introduction of non-native birds, fire, and fire-adapted vegetation. The landscape has been converted from native scrub where soils have developed and vast expanses of lava with scattered trees to roads choked with *Pennisetum setaceum* (fountain grass).

The military has been present at Pōhakuloa since the late 1930s. Areas such as Bradshaw Army Airfield and the cantonment area are developed; ranges, roads, and trails established; and expansive areas contaminated by munitions. The north portion of the installation has changed the most, but not to the same extent as other installations that have a resident population (i.e., transient, non-permanent population). Military impacts are most easily identified by non-native plants at firing points and along roads and by vehicles creating clouds of dust. Aʻa and pāhoehoe lava limit unauthorized off-road travel. Military roads and their use are effective conduits for the invasion of non-native plants and animals that have changed the dynamics of the plant communities by increasing wildland fire potential and the shift in vegetation composition and form. Impacts to natural resources have been indirect by supporting changes to the physical structure of the landscape.

### 2.3.5.1 Training Areas 1, 2, 3, and 4

These training areas (TA) comprise 1,775 ha (4,386 ac) and contain 40 km (25 mi) of bordering and interior roads and trails. All of TA 2 and parts of the other training areas lie in Palila Critical Habitat where specific rules governing training apply (see below). These training areas are used for maneuver, bivouac, and artillery live fire. Battalion-sized units use the area for two to four weeks, up to four times a year. Platoons to company-sized units average five days, 20 to 40 times per year. These training areas contain 19 artillery-firing points. Five are used for live-fire training. There are two landing zones (LZs) in this area. LZ Brad is located in TA 3 and LZ Rob is located in TA 1 (USAG-HI 2001)

### 2.3.5.2 Training Areas 5, 6, 7, and 8

These training areas comprise 1,769 ha (4,371 ac) and contain 56 km (35 mi) of bordering and interior roads and trails. Maneuver, bivouac, and live fire for company to battalion-sized units take place. There are 16 artillery-firing points. During battalion-sized exercises, upwards of 24 artillery howitzers are deployed. Mechanized ground excavation for artillery positions is allowed at four of the firing points. TA 5 contains a forward arming and refueling point (FARP) (Range 18). Range 18 averages 120 helicopter landings per year. In addition, 20 to 40 helicopter landings per year take place at firing points to insert howitzers and supplies.

### 2.3.5.3 Training Areas 10 and 11

The two training areas and the built-up portion of Pōhakuloa comprise 1,296 hectares (3,203 acres) and contain 16.3 kilometers (10.1 miles) of bordering and interior roads and trails. Company to battalion-sized units use the training areas for maneuver and bivouac about four times a year. Large areas of level ground immediately west of the airfield are frequently used for staging of field gear and tactical equipment. About 15-20 times annually, one to two helicopters take part in transporting sling loads into and off the summit area of Puʻu Maaʻu. During training exercises, communications stations may deploy to the summits of Puʻu Alakoki and Puʻu Maaʻu.

### 2.3.5.4 Training Areas 9, 12, 13, 14, 15, and 18

These training areas comprise 1,315 ha (3,250 ac) and contain 37 km (23 mi) of bordering and interior roads and trails. Company to battalion-sized units use the areas for maneuver, bivouac, and

live fire about 250 days per year. There are 30 firing points, of which 26 are actively used for artillery or mortar fire. Mechanized ground excavation for artillery positions is allowed at three firing points. Fixed-wing aircraft and helicopters frequently over fly the area at low, altitudes in support of various training missions. TA12 is the site for construction of the Battle Area Complex and a potential Mobile Modular Military Operations in Urban Terrain (MOUT) training facility for the U.S. Marine Corps. TA 18 contains a forward arming and refueling point (Range 17).

### 2.3.5.5 Training Areas 16, 17, 19, and 20

These training areas comprise 607 ha (1,500 ac) and contain 17 km (10 mi) of bordering and interior roads and trails. TAs 16 and 17 are used for maneuver and bivouac.

### 2.3.5.6 Training Area 21

TA 21 comprises 4,864 ha (12,020 ac) and contains 19 km (12 mi) of bordering and interior roads and trails. This training area is used for maneuver, bivouac, and live-fire training. There are 10 firing points located along Redleg Trail. Approximately half of the points are for firing mortars into the impact area about 250 days annually. Helicopters drop small observation groups onto the summit of Pu‘u Kailua. A number of projects are under consideration for TA 21. They include the construction of maneuver lanes in the northern section of the area that would be tied to Range 10. Range 1, which is under conservation for expansion and construction, is considered as an initiation point for a convoy live-fire training route that would extend south on Redleg Trail and then west along the Hilo Kona Highway. Ball ammunition would be fired east, opposite of the impact area at one location. All other firing would be west or north toward the impact area.

### 2.3.5.7 Training Area 22

TA 22 comprises 8,373 ha (20,690 ac) and contains 63 km (39 mi) of bordering and interior roads and trails. The training area is used for maneuver training. Ground-training use is low and largely limited to infrequent helicopter insertions, most of which support land management activities.

### 2.3.5.8 Training Area 23

TA 23 comprises 4,656 ha (11,505 ac) and contains 21 km (13 mi) of bordering and interior roads and trails. The area is normally used for ground maneuvers and bivouac. The area can support up to company-size units about twice a year when facilities throughout the installation are full. There is currently no ground training in TA 23. The airspace above Training Area 23 is available for military training.

### 2.3.5.9 Ke‘āmuku Parcel

The Ke‘āmuku Parcel will be used for off-road maneuver and helicopter operations.

### 2.3.5.10 Current Military Impacts by Activity

#### Live-Fire Weapons Training

Live-fire training impacts are concentrated to fixed ranges. Training activities have affected the type and amount of vegetative cover. Wildland fire is possible in the impact area; however, vegetative cover is low and these fires tend to be limited in extent. The loss of vegetation, disturbance, and erosion tends to be confined to the firing points and positions. Non-native plant species can be prolific at these sites. Other effects associated with live-fire weapons use include cratering, target scrape, munitions residues, and the potential for unexploded ordnance in the impact area.

### Maneuver Training
Maneuver training is limited by the extreme roughness of lava flows and administrative and environmental considerations. Suitable terrain on Pōhakuloa proper is about 29,826 ha (73,631 ac) (USACE and Nakata 2002). Pōhakuloa can accommodate most infantry company army training and evaluation program (ARTEP) mission training, but does fall short of maneuver land requirements. Maneuver in the training areas is confined to the firing points and road systems (e.g., off-road travel is not permitted on the rest of the installation, USACE and Nakata 2002). These areas are sites of non-native vegetation. Maneuver training will increase as the Keʻāmuku Parcel is developed for training.

### Reconnaissance Training
Reconnaissance training resembles dismounted maneuver training, with squad to platoon strength groups. In some instances, troops are dropped at remote locations and must navigate to pick-up locations. Overall, the terrain at Pōhakuloa does not encourage cross-country activities; therefore, foot traffic is limited to roads and has little adverse effect on the environment. When cross-country movement occurs, plants can be crushed and non-native vegetation dispersed into native vegetation via clothing.

### Bivouac
Bivouac training activities are intense and localized. Bivouac can include refueling operations, food preparation, and vehicle maintenance. Hand and mechanical excavation may occur at bivouac sites (see Appendix 9, *Installation Documents. Standard Operating Procedures. External SOP* for locations and restrictions). Soils are compressed by vehicles and field structures, and fuel/oil spills and soil contamination are more likely. Bivouac can occur at firing positions and along roads. Additional bivouac sites are available with concurrence by the Natural Resources Office. Open fires are prohibited.

### Aviation Training
Helicopter take-offs and landings are at defined locations (e.g., landing zones, firing positions) and have limited additional impacts on natural resources (e.g., dust, rotor wash) after establishment. All firing is into the impact area. Bird strikes are possible, but none have been documented. High altitude flight training over the Palila Critical Habitat has specific operational procedures to minimize possible effects on the palila. Training only occurs during daylight hours and the number of flights per day is limited to 20 and 75 flights per deployment.

### Landing and Drop Zone Activities
Land and drop zones are at established locations. Personnel and equipment drops occur at firing points and positions outside of the Palila Critical Habitat. Vehicle support during exercises is confined to existing roads and trails. Impacts to natural resources are limited.

### Major Force-on-Force Training
Force-on-force exercises typically include cross-country vehicle maneuvers, blackout driving, the use of pyrotechnics and artillery simulation devices, building hasty/limited defensive positions, emplacing obstacles, and establishing forward and rear support areas or field hospitals. At Pōhakuloa, vehicles move on hardened and improved all-weather roads, with limited use of unimproved roads and trails. Cross-country travel by HUMVEE and other wheeled vehicles is not allowed on Pōhakuloa proper except at approved firing positions. Force-on-force training has limited impacts on the natural resources of the area.

### Tentative Construction Impacts/Activities

Seven constructions projects are budgeted through DPW for Pōhakuloa: two access roads, an ammunition storage area, a battle area complex, anti-armor tracking range, easement and construction of the tank trail, range maintenance facility, and maneuver lanes for Range 10. Other construction projects are pending for the U.S. Marine Corps and Navy and include a mock airstrip, modular military operations in urban terrain facility, a forward operating base, grenade/shoot house, and convoy live-fire course. The impacts of these projects on natural resources have been, or are being, reviewed through the National Environmental Protection Act (NEPA) process.

### Other Training Impacts

Training activities on Pōhakuloa are generally month-long exercises by Army or Marine Corps battalions, or weekend or three-week exercises by Reserve components and National Guard units. The four types of major training activities that potentially affect Pōhakuloa's natural resources are maneuver exercises, bivouac, weapons live-fire, and aviation training. Units constantly rotate between various types of training activities.

## 2.3.6 Physical, Safety, and External Constraints on Training Areas and Ranges

Physical and safety constraints to training outside the impact area (37 percent) include lava flows (25 percent a'a lava), greater than 30 percent slopes (approximately 2 percent), developed areas (cantonment, Bradshaw Army Airfield; less than 1 percent), and buffer areas (impact area buffer, Waiki'i Ranch buffer; 10 percent) (Figure 2.e). In total, approximately 37 percent of the lands outside of the impact area have physical, safety, or external constraints to some type of training activity on Pōhakuloa. Safe movement of vehicles is limited to slopes less than 20-25% as is accessing rough and uneven lava.

An Intensive Fire Management Zone (IFMZ) has been established in the Ke'āmuku Parcel near the Waiki'i Ranch (Figure 2.e). The IFMZ consists of three buffers (305 m/1000 ft, 610 m/2,000ft, and 1609 m/1 mi) that cover approximately 1,606 ha (3,969 ac). The Army has agreed to (1) not operate tactical, motorized vehicles in the IFMZ; (2) not discharge ammunition or pyrotechnic devices, except blank small arms munitions of 7.62 mm or smaller, and then at 305 m (1000 ft) or greater during the day and 610 m (2000 ft) or greater at night; (3) not allow open fires or smoking; and (4) not construct structures or make improvements other than those related to fire control, safety, or livestock management. These restrictions and other points of understanding do not preclude training, but do limit the type of training [see Appendix 8, *Cooperative Agreements. Memorandum of Agreement for the Implementation of an Intensive Fire Management Zone in the Proposed West Pōhakuloa Acquisition Area (WPAA*)].

## 2.3.7 Natural Resources Constraints on Training Areas and Ranges

Terrain and federally listed species are the principal natural resource impacts to the military mission on Pōhakuloa. Lava flows deter troops from accessing sites away from roadways in many areas. The presence of federally listed species has resulted in training restrictions (e.g., no off-road driving, restricted driving to existing roads on cinder cones, restriction of fire-prone munitions based on the Burning Index, no vehicles inside the Kīpuka 'Alalā or Kīpuka Kālawamauna fence units without prior approval, training units must clean all vehicles at wash rack facilities, etc.).

The external standing operating procedures (SOPs) provide information and establish procedures for planning training operations and using Pōhakuloa (USAG-HI 2009). Annex F (*Protection of Natural and Cultural Resources*) and its appendices describe the significance of the installation in terms of

# *Physical, Safety, and External Constraints to Training Access at Pohakuloa*

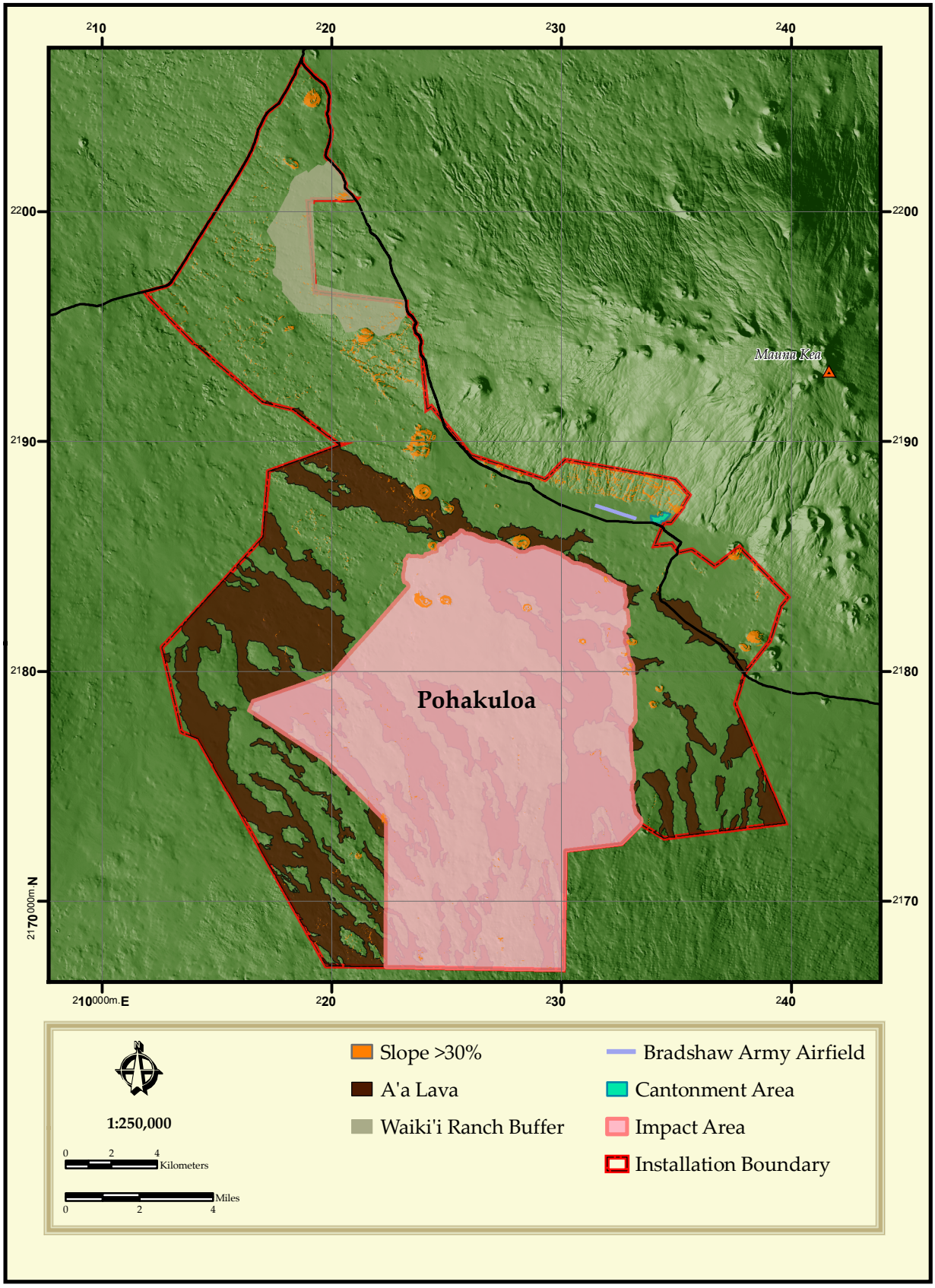



**Figure 2.e**

natural and cultural resources and the need to seek advice for training, other than described in the SOP, through proper National Environmental Policy Act (NEPA) documentation.

Some general restrictions from the Pōhakuloa External Standard Operating Procedures (Annex F) are:

- Traffic in training areas is confined to well-traveled roads and areas directly adjacent to firing points. No cross-country driving is authorized.
- Driving on cinder cones (pu‘us) is restricted to existing roads.
- No vehicles are allowed inside the Kīpuka ‘Alalā or Kālawamauna fence units without prior approval of the Natural Resources and Cultural Resources Offices.
- Training units must clean all vehicles in the wash rack facility at Pōhakuloa prior to returning to the Island of O‘ahu.
- Open fires are prohibited.
- No smoking is allowed outside of vehicles.
- Avoid moving or disturbing rocky outcroppings.
- Caves, lava tubes, and overhangs are off-limits.
- Specific rules should be followed for digging fighting positions.
- Follow emergency discovery procedures.
- About 24% of the lands outside of the impact area have some level of natural resources constraint. As noted above, these constraints do not preclude training, but may affect the type of training.

Indirectly, non-native plants have impacted the military mission by altering the landscape to one that supports wildland fires. The change in landscape characteristics threatens military facilities as well as federally listed species. Native vegetation is slow to reestablish in disturbed areas, whereas some non-native species, such as fountain grass (*Pennisetum setaceum*), establish along and in roads. Less affected by fire than native plant species, non-native plant species quickly reestablish and extend their presence by virtue of their successful competitive ability to capture space and other resources. As such, procedures are in place to minimize the threat and extent of wildland fires that are the consequence of live-fire training and non-military activities.

There are three principal sources of wildland fire: military training live-fire exercises, accidental ignitions (e.g., cigarettes, camp stoves, etc.), and from off-site. Military training-related live fire originates from 22 live-fire ranges typically found in the northern and eastern portions of Pōhakuloa proper or during aviation life-fire training. All live fire is toward a central impact area with the exception of two ranges oriented to the east of Redleg Trail. Aircraft in flight fire at designated ground targets. Aerial gunnery is the engagement of targets with bullets, cannon rockets, missiles, or bombs at fixed ranges. The Ke‘āmuku Parcel is designated for maneuver and helicopter exercises. No live fire will be conducted in the Ke‘āmuku Parcel to reduce fire potential.

Wildland fires occur in the impact area; however, vegetative cover is low and these fires tend to be limited in extent.

Although fuel breaks, dip tanks, and trained fire crews may not reduce the fire threat, they increase the Army's ability to minimize the overall effect of fires. Better data on endangered species numbers, status, and locations support greater compatibility between training and species management. Construction of fences to exclude feral animals, but not training, is yet another mechanism to minimize natural resources issues with a limited effect on training. Many of the actions the Natural Resources Office undertakes are outlined in the USFWS Biological Opinions (2003, 2008a). The 2003 Wildland Fire Management Plan is being updated and will address meeting wildland fire control needs in the Keʻāmuku Parcel as well as any additional issues associated with the placement of Saddle Road.

The mission at Pōhakuloa will probably change during the period of this plan. Measures are underway that should minimize the impacts of natural resources on military activities. The goal is to improve native habitat quality, which translates into the reduction of the spread of non-native species, the reduction and/or extent of wildland fire, and elimination of feral ungulates from areas with federally listed species. Mission changes are analyzed under the NEPA process, when applicable. USFWS will be consulted as appropriate for the situation.

Rare plants and sensitive habitats are often cited as the justification for the various restrictions (e.g., must drive on established roads). In some cases, access to specific areas is with approval by the Natural Resources Office (e.g., access to the Kīpuka Kālawamauna Fence Unit). Training in the Palila Critical Habitat must follow established rules (e.g., no live fire, maximum number of artillery pieces, number of troops, etc.). Many areas with rare and sensitive plants can be accessed for training exercises, but must be coordinated with the Natural Resources Office. Federally listed plants and animals do not preclude military access; however, the type of training, access, and munitions may be regulated by the Pōhakuloa External SOPs. Training restrictions have been the result of various consultations with the USFWS, including the 2003 and 2008 Biological Opinions. In the case of the large fence units constructed and planned on the installation proper, no new training restrictions are expected; however, a previous number of restrictions were established and limit training activities (Figure 2.f). (Appendix 9, *Installation Documents. Standard Operating Procedures. Guidelines for Natural and Cultural Resource Protection* and Annex F*, Protection of Natural and Cultural Resources*).

### 2.3.7.1 Training Areas 1, 2, 3, and 4

Training Areas 2 and parts of Training Areas 1,4,11 are in Palila Critical Habitat. These training areas contain 19 artillery-firing points. Fourteen of the firing points in the Palila Critical Habitat are for non live-fire training.

The following rules apply to training areas with the Palila Critical Habitat:

- Live fire is not permitted.
- A maximum of 24 artillery pieces may be deployed for dry-fire exercises only.
- No more than 500 troops may bivouac within the Palila Critical Habitat.
- Aircraft are restricted to an elevation of 610 m (2,000 ft) above ground level and 1,500 m (4,921 ft) from Mauna Kea.
- No maneuver or firing of blanks within 1,500 m (4,921 ft) of Mauna Kea State Park.
- Use only well-defined roads and trails south of Infantry Trail and Mauna Kea Road.
- No fires are allowed.

# *Natural Resource Constraints on Training at Pohakuloa*

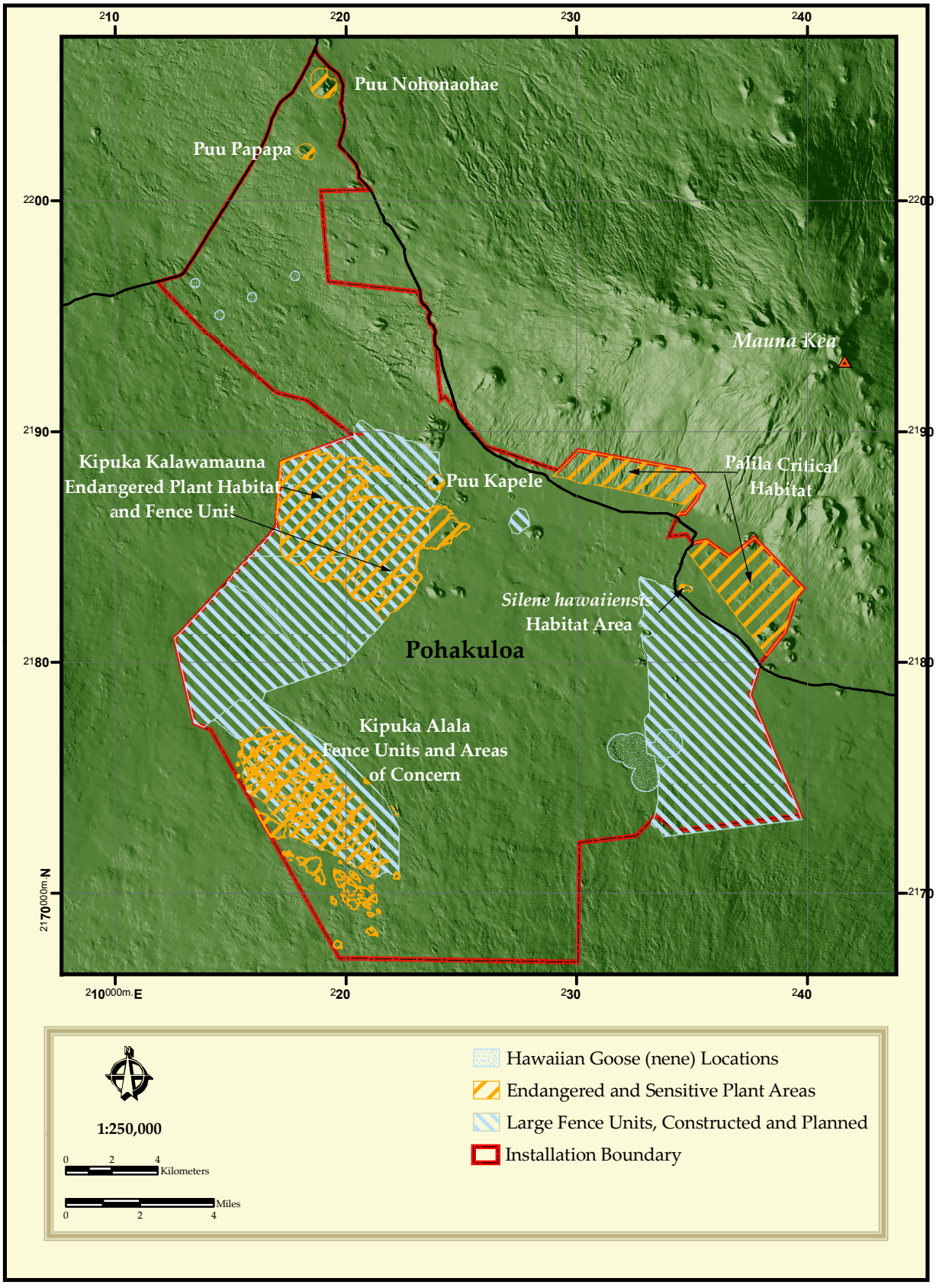



**Figure 2.f**

- No refueling operations, food preparation, or vehicle maintenance.
- A maximum of seven helicopters is allowed in the Palila Critical Habitat at a given time.
- Do not cut vegetation.
- Use of pyrotechnics or simulators is not allowed.

### 2.3.7.2 Training Areas 5, 6, 7, and 8

There are no significant natural resources constraints in these training areas.

### 2.3.7.3 Training Areas 10 and 11

No live fire is permitted in these training areas. All of Training Area 10 lies within the Palila Critical Habitat.

### 2.3.7.4 Training Areas 9, 12, 13, 14, 15, and 18

Pu‘u Ahi is in TA 9. No off-road access is permitted due to rare and endangered plants on higher slopes. A portion of TA 18 is in the Kīpuka Kālawamauna Endangered Plants Habitat.

New individuals of popolo ku mai (*Solanum incompletum*) were identified in Training Area 18 in 2008. The 2003 USFWS Biological Opinion requires all individuals of popolo ku mai (*Solanum incompletum*) to be fenced. This was reiterated in the 2008 USFWS Biological Opinion. The area will be fenced to encompass these individuals and ungulates removed. No training will be allowed in the fenced area including use of existing firing points (FP 440 and 506).

### 2.3.7.5 Training Areas 16, 17, 19, and 20

Pu‘us Ka Pele Leilani and Hukilau are in TA17 and have special restrictions due to the high occurrences of rare and endangered plant species. Troops are directed to coordinate activities with the Natural Resources Office. Portions of TAs 19 and 20 are in the Kīpuka Kālawamauna Endangered Plants Habitat and are subject to the following training restrictions:

- No overnight bivouacking within 2,000 m (1.2 mi) of Kona Highway.
- No fires or use of any type of pyrotechnic or incendiary munitions.
- Foot march is permitted. Rocky outcroppings and caves must be avoided.
- Vehicles are restricted to established roads and are not permitted in areas protected by gates. Two yellow gates on New Bobcat Trail are not to be crossed, even if found open.
- Firing points 701 and 703 and all firing points in the Kīpuka Kālawamauna Endangered Plants Habitat are off-limits.

### 2.3.7.6 Training Area 21 & Impact Area

To the east of Redleg Trail, are a number of archaeological sites as well as individuals of Hawaiian catchfly (*Silene hawaiiensis*) and fragile fern (*Asplenium peruvianum* var. *insulare*). The Army is constructing a fence to encompass TA 21 to comply with the intent of the 2003 Biological Opinion (USFWS 2008a). Feral animals will be removed by the end of 2015.

To the west of TA 21 is the impact area. Nēnē (*Branta sandvicensis*) use the area around Range 1 at the southern end of TA 21. Conservation actions noted in the 2008 USFWS Biological Opinion are being executed (e.g., nēnē monitoring during the flocking season, personnel education, surveys prior

to and after training exercises, etc.) and include training restrictions (e.g., no weapons firing if nēnē are present within a weapon's surface danger zone, no live-fire training if six nēnē are present in the nēnē survey area, cessation of firing if nēnē are flying in the line of fire, etc.) to insure continued training and species protection.

TA 21 is used for maneuver, bivouac, and live-fire training. There are 10 firing points located along Redleg Trail. Use of the area is expanding to include realistic scenarios of convoy live-fire training that support standard training events and threats associated with convoy travel (DA HQ and USACOE 2004).

#### 2.3.7.7 Training Area 22

Live fire does not occur at firing points in TA 22. To protect the biological resources in Training Area 22 and to support mission, some 16 km (10 mi) of fire break/roads will be constructed. These firebreak roads will be available for military use as maneuver lanes.

#### 2.3.7.8 Training Area 23

Currently, there is no ground training in TA 23. The Army will complete an Environmental Impact Statement prior to operation in this area. The Kīpuka ʻAlalā is in TA 23. No vehicles are allowed inside fenced areas. Units are required to coordinate with the Natural Resources Office when accessing the fence units.

#### 2.3.7.9 Keʻāmuku Parcel

Live-fire will not be permitted because of the area's wildland fire potential. Fire/fuel breaks will surround most of the parcel. The 2003 USFWS Biological Opinion stipulates that no training activities will be permitted in the fence units constructed around Puʻu Papapa and Puʻu Nohonaohae, sites of rare and endangered plant taxa. The western fence unit will extend into the southern corner of the parcel to capture a large population of honohono (*Haplostachys haplostachya*). NRO staff conduct surveys for nēnē (*Branta sandvicensis*) nests (October to March). When nests are found, threats will be controlled and include trapping (mongoose, rat, and cat), protection from grazers (cattle, sheep, and goats), and the creation of a "no-go" buffer, which may include road/trail closure, as well as conducting basic research (e.g., observation) (USFWS 2008a).

### 2.3.8 General Physical Environment and Ecosystems

#### 2.3.8.1 Climate

The Island of Hawaiʻi is in the humid tropical Pacific, but elevation and orographic processes at Pōhakuloa results in a climate classified as a cool, tropical dry climate. The installation is more "wet" at lower elevations. The position of the installation is to the west and below the Humuʻula Saddle and on the leeward side of Mauna Kea. Moisture carried by the summer easterly trade winds is lost as precipitation with the increase in elevation, and rarely reaches Pōhakuloa at higher elevation. Much of the installation is situated above the thermal inversion layer and is not influenced by the trade wind-orographic rainfall regime. Occasionally, moist air trapped below the inversion layer rises into the Saddle Region in the late afternoon. Fog is typical of late winter and early spring when trade winds fail. Mornings can be clear and sunny at lower and mid-installation elevations, and in the afternoon, a cloud belt can develop from about 750 to 1675 m (about 2,500 to 5,500 ft). Visibility becomes limited at lower elevations, whereas the base camp has clear skies. Fog and fog-drip is a source of precipitation, and may equal rainfall on some parts of the island (Sato et al. 1973, Juvik and Perreira 1973). However, the majority of the installation is above the thermal layer and dry. Drought is common when winter storms fail.

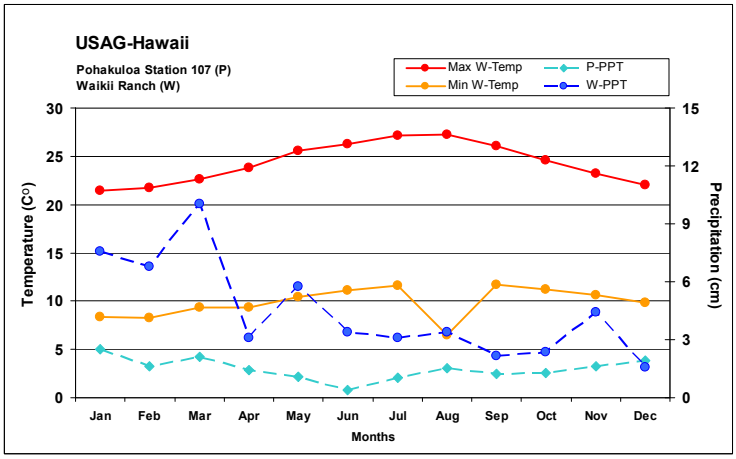



**Figure 2.g Climate Diagram for Pōhakuloa Station 107 and the Waikiʻi Ranch Station.**

The 59-year average annual precipitation at Pōhakuloa Weather Station (107) is 35.4 cm (14.4 in). At the Waikiʻi Ranch weather station (4 to 5-years of data), rainfall averages 53.7 cm (21.1 in), 52 percent greater than the base camp (Figure 2.g). Most rainfall occurs during the winter months. The Waikiʻi Ranch weather station is located in the middle of the Keʻāmuku Parcel. In and below the thermal inversion, rainfall and fog-drip is considerably greater in the Keʻāmuku Parcel than for Pōhakuloa west of the Humuʻula Saddle. The annual mean temperature is about 17° C (63° F) at the Waikiʻi Ranch and about 10° C (50° F) near the cantonment area (29-years of data, U.S. Army Engineering and Support Center 2000). Diurnal temperature fluctuations are greater than the seasonal variations.

There are eight remote weather stations on Pōhakuloa and the Keʻāmuku Parcel. These stations are used primarily for developing fire index values, but data are used for natural resources and other purposes as well.

### 2.3.8.2 Geology

The Island of Hawaiʻi is the southernmost and the largest in the Hawaiian Archipelago. The island was built by five volcanoes – Kohala (extinct in the Middle Pleistocene), Mauna Kea (the tallest and dormant, built up of olivine basalt, covered with layers of volcanic ash and presently dormant), Hualālai (a buildup of basalts, last eruption 1880 to 1801), and Mauna Loa (covers about 50 percent of the island, last erupted in 1950) (Macdonald et al. 1983). Pōhakuloa is located west of the Humuʻula Saddle and northwest of the island's center. The Saddle Region was formed by the convergence of the slopes of Mauna Kea to the north and Mauna Loa to the south. Mauna Loa, the "Lone Mountain," is the largest volcano on earth, rising 17,069 m (56,000 ft) from its base in the Pacific Ocean, with a volume of 79,195 $km^3$ (19,000 $mi^3$). Hualālai, lies to the west of the installation, but does not affect the topography of Pōhakuloa.

The lava flows that cross Pōhakuloa are a diverse assemblage of extrusive volcanic rocks. The principal type of volcanics is prehistoric rocks from the Kau volcanic series. This series occurred during the present shield-stage of Mauna Loa and was formed during the later part of the Pleistocene (Stearns and Macdonald 1946, Langeheim and Clague 1987). Five Mauna Loa flows of known age traverse the Pōhakuloa (Macdonald 1949) (Figure 2.h). The estimated date of the oldest historic flow, the Keʻāmuku lava flow, is 1750. Keʻāmuku lava flowed northward toward Mauna Kea, turning to the west and extending across the northern portion of the installation, just to the south of Lava Road. The Keʻāmuku flow forms much of the southwestern boundary of the Keʻāmuku Parcel. The 1843,

1852, and 1935 flows were from the north flank of Mauna Loa and stayed to the east of the Keʻāmuku flow, and cover much of TA 21. In contrast, the 1859 flow was from the northeast rift area, one of the two major rift zones of Mauna Loa. The 1859 flow covers the southwest corner of the installation and parallels the rest of the southwest boundary to the north.

The lava flows in the northeastern section of the installation above Saddle Road are Laupāhoehoe volcanics (Holocene), whereas the area above the Mauna Kea Trail and Infantry Road are part of the Hāmākua volcanics, basaltic-substage lavas of Mauna Kea from the Pleistocene (Macdonald 1949; Wolfe and Morris 1996). Both series of flows originated from the post-shield stage of Mauna Kea and are alkali (Langeheim and Clauge 1987). The area between Saddle Road/Lava Road and Saddle/Infantry Road is the interface between the volcanics of Mauna Loa and Mauna Kea. The 1843 Mauna Loa flow overlay Mauna Kea lavas (Macdonald 1949). The puʻu's (cinder cones) and kīpukas (inliers) associated with Mauna Loa volcanics in the northern part of the installation are remnants of the older volcanics (Lockwood et al. 1988).

### 2.3.8.3 Volcanic and Earthquake Hazards

The Island of Hawaiʻi is geologically the most active of the Hawaiian Archipelago. Many volcanic eruptions have been recorded in historic times. Faults, rift zones, lava flows, lava tubes, and vents are present. In the Pōhakuloa vicinity, Mauna Loa is an active, basaltic volcano that has erupted 33 times since its first documented historic eruption in 1843. The most recent eruption was in 1984. Historical records of eruptions and seismic events provide an indication of the relative risk in various geographical areas on the island. The U.S. Geological Survey recognizes nine Lava Hazard Zones in order of decreasing risk. Zone 1, the hazard zone with the highest volcanic risk, includes those areas where lava covers more than 25 percent of the land since 1800. Zone 1 areas occur adjacent to major rift zones of Mauna Loa and Kīlauea. Zone 2 represents lava flow inundations of 15 to 25 percent coverage since 1800, and Zone 3 represents inundations of areas with 1 to 15 percent lava cover. Zones 2 occurs adjacent to and down slope from active rift zones, whereas Zone 3 is slightly less hazardous because of greater distance from recently active vents or because topography makes a flow covering the area less likely. Zone 4 represents areas with about 5 percent lava cover and includes all of Hualālai and Mauna Loa. Zones 5 to 9 have not been covered by lava since 1800 and are protected by topography or have not been covered by lava for 10,000 years or more. Most of Pōhakuloa sits in Zone 3, with the eastern edge (i.e., Training Area 21 and some of the impact area) in Zone 2 and areas on the upslope of Mauna Kea in Zone 8.

Most of Hawaii's earthquakes are directly related to volcanic activity and are caused by magma moving beneath the earth's surface. Earthquakes occur before and during volcanic eruptions. An earthquake at a magnitude of 5.0 is potentially damaging and a quake at a magnitude of 7.0 or greater, typically will cause widespread property damage. Ten destructive earthquakes with greater than a magnitude of 6.0 occurred from 1868 to 2006. Two quakes (6.7, 6.0) occurred at Kīholo Bay 15 October 2006. These earthquakes caused more than $100 million of damage.

### 2.3.8.4 Topography

The elevation on Pōhakuloa ranges from about 768 m (2,520 ft) above mean sea level near the northwestern corner of the installation where the boundary meets the Māmalahoa Highway to about 2,719 m (8,920 ft) at the southeast corner of the installation on the slopes of Mauna Loa. The topography is nearly flat to gently rolling across the center of the installation. In this area, slopes increase or decrease in the southern and northern extents of the installation, respectively. The overall slope is about six percent with large variations. Aspect is slightly west-northwest. The steepest areas (approximately 11%) are found in the northern portion of the installation in TA 11 on the lower slopes of Mauna Kea and on cinder cones (Figure 2.i).

# *Historic Lava Flows on Pohakuloa*

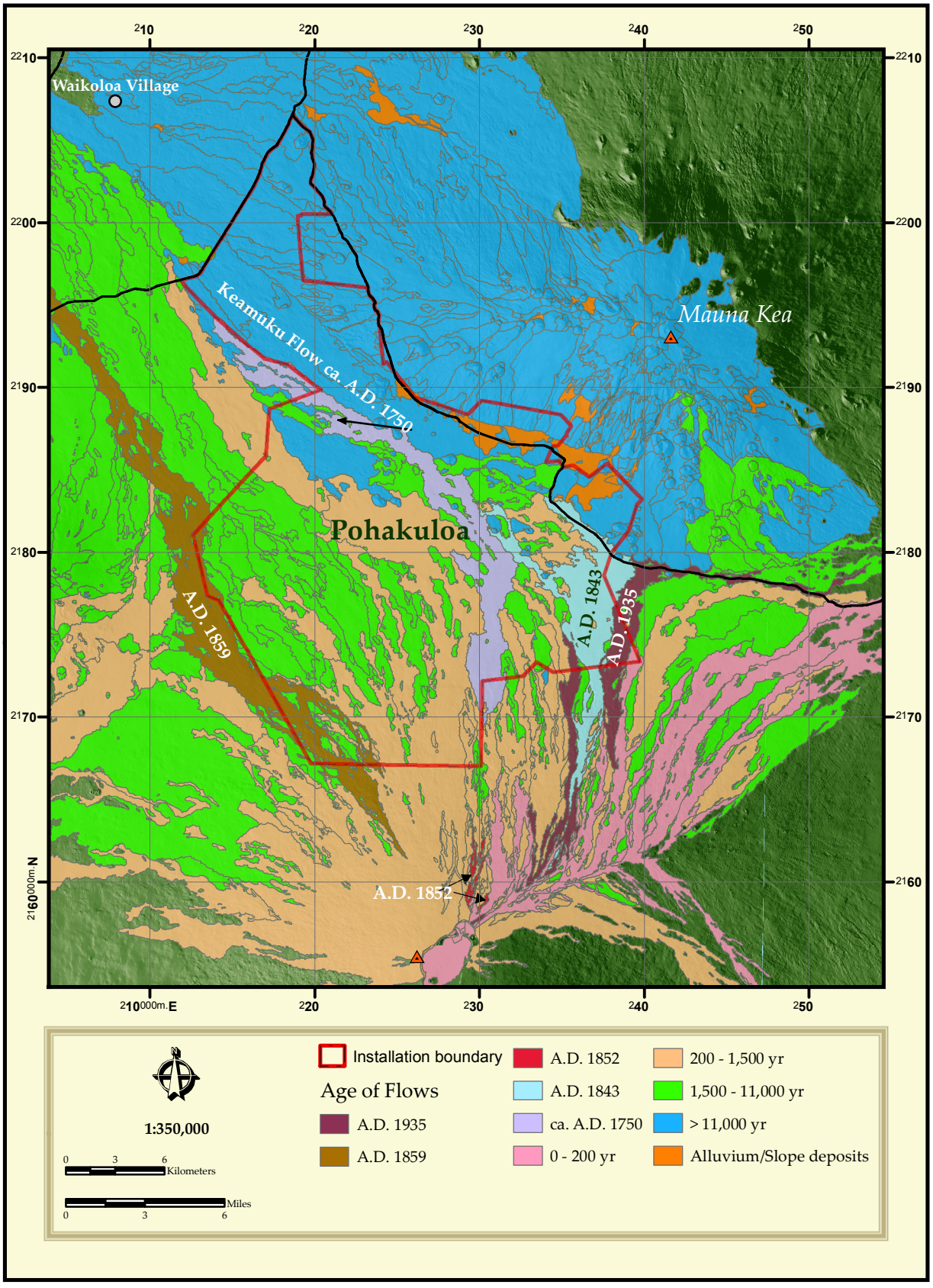
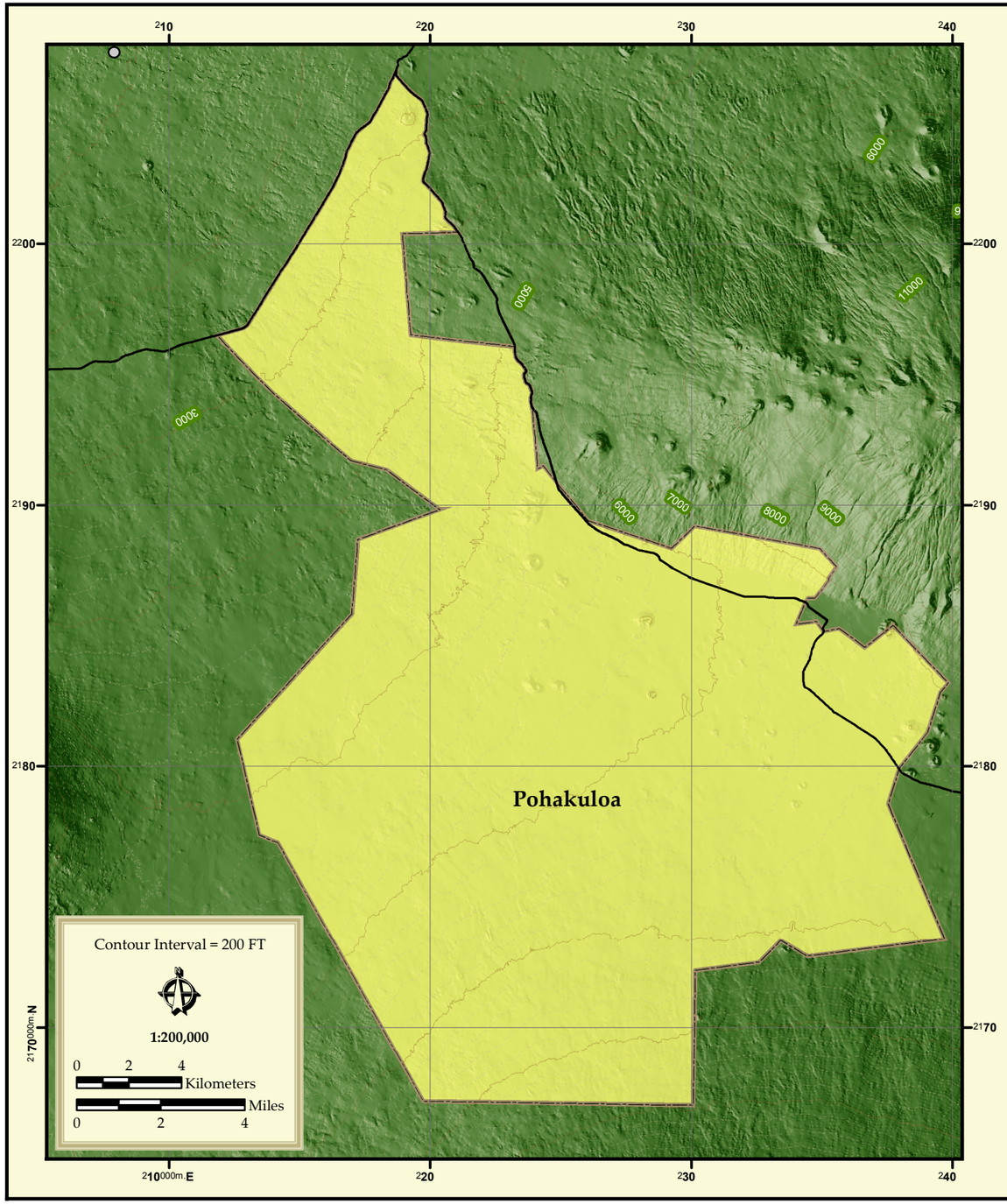
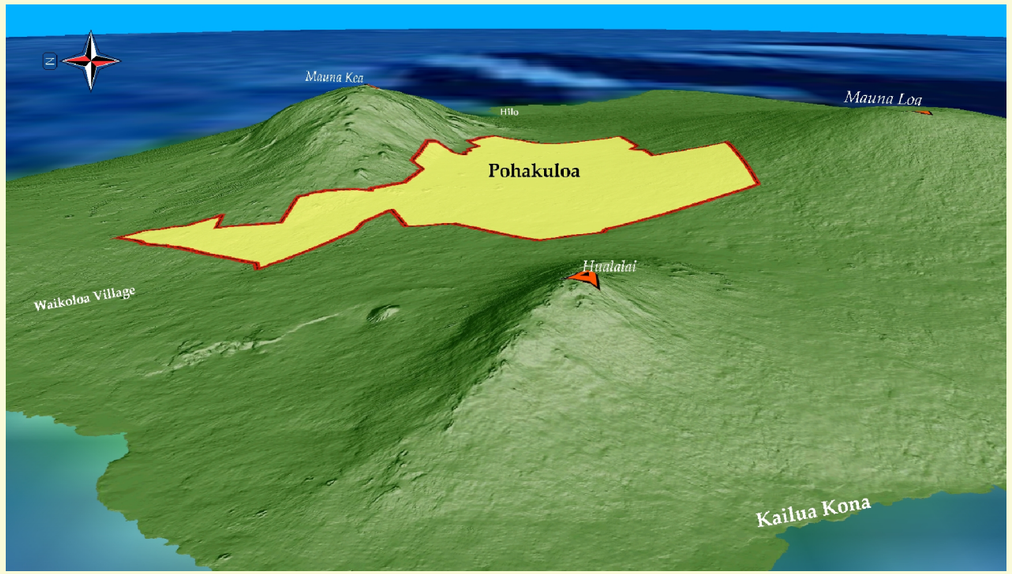



**Figure 2.h**




**3D Perspective View of Pohakuloa - Looking East**




**Percent Slope on Pohakuloa**

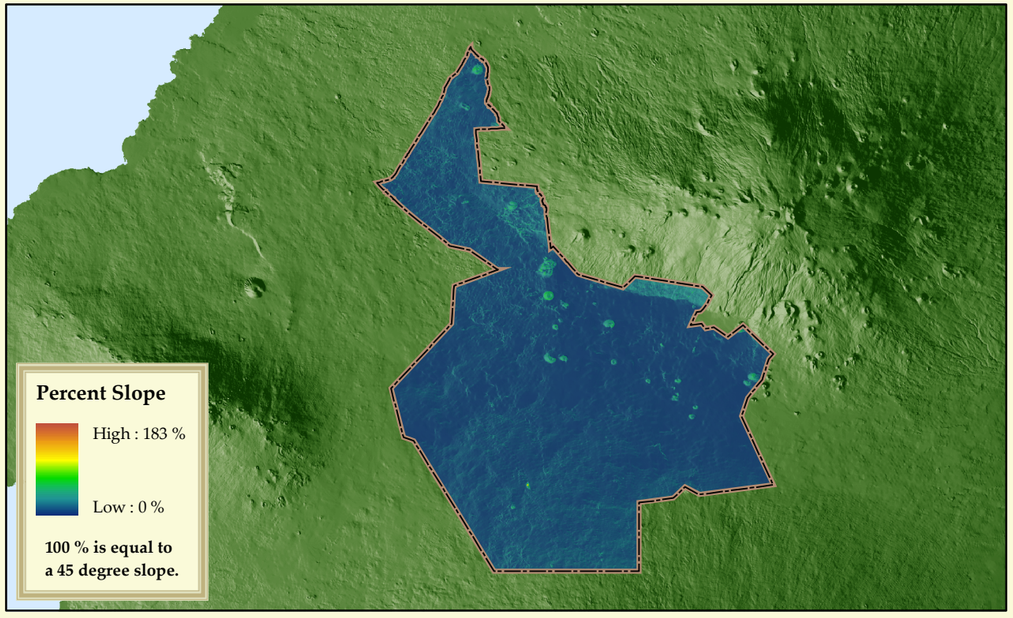



**Figure 2.i**

### 2.3.8.5 Soils

Soils are poorly developed on much of Pōhakuloa due to the recent deposition of a majority of the substrates. Pāhoehoe lava, a‘a lava, and miscellaneous land types (e.g., pu‘us) cover approximately 79 percent of the installation. The U.S. Department of Agriculture has broadly classified 10 soil types and 5 land types on Pōhakuloa (Figure 2.j) (Sato et al. 1973). Deep soils are found in the northern and western portion (e.g., Ke‘āmuku Parcel) of the installation. The soils located in the northern portion of the installation occur on older Mauna Kea substrates. In addition, small amounts of eolian sands have accumulated on the installation.

Miscellaneous land types are the most frequently encountered and include:

- Lava flows, pāhoehoe (rLW) (36.4 percent) (19,434 ha, 48,024 ac), a relatively smooth, billowy lava with a ropy, glazed surface.
- Lava flows, a‘a (rLV) (30.8 percent) (16,424 ha, 40,584 ac), a mass of clinkery, sharp, jagged, fragmented lava in tumbled heaps.
- Very stony land (rVS) (7.6 percent) (4,080 ha, 10,082 ac), very shallow soil material and a high proportion of a´a outcrops.
- Rock land (rRO) (2.6 percent) (1,407 ha, 3,477 ac) consists of pāhoehoe lava bedrock with a thin layer of soil material that averages 15 to 20 cm (6 to 8 in) deep.
- Cinder land (rCL) (1.2 percent) (635 ha, 1,570 ac) consists of bedded cinders, pumice, and ash.

The remaining 21 percent are a collection of Andisols (formed in volcanic ash), Entisols (recent origin in unconsolidated parent material), Histosols (contain 20 to 30 percent organic matter and are relatively deep compared to other soil types), and Inceptisols (horizon development).

Overall, water erosion on the installation is low due to gentle slopes, low soil erosivity potential (e.g., extensive lava fields, stony rocklands, and cinderlands), and low intensity, gentle rainfalls. Soil erosion associated with water average about 7% of tolerance as calculated from Range and Training Land Assessment data collected in 1989, 1990, 1993, and 2000 on Pōhakuloa proper (USACE-HI 2003). Soil erosion is locally significant in areas where soils are well developed, principally in the training areas and on the northern portion of Pōhakuloa. Gullies and eroded trails in the Ke´āmuku Parcel suggest water erosion potential may be greater there than in the rest of the installation. Greater amounts and intensity of precipitation and a greater slope to the land will probably contribute to a greater rate of soil water potential in the Ke´āmuku Parcel. Significant soil erosion is found on and beside roadways due to inadequate drainage and in the gullies that run through the Ke‘āmuku Parcel. Wind erosion is a more significant type of erosion than water at Pōhakuloa in terms of impacts on military activities. Wind erosion in the Ke‘āmuku Parcel may be greater because of soil development.

### 2.3.8.6 Water Resources

There are no surface streams, lakes, or other bodies of water on Pōhakuloa. Water typically leaves the site through crevices in the lava. Intermittent stream channels, such as those on the Ke‘āmuku Parcel, quickly dry after rainfalls. Rainfall, fog drip, and occasional frost are the sources of water that sustain plants and animals.

Three water storage tanks were established at Pōhakuloa in 1997. Each tank holds 2,535,950 liters (670,000 gal). The water distribution system was partially upgraded in 1999. The existing storage capacity, condition of stored water, and treatment and distribution systems are considered adequate (U.S. Department of Transportation and State of Hawai‘i 1999; Townscape, Inc. 1999).

Potable water is trucked to Pōhakuloa from county wells, primarily from the Waimea well approximately 40 km (25 mi) from the cantonment area. Depending on seasonal conditions, water is also available from a water line running from the Mauna Kea Spring northeast of the cantonment area. This water source is shared with Mauna Kea State Park, which has rights to the first 37,850 liters (10,000 gal) per day. Pōhakuloa's annual usage of water from Mauna Kea Spring varies greatly, but averages 5,677,500 liters (1,500,000 gal) (U.S. Department of Transportation and State of Hawai'i 1999; Townscape, Inc. 1999). The Mauna Kea water is non-potable because the filtration system installed at the base camp was never maintained and needs major upgrades to meet Environmental Protection Agency (EPA) standards. The agreement with the State involves the Army maintaining the pipeline for use of water (i.e., in-kind agreement). The Army is still investigating the development of a deep-well system to serve Pōhakuloa (Townscape, Inc. 1999).

## 2.3.9 General Biotic Environment

The Hawaiian Islands are the most isolated high-island archipelago on Earth. The Pacific Ocean forms a barrier of more than 2,500 mi (4,023 km) and separates the islands from the nearest continent.. The small islands of the central and western Pacific are hundreds to thousands of miles downstream of prevailing oceanic and atmospheric currents. This isolation has significant implications for the biological resources of these islands. Many of the species on Pōhakuloa are endemic to the Hawaiian Islands and the species assemblages generally are limited in their distribution.

Installation information in the following sections reflects Pōhakuloa proper. The Ke'āmuku Parcel is a recent acquisition and site-specific information is being collected. As such, references to Pōhakuloa are limited to the historic boundary of the installation and data for the Ke'āmuku Parcel are specifically identified.

### 2.3.9.1 Threatened and Endangered (T&E) Species and Species of Concern

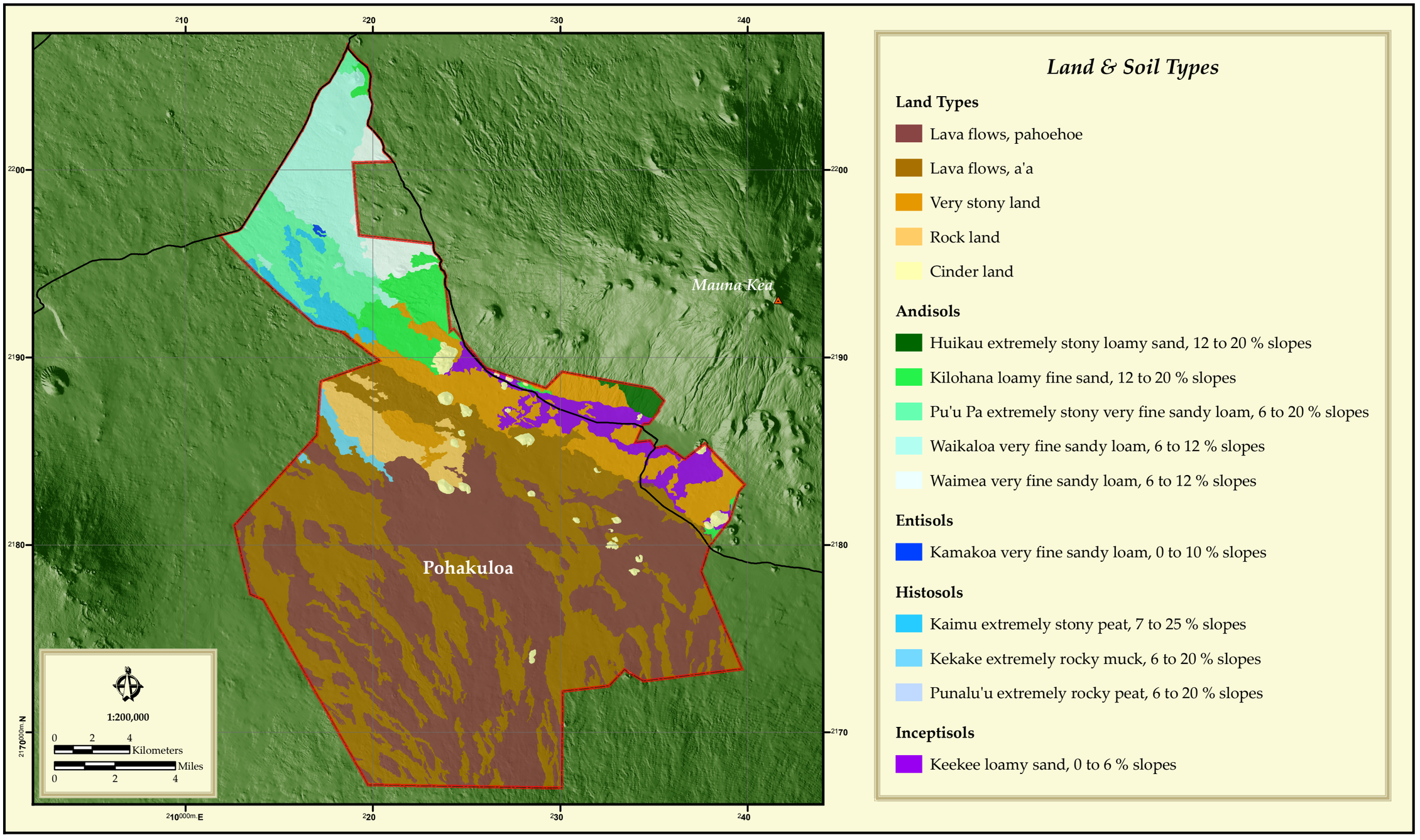
#### Fauna

In 1995, two inventories for threatened and endangered fauna were conducted to support the Endangered Species Management Plan Report, Pōhakuloa Training Area (R.M. Towill Corporation 1997). David (1995) surveyed rare and endangered avian species in the Palila Critical Habitat. Cooper et al. (1996) studied the distribution of endangered seabirds and Hawaiian hoary bats on the installation. In 1998, an inventory of rare arthropods was conducted (Hawai'i Natural Heritage Program 1998). The purpose of these studies was to provide baseline information for management and land-use decisions for federally listed species. Since 1997, Pōhakuloa has conducted avian surveys annually and monitors for the presence of some federally listed species (USAG-HI 2007b).

Over the course of these studies, one federally listed endangered mammal (*Lasiurus cinereus semotus*/ 'ope'ape'a/Hawaiian hoary bat) and three birds (*Branta sandvicensis*—nēnē, Hawaiian goose; *Buteo solitaries*—'io, Hawaiian hawk; and *Pterodroma sandwichensis*—'ua'u, Hawaiian dark-rumped petrel) have been identified, along with a number of invertebrate species of concern (Table 2c).

Other species that have an historical presence include the palila (*Loxioides bailleui*), Hawaiian crow (*Crovus hawaiiensis*), akepa (*Loxops coccineus coccineus*), and Hawaiian creeper (*Oreomystis mana*). Because these later species have not been seen for over 20 years on the installation, they are no longer included in any specific management actions.

# *Land & Soil Types at Pohakuloa*




## *Land & Soil Types*

**Land Types**

- Lava flows, pahoehoe
- Lava flows, a'a
- Very stony land
- Rock land
- Cinder land

**Andisols**

- Huikau extremely stony loamy sand, 12 to 20 % slopes
- Kilohana loamy fine sand, 12 to 20 % slopes
- Pu'u Pa extremely stony very fine sandy loam, 6 to 20 % slopes
- Waikaloa very fine sandy loam, 6 to 12 % slopes
- Waimea very fine sandy loam, 6 to 12 % slopes

**Entisols**

- Kamakoa very fine sandy loam, 0 to 10 % slopes

**Histosols**

- Kaimu extremely stony peat, 7 to 25 % slopes
- Kekake extremely rocky muck, 6 to 20 % slopes
- Punalu'u extremely rocky peat, 6 to 20 % slopes

**Inceptisols**

- Keekee loamy sand, 0 to 6 % slopes

**Figure 2.j**

**Table 2.c Federally Listed and Rare Fauna of Pōhakuloa.**

| Scientific Name | Common Name | Status[1] | Heritage Global Rank[2] |
|---|---|---|---|
| | ***Birds*** | | |
| *Branta sandvicensis* | Nēnē, Hawaiian goose | LE | G1 |
| *Buteo solitaries* | ʻIo , Hawaiian hawk | LE | G2 |
| *Pterodroma sandwichensis* | Uaʻu , Hawaiian dark-rumped petrel | LE | G2 |
| | ***Mammals*** | | |
| *Lasiurus cinereus semotus* | ʻOpeʻapeʻa, Hawaiian hoary bat | LE | G5T2 |

*Sources:* Endangered Species Management Plan Report, Pōhakuloa Training Area (R.M. Towill Corporation 1997); Arthropod Survey at Pōhakuloa Training Area, Island of Hawai´i, Hawai´i (Hawai´i Natural Heritage Program 1998); USAG-HI 2007b); and Hawai'i Biodiversity & Mapping Program. March 2010. Databook. University of Hawai'i Manoa. http://hbmp.hawaii.edu/index.html. 13 August 2007.

[1] Key to Federal Status: LE - endangered; SOC - species of concern (receives no protection under the Endangered Species Act of 1973, as amended. Is used by the Hawai'i Biodiversity & Mapping Program).

[2] Key to Global Ranks as defined by Hawai´i Natural Heritage Program: G1 - species critically imperiled globally (typically 1-5 occurrences); G2 - species imperiled globally (typically 6-20 occurrences); G5T2 - species globally secure but subspecies or variety imperiled globally (typically 6-20 occurrences). "GNR" refers to species not yet ranked.

Rare and endangered bird surveys are ongoing as per the USFWS (2003, 2008a) Biological Opinions and as part of the installation's ecosystem management program. Information gathered is utilized to determine and guide management strategies for enhancing habitats and populations. Species currently monitored include the Hawaiian ʻelepaio (*Chasiempis sandwichensis sandwichensis*), ʻio (*Buteo solitarius*), nēnē (*Branta sandvicensis*), and ʻuaʻu (*Pterodroma phaeopygia sandwichensis*). The NRO staff uses peer-reviewed survey and monitoring protocols for ʻio, nēnē, and ʻuaʻu, which are part of Pōhakuloa Implementation Plan. The Pōhakuloa Implementation Plan will be incorporated into the INRMP through the annual review process.

The Pōhakuloa Implementation Plan will include survey and monitoring methods of the ʻopeʻapeʻa or Hawaiian hoary bat (*Lasiurus cinereus semotus*). The Hawaiian hoary bat population and habitat use data was limited prior to the 2003 USFWS Biological Opinion. The USFWS (2003) required extensive studies of Hawaiian hoary bat (*Lasiurus cinereus semotus*) on the installation. These studies began in 2006.

### Flora

Pōhakuloa has 15 federally listed endangered, 1 federally listed threatened, and 2 candidate plants (Table 2.d) (Hawai'i Biodiversity & Mapping Program 2007). Three of the endangered plant species are located in the Keʻāmuku Parcel. Twelve taxa have a Global Rank of G1, which recognizes these species as critically imperiled globally. This ranking extends to subspecies and variety for two taxa. Four taxa are categorized as imperiled globally (G2), with the ranking extending to variety for one of the taxa. The Army considers federal candidate species and G1-G2 and T1-T2 as species at risk. Proactive management that prevents federal listing is more cost-effective and less destructive to military training and testing (DA 2006).

## 2.3.9.2 Critical Habitat and Areas of Special Concern

Two areas on Pōhakuloa are part of the designated Palila Critical Habitat. Additional areas are identified as areas of concern because of their botanical composition and/or habitat value for rare species (Figure 2.k). Special training restrictions for these areas are provided in Appendix F of the External SOPs for Pōhakuloa Training Area (USAG-HI 2009).

**Table 2.d Federally Listed and Candidate Flora at Pōhakuloa.**

| Scientific Name | Common Name | Status[1] | Heritage Global Rank[2] |
|---|---|---|---|
| *Asplenium peruvianum* var. *insulare* | fragile fern | LE | G5T1 |
| *Festuca hawaiiensis* | Hawaiian fescue | C | G1 |
| *Haplostachys haplostachya* | honohono | LE | G1 |
| *Isodendrion hosakae* | aupaka | LE | G1 |
| *Kadua coriacea (*Syn. *Hedyotis coriacea*) | kioʻele | LE | G1 |
| *Lipochaeta venosa* (Syn. *Melanthera venosa*) | nehe | LE | G1 |
| *Neraudia ovata* | maʻaloa | LE | G1 |
| *Portulaca sclerocarpa* | ʻihi makole | LE | G2 |
| *Schiedea pubescens* | Hairy schiedea | C | G1 |
| *Silene hawaiiensis* | Hawaiian catchfly | LT | G2 |
| *Silene lanceolata* | lanceleaf catchfly | LE | G1 |
| *Solanum incompletum* | popolu ku mai | LE | G1 |
| *Spermolepis hawaiiensis* | Hawaiian parsley | LE | G2 |
| *Stenogyne angustifolia* var. *angustifolia* | creeping mint | LE | G2 |
| *Tetramolopium arenarium* var. *arenarium* | Mauna Kea pamakani | LE | G1T1 |
| *Vigna o-wahuensis* | no common name | LE | G1 |
| *Zanthoxylum hawaiiense* | aʻe | LE | G1 |

Sources: USAG-HI (2006); NatureServe (http://www.natureserve.org/explorer/); Hawai´i DLNR (http://www.state.hi.us/dlnr/dofaw/pubs/TEplant.html), and Hawaiʻi Biodiversity & Mapping Program. March 2010. Databook. University of Hawaiʻi Manoa. http://hbmp.hawaii.edu/index.html. 13 August 2007.

[1] Key to Federal Status: FE – listed endangered; FT – listed threatened; C - candidate for listing; and SOC – species of concern are as noted by the Hawaiʻi Biodiversity & Mapping Program

[2] Key to Global Ranks as defined by NatureServe : G1 - species critically imperiled globally (typically 1-5 occurrences); G2 - species imperiled globally (typically 6-20 occurrences); GH – species possibly extinct; T1 - subspecies or variety critically imperiled globally (typically 1-5 occurrences); T2 - subspecies or variety imperiled globally (typically 6-20 occurrences).

## Palila Critical Habitat

In 1977, USFWS designated critical habitat for the federally listed palila (*Loxioides bailleui*), which included areas on Pōhakuloa (USFWS 1967). A member of the Hawaiian honeycreeper family (Drepanididae), the species was listed as endangered in 1967 (USFWS 1967). Two non-contiguous areas comprise the critical habitat along the north-northeast border on the installation.

The Palila Critical Habitat is composed of māmane (*Sophora chrysophylla*) and naio (*Myoporum sandwicense*) forest vegetation. Māmane flowers and fruits play an essential role in the survival of the species. Currently, the palila is found only at the upper limits of its former range, mostly on the western slopes of Mauna Kea.

- **Critical Habitat Area A** consists of 827 ha (2,073 ac) of ʻaʻaliʻi (*Dodonaea viscosa*) *shrubland* with hardstem lovegrass (*Eragrostis atropoides*) filling most interspaces with scattered pockets of māmane (*Sophora chrysophylla*) and naio (*Myoporum sandwicense*). Fountain grass (*Pennisetum setaceum*) is beginning to invade this area. The area is steep and there are no firing points.

# *Critical Habitat and Areas of Special Concern at Pohakuloa*

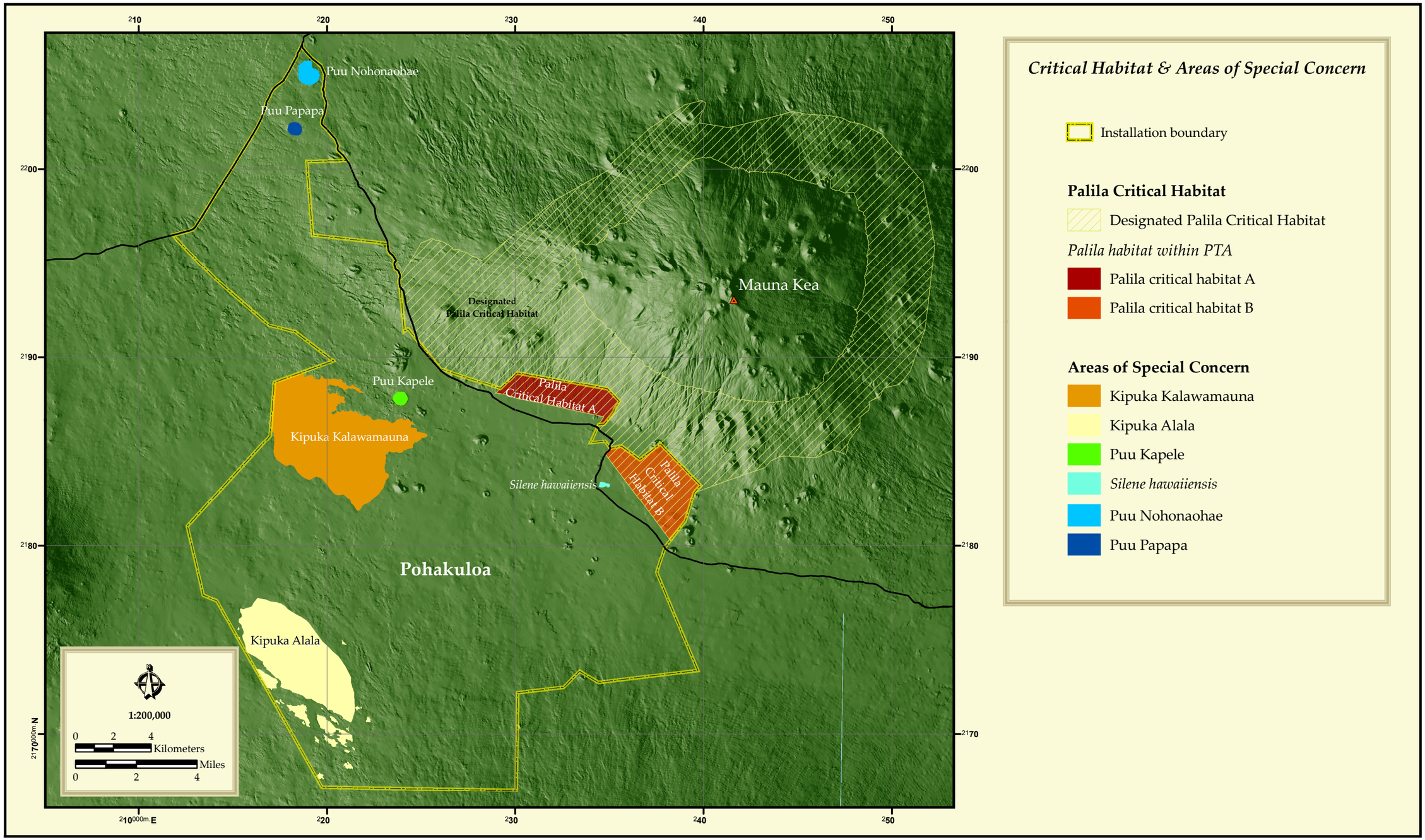



**Figure 2.k**

- Critical Habitat Area B consists of 1,115 ha (2,854 ac) of open māmane (Sophora chrysophylla) and naio (Myoporum sandwicense) with grass understory. There are 11 firing points in this area. Military use is greater than in Critical Habitat A.

There are no documented populations of palila in critical habitat on the installation, but there could be incidental palila usage on Critical Habitat Area B as birds are found on adjacent state lands.

### Kīpuka Kālawamauna Endangered Plants Habitat

The Kīpuka Kālawamauna Endangered Plant Habitat was designated as sensitive by the U.S. Army when two rare plants (*Haplostachys haplostachya* and *Stenogyne angustifolia*) were discovered during a floristic survey in 1977 (USFWS 2003). The Endangered Plant Habitat covers approximately 3,178 ha (7,853 ac).

Other rare and federally listed plants identified in the area include ʻakoko (*Chamaesyce olowaluana*), fragile fern (*Asplenium peruvianum* var. *fragile*), bent lovegrass (*Eragrostis deflexa*), kioʻele (*Kadua coriacea*), Hawaiian catchfly (*Silene hawaiiensis*), lanceleaf catchfly (*Silene lanceolata*), aʻe (*Zanthoxylum hawaiiense*), and Mauna Kea pamakani (*Tetramolopium arenarium* var. *arenarium*). The site is also used by the ʻopeʻapeʻa (Hawaiian hoary bat/*Lasiurus cinereus semotus*). Future inventories of the area will determine Hawaiian hoary bat use levels and habitat preferences as required by the USFWS (2003) Biological Opinion. The habitat consists of 3,178 ha (7,854 ac) and is in the western portion of Pōhakuloa (TAs 18 to 22). Gates limit access to a portion of the area (754 ha or 1,863 ac) on Old Bobcat Trail.

### Kīpuka Kālawamauna Fence Unit

The Kīpuka Kālawamauna Fence Unit was built as mitigation for Hawaiian catchfly (*Silene hawaiiense*) lost to the expansion of Range 8. The unit includes about 24 percent of the Kīpuka Kālawamauna and is the location of the federally listed fragile fern (*Asplenium peruvianum* var. *fragile*), kioʻele (*Kadua coriacea*), honohono (*Haplostachys* haplostachya), lance-leaf catchfly (*Silene lanceolata*), Mauna Kea pamakani (*Tetramolopium arenarium* var. *arenarium*), and aʻe (*Zanthoxylum hawaiiense*). Only foot access is permitted, and no live fire or pyrotechnics are allowed.

### Kīpuka ʻAlalā Fence Unit

Kīpuka ʻAlalā is located in Training Area 23 in the southwest corner of the installation. The two fence units capture 46 percent of the training area. The first area (441 ha, 1090 ac) was fenced in 1999 to protect federally listed plants and their habitat from feral and introduced ungulates. The second fence unit (1,611 ha, 4,001 ac) was constructed as mitigation for the loss of Palila Critical Habitat associated with the realignment of Saddle Road. About 63 ha (160 ac) of Kīpuka were cleared for construction of a Multipurpose Range Complex (MPRC) in 1988. The Army completed an environmental assessment and made a "finding of no significant impact" (FONSI). Construction began and the FONSI was challenged. The courts found for the Army; however, an appeal was filed in the 9th Circuit Court. The plaintiff and the Army agreed construction would continue; however, an environmental impact statement would be prepared prior to operation. To date, the MPRC has not been used for military training, and part of the area is used as endangered species mitigation for both the Saddle Road Realignment Biological Opinion and the 2003 Legacy and Transformation Biological Opinion.

### Puʻu Ka Pele Fence Unit

A 45 ha (111 ac) area surrounding Puʻu Ka Pele was fenced in 1981to protect a large population of honohono (Haplostachys haplostachya). The land was part of the 2006 Keʻāmuku Parcel purchase.

### Silene hawaiiensis Fence Unit

This fence unit encompasses the largest population of the species. Located in Training Area 3, there are more than 500 individuals in a 14-ha (33-ac) area. The population is large enough to be self-perpetuating (USAG-HI 1999). The fence unit is a mixture of substrates including pāhoehoe, ash, and soil. The area has a low occurrence of weeds and wildland fires are not a potential threat to the site.

### Pu‘u Nohonaohae Fence Unit

Pu‘u Nohonaohae is 127 ha (314 ac) at the northwestern tip of the Ke‘āmuku Parcel. Honohono (*Haplostachys haplostachya*), aupaka (*Isodendron hosakae*), and nehe (*Lipochaeta venosa*) are present on the site along with fountain grass (*Pennisetum setaceum*) and ‘a‘ali‘i (*Dodonaea viscosa*).

### Pu‘u Pāpapa Fence Unit

Pu‘u Pāpapa is a 28-ha (68-ac) fence unit and is 2.1 km (1.3 mi) south of Pu‘u Nohonaohae. The vegetation is similar to that of Pu‘u Nohonaohae, along with the presence of māmane (*Sophora chrysophylla*), akia (*Wikstroemia pulcherrima*), pūkiawe (*Styphelia tameiameiae*), ‘ūlei (*Osteomeles anthyllidifolia*), and a number of non-native grasses and forbs. Federally listed species on the Pu‘u are aupaka (*Isodendrion hosakae*) and *Vigna o-wahuensis*.

### Individual Plant Emergency Exclosures

Some critically endangered plants or groupings of plants require immediate fencing to minimize browsing damage. These temporary emergency exclosures include the use of hog wire, concertina wire, and/or plastic construction fencing. Plants protected by emergency exclosures include kio‘ele (*Kadua coriacea*), ma‘aloa *Neraudia ovata*, po‘e (*Portulaca sclerocarpa*), velvet-flowered schiedea (*Schiedea hawaiiensis*), lanceleaf catchfly (*Silene lanceolata*), pōpolo kū mai (*Solanum incompletum*), Mauna Kea pamakani (*Tetramolopium arenarium* var. *arenarium*), and a‘e (*Zanthoxylum hawaiiense*).

### Large Fence Units

Many federally listed plant species are present to the west and southwest of the impact area and will be encompassed by six contiguous fence units (see Figure 4.c). These fence units will enclose approximately 7,921 ha (19,572 ac) and consist of 101 km (63 mi) of fencing (25th ID &U.S. Army, Hawai‘i 2006a). Additional fencing is planned for the west side to include recently located plants of popolo ku mai (*Solanum incompletum*) in TA18. The purpose of the fence units is to protect the greatest number of threatened and endangered plants and their habitats from the destructive impact of non-native ungulates and other feral animals. Indirectly, the fence will benefit the ‘ope‘ape‘a or Hawaiian hoary bat (*Lasiurus cinereus semotus*) by improving habitat quality. The fence units are required to meet conditions stipulated in the USFWS (2003) Biological Opinion. Studies on the benefits of excluding feral ungulates have demonstrated notable recovery in areas after 10 to 50 years of protection (25th ID &U.S. Army, Hawai‘i 2006a). When sheep were removed from a subalpine woodland on Mauna Kea, native plants reestablished and spread, even in the presence of non-native, invasive plant species (Scowcroft and Conrad 1992).

Some plants are already enclosed in fence units (e.g., Kīpuka Kālawamauna, Kīpuka ‘Alalā), and these units will be part of the larger unit. The final fence on the western and southern side of Pōhakuloa will be a contiguous fenced area.

As described above, on the eastern portion of the installation is the *Silene hawaiiensis* Fence Unit. This fence unit will be maintained, and an additional large fence unit encompassing approximately 607 ha (1,500 ac) to help protect Hawaiian catchfly (*Silene hawaiiensis*) and fragile fern (*Asplenium peruvianum* var. *fragile*) from training actions and ungulates on this side of the installation.

Lastly, a permanent fence surrounds honohono (*Haplostachys haplostachya*) near Pu‘u Ahi. Prior to construction, only a single-strand fence existed.

Ungulates removal is scheduled to be completed from the western fence units by 2010 and the eastern fence unit by 2015. Units will be kept free of feral animals. Aerial surveys will be made to ensure the units remain animal free. Fence lines will be walked, checked for breaches, and repaired as necessary.

### 2.3.9.3 Fauna

#### Mammals

The ‘ope‘ape‘a or Hawaiian hoary bat (*Lasiurus cinereus semotus*) is the only native land mammal in Hawai‘i. All other mammals are non-native and individual perceptions can affect their designation as game or as an invasive/nuisance species. Common game mammals include feral goat, sheep, and pig, which, along with rat species (*Rattus rattus*), mongoose (*Herpestes auropunctatus*), mouse (*Mus domesticus*), domestic cattle, domestic horse, and feral dogs and cats, are considered nuisance species and harmful to the persistence of many native species.

#### Birds

Twelve native bird species, along with 33 non-native bird species, have been documented on the installation[2] during various surveys since 1991 (Freed 1991; David 1990; Gon et al. 1993, and Hawai‘i DOT and USDOT 2010). Ten of the non-native species are game birds. Six native bird species are protected by the Migratory Bird Treaty Act, as are six of the non-native species (see Appendix 3, *Species on Pōhakuloa*).

In 1998, the Pōhakuloa NRO staff initiated avian surveys of forest populations. A series of transects were established and monitored in the Kīpuka ‘Alalā, the Palila Critical Habitat, and TA 22. The Hawaiian ‘amakihi (*Hemignathus virens virens*; native) is the most frequently documented species during these surveys, averaging 26 percent of the sightings from 2003 to 2005; followed by the Japanese white-eye (*Zosterops japonicus*; non-game, non-native, 19 percent), Erckel’s Francolin (*Francolinus erckelli*, non-native, game bird, 11 percent), and house finch (*Carpodacus mexicanus*; non-native, non-game, migratory bird, 10 percent) (USAG-HI 2007b).

#### Invertebrates

Caves and lava tubes are a specialized habitat type on Pōhakuloa. At least 90 species of arthropods (with at least 60 native) and six other invertebrates (including the rare native snail, *Leptachatina* sp.) are found in Pōhakuloa caves and lava tubes (Howarth et al. 1996). A 1996 to 1998 survey found 485 taxa of arthropods on Pōhakuloa (Hawai‘i Natural Heritage Program 1998). Most taxa were non-native species. Other invertebrate studies determined the presence and location of the Argentine ant (*Linepithema humile*) and other ant species.

A species of concern is a wingless weevil, *Rhyncogonus stellaris*, known only from Kīpuka Kālawamauna, Pōhakuloa (USAG-HI 2006). Documented in the North Kona and South Kohala districts in 1939 (Samuelson 2003), non-native predators and the loss of habitat may be the causes behind this taxon’s limited distribution. Study sites have been established to determine extant and potential threats.

[2] One incidental sighting of palila (*Loxioides bailleui*) was noted by David (1995) as unsubstantiated by an ornithologist.

### 2.3.9.4 Flora

Vegetation studies of Pōhakuloa and associated areas began as early as 1888 with Hillebrand's *Flora of the Hawaiian Islands*. A comprehensive description of the vegetation was developed for an environmental impact statement of Pōhakuloa (Environmental Impact Survey, Inc. 1977), which cited various earlier vegetation studies (Knapp 1965; Krajina 1963; Ripperton and Hosaka 1942; Robyns and Lamb 1939; and Rock 1913). In 1997, as part of the *Endangered Species Management Plan Report for Pōhakuloa Training Area*, an annotated bibliography was prepared, describing more recent surveys (R.M. Towill Corporation 1997). Vegetation studies of the Keʻāmuku Parcel are limited to the threatened and endangered species surveys conducted for the biological assessment in 2003. Follow-up surveys were conducted by NRO staff in 2006.

A total of 313 vascular plant taxa from 75 families and 203 genera have been identified on Pōhakuloa (Shaw and Castillo 1997, Arnett 2002a and 2002b). The most recent additions to the species list was of species unique to the Keʻāmuku Parcel noted in the 2010 Supplemental EIS for Saddle Road (Hawaiʻi DOT and USDOT 2010). Most taxa are forbs (42 percent), followed by grasses and grasslike plants (18 percent) and shrubs (16 percent). Ferns comprise 8 percent of the taxa, vines 5 percent, and trees 4 percent. Some taxa are present with both tree and shrub forms (5 percent). Most species are perennials (69 percent), while annuals constitute 25 percent. Approximately 40 percent of plants found at Pōhakuloa are indigenous or endemic, and about 60 percent are non-native species. (See Appendix 3, *Species on Pōhakuloa.*)

#### Invasive, Noxious, and Weedy Species

Pōhakuloa has identified eight plants, seven ants, one weevil, and nine mammals as invasive species within the boundaries of the installation (Table 2.e). The NRO staff is involved in the control of these species. The characteristics of an invasive species differs by perspective, although technically, federal and state agencies identify those species that require control or eradication (32 CFR 190). On Pōhakuloa, these species directly, or indirectly, affect native species and their persistence, and/or interfere with the military mission. Invasive species management is addressed in Chapter 4.

### 2.3.9.5 Native Vegetation Communities

Twenty-four plant communities including the land type, barren lava, describe Pōhakuloa (Shaw and Castillo 1997). An additional ten plant communities were described for the Keʻāmuku Parcel (Arnett 2002b) (Figure 2.l). Soil and land types affect the type and amount of plant cover. Conditions that support the survival and growth of plants differ from more classical primary succession scenarios. Cracks and crevices; blown soil, organic matter, seeds and spores; and sufficient moisture provide woody species with deep roots an advantage. In recent years, the non-native invasive species, fountain grass (*Pennisetum setaceum*), has become an increasing part of the landscape, especially in disturbed sites (e.g., along roads and covering trails).

Plant communities range from barren lava with less than 5 percent plant cover to treelands, shrublands, and grasslands. The most complex and the oldest communities are found in the kīpukas. These are areas that persisted after volcanic eruptions. Lava moved around rather than over these areas. Grasslands are prevalent in the Keʻāmuku Parcel where soils are more developed.

### 2.3.9.6 Wetlands and Deepwater Habitats

Based on National Wetlands Inventory criteria, there are no wetlands (i.e., one or more of three attributes is present: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is

**Table 2.e Invasive, Noxious, and Weedy Species on Pōhakuloa.**

| Family/Class | Scientific Name | Common Name |
|---|---|---|
| **Plants** | | |
| **Family** | | |
| Asteraceae | *Senecio madagascariensis*[1] | fireweed |
| Asteraceae | *Senecio mikanioides* | German ivy |
| Asteraceae | *Tagetes minuta* | muster |
| Chenopodiaceae | *Salsola kali*[1] | Russian thistle |
| Crassulaceae | *Kalanchoe tubiflora* | chandelier plant |
| Passifloraceae | *Passiflora mollissima*[1] | banana poka |
| Poaceae | *Ehrharta stipoides* | weeping grass |
| Poaceae | *Pennisetum setaceum*[1] | fountain grass |
| Polygonanceae | *Emex spinosa*[1] | spiny threecornerjack |
| Scrophulaceae | *Verbascum thapsus*[1] | common mullein |
| **Animals** | | |
| **Class** | | |
| Insecta | *Pantomorus cervinus* (*Asynonychus godmanni*) | weevil |
| Insecta | *Cardiocondyla venustula* | (ant) |
| Insecta | *Hypoponera opaciceps* | (ant) |
| Insecta | *Linepithema humile* | Argentine ant |
| Insecta | *Monomorium latinode* | (ant) |
| Insecta | *Pheidole megacephala*[2] | bigheaded ant |
| Insecta | *Tapinoma melanocephalum* | tiny yellow house ant |
| Insecta | *Technomyrmex albipes* | (ant) |
| Mammalia | *Canis lupus* | dog |
| Mammalia | *Capra hircus* | goat |
| Mammalia | *Felis silvestris* | cat |
| Mammalia | *Herpestes javanicus* | Indian mongoose |
| Mammalia | *Oncholaimus domesticus* | mouse |
| Mammalia | *Ovis aries* | sheep |
| Mammalia | *Ovis musimon* | mouflon |
| Mammalia | *Rattus rattus* | black rat |
| Mammalia | *Sus scrofa* | pig |

[1]Noxious weeds as identified by the State of Hawai´i , Department of Agriculture (19 October 2005).
[2]Pests for control or eradication (Hawai´i Administrative Rules Title 4 Subtitle 6 Chapter 69A)

predominately undrained hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year) (FWS 1992) or deep-water habitats (i.e., permanently flooded lands lying below the deep-water boundary of wetlands) (FWS 1992).

# *Vegetation Communities of Pohakuloa*

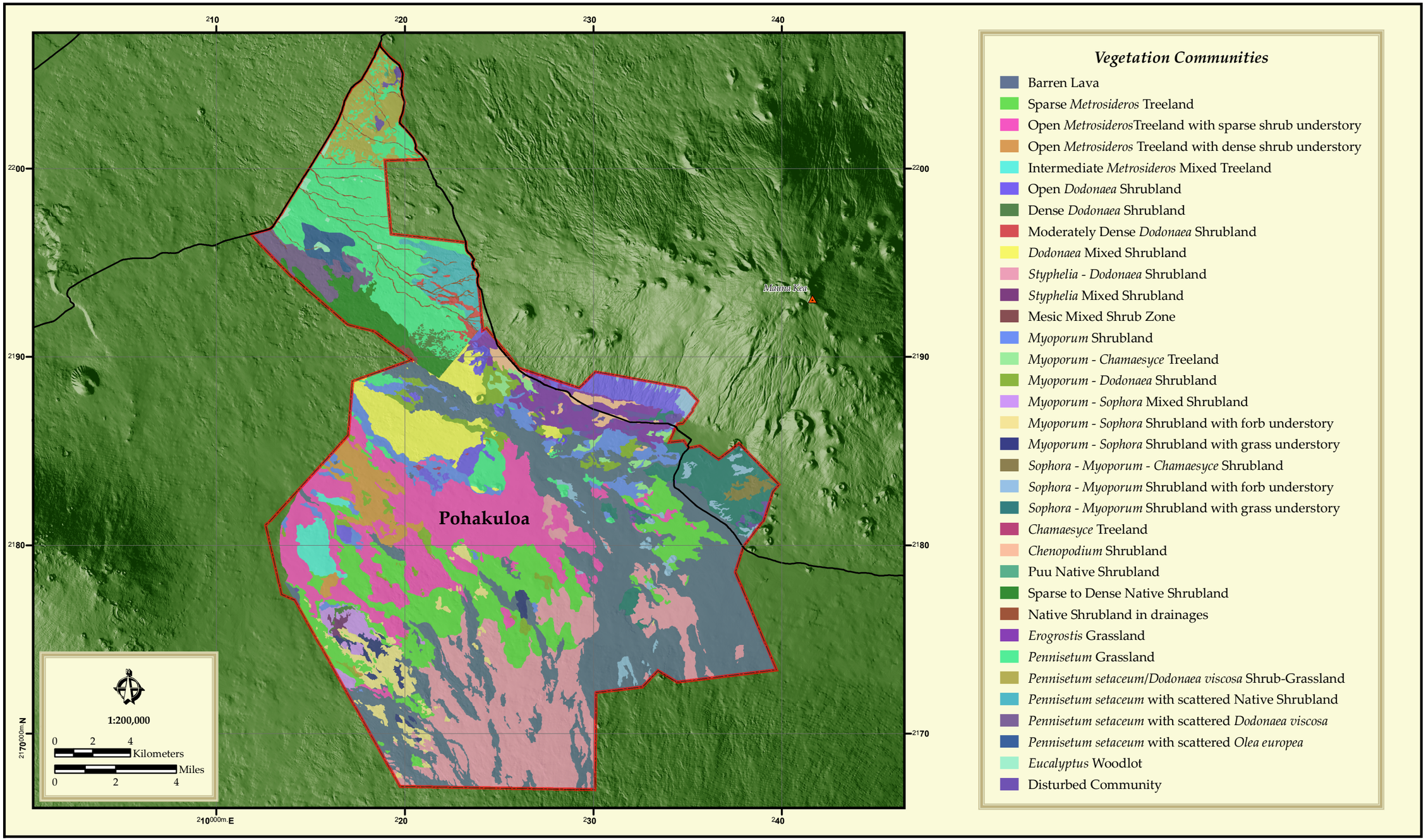



**Figure 2.1**

# CHAPTER 3

# SUPPORTING SUSTAINABILITY OF THE MILITARY MISSION AND THE NATURAL ENVIRONMENT

# CHAPTER 3 ENVIRONMENTAL MANAGEMENT STRATEGY AND MISSION SUSTAINABILITY

## 3.1 Supporting Sustainability of the Military Mission and the Natural Environment

### 3.1.1 Integrate Military Mission and Sustainable Land Use

The integration of the military mission and effective land use practice is necessary for sustainable land use when resources are limited. Natural recovery is rarely an option due to time constraints, limited land extent, and non-renewable resources. Section 101(b)(1)(I) of the Sikes Act states that each INRMP will provide for "no net loss in capability of military installation lands to support the military mission of the installation" where appropriate and applicable. The statement, "where appropriate and applicable" recognizes that there are instances where resources will be lost. Effective planning and conservation measures are required for protecting future mission capabilities. Conservation compliance helps direct long-term efforts for resource sustainability. The biological setting is only one factor under the installation's command when determining land use. It becomes the responsibility of the Natural Resources Office to understand the mission, to meet compliance requirements, and effectively address conflicting issues. Involvement by land users and the land managers is a valuable mechanism for achieving a balance that supports the mission and resources.

The Pōhakuloa training and natural resources management communities share the goal of sustaining the landscape to accommodate continued training with minimal restrictions. Sustaining the natural landscapes ensures that resources not only sustain the mission, but allow Soldiers to train in more realistic conditions. This shared value is attainable through cooperation and collaboration. Open communication and information sharing is imperative. Several forums exist to facilitate coordination.

- Weekly staff meetings held by the Command to present and review existing issues, providing opportunities to coordinate and cooperate mission training exercises with natural resources.
- Regular interaction between Natural Resource Office and ITAM personnel.
- Annual reports on natural resource activities are provided to the Command, Range Control, USFWS and other parties.

### 3.1.2 Range Complex Management Plan or Other Operational Area Plans

Integration is the sharing and utilization of information between disciplines, offices, directorates, and agencies. Four plans share environmental data and concerns: (1) Range Complex Master Plan (in progress), (2) Integrated Training Area Management Five-Year Work Plan (revised annually), and (3) Range and Training Land Program Assessment Plan [25$^{th}$ ID(L) and USARHAW 2002], and (4) Integrated Natural Resources Management Plan. This coordination helps to establish common installation goals and objectives and to: (1) reduce duplication of efforts and maximize critical resources, (2) site future ranges and avoid environmental or encroachment issues, and (3) identify problems areas and establish procedures and actions to avoid loss of valuable training lands.

## 3.2. Natural Resources Consultation Requirements

### 3.2.1 Sikes Act Improvement Act

The Sikes Act Improvement Act requires that the INRMP be prepared, reviewed, and updated in coordination with the USFWS and the appropriate state fish and game agency, which is the Department of Land and Natural Resources (DLNR) in Hawai‘i. The resulting INRMP reflects the mutual agreement of USFWS, Hawai‘i DLNR, and USAG-HI concerning the conservation, protection, and management of plant and wildlife resources as are applicable to their respective legal authority (i.e., SAIA, ESA). USFWS and Hawai‘i DLNR were invited to participate in the revision of the INRMP.

### 3.2.2 Endangered Species Act

Section7(a)(1) of the Endangered Species Act states that all federal agencies, in consultation with USFWS and the National Marine Fisheries Services (NMFS), shall use their authorities to further the purpose of the act by carrying out programs for the conservation of endangered and threatened species. Section 7(a)(2) requires that federal agencies in consultation and assistance with USFWS or NMFS "insure that any action authorized, funded, or carried out . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species."

Further, DoD Instruction 4715.3 stipulates that procedures to comply with the Endangered Species Act shall emphasize military mission requirements and interagency cooperation during consultation, species recovery planning, and management activities.

### 3.2.3 Endangered Species Act, as amended by the National Defense Authorization Act, 2004

The National Defense Authorization Act (NDAA) for Fiscal Year 2004 changed the Endangered Species Act regarding INRMPs. Under Section 4(a)(3)(B)(i) of the act, the Secretary of Interior or the Secretary of Commerce, as appropriate, is precluded from designating critical habitat on any areas owned, controlled, or designated for use by the DoD where an INRMP has been developed that, as determined by the Secretary of Interior or Secretary of Commerce, provides a benefit to the species subject to critical habitat designation. In contrast, Section 4(b)(2) is discretionary. This section allows the Secretaries of Interior and/or Commerce to specifically preclude designation of critical habitat on military facilities if they conclude that the benefits of such designation are outweighed by the impact on national security, as long as such exclusion does not cause the extinction of a species.

As such, this INRMP addresses the benefits of management actions taken for federally listed species and their habitats. The following plan demonstrates management actions that (1) benefit these species so as to maintain or increase populations or to enhance or restore habitat, (2) provide certainty that the management plan will be implemented, and (3) measures will be taken to demonstrate that conservation efforts will be effective (e.g., includes biological goals and objectives that are quantifiable through monitoring and will be reported).

### 3.2.4 Conservation of Migratory Birds

The Migratory Bird Treaty Act controls the taking of birds, nests, eggs, as well as parts and products of species identified as migratory. The DoD and USFWS entered into a Memorandum of

Understanding (MOU) in 2006 to promote the conservation of migratory birds in accordance with Executive Order 13186 (*Responsibilities of Federal Agencies to Protect Migratory Birds*). The intent of the MOU is to describe actions to be taken to advance migratory bird conservation, avoid or minimize bird take, and ensure DoD operations are consistent with the Migratory Bird Treaty Act. The MOU describes how USFWS and DoD will work together to achieve these ends.

Congress passed the National Defense Authorization Act (December 2002) and thereby allowed incidental take of migratory birds as a result of military readiness activities. However, the Armed Forces are still required to give appropriate consideration to the protection of migratory birds when planning and executing military readiness activities. As such, the Army is required to confer and cooperate with the USFWS if the Army determines that a proposed or ongoing military readiness activity may result in a significant adverse effect on a population of a migratory bird species and to develop appropriate and reasonable conservation measures.

### 3.2.5 Memorandum of Understanding (Department of Defense, U.S. Fish and Wildlife Service, and International Association of Fish and Wildlife Agencies)

The DoD, USFWS, and the International Association of Fish and Wildlife Agencies signed a Memorandum of Understanding that helps manage natural resources on military installations under provisions of the Sikes Act. The MOU encourages the signatories to coordinate and discuss cooperative elements of the Sikes Act as well as to establish INRMP implementation teams.

### 3.2.6 Executive Order 13352, Facilitation of Cooperative Conservation

Executive Order 13352 (August 2004) ensures Department of Interior, Agriculture, Commerce, and Defense, and the Environmental Protection Agency implement laws relating to the environment and natural resources in a manner that promotes cooperative conservation, with an emphasis on appropriate inclusion of local participation in federal decision-making, in accordance with their respective agency missions, policies, and regulations.

### 3.2.7 Current/Planned Consultations

Currently, there are no planned consultations. The Federal Highway Administration (FHWA) recently concluded a consultation with the USFWS regarding an alternate location of Saddle Road through the Army's Keʻāmuku Parcel. The USAG-HI requested that the Hawaiʻi Department of Transportation and FHWA consider relocating the highway closer to the southern boundary of the Keʻāmuku Parcel to maximize training and minimize conflict with the traveling public.

## 3.3 NEPA Compliance

### 3.3.1 National Environmental Policy Act of 1969

An INRMP documents actions and triggers NEPA compliance requirements. NEPA requires federal agencies to consider the environmental consequences of proposed major federal actions. The premise of the act is that the decision-makers (project proponents) take a "hard look" at the environmental consequences of proposed actions. The project proponents then shares this information with public officials and citizens and provides them the opportunity to participate in evaluating environmental factors and alternatives before a final decision is made.

### 3.3.2 Army Regulations 200-1 and 200-2

Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*, implements federal, state, and local environmental laws and DOD policies for preserving, conserving, and restoring the quality of the environment. Published 13 December 2007, AR 200-1 is a major revision to the February 1997 document. The document incorporates policy and related requirements from AR 200-3, AR 200-4, and AR 200-5. This revised regulation addresses changes to the DA's organization, implements applicable portions of DoD Instructions and Directives, and revises terminology to clarify mandatory and desirable activities. Program requirements for INRMPs are addressed in Section 4.3 d. (1) *Integrated Natural Resources Management*. This section addresses current policies, responsibilities, and procedures relating to natural resources management that may be included in an installation's Integrated Natural Resources Management Plan.

Army Regulation 200-2, *Environmental Analysis of Army Actions, dated March 29, 2002,* (32 CFR Part 651) dictates policies, responsibilities, and procedures for integrating environmental considerations into Army planning and decision-making. It implements the Council of Environmental Quality's NEPA regulations and directs installations to integrate environmental analysis as much as practicable with other environmental reviews, laws, directives, and executive orders. This regulation requires that natural resources management plans be evaluated for environmental impacts (Section 651.10 (b) of Army Regulation 200-2).

## 3.4 Beneficial Partnerships and Collaborative Resource Planning

### 3.4.1 Outside Relationships

Pōhakuloa has developed relationships with the Hawaiian Hoary Bat Research Cooperative; Department of Lands and Natural Resources (DLNR), Division of Forestry and Wildlife; and Big Island Game Bird Hunters. Other interested parties are discussed in Section 1.5.2.3 and include the U.S. Forest Service, National Park Service, U.S. Geological Survey – Biological Resource Discipline, Hawai'i Conservation Alliance, Hawai'i Biodiversity and Mapping Program, Palila Working Group, Nēnē Working Group, Hawaiian Forest bird Interagency Database Project, Mauna Kea Watershed Group, Big Island Rare Plant Working Group, Dryland Forest Working Group, Cornell University Bioacoustics Laboratory, University of Puerto Rico, University of Hawai'i (Hilo and Mānoa), and Colorado State University. These associations provide working avenues for communication, exchange of information, and collaboration.

### 3.4.2 Collaborative Resource Planning

Execution of the 2003 USFWS Biological Opinion required an implementation team be formed to oversee the development and execution of the Pōhakuloa Implementation Plan. The team includes biologists representing the Army, USFWS, U.S. Forest Service, National Park Service, U.S. Geological Service, Research Corporation—University of Hawai'i, Center for Environmental Management of Military Lands—Colorado State University, Volcano Rare Plant Facility, Department of Fish and Wildlife—State of Hawai'i, and Rana Productions. In total, there are 20 members to the Implementation Team from 11 organizations/agencies. Team members are experts in their respective fields and provide scientifically sound advice and assistance. The Pōhakuloa Implementation Plan (2010) addresses the USAG-HI goals, objectives, and action plans for 19 federally listed species.

## 3.5 Public Access

"*The principal purpose of DoD lands and waters is to support mission-related activities. Those lands and waters shall be made available to the public for educational or recreational use of natural and cultural resources when such access is compatible with military mission activities, ecosystem sustainability, and other considerations such as security, safety, and fiscal soundness. Opportunities for such access shall be equitably and impartially allocated.*"

Department of Defense Directive 4715.3
Environmental Conservation Program
3 May 1996

*4-3.d (9) Hunting, Fishing, and Trapping (d) Provide for controlled recreational access where feasible at Army installations containing land and water areas suitable for recreational use. (LD: 16 USC 670a).*

*(e) Provide access to uniformed personnel, family members, and the public to hunting, fishing, and trapping, consistent with security requirements and safety concerns.*

Army Regulation 200-1
Environmental Quality
Environmental Protection and Enhancement
13 December 2007

Public access is a tradition at Pōhakuloa, which has been open to the public for hunting and limited other recreational uses for more than 50 years. Pōhakuloa is an open post in the truest sense, as most of its boundary is not fenced or signed. Many access roads entering the post are not gated. Generally, signs on entry roads indicate Pōhakuloa boundaries. In maintaining a policy of public access, USAG-HI relies on a responsible public to adhere to restrictions placed on range access.

Public access for outdoor recreational activities and the harvest of game mammals and birds is permitted when compatible with environmental conditions or restrictions and the objectives of sustained multiple use and the continued accomplishment of the military's mission. All activities must comply with state, federal, and U.S. Army statutes and regulations (USAG-HI 2008b).

Public access is limited, by permission, and permit only (USAG-HI 2008b). Persons must obtain a Recreation Orientation Card for hunting and recreation activities from the installation headquarters. All vehicles and weapons must be registered at the Pass and I.D. Office, and a Downrange Access Permit issued. Hunters and recreationists must check-in and check-out with the DA Police. This provides a safety check. Hunters and other recreationists must sign a "hold-harmless" agreement, to limit Army liability on Army lands.

Pōhakuloa is open to various outdoor recreational activities (e.g., motocross races, hunting, mountain bike races, archery, bird dog training, etc.), provided such activities are consistent with use of lands and do not conflict with the military mission. The hunting program and other public uses are presented in detail in Chapter 4.

## 3.6 Encroachment Partnering

Much of Pōhakuloa is bordered by lands owned by the State of Hawai'i, Kamehameha Schools, and the Richard Smart Trust (Parker Ranch). These lands are undeveloped and some are used for

ranching. Encroachment has not been an issue recently. The purchase of the Keʻāmuku Parcel has placed future training around three sides of a residential area (Waikiʻi Ranch), the redesign of Saddle Road will increase traffic flow along the side of and across the installation, and the tank trail and the Keʻāmuku Parcel will place military activities near the Māmalahoa Highway.

The Waikiʻi Ranch Homeowners Association and the DA established a *Memorandum of Agreement for the Implementation of an Intensive Fire Management Zone in the Proposed West Pōhakuloa Training Area (PTA) Acquisition Area (WPAA)*, 2006. The MOA establishes a 1-mile buffer around the subdivision. Within the 1-mile buffer:

- Tactical military vehicles will not operate.
- Foot Soldiers have access up to 305 m (1,000 ft) of the boundary during the day and up to 610 m (2,000 ft) at night.
- No buildings or structures are allowed except for fire or grazing purposes.
- Firebreak will be constructed around the 1-mile buffer.

### 3.6.1 Army Compatible Use Buffers

The U.S. Army Environmental Command (USAEC) provides program management and execution for the Army Compatible Use Buffer (ACUB) program. Through the ACUB program, the Army partners with public and private organizations to identify mutual objectives for land conservation. Under 10 USC 2864a, the Army may contribute funds to its partners to purchase easements or properties from willing landowners through a cooperative agreement. As USAG-HI's ACUB program matures, biennial reviews are necessary for the government to review original assumptions, refine the need for protection, and re-prioritize across the program, as necessary (USAEC 2007).

ACUBs support the Army's mission to fight and win the nation's wars. Winning wars requires a trained and ready force. Trained and ready Soldiers require land for maneuvers, live fire, testing and other operations. ACUBs establish buffer areas around Army installations to limit effects of encroachment and maximize land inside the installation that can be used to support the installation's mission.

ACUBs support the Army's responsibility as a federal agency to comply with all environmental regulations, including endangered species habitat protection. By working in partnership with conservation organizations, ACUBs can coordinate habitat conservation planning at the ecosystem level, to ensure that greater benefits are realized towards species and habitat recovery.

ACUBs support local and regional planning and sustainability efforts by emphasizing partnerships with state and local governments and private conservation organizations to work towards common objectives and leveraging public and private funds towards those common goals.

#### Current Management

Currently, there are no ACUBs associated with Pōhakuloa.

## 3.7 Hawaii's Comprehensive Wildlife Conservation Strategy

Hawaii's Comprehensive Wildlife Conservation Strategy outlines a statewide strategy for native wildlife conservation (DLNR 2005). The strategy reviews the status of the state's native terrestrial and aquatic species and presents methods for long-term conservation. Seven threats were identified and include:

- Loss and degradation of habitat resulting from human development, alteration of hydrology, wildfire, invasive species, recreational overuse, natural disaster, and climate change.
- Introduced invasive species (e.g., habitat-modifiers, including weeds, ungulates, algae and corals, predators, competitors, disease carriers, and disease).
- Limited information and insufficient information management.
- Uneven compliance with existing conservation laws, rules and regulations.
- Overharvest and excessive extractive use.
- Management constraints.
- Inadequate funding to implement needed conservation actions.

The intent of the Comprehensive Wildlife Conservation Strategy is to address these threats by taking the following seven steps:

- Maintain, protect, manage, and restore native species and habitats in sufficient quantity and quality to allow native species to thrive.
- Combat invasive species through a three-tiered approach combining prevention and interdiction, early detection and rapid response, and ongoing control or eradication.
- Develop and implement programs to obtain, manage, and disseminate information needed to guide conservation management and recovery programs.
- Strengthen existing and create new partnerships and cooperative efforts.
- Expand and strengthen outreach and education to improve understanding of our native wildlife resources among the people of Hawai‘i.
- Support policy changes aimed at improving and protecting native species and habitats.
- Enhance funding opportunities to implement needed conservation actions.

The Pōhakuloa INRMP is referenced in the Strategy (Chapter 6 page 77) as an existing management plan and tool. The use of exclosures and "intensive management areas" are noted along with ongoing monitoring and fire prevention and control. The Comprehensive Wildlife Conservation Strategy identifies the assessment of possible impacts by the Stryker on current natural resources management activities as a future need. A second reference documents the cooperative efforts of the U.S. Army, DLNR and the Hawaii Department of Forestry and Wildlife at the Mauna Loa Forest Reserve (Chapter 6 page 85). Collectively, these agencies work to (1) identify more proactive predator control to protect nesting seabirds, (2) prevent fire, (3) fence areas where plant communities are rare or largely intact, and (4) research rare invertebrates, which includes determining limiting factors and conservation actions that could enhance populations.

Pōhakuloa's NRO staff includes many of the approaches and methods outlined in the Comprehensive Wildlife Conservation Strategy in its operations as outlined in the INRMP with the intent of engaging a range of audiences and groups, garnering information, and build support for its programs. These elements are accomplished by (1) public participation and education, (2) participation by resource managers in collaborative efforts, (3) identifying species requiring the greatest conservation needs and their habitats, (4) identifying threats, conservation objectives, research needs, establishing monitoring programs, (5) utilizing maps and geographic information systems collaborative, and (6) reviewing plans and encouraging public input.

# CHAPTER 4

# PROGRAM ELEMENTS

# CHAPTER 4 PROGRAM ELEMENTS

Pōhakuloa[1] does not meet the environmental and physical conditions to support fish, wetlands and deep-water habitats, agriculture, coastal/marine areas, and/or floodplains. As such, these topics are not addressed in this document.

## 4.1 Threatened and Endangered Species Management and Species Benefit, Critical Habitat, and Species of Concern Management.

### 4.1.1 Policy and Background

The Endangered Species Act, Sikes Act, DoD Instruction 4715.3 (*Environmental Conservation*), and AR 200-1 (*Environmental Quality, Environmental Protection and Enhancement*) mandate the management of threatened and endangered species on military lands. Pōhakuloa supports 19 federally listed threatened or endangered species, which consist of 1 threatened and 14 endangered plant taxa, 3 endangered bird species, and 1 endangered mammal taxon. The installation works to maintain habitat quality in the Palila Critical Habitat.

Much of the installation's threatened and endangered species management is in an effort to comply with the Endangered Species Act. However, implementing conservation and management activities for federally listed species benefits the installation's ecosystems and associated plants and animals.

The principal guidance for federally listed species management is the 23 December 2003 *Biological Opinion of the U.S. Fish and Wildlife Service for Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light), U.S. Military Installations, Island of Hawai'i.* As the title states, the biological opinion addresses impacts associated with the Legacy and Transformation military missions and training activities at Pōhakuloa. The species include 15 plant taxa— fragile fern (*Asplenium peruvianum* var. *insulare;* Syn. *A. fragile* var. *insulare*), honohono (*Haplostachys haplostachya*), kio'ele (*Kadua coriacea*; Syn. *Hedyotis coriacea*), aupaka (*Isodendrion hosakae*), nehe (*Lipochaeta venosa*; Syn. *Melanthera venosa*), ma'aloa (*Neraudia ovata*), po'e (*Portulaca sclerocarpa*), Hawaiian catchfly (*Silene hawaiiensis*), lance-leaf catchfly (*Silene lanceolata*), popolo ku mai (*Solanum incompletum*), Hawaiian parsley (*Spermolepis hawaiiensis*), creeping mint (*Stenogyne angustifolia*), Mauna Kea pamakani (*Tetramolopium arenarium*), O'ahu cowpea (*Vigna o-wahuensis*), a'e (*Zanthoxylum hawaiiense*); one mammal—Hawaiian hoary bat (*Lasiurus cinereus semotus*); and the designated critical habitat for Palila (*Loxioides bailleui*). The biological opinion required additional surveys to determine the status and abundance of nēnē (*Branta sandvicensis*), Hawaiian dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*), and 'io or Hawaiian hawk (*Buteo solitarius*).

A series of nondiscretionary conservation measures were established to reduce the overall project impacts associated with Legacy and SBCT transformation training and construction activities. These measures include:

[1] The term "Pōhakuloa" is used for the entire installation; that is, including the Ke`āmuku Parcel. When a distinction is imperative to the understanding of the text, "Pōhakuloa proper" is used. Those times when "western," "eastern," or "northern" Pōhakuloa are used, the reference is to Pōhakuloa proper.

- Formation of an Implementation Team (a panel of experts from in-house staff, agencies, universities, and organizations) to oversee and review the development and execution of the Pōhakuloa Implementation Plan. The plan would be developed and executed for (1) rare plant conservation and management projects and goals that included monitoring federally listed species, week control, invasive plant inventory, and ungulate and ant control; (2) rare plant propagation, outplanting, *ex situ* genetic storage, and site management; (3) rodent and invertebrate control; (4) avian surveys to detect changes in population demographics, vigor, and total population numbers; and (5) the maintenance and expansion of plant propagation and support facilities.
- Construction of fence units and buffers to minimize threats by feral animals on federally listed plants, and indirectly to enhance Hawaiian hoary bat (*Lasiurus cinereus semotus*) habitat. Large fence units will be constructed to the west and southwest of the impact area, two small fence units will surround pu`us in the Keʻāmuku Parcel, one fence unit around Puʻu Ahi, and five small fence units to protect groupings of Hawaiian catchfly (*Silene hawaiiensis*) and fragile fern (*Asplenium peruvianum* var. *insulare*). The Army will maintain the existing *Silene hawaiiensis* fence unit. Western fence units are to be feral ungulate-free by 2010.
- Institution of training restrictions and requirements, such as restriction of artillery training to established fire points and ranges; off-road maneuver in designated areas only; survey and approval of new field bivouac sites by Natural Resources Office (NRO) staff; measures to reduce dust; inspections for non-native, invasive species; restriction of smoking to specific areas when training in specific locations (e.g., Palila Critical Habitat); and reporting of all bird and bat strikes.
- Execution of biological studies such as those for the effects of dust on native plants; surveys for species presence, abundance, and habitat use by the Hawaiian dark-rumped petrel (*Pterodroma sandwichensis*), ʻio (*Buteo solitarius*), and nēnē (*Branta sandvicensis*); surveys to determine species abundance and habitat use of the ʻopeʻapeʻa or Hawaiian hoary bat (*Lasiurus cinereus semotus*); impact of rodents on māmane (*Sophora chrysophylla*); and impacts of foot traffic on federally listed species.
- Survey of gulches and gullies in the Keʻāmuku Parcel, along with the collection of seed from federally listed species.
- Changes to the Wildland Fire Management Plan to address the establishment of fuel breaks, fire breaks, and fuel management corridors; fire suppression measures; and implementation of the Fire Danger Rating System.
- Invasive plant control within and adjacent to landing zones, trails, and roadsides; removal from vehicles prior to transport; and the implementation of an education program.
- Invasive animal control to include the washing of vehicles before transport off the island, inspection of plant materials, protocols for the removal of introduced animals, and education of Soldiers and contractors about the introduction of invasive species.
- Creation and maintenance of a buffer outside Palila Critical Habitat Area B to reduce and understand the impacts of Stryker off-road maneuvers.

In 2008, the Army reinitiated section 7 consultation of the 2003 Biological Opinion with the U.S. Fish and Wildlife Service (USFWS) (USAG-HI 2008b). The consultation addressed (1) nēnē (*Branta sandvicensis*) nests located in the Keʻāmuku Parcel and the seasonal visitation by nēnē (*Branta sandvicensis*) at Range 1, (2) fencing requirements for additional locations of the Hawaiian catchfly

(*Silene hawaiiensis*) and caves suitable for fragile fern (*Asplenium peruvianum* var. *insulare*) in TA 21, (3) new locations of popolo ku mai (*Solanum incompletum*) east of Kīpuka Road, and (4) use of Puʻu Omaokaoli in the Palila Critical Habitat for helicopter pinnacle training.

A number of nondiscretionary measures were presented to the Army from USFWS and include:

- Annual reporting on nēnē (*Branta sandvicensis*) research, conservation measures, and use of Range 1 and the Keʻāmuku Maneuver Area as presented in the Biological Assessment (USAG-HI 2008b) and 2008 Biological Opinion (USFWS 2008a).
- Report on the application and success of conservation measures for Hawaiian catchfly (*Silene hawaiiensis*), fragile fern (*Asplenium peruvianum* var. *insulare*), and popolo ku mai (*Solanum incompletum*) as outlined in the 2003 and 2008 Biological Opinions and Biological Assessments (USAG-HI 2008b and USACOE 2003).
- Develop a nēnē (*Branta sandvicensis*) protocol.
- Minimize impacts to nēnē (*Branta sandvicensis*) from training at Pōhakuloa and the Keʻāmuku Parcel.
- Report and transfer dead nēnē (*Branta sandvicensis*) and Hawaiian hoary bats (*Lasiurus cinereus semotus*).
- Remove barbed wire from fences.
- Fence and remove ungulates from Training Area 21 and fence to protect popolo ku mai (*Solanum incompletum*).

The Army was tasked in the USFWS 2003 Biological Opinion to develop and execute an Implementation Plan for the management of the taxa noted above, which was further developed to include all new conservation measures identified the USFWS 2008 Biological Opinion. The Army drafted a plan in consultation with the Implementation Team, which consists of Army, USFWS, U.S. Forest Service, National Park Service, U.S. Geological Service, and state biologists familiar with the species and the conservation areas. The Implementation Team consists of 20 members from 9 organizations/agencies. The foundation to the Implementation Plan is the Pōhakuloa Ecosystem Management Program Plan (USAG-HI 2003). Topics covered in the Implementation Plan include:

- Monitoring and outplanting of listed plants
- Endangered bird surveys
- Hawaiian hoary bat monitoring, conservation, and management
- Invasive plant species control
- Ungulate control
- Rodent control
- Invertebrate control
- Large-scale fencing
- Budgeting, timeframes, data management, and analysis
- Assessing success and project modification
- Nēnē survey protocol, survey and monitoring, and research
- Barbed wire removal

The Implementation Plan will be finalized in 2010, and includes a 20-year budget. There is no defined "end point" for meeting biological opinion requirements and, therefore, management efforts

may extend beyond 20 years. The document supports an adaptive management approach, adjusting protocols to promote the best conservation measures for listed species and their associated habitats.

The Implementation Plan is designed to assess and develop appropriate management and monitoring protocols for the conservation, augmentation, and reintroduction of all listed plant species with the exception of poʻe (*Portulaca sclerocarpa*) and Hawaiian parsley (*Spermolepis hawaiiensis*) (USFWS 2003). Outplanting of poʻe (*Portulaca sclerocarpa*) and Hawaiian parsley (*Spermolepis hawaiiensis*) is not required because only 2 and 3 percent, respectively, of the state's populations are found on Pōhakuloa. Despite that, NRO staff has included measures for the conservation of these two species into its activities. Demographic data for all other plant taxa will be used to construct stochastic projection matrix models for population viability (USAG-HI 2010).

Successful execution of the Implementation Plan exhibits due diligence to the USFWS that the Army complies with the Endangered Species Act and the recommendations of the Biological Opinion, while accomplishing its training mission (USFWS 2003). The requirements of the plan are to:

- Identify areas within the Pōhakuloa Action Area for species management.
- Estimate of the minimum viable population (population viability analysis, PVA or other model) for survival and recover for each taxon considered likely to be impacted by Army activities with an initial focus on *Kadua coriacea, Neraudia ovata, Portulaca sclerocarpa, Silene lanceolata, Solanum incompletum, Vigna o-wahuensis, Zanthoxylum hawaiiense, and Tetramolopium arenarium* var. *arenarium*.
- Determine intermediate and final definitions of success for population viability of each taxon with initial attention focused on *Kadua coriacea, Neraudia ovata, Portulaca sclerocarpa, Silene lanceolata, Solanum incompletum, Vigna o-wahuensis, Zanthoxylum hawaiiense, and Tetramolopium arenarium* var. *arenarium*. This includes identifying limiting factors for survival and recruitment.
- Develop reintroduction and augmentation protocols for plant species.
- Determine the greatest possible genetic representation for each plant taxon.
- Determine and execute habitat improvements (e.g., control of invasive, non-native plants, feral ungulates, rodents, invertebrates, dust, etc.).
- Develop an invasive plant management plan to reduce and control the threats of incipient weeds and to enhance habitat quality.
- Construct fences and determine the frequency and logistics for fence maintenance and hunting programs to accomplish ungulate removal.
- Maintain 12 percent ground cover in off-road maneuver areas.
- Outline monitoring protocols for plants in the Keʻāmuku Parcel, if the area is used for long-term training, along with annual monitoring requirements to assess population structure, vigor, and damage of federally listed plants.
- Detail additional measures to address propagation and outplanting of (1) fragile fern (*Asplenium peruvianum* var. *insulare*) in Fuel Management Areas, (2) honohono (*Haplostachys haplostachya*) and kioʻele (*Kadua coriacea*) to offset transformation impact losses, (3) popolo ku mai (*Solanum incompletum*) and maʻaloa (*Neraudia ovata*) to offset potential losses to stochastic events, and (4) Hawaiian catchfly (*Silene hawaiiensis*) to increase abundance and distribution on Pōhakuloa.
- Develop methods to monitor, integrate and evaluate data, and report results.

**Goal 1: Fund and implement the Pōhakuloa Implementation Plan.**

**Goal 2: Execute projects identified in USFWS biological opinions.**

**Goal 3: Execute decisions made by the Implementation Team for required USFWS projects.**

**Objective:** Annual review and revisions as necessary (adaptive management) of the Pōhakuloa Implementation Plan.

## 4.1.2 Current Management

### 4.1.2.1 Management Approach

Endangered species management at Pōhakuloa approaches issues at two levels: small scale (species management), with concerns for immediate individuals and groupings, and large scale, which focuses on improving ecosystem functions. Small-scale efforts could be viewed as crisis management and quick fixes necessary to prevent the additional loss of individuals. Large-scale (ecosystem) management involves singular efforts that have broad effects (e.g., ungulate removal). Both approaches work to stabilize conditions and provide oversight for the persistence of species.

Species management activities includes the development of propagation protocols for all listed plant species, outplanting procedures, building emergency fences, plant species monitoring, and nēnē (*Branta sandvicensis*) surveys. Intensive weeding occurs around individual plants and subsets of populations and at outplanting sites (USAG-HI 2007b). Plant species are prioritized for weed control based on population numbers statewide and at Pōhakuloa. Ecosystem management activities include the construction of large fences, removal of feral animals, and minimizing fire threats. The NRO staff works at both ends of this spectrum, in the hope that as efforts move toward each other, overall management will be less and areas will become self-sufficient systems, tolerating a wider range of environmental conditions.

The NRO staff has identified success as seedling recruitment, survival, reproduction, increases in abundance and, finally, the expansion of populations. These data elements will be used to predict a species' population viability. Success has a greater likelihood when limiting factors to a species' survival and life history characteristics (e.g., pollination mechanisms, germination requirements, susceptibility to outside threats, etc.) are known. The immediate, short-term objective is to minimize the risk of immediate extinction. The long-term objective is to promote conditions that increase individual species' persistence. The NRO staff uses the following mechanisms to ensure success: Implement individual species management requirements.

Wildland fire management is a 2003 USFWS Biological Opinion requirement and is outside the direct preview of the NRO staff. However, the NRO staff actively supports fire management efforts and has been tasked to bring firebreaks up to a 10/20/30 standard, where the road is 20-m wide and a 30-m buffer is maintained on the direction a fire would approach and a 10-m wide buffer on the leeward side of the fire.

### 4.1.2.2 Priority Ranking of Plant Tasks

No one listed species is more important than any other listed species; however, threats and sensitivities among listed species vary. Ranking prioritizes the importance of an action relative to an individual taxon and assists with the execution of tasks. Typically, all rankings are from 1 (high priority) to 3 (low priority). In the case of weeds, a fourth rank is assigned, while the attributes of the

species are determined. Five management states are ranked to assist in the management of plant species.

- Areas of Species Recovery (ASR) are ranked after areas are surveyed for listed species. The threats to species in an ASR are assessed and prioritized, and controls implemented.
- Seeds collection efforts are based on the number of known individuals. Therefore, those species with fewest individuals or those who show poor recruitment receive greater attention.
- Out planting is based on species rarity and geographic extent. The rarer and the more localized the species the greater the out planting priority.
- Weed species are ranked by invasiveness, distribution, ability to outcompete for resources with native species, fine fuel production, and ability to contain/control the species.
- Weed control around listed species is prioritized based on numbers of remaining listed individuals and threats to the taxon; the fewer the individuals, the greater the priority status for weed control. Priority is based on listed species numbers and/or numbers of populations.

A species such as *Silene lanceolata* is ranked Priority Level 3 for seed collection and Priority Level 2 for weed control. Priority ranking is a guide and not an absolute management directive.

**Goal: Annually evaluate the ranking of priority status for federally listed plant species within the context of the Pōhakuloa Implementation Plan.**

**Objective:** Execute ASR (see Section 4.1.2.4, *Areas of Species Recovery*) and conduct the necessary seed collection, outplanting, and weed species control (general, site specific) activities based on assigned rankings.

### 4.1.2.3 Emergency Fences

Emergency fences are constructed around newly located plants or groupings vulnerable to feral ungulates. Feral ungulates may browse and trample plants, but they are also vectors for non-native plants that affect the environment of federally listed and candidate species. Fencing typically includes establishing rebar in the ground and covering the aboveground portion with pipe that is 1.2 m (4 ft) tall. Orange fence fabric is secured to the pipes with ultraviolet-light resistant zip ties.

**Goal: Establish emergency fences for the temporary protection of federally listed and rare species, groupings of sensitive plants, and for unique natural resources.**

**Objective 1:** Establish fence units as necessary.

**Objective 2:** Prioritize the importance of each new fence unit.

**Objective 3:** Maintain all temporary fences ungulate-free.

**Objective 4:** Maintain temporary fences as long as necessary.

### 4.1.2.4 Areas of Species Recovery

Areas of Species Recovery (ASR) are a management tool that facilitates short and long-term planning goals (Figure 4.a) (USAG-HI 2010). The boundaries of an ASR are determined by drawing polygons around clusters of listed plants, thereby excluding areas without sensitive species. Islands of improved habitat are the management goal. To be identified as an ASR, the area has to have high natural resource value, quality habitat, and/or listed species. A listed plant survey is conducted in each established unit, threats to species are assessed, and the area prioritized for various management

# *Areas of Species Recovery (ASRs) at Pohakuloa*

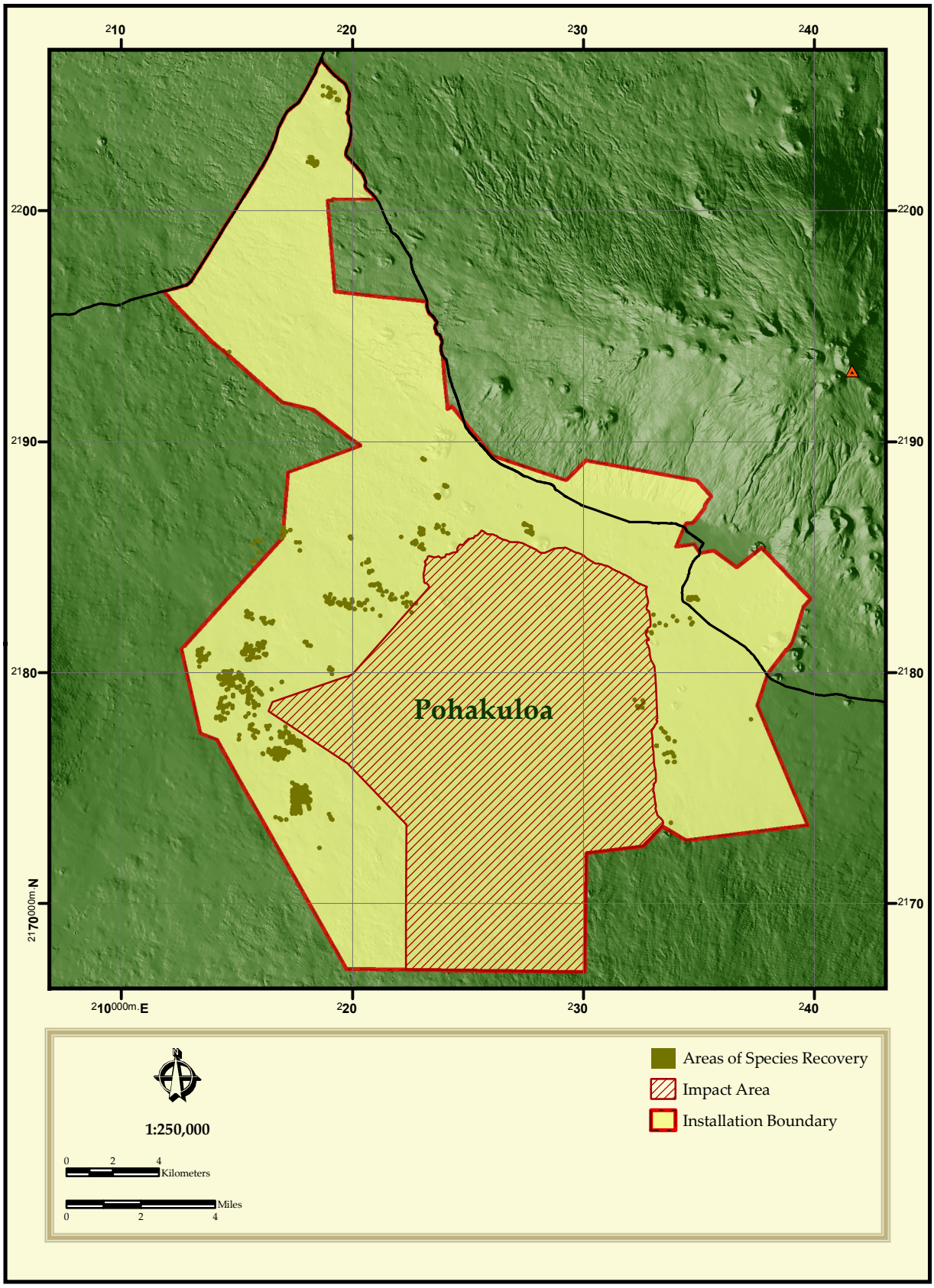



**Figure 4.a**

actions (1=high priority to 3=low priority). Management actions are conducted with the ecosystem in mind. Common management actions are weed, rodent, and ungulate control.

Areas of Species Recovery vary with the distribution and number of plants present. Within an ASR, individual species management may vary dependent on its priority ranking – a Priority Level 1 species for weed control receiving a more intensive weeding protocol than a Priority Level 3 species, for example. However, if an area receives a high priority for weed control, a Priority Level 3 species for weed control would still benefit. An ASR is defined by a 100-m buffer around all known listed plants at sites selected for management. The buffer optimizes habitat condition and minimizes threats to listed species.

**Goal 1: Identify and regularly reevaluate Areas of Species Recovery.**

**Objective 1:** Perform maintenance requirements based on ranking and needs as per the Pōhakuloa Implementation Plan (2010). Determine if additional measures are needed.

**Objective 2:** Annually evaluate management activity rankings and increase or decrease intensity as appropriate.

### 4.1.2.5 Data Collection and Monitoring

Data are collected to document plant population characteristics (e.g., abundance, distribution, age structure, health, etc.) determine a species' population viability and for future comparison. Data elements monitored were recommended by the Hawai'i Rare Plant Restoration Group.

Current monitoring is based on (1) past data collection efforts, data analysis and results, and subsequent literature review; (2) a refined monitoring program incorporating past efforts and peer-review; (3) determination of a statistically and scientifically sound sample size for each species; and (4) the execution of a species-specific sampling and monitoring strategy. The Implementation Plan details the execution of the species-specific monitoring. The data collected by the NRO staff meets the monitoring goals of the biological opinions.

**Goal 1: Maintain data quality at standards specific to each species and/or Area of Species Recovery.**

**Goal 2: Ensure data are properly stored, retrievable, and safe.**

**Goal 3: Ensure that collected data are analyzed and reported in a timely manner.**

**Objective 1:** Each project will have specific goals and objectives, all required elements will be identified in the objectives and a level of rigor determined, all methods will be detailed, logistical elements will be identified, and a time table will be provided for data management, analysis, and reporting.

**Objective 2:** Data will be stored in one or more relational databases appropriate for an area of study. Data storage will meet defined data standards.

**Objective 3:** Data will have geospatial reference information and metadata will meet SDSFIE standards.

**Objective 4:** Data will be stored off-site as well as on-site.

### 4.1.2.6 Habitat Enhancement

Constructing fences, controlling feral animals, controlling non-native, invasive plants, minimizing dust, applying pesticides, establishing shade protection, and reducing the threat of wildland fire

enhance habitat quality for federally listed plant species. The application of pesticides and shade protection are two topics not described elsewhere in the INRMP.

Herbicide application is discussed in relation to non-native, invasive species control in Section 4.9.2, *Invasive Species Management*; however, the 2003 USFWS Biological Opinion mentions the need for an insecticide to be applied to honohono (*Haplostachys haplostachya*) for the control of aphids as well as the application of a fungicide for the control of mildew. Both have been observed on the taxon in the field and in the rare plant propagation facility. Measures are ongoing to determine the most effective methods for control.

As for improving habitat conditions by providing shade protection, the NRO staff observed that several individuals of popolo ku mai (*Solanum incompletum*) appeared to be failing due to sun exposure and heat, which may be the consequence of drought conditions some years. Shade covering was erected over plants to reduce heat and sunlight; which improved the health of the plants (S. Gleason, pers. com. 2003). This is now a continued practice.

**Goal: Improve habitat quality for species and ecosystems.**

**Objective 1:** Address species-specific needs [e.g., shade cloth for popolo ku mai (*Solanum incompletum)*, fungicide application for honohono (*Haplostachys haplostachya)*, rodent bait in areas with the Hawaiian ʻelepaio (*Chasiempis sandwichensis*) and populations of aʻe (*Zanthoxylum hawaiiense*)].

**Objective 2:** Address ecosystem needs (e.g., construction of large-scale fences, aerial application of rodenticide, removal of ungulates from fence units, etc.).

### 4.1.2.7 Seed Collection, Propagation, and Outplanting

The level of effort for future seed collecting, propagation, and outplanting will be dependent on individual species. Species with the fewest number of known reproducing individuals and/or those that lack successful recruitment will receive the highest priority. Seeds will be collected from all known plants on the installation when number of plants is limited or a subsample made when 50 or more plants are present in a population unit. In some cases, genetic material will be maintained vegetatively when threats are high (e.g., nehe—*Melanthera venosa*) or seed germination is poor (e.g., honohono—*Haplostachys haplostachya*).

Seed collection and storage are ongoing efforts, along with refining propagation and seed storage protocols. Collected seed are kept in refrigerators with moderated humidity. Seeds are catalogued by species, collection date, collection location, and founders (i.e., a wild individual from which seeds collected or cuttings were made). Seeds are provided to a number of conservation agencies to facilitate work on these species by agencies other than the Army. Species-specific germination regimes are documented and compared with those from other conservation agencies. For those species where germination has been limited, or time until germination has been extensive, seeds have been field broadcasted.

In 1997, Natural Resources and Public Works personnel constructed a 9.75 x 18.29 m (32 x 60 ft) Rare Plant Propagation Facility (a type of greenhouse), rated to withstand winds up to 90 miles per hour. This facility has automatic climate controls and was completed in July 1998. This facility is the location for seed germination, propagation, and growth before transplanting individuals into the field.

The outplanting goal is to increase listed species abundance and distribution in their known historic range. Outplanted groupings are monitored annually for success. The immediate goal is to establish two off-site outplantings per species to serve as genetic storage, determine/understand species-

specific habitat preferences, and possibly infer historic distributions. Multiple species are planted in accessible areas. The Pōhakuloa IP (2010) defines site suitability as locations where 50 percent or more of the plants survive and at least 50 percent healthy vigor is achieved.

Outplanting on the installation and within the historic range of the species is required for 11 of the 15 species in the biological opinion (USFWS 2003). Three off-installation sites for outplanting are being used. All are on state lands managed by the Hawai‘i Department of Forestry and Wildlife—Pu‘u Huluhulu, Kīpuka ‘Owe‘owe, and Pu‘u Wa‘awa‘a Cone Unit (Figure 4.b). Two other off-sites are managed by the Hawai‘i Department of Forestry and Wildlife—the *Neraudia ovata* Fence Unit in Pu‘u Anahulu, which is maintained by Pōhakuloa, and the Koai‘a Tree Sanctuary (Kohala). Ten of the 15 species (kio‘ele—*Kadua coriacea,* honohono—*Haplostachys haplostachya,* ma‘aloa—*Neraudia ovata,* po‘e —*Portulaca sclerocarpa,* lance-leaf catchfly—*Silene lanceolata, popolo ku mai—Solanum incompletum,* Hawaiian parsley—*Spermolepis hawaiiensis,* creeping mint—*Stenogyne angustifolia,* Mauna Kea pamakani—*Tetramolopium arenarium,* and O‘ahu cowpea—*Vigna o-wahuensis*) along with three species of concern (‘akoko—*Chamaesyce olowaluana,* lovegrass—*Eragrostis deflexa,* and velvet-flower schiedea—*Schiedea hawaiiensis*) have already been outplanted. State lands are used through an agreement with the Hawai‘i Island State Botanist. The Natural Resources Office documents this work in annual reports that are provided to the State for its use.

**Goal 1: Ensure complete genetic representation of listed species in *ex situ* storage.**

**Goal 2: Increase species abundance and distribution in the known historic range or other suitable habitat.**

**Objective 1:** Establish official relationships (e.g., Memoranda of Understanding, permits) with agencies and private parties for the off-site outplanting of federally listed and rare species on Pōhakuloa.

**Objective 2:** Continue on-site and off-site outplanting of federally listed and rare species.

**Objective 3:** Document procedures (e.g., plant germination, hardening, planting, maintenance, etc.) of all outplantings. Document lessons learned. Analyze results and provide reports to interested parties.

**Objective 4:** Collect seed annually from a variety of plants and locations for storage and germination. Test germination to determine if environmental differences between years affect success.

**Objective 5:** Disperse seeds to storage facilities, agencies, and universities. Encourage assistance in determining germination requirements.

**Objective 6:** Maintain the Rare Plant Propagation Facility.

## 4.1.2.8 Large Fence Units

The biological opinion (USFWS 2003) requires the construction of fence units on Pōhakuloa to offset adverse effects to listed species as the result of ongoing training activities. The 2008 USFWS Biological Opinion modified the eastern fence unit and cited the need of additional fencing for popolo ku mai (*Solanum incompletum*).

### Western Fence Units (7 units)

The large-scale fence units on the western side of Pōhakuloa proper are an ongoing, long-term effort with an expected completion date in 2012. The fence encircles TAs 19 and 22, parts of TA 17 and 20, and parts of TA 18 (Figure 4.c). The fence will connect to the northern and northeastern sections of the Kīpuka ‘Alalā fence units in TA 23. The fence will be extended to include the southern corner of

# *Off-site Outplantings for Threatened, Endangered, and Rare Plants, Pohakuloa*

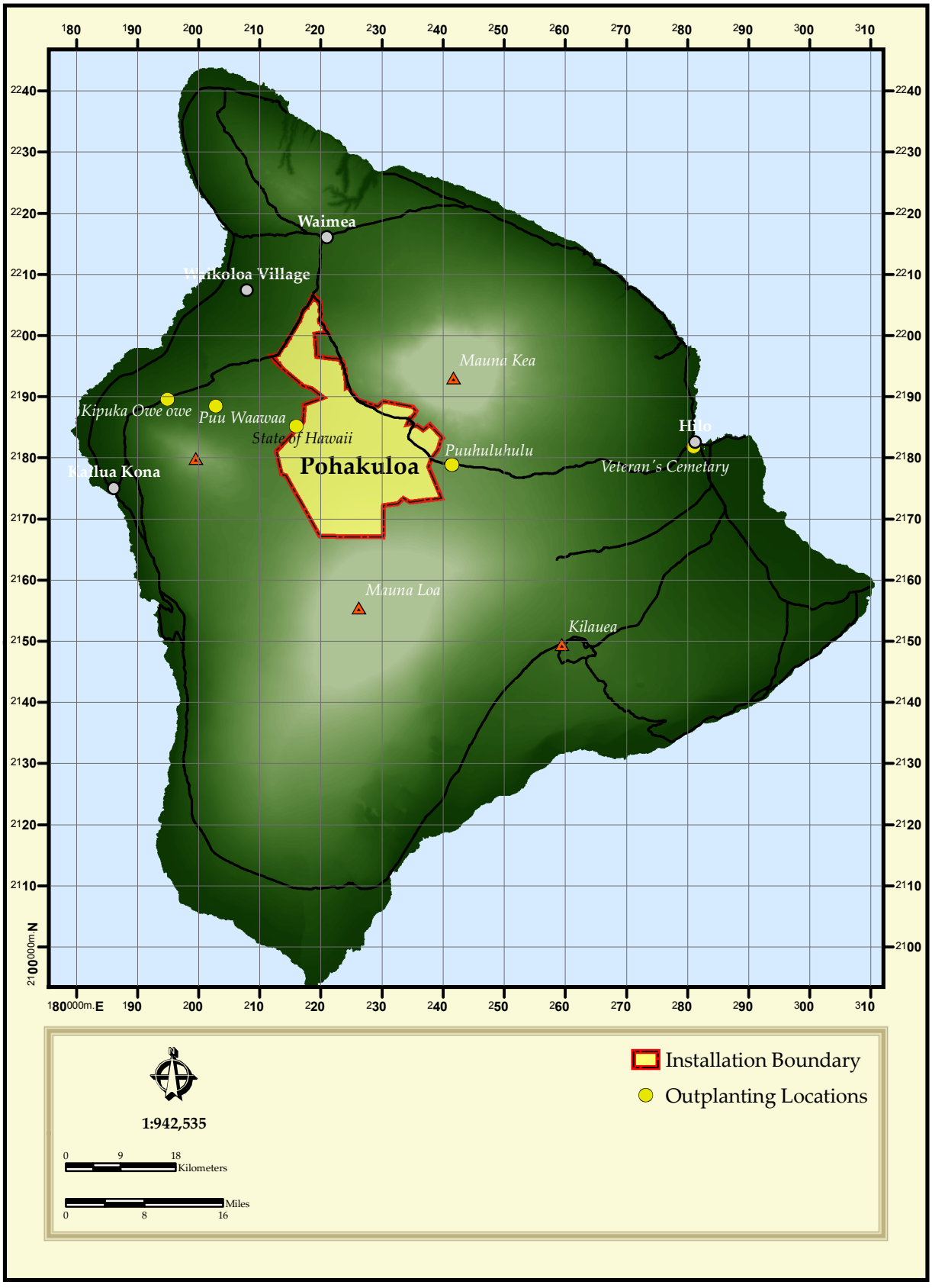



**Figure 4.b**

the Keʻāmuku Parcel, thereby encompassing the honohono (*Haplostachys haplostachya*), creeping mint (*Stenogyne angustifolia*), and Oʻahu cowpea (*Vigna o-wahuensis*) plants at that location. Solid hogwire fencing will be used and will be 2 m (6 ft) tall. The fence unit will have cross fences.

### Keʻāmuku Parcel Fence Units (2 units)

Two fences have been constructed around Puʻu Pāpapa and Puʻu Nohonaohae in the Keʻāmuku Parcel. A 10 m (30 ft) firebreak has been included with the parcel's fence units to reduce the indirect effects of off-road maneuver on plants and to lessen the chance of a fire entering these areas.

### Haplostachys haplostachya Fence Unit (1 unit)

A fence unit was constructed west of Puʻu Ahi for honohono (*Haplostachys haplostachya*).

### Eastern Fence Unit

The USFWS 2003 Biological Opinion required a series of small fence units be constructed to the east of Redleg Trail. The USFWS 2008 Biological Opinion extended the fencing to include all of TA 21 when additional cave locations for fragile fern (*Asplenium peruvianum* var. *insulare*) habitat were identified, as well as additional locations of Hawaiian catchfly (*Silene hawaiiensis*). Such a unit protects more lava tubes, meets the minimum number of fragile fern (*Asplenium peruvianum* var. *insulare*) sites required, protects upwards of three times as many Hawaiian catchfly (*Silene hawaiiensis*), and exclude feral ungulates from a significantly larger area.

### Solanum incompletum Fence Unit(s)

Additional plants of popolo ku mai (*Solanum incompletum*) were located in 2008 in the vicinity of the Twin Puʻus. Temporary fences were constructed to protect plants from ungulate browse (USAG-HI 2008b). As required by the 2003 USFWS Biological Opinion and restated in the 2008 USFWS Biological Opinion, the Army will permanently fence all known plants of popolo ku mai (*Solanum incompletum*).

All feral ungulates will be removed from all proposed fence units by 2014. The removal of feral ungulates from these fenced areas will allow federally listed plants and their habitats to regenerate naturally. Ground and aerial surveys will be conducted regularly to ensure the areas remain ungulate-free.

**Goal: Construct fences as required by the Biological Opinion.**

**Objective 1:** Plan and construct fence units until completed.

**Objective 2:** Remove feral ungulates from the completed fence units.

**Objective 3:** Inspect and maintain fence units annually.

**Objective 4:** Monitor plants for damage by ungulates on an annual basis.

## 4.1.2.9 Individual Plant Species Management

USFWS identified information needs and management actions for each federally listed plant species in the 2003 USFWS Biological Opinion (Table 4.a.). The specific measures undertaken by the NRO staff for individual taxa are detailed in the Pōhakuloa Implementation Plan.

## *Existing and Proposed Fences at Pohakuloa*

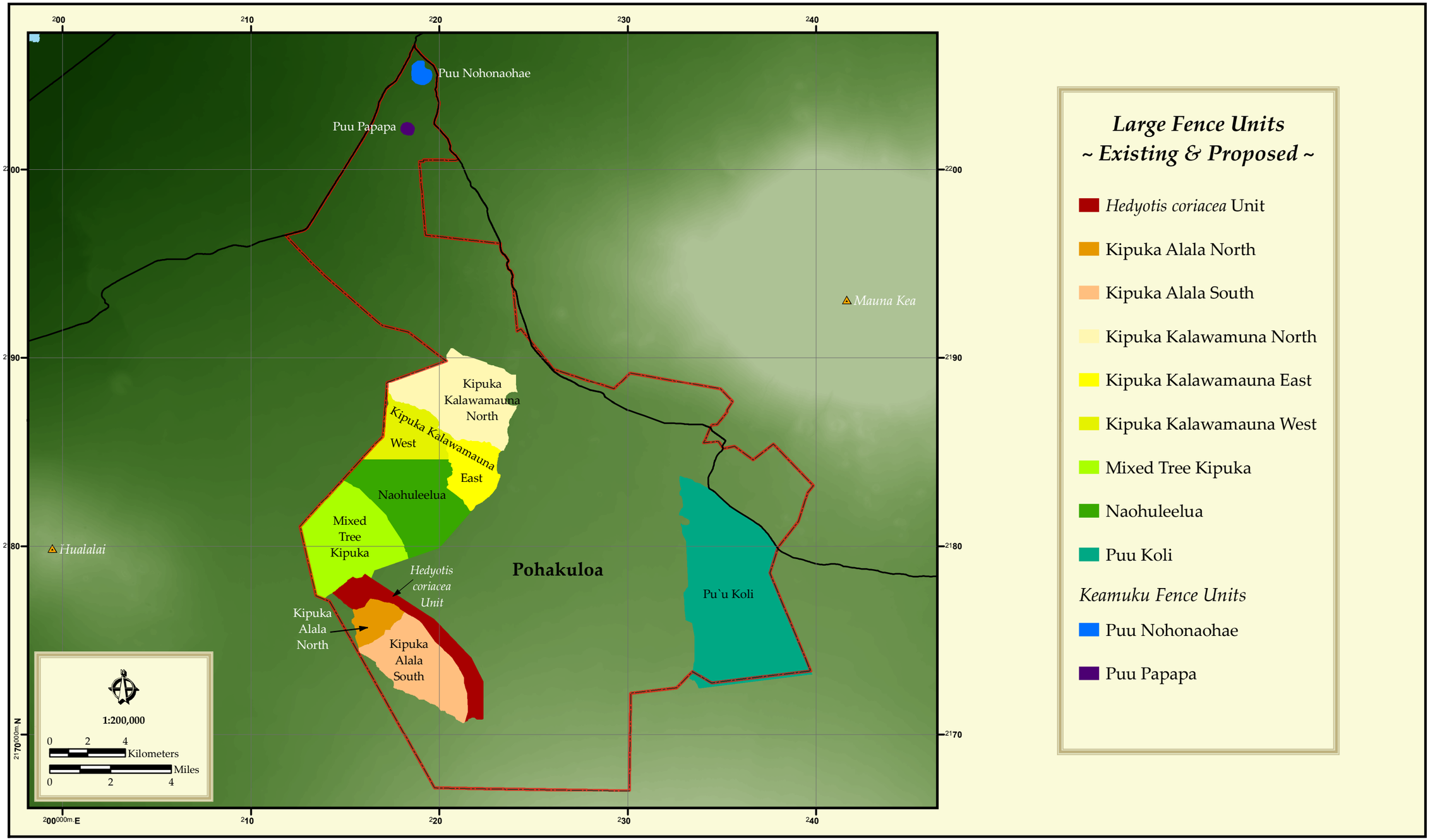



**Figure 4.c**

**Table 4.a. Summary of the Biological Opinion Requirements (USFWS 2003) for Plant Conservation.** The priority rankings (seed collection/outplanting/rarity) are as provided in the *Pōhakuloa Implementation Plan.*

| Species | *Asplenium peruvianum* var. *insulare* (E[1]) (*Asplenium fragile* var. *insulare*) | *Haplostachys haplostachya* (E) | *Kadua coriacea* (E) (*Hedyotis coriacea*) | *Isodendrion hosakae* (E) | *Melanthera venosa (Lipochaeta venosa)* (E) | *Nerautdia ovata* (E) | *Portulaca sclerocarpa* (E) | *Silene hawaiiensis* (T) | *Silene lanceolata* (E) | *Solanum incompletum* (E) | *Spermolepis hawaiiensis* (E) | *Stenogyne angustifolia* (E) | *Tetramolopium arenarium* ssp. *arenarium* (E) | *Vigna o-wahuensis* (E) | *Zanthoxylum hawaiiense* (E) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Priority ranking[2] | 2/3/2 | 3/3/3 | 1/1/1 | 1/1/1 | 1/1/1 | 1/1/1 | 2/3/2 | 3/3/3 | 3/3/2 | 1/1/1 | 3/3/3 | 3/3/3 | 1/1/1 | 1/1/1 | 2/2/2 |
| Additional surveying | x | | | | | | | | | | | | | | |
| Demographic monitoring | | x | | | | | | | | | | x | | | |
| Dust monitoring | | x | | | | | | | | | | | | | |
| Dust, minimize | | x | | | | | | | x | | | | | | |
| Fencing | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| Feral animal control (inc. cattle) | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| Fungus control | | x | | | | | | | | | | | | | |
| Genetic storage (ex situ) | | x | | | | x | x | x | x | | | x | x | | x |
| Germplasm collection (areas lost to construction/training) | | x | | | | | | | | | | | | x | x |
| Insect control | | x | | | | | | | | | | | | | |
| Maintain fire breaks | | | | | | | | | | | | x | | | |
| Monitor extant population(s) | x | x | x | x | x | x | | x | x | x | | x | x | x | x |
| Monitoring (abundance and distribution) | | | | | | | | | | | | x | | | |
| Non-native invasive plant control | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| Outplanting in action area | x | | x | x | x | x | | x | x | | | x | x | x | x |
| Outplanting in historic range | | x | x | | x | | x | x | x | x | | x | x | x | x |
| Propagation (in situ) | | x | x | | | x | x | x | x | x | | x | x | | x |
| Reduce training impacts | | | | | | x | | | | | x | | | | |
| Reduce fire threat | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| Seeds to other agencies | | | | x | x | | | | | | | | | x | |
| Shading | | | | | | | | | | x | | | | | |

[1] Letters in parenthesis indicate federal listing. LE=endangered, LT=threatened
[2] Priority Ratings are as provided in the Pōhakuloa Implementation Plan.

## 4.1.2.10 Individual Animal Species Management

### Birds

USFWS noted in the 2003 and 2008 Biological Opinions that information to determine if nēnē (*Branta sandvicensis),* Hawaiian dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*), and/or ʻio (*Buteo solitarius*) might be affected by Legacy and/or Stryker Brigade Combat Team Transformation (SBCT) training actions was insufficient. As such, the Army was directed to conduct surveys for species presence, abundance, and habitat use.

- **Nēnē (*Branta sandvicensis*).** Breeding pairs of nēnē (*Branta sandvicensis*) were encountered on the Keʻāmuku Parcel in 2008 as well as individual birds at Range 1 in 2007. Section 7 consultation was reinitiated with the USFWS in 2008. The NRO staff is collecting information on the taxon, has developed monitoring and survey protocols, and is providing input on training access and availability. Future efforts will continue to locate use areas, determine abundance, and develop military standard operating procedures that support the persistence of the species while maximizing training opportunities. Remote sensing cameras and recorded calls may provide greater information to understanding when and how the species uses Pōhakuloa resources.

- **ʻIo or Hawaiian hawk (*Buteo solitarius*) and Hawaiian dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*).** Surveys for the ʻio/Hawaiian hawk (*Buteo solitaries*) were conducted in 2007 and from 2004 to 2006. These surveys led to the conclusion that this species is not a resident on Pōhakuloa, and use of the area is unpredictable (USAG-HI 2007b). Monitoring protocols in the Pōhakuloa Implementation Plan call for subsequent surveys every five years unless individuals are sighted during their breeding season or individuals are seen more than five times in a single area within a year. Also, USFWS presented a post-delisting monitoring plan for the species, 11 February 2009 (74 FR 27004-27005), following three previous notices (USFWS 2009b—74 FR 6853-6854; USFWS 2008—73 FR 45680-45689; USFWS 1993—58 FR 41684-41688).

  Surveys for the Hawaiian dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*) occurred May and June 2007 and were repeated in June and July 2008 as well as June and July 2009. No birds were encountered during four nights of monitoring from sunset to 21:00 HST. More survey time is planned in known, former petrel habitat on the installation in 2010, along with the lease remote audio recording equipment.

- **Palila Critical Habitat**—USFWS requires the Army to:

  - Maintain the established external standard operating procedures and the Wildland Fire Management Plan in the Palila Critical Habitat.

  - Determine if the initial 75 m (246 ft) buffer along the southern edge of the Palila Critical Habitat Area B is sufficient to reduce the impacts from Stryker off-road maneuvers. The buffer can be reduced if Stryker vehicle effects are less than anticipated. If vehicles[2] breach the buffer, Siebert Stakes must to be established. Monitoring and placing Siebert Stakes may be ITAM duties.

### Mammals

- **Hawaiian Hoary Bat (*Lasiurus cinereus semotus*)—**The terms and conditions of the 2003 Biological Opinion (USFWS 2003) require Pōhakuloa to develop and implement monitoring protocols to determine bat presence on the installation; guidelines to protect bats from direct

[2] Stryker vehicles have on-board GPS, which will be used to identify the buffer boundary.

harm and/or harassment due to human activities, and to maintain, enhance, and replace lost roosting and forage habitat. To accomplish these tasks, the following information will be determined:

- Area of existing treeland, shrubland, and grassland at Pōhakuloa.
- Area of existing treeland, shrubland, and grassland in the impact area (estimates from aerial photographs).
- Area of existing treeland, shrubland, and grassland at Pōhakuloa prior to live fire (estimates from historic photographs).
- Annual area destroyed by past fires at Pōhakuloa and the frequency of large fires.
- Spatial and temporal trends in abundance and distribution of the Hawaiian hoary bat.
- Density of the Hawaiian hoary bat at various roosting and foraging habitats.

A protocol for Hawaiian hoary bat (*Lasiurus cinereus semotus*) management is included in the Pōhakuloa Implementation Plan (USAG-HI 2010). The protocol:

- Provides a brief description of the current state of knowledge,
- Outlines knowledge gaps to be addressed by monitoring and management, and
- Provides a plan for addressing information needs (e.g., occupancy trends, habitat, future research, etc.).

Surveys have been initiated to determine species abundance and habitat use with bat detectors, mist netting, tagging, and/or other appropriate techniques for bat detection. Automated passive echolocation detectors were used in a preliminary study in 2007 (Jacobs). Detectors are less labor intensive and thereby more cost-effective by providing more data. Year-round monitoring is proposed until a baseline of occupancy at Pōhakuloa and the Keʻāmuku Parcel is determined. This information may establish seasonal changes in occupancy, the level of variability in annual use, and may identify habitat preferences.

The USFWS 2008 Biological Opinion has called for the removal of barbed wire after a bat was found impaled in western Pōhakuloa.

The Implementation Team will review collected data, methods, and management.

### 4.1.2.11 Rare Vertebrate (Bird) Species Management

Rare bird management is comprised the non-listed, native bird species on Pōhakuloa. An example is the Hawaiʻi ʻelepaio (*Chasiempis sandwichensis sandwichensis*). The Hawaiʻi ʻelepaio is endemic to the Hawaiian Islands, is State listed as endemic, and is identified by Hawaii's Comprehensive Wildlife Conservation Strategy as a species of "conservation need." A passerine songbird, Hawaiʻi ʻelepaio (*C. s. sandwichensis*) inhabits wet or mesic forests above 600 m (2,000 ft). Rats and feral cats are a threat to nests and female birds. A 1993 survey noted 244 detections (Gon et al. 1993). In 1996, 20 ʻelepaio (*C. s. sandwichensis*) were found in Kīpuka ʻAlalā and an additional 15 birds counted in 1998. In 2006, one breeding pair and perhaps one to three additional individuals were noted (USAG-HI 2006). The species is nearly extirpated from Pōhakuloa, and rat predation is considered the most likely cause.

### 4.1.2.12 Rare Invertebrate Species Management

There is very limited knowledge about the invertebrates on Pōhakuloa. At least three arthropods and eight snails are species of concern and known to occur. DA Memorandum *Army Goals and Implementing Guidance for Natural Resources Planning Level Surveys* and *Integrated Natural Resources Management Plan* (21 March 1997) and AR 200-1, 4-3.d(1)(r), directs installations to conduct (at a minimum) surveys for all locally rare and keystone faunal species. The Comprehensive Wildlife Conservation Strategy notes that keystone species in the Orders Coleoptera (beetles), Diptera (true flies), Heteroptera (true bugs), Homoptera (aphids, plant hoppers, leaf hoppers, etc.), Hymenoptera (ants, bees, and wasps), Lepidoptera (moths, butterflies, and hyposmocoma), Odonata (damselflies and dragonflies), and Orthoptera (grasshoppers, crickets, and katydids) are present on the Island of Hawai‘i.

In recent years, only one rare invertebrate, a wingless weevil (*Rhyncogonus stellaris*), has been studied at Pōhakuloa. This species appears to be restricted to the installation, but was once known from lower elevations in the North Kona and South Kohala districts (Samuelson 2003). From August to September 2004, a study was conducted at eight sites. Each site was visited once or twice per month. Eighteen weevils (*Rhyncogonus stellaris*) were observed at one site in one day (16 August 2004). Limited sampling may be a consequence of sample size and season. *Asnonycus codmanii*, an introduced weevil, was observed at all of the study sites. The role of this species to the native species cannot be addressed without additional information.

Other important invertebrates include:

- **Hawaiian helicoverpa moth (*Helicoverpa confusa*),** identified on the installation in 1998. Like the weevil, this moth has a restrictive range and more information is necessary.
- **Kona yellow-headed bee (*Hylaeus kona*),** a small bee endemic to the Island of Hawai‘i is restricted to the area between Hualalai, Mauna Kea, and Mauna Loa (Magnacca 2005). Recent collections sites include Kīpuka ‘Alalā. The species appears to favor koko (*Chamaesyce olowaluana*), although the species is found on other flowers (Magnacca and Danforth 2006).
- Eight rare snails have been identified on the installation.
- Lava tube and cave study identified these sites as potential locations, not only for rare species, but also for previously undescribed species (Howarth et al. 1996).

Invertebrate information is not only helpful for maintaining the native species but for understanding their relationships with other life forms. As potential pollinators, food sources, and predators, invertebrates are a key component to ecosystems.

**Goal 1: Meet the federally listed species management requirements required by the 2003 and 2008 USFWS Biological Opinions.**

**Goal 2: Meet the Army stewardship requirements for keystone species and species of concern.**

**Objective 1:** Conduct Hawaiian hoary bat surveys to: (1) determine spatial and temporal trends in abundance and distribution, (2) document historic and current extent of habitat, (3) determine and document roosting and foraging habitats, and (4) determine if fire and fire frequency plays a role in distribution and use of the species at Pōhakuloa.

**Objective 2:** Address additional information needs for nēnē (*Branta sandvicensis*) noted in the Pōhakuloa Implementation Plan as directed in the 2008 USFWS Biological Opinion and the Implementation Team.

**Objective 4:** Continue with individual bird species studies: ʻelepaio (*Chasiempis sandwichensis sandwichensis*), ʻio (*Buteo solitarius*), and dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*).

**Objective 5**: Continue to seek funding for a comprehensive invertebrate survey.

**Objective 6**: Continue with individual species studies for species of concern/risk: wingless weevil (*Rhyncogonus stellaris*), Hawaiian helicoverpa moth (*Helicoverpa confusa*), and Kona yellow-headed bee (*Hylaeus kona*).

### 4.1.2.13 Managing Threats

Working for the conservation and propagation of federally listed and rare species is fundamentally working with and managing the threats to these species. The non-native invasive plants on Hawaiʻi tend to be more successful in capturing resources (e.g., light, space, nutrients), more tolerant of dry conditions, and better colonizers (e.g., faster and greater germination rates) than native species. In Hawaiʻi, non-native mammals have no predators to control population. Native birds are vulnerable to avian malaria and avian pox, diseases inadvertently introduced to the islands (1920s and 1880s, respectively). In the case of bird populations, introduced non-native birds did not out compete, but out-survived, native bird species.

Collectively, non-native introductions have not only changed species presence and abundance, but have changed how ecosystems function. Wildland fire was a small part of natural ecology of Hawaiʻi (see Section 4.15 *Wildland Fire Management*); however, wildland fire characteristics are changing as vegetation and vegetation characteristics change. As with the introductions of plants, animals, and diseases, human activities have increased wildland fire potential.

Human effects on Pōhakuloa resources include damage from fire, construction, training (fixed ranges, maneuver areas), facilities, and roads. The consequence of these effects is dust generation, inadvertent species introductions, and habitat modification. The NRO staff works to understand and to lessen when necessary the effects of land use in support of the military mission, and to preserve the uniqueness of Pōhakuloa.

**Goal: Remove or minimize threats to federally listed and rare species on Pōhakuloa using an adaptive management process, which means executing the following objectives based on established priorities.**

**Objective 1:** Remove all ungulates from large fence units as the units are built.

**Objective 2:** Remove/control rodent and feral cat populations.

**Objective 3:** Pursue the possibility of using predator-proof fencing at Pōhakuloa to protect species more vulnerable to rodents.

**Objective 4:** Fund research to understand the connection between rodents and habitat restoration.

**Objective 5:** Pursue the possibility of using predator-proof fencing to protect nēnē (*Branta sandvicensis*) nesting sites on the Keʻāmuku Parcel.

**Objective 6:** Remove/control non-native invasive species from around federally listed and rare plants, thereby increasing resource availability and minimizing wildland fire threats.

**Objective 7:** Minimize all other threats known to limit the success of federally listed and rare species on Pōhakuloa.

**Objective 8:** Develop Soldier briefing materials, including outreach brochures, to be used prior to training events at Pōhakuloa.

**Objective 9:** Ensure that outgoing units use the wash racks provided at Pōhakuloa to clean their vehicles of weed seeds before transporting back to Oʻahu.

**Objective 10:** Ensure that ingoing units have properly washed/cleaned their vehicles of weed seeds and animals before transporting to Pōhakuloa.

### 4.1.2.14 Research

Below are studies conducted pursuant to the USFWS 2003 and 2008 Biological Opinions. In some cases, the intent of the study was to determine species presence, actual impacts (e.g., dust), and future needs prior to making management decisions.

- **Dust.** The USFWS recognizes that dust is a consequence of military training. One conservation measure the Army proposed and required by USFWS under the terms of the consultation, is a study to determine the effect of dust on listed plants and native plant species at Pōhakuloa. The intent of the study was to validate various assumptions of the effect of dust on plants (e.g., increased physiological functions, decreased growth rates with reduced photosynthesis, and so on). The study included different growth forms, habitat types, and families of rare indigenous, common indigenous, and non-indigenous plants. The study determined that plants at least 20 cm tall and 40 m from disturbance points had limited damage to leaves or reduction in photosynthesis, and that soil transport decreased as vegetation density increased (Gleason et al. unpublished). Thus, keeping roads and training points at least 40 m from rare plant habitats and maintaining at least 12% plant cover on training points, direct and indirect impacts related to windblown soils were negligible. No significant differences were noted between rare indigenous, common indigenous, or non-indigenous plants to sandblasting or dust loading on photosynthesis.
- **Palila Critical Habitat Degradation.** The 2003 USFWS Biological Opinion directed the Army to conduct a study to address habitat degradation in the Palilia Critical Habitat. The study is to address vegetation changes that may occur post-transformation, to include dust deposition and the increase of non-native plants. The study is to determine mechanisms to resolve degradation and to improve habitat quality.
- **Propagation and Outplanting Needs.** The 2003 USFWS Biological Opinion requires the Army to address propagation and outplanting of (1) fragile fern (*Asplenium peruvianum* var. *insulare*) in Fuel Management Areas, (2) honohono (*Haplostachys haplostachya*) and kioʻele (*Kadua coriacea*) for Transformation losses, (3) popolo ku mai (*Solanum incompletum*) and maʻaloa (*Neraudia ovata*) to offset potential losses to stochastic events, and (4) Hawaiian catchfly (*Silene hawaiiensis*) to increase species abundance and distribution on Pōhakuloa.

  The Army has initiated a study to examine the population genetics and pollination biology of kioʻele (*Kadua coriacea*). Kioʻele is thought to be affected by inbreeding depression. Currently, there are 167 known individuals, and all except one are mature plants. Seeds are produced and germinate successfully under controlled conditions, but plants are not successful under natural conditions. Studies will determine if unique alleles are present in various populations (microsats/neutral markers), as well as examine sub-populations of plants for independent characterization of their genetic structure (random amplified polymorphic DNA markers). A second set of studies will examine the reproductive biology of the taxon and include pollination observations (e.g., determine when, by whom, how often, etc.), floral nectar production and concentration (e.g., compare to more close relatives), phenology (e.g., monitor flower and fruit development), and breeding systems and seed germination

- **Gulches and Gullies—Keʻāmuku Parcel.** Prior to Army ownership, the Keʻāmuku Parcel was used for commercial livestock grazing. Most areas were impacted by grazing with the exclusion of the two puʻus that were fenced and the drainages with slopes too steep for cattle to navigate. The consequence is pockets of vegetation with dense native shrubs including kolea (*Myrsine lanaiensis*), ʻakoko (*Chamaesyce olowaluana*), ʻillahi (*Santalum paniculatum*), and naieo (*Myoporum sandwicense*) at the higher elevations (southeast) (Arnett 2002b). A partial survey following purchase confirmed that native vegetation stands are no longer present outside of the gulches and gullies.
- **Nēnē Research.** A number of questions arose with the flocking of nēnē (*Branta sandvicensis*) at Range 1 and the discovery of nests in the Keʻāmuku Parcel. To address these questions, NRO staff will monitor nēnē through the flocking season. The collected data will be reviewed in 2012 to determine if new management actions should be incorporated into the project description (USFWS 2008a). Efforts to provide an alternative site for loafing will be developed and success assessed. The NRO staff will also support an ongoing satellite transmitter study conducted by the U.S. Geological Survey-Biological Resources Discipline and the National Park Service. On the Keʻāmuku Parcel, located nests will be monitored to determine hatch date and the cause(s) of any nest failure.
- **Other Projects.** See management sections for rare vertebrate species (Sec. 4.1.2.11) and rare invertebrate species (Sec. 4.1.2.12) for additional research topics.

The following project was not identified as a requirement in the 2003 and 2008 Biological Opinions.

- **Restoration to Break the Grass/Fire Cycle in Dryland Ecosystems.** This is a four-year funded Strategic Environmental Research and Development Program project (2008-2011). The project will use remote-sensing, field-based studies to (1) define the current condition and historical changes to tropical dry forest ecosystems in Hawaiʻi, (2) develop technology for regional restoration planning and ecosystem monitoring, (3) quantify restoration potential and develop restoration prescriptions for remnant Hawaiian dry forests and shrublands, and (4) develop effective fuel and fire risk reduction measures that initiate succession for degraded grasslands to native woody communities.

Additional research projects are expected as a response to unplanned events such as fire, drought, storms, etc. as well as when new information and observations are made. Others will be in support of outside agencies' requests.

**Goal 1: Develop research projects that address federally listed species' management needs.**

**Goal 2: Continue to seek outside support and funding for research projects (e.g., Strategic Environmental Research & Development Program, Legacy, National Science Foundation, etc.).**

**Goal 3: Meet the research requirements identified by the USFWS in its biological opinions.**

**Objective 1:** Develop and execute projects to determine: (1) use of the installation by nēnē (*Branta sandvicensis*) and their movement patterns seasonally on the Island of Hawaii, (2) limiting factors to the success of ʻelepaio (*Chasiempis sandwichensis*) in the Kīpuka ʻAlalā, (3) pollination strategies of federally listed and rare plant species, and (4) role of non-native pollinators with native plants and native pollinators.

**Objective 2:** Work with the USFWS, USFS, DLNR, HEAR, and other agencies and organizations to determine if project work and costs can be shared.

## 4.2 Section 7 Consultation

### 4.2.1 Policy and Background

The Army is developing the Pōhakuloa Implementation Plan (2010) as required in the *Biological Opinion by the U.S. Fish and Wildlife Service for Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light), U.S. Army Installations, Island of Hawaii*, 23 December 2003. Additional requirements identified in the USFWS 2008 Biological Opinion are included in the plan. The Implementation Plan was developed by the Implementation Team and USFWS and included the location of fences, management and monitoring protocols, outplanting strategies, off-site plant of species, dust studies, invasive plant control, and more.

In September 2008, USAG-HI reinitiated Section 7 consultation with USFWS by submitting a biological assessment (*Biological Assessment for Reinitiation of the December 2003 Section 7 Consultation on Training at Pōhakuloa Training Area, Hawai'i, #1-2-2003-F-002*). Multiple factors precipitated the action:

- Two separate pairs of nēnē (*Branta sandvicensis*) were observed protecting nest sites on the Ke'āmuku Parcel (January 2008). This is the first time nests were observed on Pōhakuloa.
- Nēnē have been seen on Range 1 in large numbers (more than 20 birds at one sighting).
- Surveys in TA 21 for 20 or more caves occupied by or suitable for fragile fern (*Asplenium peruvianum* var. *insulare*) found only 10 caves within the proposed fence units. Consequently, the Army sought clarification from the USFWS regarding fencing and suggested all of TA 21 be fenced.
- Additional surveys of TA 21 found 478 Hawaiian catchfly (*Silene hawaiiensis*) plants. The fencing required by the 2003 USFWS Biological Opinion would protect 35 percent of the 160 known locations of the taxon. As such, the Army sought clarification from USFWS regarding fencing and suggested all of TA 21 be fenced to comply with the intent of the 2003 USFWS Biological Opinion.
- Additional individuals of popolo ku mai (*Solanum incompletum*) were found in an area previously identified as not containing plants. Five new locations with 60 to 79 individuals were found in the vicinity of the Twin Pu'us area, east of Kīpuka Road. These additional plants cause a substantial change in the status of a very rare species.
- Proposed helicopter pinnacle training on Pu'u Omaokaoli within the Palila Critical Habitat by the Army.

The USFWS issued its biological opinion (Reinitiation of Formal Section 7 Consultation for Additional Species and New Training Actions at Pōhakuloa Training Area, Hawai'i) on December 12, 2008. Fragile fern (*Asplenium peruvianum* var. *insulare*), Hawaiian catchfly (*Silene hawaiiensis*), and popolo ku mai (*Solanum incompletum*) were reviewed in the USFWS 2003 Biological Opinion. A large fence, rather than a series of small fences, in Training Area 21 would address the issues associated with fragile fern and Hawaiian catchfly. A fence unit around newly found popolo ku mai in TA 18 and the exclusion of training from the fenced area would alleviate issues with this species.

Steps to address nēnē occurrences are more detailed and include greater NRO staff oversight during training exercises at Range 1, and survey, monitoring, and observation in the Ke'āmuku Parcel. Also, because a bat was found impaled on a barb wire fence, that type of fencing is to be removed from all areas other than the cantonment and an alternative to barb wire is to be sought for the cantonment

area. Lastly, pinnacle training on Puʻu Omaokaoli was found not likely to adversely affect Palila Critical Habitat.

### 4.2.2 Current Management

The Army utilizes informal and formal consultations with USFWS and NMFS pursuant to section 7 of the Endangered Species Act (1973, as amended), following the guidance of the *Endangered Species Consultation Handbook* (USFWS and National Marine Fisheries Service 1998).

Section 7 consultation ensures any action authorized, funded, or carried out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Section 7 consultation is a cooperative effort involving the affected parties engaged in analyzing effects posed by the proposed actions on listed species or critical habitat(s). Formal consultation becomes necessary when (1) the action agency requests consultation after determining the proposed action may affect listed species or critical habitat, or (2) USFWS/NMFS, through informal consultation, does not concur with the action agency's finding that the proposed action is not likely to adversely affect the listed species or critical habitat. Informal consultations clarify, determine, and explore issues to decide if a formal consultation is necessary. If no species or critical habitat is likely to be adversely affected, informal consultation can end with a letter to the appropriate parties summarizing results and any concerns and recommendations.

The Army will work with USFWS to ensure issues that have arisen since the USFWS 2003 and 2008 Biological Opinions are addressed and resolved.

**Goal: To inform and comply with federal, state, DoD, and Army laws, regulations, and policies in regard to the Endangered Species Act, Sikes Act, and the Migratory Bird Species Act.**

**Objective 1:** Proactively maintain an up-to-date presence/absence list, distribution information, and habitat data for all Special Status Species on Pōhakuloa, in support of project and activity planning, management and implementation.

**Objective 2:** Review new projects for consistency with the Biological Opinions (USFWS 2003, 2008a).

**Objective 3:** Monitor existing projects executed to comply with the 2003 and 2008 USFWS Biological Opinions.

## 4.3 Wetlands and Deep Water Habitat Management

Pōhakuloa has no wetlands or deep water habitat.

## 4.4 Law Enforcement of Natural Resources Laws and Regulations

### 4.4.1 Policy and Background

Natural resources law enforcement is a combined responsibility of the Department of Defense (DoD) Police and the Hawaiʻi DLNR Law Enforcement Division (Cooperative Agreement, DA, Department of Interior, State of Hawaiʻi, 23 July 1965). The DA Police control access and physical security at Pōhakuloa. The Hawaiʻi DLNR is responsible for enforcing state laws involving natural resources such as state hunting regulations. Under the cooperative agreement, the DA Police and the DLNR officers patrol state and federal lands on Pōhakuloa and provide assistance to each other within their

areas of expertise and authority. The DA Police do not conduct patrols specifically for wildlife-related enforcement, but do report suspected hunting violations to the DLNR.

The Pōhakuloa boundary is poorly marked, which makes enforcement difficult. There are no gates, few signs, and no boundary fences. Enforcement is difficult in many areas due to remoteness and vehicle inaccessibility.

### 4.4.2 Current Management

Most law enforcement falls under the direction of the DA Police at Pōhakuloa. Hunters are the principal non-military users of the installation. Hunters are required to sign in and out of the installation at the Police Station (see Section 4.13.3, *Outdoor Recreation*). DLNR officers check stations during hunting periods.

**Goal: Assure legal compliance during military and civilian activities with regard to natural resources on Pōhakuloa.**

**Objective 1:** Develop signage at potential access points.

**Objective 2:** Review cooperative agreement(s) and determine if being used effectively.

**Objective 3:** Develop a pamphlet on non-military access and use of the installation. Provide contact names and numbers.

## 4.5 Wildlife and Game Management

### 4.5.1 Policy and Background

Wildlife management at Pōhakuloa provides for wildlife populations and their habitats consistent with accepted scientific principles, the Endangered Species Act, and other applicable laws and regulations (AR 200-1). This Integrated Natural Resources Management Plan acts as the required Wildlife Cooperative Plan for Pōhakuloa, a Category I installation with adequate acreage of land resources. Typically, funds are programmed for wildlife and game management as required by the Sikes Act. Wildlife resources at Pōhakuloa are managed by agreement by the Sikes Act's required partners: USAG-HI, USFWS, and Hawai'i DNLR. Often, an installation's cooperative plan provides direction for program planning and development, maintenance, and coordination of wildlife, fish, and game conservation. The plan outlines measures for wildlife habitat improvements or modifications, wildlife considerations in range rehabilitation, control of off-road vehicle traffic, use and protection of wildlife resources, to include both consumptive and non-consumptive use, natural resources law enforcement requirements, and designated responsibilities for the control and disposal of feral animals.

All mammals, other than the 'ope'ape'a or Hawaiian hoary bat (*Lasiurus cinereus semotus*) are nonnative and nearly all negatively impact the native habitat. There are no water bodies to support aquatic fauna. There are no native amphibians or reptiles. Game birds are present. NRO staff activities support native bird populations, and native habitats benefit game birds.

Department of Defense Instruction 47153, *Environmental Conservation Program*, 3 May 1996). Army Regulation 200-1 (*Environmental Quality—Environmental Protection and Enhancement,* 13 December 2007), advises installations to conduct initial, thorough faunal and floral inventories and that species lists be reviewed during the INRMP review process. This regulation further states that

faunal surveys are to include field data that describes and maps the distribution and extent of animals. Faunal surveys at Pōhakuloa identify native, neotropical, upland game, and raptor bird species. An on-going study has documented the location and densities of the ʻopeʻapeʻa/Hawaiian hoary bat (*Lasiurus cinereus semotus*).

Related wildlife management issues are addressed in Sections: 4.6, *Migratory Bird Management*; 4.9.2, *Invasive Species Management*; 4.1.2.10, *Individual Animal Species Management*; 4.13.3, *Outdoor Recreation*.

## 4.5.2 Wildlife Management

Many of the wildlife projects at Pōhakuloa fall under multiple areas of management (see Section 4.1.2.10, *Individual Animal Species Management;* Section 4.9.2.3, *Invasive Animal Species Management*). Projects include:

- Forest Bird Surveys on Pōhakuloa began by establishing a transect in the Palila Critical Habitat as part of the Hawaiian Forest Bird Survey by USFWS. Data were collected annually (1976 to 1983). In 1992, The Nature Conservancy established eight bird transects in Kīpuka ʻAlalā and data were collected monthly for a year. As part of Saddle Road realignment mitigation, the NRO staff began developing a survey for forest birds by re-establishing seven of the eight 1992 Kīpuka ʻAlalā transects and adding three new transects in Palila Critical Habitat (total of 11 native bird transects) in 1977. Since 1998, data have been collected at 15 locations in three areas (Kīpuka ʻAlalā, Palila Critical Habitat, and Training Area 22). During the last three surveys, four native species were recorded, of which two are common: ʻapapane (*Himatione sanguinea*) and amakhi (*Hemignathus virens*).
- Rare bird surveys are conducted to better understand a species' habitat requirements and populations to develop strategies to guide management decisions. Rare bird surveys are discussed in Section 4.1.2.11, *Rare Vertebrate (Birds) Species Management.*
- Habitat improvement includes improving habitat quality for the palila (*Loxioides bailleui*) in the Palila Critical Habitat, and palila and ʻelepaio (*Chasiempis sandwichensis sandwichensis* in Kīpuka ʻAlalā,
- Hawaiian hoary bat (*Lasiurus cinereus semotus*) research on the habitat needs and life history characteristics. In 2005, surveys were conducted along roads scattered throughout the installation to determine its presence. In 2006, 120 survey points were stratified by five habitat types. Extensive studies are required by the USFWS Biological Opinion (see Section 4.1.2.10, *Individual Animal Species Management*).
- Data collection and documentation is an important part of all wildlife projects from avian forest bird surveys to document number and species harvested through hunting. All collected data meets NRO data quality objectives.

## 4.5.3 Game Management

Game bird harvest data have been collected since 1986 at Pōhakuloa. These data provide an indication of population trends for some game bird species. Hunter data are collected by Hawaiʻi Division of Forestry and Wildlife (DoFAW) weekly during hunting seasons. During the 2002-2003 season, 3,685 birds represented by 13 taxa were harvested. California quail was the most commonly harvested species at 2,065 individuals or 56 percent, followed by Erckle's francolin at 883 birds (24 percent), Chukar with 255 birds (7 percent), and black francolin at 212 individuals (6 percent). Species are tracked by location of hunting areas within the Game Management Units. The 2003 NRO

Report (USAG-HI 2003) notes that bird harvest numbers are consistent across years. The only other management is the maintenance of wildlife water units that were originally constructed by DoFAW.

USAG-HI manages hunting and trapping in terms of areas available, dates within DoFAW seasons, safety requirements, permit and reporting requirements, threatened and endangered species concerns, and other parameters to avoid conflicts with the military mission and to provide safe, quality recreational experiences. USAG-HI will continue to allow public access for hunting through Range Control based on DoFAW regulations when there is no conflict with the military mission.

**Goal 1: Determine the distribution of wildlife and game birds on Pōhakuloa.**

**Goal 2: Determine the factors influencing the existence of wildlife and game birds on Pōhakuloa.**

**Objective 1:** Identify habitat requirements for all native vertebrate species on Pōhakuloa.

**Objective 2:** Identify and characterize wildlife habitats that support natural resource goals for the native fauna on Pōhakuloa.

# 4.6 Migratory Birds Management

## 4.6.1 Policy and Background

Six native bird species and six non-native, non-game bird species are protected by the Migratory Bird Act and Executive Order 13186 (*Responsibilities of Federal Agencies to Protect Migratory Birds*, 10 January 2001) on Pōhakuloa. An additional six native, non-migratory species are present on the installation. The Migratory Bird Treaty Act decreed that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected. The act is a domestic law that affirms and implements the U.S. commitment to four international conventions for the protection of a shared migratory bird resource.

The DoD and USFWS entered into a Memorandum of Understanding (MOU) in 2006 to promote the conservation of migratory birds in accordance with the executive order. The intent of the MOU is to describe actions to be taken to advance migratory bird conservation, avoid or minimize bird take, and ensure DoD operations are consistent with the Migratory Bird Treaty Act. The MOU describes how USFWS and DoD will work together to achieve these ends. This MOU mainly focuses on those activities that are not considered military readiness activities such as land management, range construction and maintenance, building and maintaining perimeter and other fences, etc.

On 28 February 2007, USFWS finalized a rule (*Migratory Bird Permits, Take of Migratory Birds by the Armed Forces*, 72 FR 8931) allowing the Armed Forces to "take" migratory birds in the course of military readiness activities, as directed by the 2003 National Defense Authorization Act (2 December 2002). The February 2007 rule states that the Armed Forces will consult with USFWS "to identify measures to minimize and mitigate adverse impacts of authorized military readiness activities on migratory birds, and to identify techniques and protocols to monitor impacts of such activities." The rule cites INRMPs as a source of baseline conservation information and conservation initiatives. Knowledge about migratory bird habits and life histories is an essential step to minimizing and mitigating takes. The rule calls for habitat conservation and enhancement by improving existing habitats, maintaining forest buffers, eliminating feral animals (in particular feral cats), and eliminating invasive species that crowd out other species necessary for migratory bird survival (e.g., brown tree snake, Japanese honeysuckle, kudzu, and brown-headed cowbirds). Armed Forces are directed to identify measures to monitor the impacts of military readiness activities on migratory birds.

The rule relies on the use of the NEPA process to determine whether any ongoing or proposed military readiness activity is "likely to result in a significant adverse effect on the population of a migratory bird species." If a significant adverse effect is identified, the rule requires the Armed Forces to confer with USFWS and to develop and implement appropriate conservation measures to minimize or mitigate any significant adverse effects. The rule does not negate the need for the Armed Forces to continue to apply for and receive a Migratory Bird Treaty Act permit for scientific collecting, bird control on military lands, or any other activity that is addressed in current permit regulations.

On 28 July 2008, the Army Environmental Center issued an Interim Memorandum addressing *Unintentional Take of Migratory Birds for Actions Other than Military Readiness*. This guidance addresses the unintentional take of a migratory bird during non-military readiness activities At this time, there is no authorization or permitting process for an unintentional take of a migratory bird during such activities such as routine installation operations, maintenance, and construction.

### 4.6.2 Current Management

Annual forest bird surveys conducted by the NRO staff and two other studies (Green 1993; Gon et al. 1993) document the migratory birds encountered on Pōhakuloa. Currently, 12 migratory bird species are known to Pōhakuloa (see Appendix 3, *Species on Pōhakuloa*). Six species are native (nēnē—*Branta* sandvicensis, dark-rumped petrel—*Pterodroma phaeopygia sandvicensis*, omao—*Myadestes obscurus*, Pacific golden plover—*Pluvialis fulva*, ruby turnstone—*Arenaria interpres*, and ʻio, Hawaiian hawk—*Buteo solitarius*), six are non-native, non-game species (barn owl—*Tyto alba*, house finch—*Carpodacus mexicanus*, northern cardinal—*Cardinalis cardinalis*, northern mockingbird—*Mimus polyglottus*, mourning dove—*Zenaida macroura*, and sanderling—*Calidris alba*) of which one is a non-native, game species (mourning dove). An additional six taxa are native and possibly require as much, if not more, management support than the non-native MBTA species. The relationship between migratory, native, and other non-native avian species is not known. In addition, the effects of feral cats and other predators on migratory and native non-migratory birds are poorly understood.

USAG-HI has identified potential measures to minimize and mitigate adverse impacts of authorized military readiness activities on migratory and non-migratory native birds:

- Identify techniques and protocols to monitor impacts of such activities on migratory and non-migratory native migratory birds.
- Ongoing efforts to identify migratory and native birds present on Pōhakuloa.
- Knowledge of migratory and non-migratory native bird habits and life histories is an essential step to minimizing and mitigating takes.
- Habitat conservation and improvement where necessary and feasible.
- Eliminate feral animals (in particular feral cats and rats).
- Eliminate invasive species that crowd out other species necessary for migratory and non-migratory native bird survival.

The rule relies on the use of the National Environmental Policy Act process to determine whether any ongoing or proposed military readiness activity is "likely to result in a significant adverse effect on the population of a migratory bird species." The rule does not negate the need for the Armed Forces to continue to apply for and receive a Migratory Bird Treaty Act permit for scientific collecting, bird control on military lands, or any other activity that is addressed in current permit regulations.

**Goal 1: Ensure the Army meets the requirements for migratory birds.**

**Goal 2: When possible and appropriate execute the following objectives for native and non-migratory native birds.**

**Objective 1:** Develop and implement a Migratory Bird Management Plan. The plan should include a list of potential migratory bird species, appropriate survey methods for each species, a species profile, potential habitats, and if improvements should be made to existing habitats on Pōhakuloa in consultation with the USFWS.

**Objective 2:** Conduct surveys for migratory birds, describe habitats, and identify habitat types requiring improvements to support migratory bird species on Pōhakuloa.

**Objective 3:** Make information from surveys available for inclusion in various environmental documentation (e.g., NEPA).

**Objective 4:** Document and report birds "taken" because of military readiness activities in NRO annual reports.

**Objective 5:** Consult with USFWS if non-military readiness activities are being executed in the area of breeding migratory birds.

# 4.7 Vegetative Management and Soil Conservation

## 4.7.1 Policy and Background

Watershed, fuel break/fire management, invasive species control, and soil conservation are all considered to be components of vegetation management. Meeting the objectives of each of these components requires an integrated approach.

## 4.7.2 Floristic Surveys

Planning level surveys are an initial step to understanding the floral resources present on an installation. Just as wildlife benefit from planning level surveys (see Section 4.5, *Wildlife and Game Management*), so do plants. AR 200-1 advises that planning level survey information be current, and reviewed and updated if necessary prior to an INRMP's revision. DoD Instruction 4715.3, *Environmental Conservation Program* (3 May 1996) suggests that installation-wide surveys be conducted for locally rare and keystone species. DA memorandum, *Army Goals and Implementing Guidance for Natural Resources Planning Level Surveys and Integrated Natural Resources Management Plan* (21 March 1997) further stipulates "an installation-wide vascular plant survey produce a list of plant(s)."

Inventory and survey not only provide a list of species present, but also can provide information on vegetative composition, species diversity/complexity, and condition. These data identify environmental assets, presence or absence of potential training constraints, and land management issues and benefits. Lists of locally rare and keystone species are available from the Hawai'i Biodiversity & Mapping Program and Hawaii's DLNR, Comprehensive Wildlife Conservation Strategy (2005). These data provide support materials for NEPA and other documents.

Vegetation management includes weed management, removal of feral ungulates, safe practices to reduce/eliminate fire, outplanting, insect and fungal control, monitoring plant populations, and dust control. Vegetation management entails the preservation of habitat for native birds, bats, insects, and mollusks.

### 4.7.3 Vegetation Mapping

Just as planning level surveys provide essential baseline and background information supporting NEPA, Endangered Species Act, and other documents, so does a vegetation map. A vegetation map may detail plant species and dominant life forms, but it is also the basis for defining wildlife habitats. Army Regulation 200-1 requires the distribution and extent of dominant and co-dominate plant communities (alliances) be mapped and supported by field data.

A plant community map was created for Pōhakuloa by Shaw and Castillo (1997). Community designations were strongly aligned to soil types. Plant community designations included class descriptions (e.g., "with sparse shrub understory") and differ from other classification schemes used in Hawai‘i.

Vegetation mapping can assist vegetation management using remote sensed data to define community or plant characteristics and then using that information to locate potential locations for new populations or potential habitats. Remotely sensed data could be used to monitor the expansion of specific invasive species or to show and demonstrate the impacts of training and the time needed for an area to recover. New technologies, or the re-application of existing technologies, (e.g., unmanned aerial vehicles) could be used to address vegetation questions.

### 4.7.4 Soils Mapping & Erosion

A soil survey was conducted on the Island of Hawai‘i in 1973 (Sato et al.). All of the installation and the Ke‘āmuku Parcel were included. These data provide the installation with information on the types of soils present and their location. These data should be periodically checked to determine if current Natural Resources Conservation Services' survey standards for the classification, categorization, and description for soils by map unit as set forth in Army Regulation 200-1 are met.

Soil data are valuable for assessing each soil map unit's tolerance value to erosion. By comparing actual erosion rate to the tolerable rate, the potential soil erosion status can be determined. Slope and vegetative cover are essential components in moderating and accelerating soil erosion. Soil erosion can be modeled and validated with satellite imagery and field data.

Much of Pōhakuloa has no surface soils, but rather is pahoehoe lava, a‘a lava, or cinder cone. As lava or cinder cone materials are modified by construction activities, dust becomes an issue. The north portion of Pōhakuloa has the best-developed soils on the installation proper. Dust generation is a problem at firing points when vegetative cover is less than 12% (Gleason and Faucette, pers. com.). Increasing vegetative cover and the application of palliatives help remediate dust problems.

### 4.7.5 Current Management

#### Floristic Survey

The NRO staff at Pōhakuloa maintains a collection of plant specimens and two laminated collections representing 193 taxa for field work on the installation. In addition, the Center for Environmental Management of Military Lands holds slightly more than 200 voucher collections from Pōhakuloa in its collection. Plant collections are ongoing on Pōhakuloa proper, an exercise that will be extended onto the Ke‘āmuku Parcel.

#### Vegetation Mapping

As noted above, a plant community map was constructed in 1997. The map does not correspond to the classifications schemes used by most agencies in Hawai‘i. As such, the NRO staff is working to

create a map that follows Gagne and Cuddihy (1990) vegetation descriptions based on elevation, moisture, and physiognomy regimes for the principal community types as used in the Manual of Flowering Plants of Hawai‘i, (Wagner et al. 1990). Dominant or co-dominant species (e.g., *Dodonaea*/*Vaccinium*/*Styphelia*) followed by a physiognomic class (*Dodonaea*/*Vaccinium*/*Styphelia* Shrubland) describe 106 plant communities recognized on the Hawaiian Islands.

### Soils Mapping and Erosion

Dust and off-site soil export may be an issue on the Ke‘āmuku Parcel. Most soils on the Ke‘āmuku Parcel are underlain by volcanic ash. The susceptibility of these soils to erosion is seen where trails now lie feet below adjacent ground level. A study is being conducted by the Land Rehabilitation and Maintenance (LRAM) program to monitor pre-training use particulate matter generation to post-training conditions. As vegetation is crushed and removed, rains are more likely to move soils into gulches that transect the parcel and ultimately off-site. Range and Training Land Assessment (RTLA) projects may help determine if off-site transport of soils is a real issue to be addressed.

All vegetation and soil projects work to identify the sensitivity/resilience and the ability for disturbed ecosystems to recover, along with the level of land management needs to sustain training and land use.

**Goal 1: Document the vegetation present and the major plant communities on Pōhakuloa.**

**Goal 2: Determine the factors influencing the distribution of native vegetation types on Pōhakuloa.**

**Goal 3: Determine the relationship between vegetation and soils on Pōhakuloa.**

**Goal 4: Provide floristic support to outside agencies.**

**Objective 1:** Update vascular plant list for Pōhakuloa.

**Objective 2:** Update the existing vegetation maps to be consistent with other agencies.

**Objective 3:** Conduct surveys as needed to support federally listed species management.

## 4.8 Forest Management

### 4.8.1 Policy and Background

The Army maintains, restores, and manages forests on an ecosystem basis. Forest ecosystems support and enhance the immediate and long-term military mission and meet natural resources stewardship requirements set forth in federal laws (AR 200-1). Forest ecosystems perform important, sometimes unique, natural resource functions, which we inherently value, and are of benefit to all living things. Forest ecosystems benefit species biodiversity, natural beauty, outdoor recreation opportunities, wildlife habitat, soil conservation and watershed protection, improve air and water quality, produce commercially valuable forest products, assist in noise abatement, and sustain viable and diversified training lands to meet the military mission.

U.S. Army installations are directed to “practice responsible stewardship of forested lands to support the mission” (AR 200-1). Army Regulation 200-1 cautions installations “not to outlease land for agricultural or grazing purposes unless the effects of the sale or lease are compatible with the installation’s INRMP.” The forested areas at Pōhakuloa lack commercial value for any appreciable economic scale. The forested areas on Pōhakuloa are invaluable habitat for the Hawaiian hoary bat

(*Lasiurus cinereus semotus*) and native bird species, such as the Hawaiian ‘elepaio (*Chasiempis sandwichensis*).

### 4.8.2 Current Management

The preservation and management of native dry forests is a recognized NRO staff task, because native dry forests support native wildlife, vegetation, federally listed species, and species of concern/at risk. Management is area-specific and can include fencing, ungulate removal, weed control, species monitoring, and more.

Some examples of forest management include studying the impact of rodents on māmane (*Sophora chrysophylla*) in the Palila Critical Habitat; the survey of gullies in the Ke‘āmuku Parcel for remnant tree communities; preserving the native forests; and planting trees at firing points to reduce the effects of wind and dust, and to provide concealment. To date, forest management practices in the Palila Critical Habitat have proven successful in establishment of māmane plants. Efforts will continue and be documented.

## 4.9 Pest Management

### 4.9.1 Policy and Background

There are no statutory requirements for pest management plans; however, the DoD has been granted authority by the Environmental Protection Agency through the Federal Insecticide Fungicide and Rodenticide Act (40 CFR 171.8) to disseminate training and certification requirements for DoD pest management personnel on installations. One of the requirements for pesticide applicators is to perform duties under standards established by an installation’s pest management plan that has been reviewed and approved by DoD pest management consultants (Bennett 1996). DoD Instruction 4150.07 (*DoDI Pest Management Program*, 28 May 2008) applies to all DoD activities and installations with pest management requirements to have pest management plans that are annually reviewed and updated with the exclusion of the Army Corps of Engineers or state-owned or operated installations and facilities used by the National Guard. This instruction also addresses the application of pesticides in the vicinity of federally listed species or species proposed for listing, including the requirement to consult or confer with the USFWS on activities that may affect those species [(*Endangered Species Act*, Section 7(a)(2)].

Army pest management planning requirements are provided in AR 200-1. A pest management plan is required if 50 percent or more than a productive work-year of pest management occurs. This includes program administration, quality assurance evaluation, and contract supervision). Pest management plans are reviewed and approved by Army Environmental Command (AEC) for the Installation Management Command. A pest management plan promotes effective integrated pest management, safeguards the environment and human health, supports stewardship of natural and cultural resources, protects property, and complies with applicable laws, regulations, and policies.

The initial pest management plan for USAG-HI was authorized in 1997. A subsequent plan was authorized January 2008 (USAG-HI 2008c). The execution of the plan is under the Installation Pest Management Coordinator. The plan is submitted annually to the Command Consultant for review by 30 October. Annual review reports are submitted to the Commander, 25th ID and USARHAW; Commander, U.S. Army Pacific; and the Commander, U.S. Army Environmental Command Pest Management Consultant.

The installation pest management plan for USAG-HI describes pest management on Hawai‘i installation’s management requirements; outlines the resources necessary for pest surveillance and control; describes the administrative, safety, and environmental requirements of the program; and how resources and requirements enable USAG-HI to provide effective pest control (USAG-HI 2008c). The installation pest management plan includes implementation and coordination for optimum sanitation, sound structural design and maintenance of facilities, and mechanical, regulatory, cultural, and biological controls.

USAG-HI recognizes eight categories of pests and undesirable vegetation that requirement management:

(1) Real property pests (structural/wood destroying pests (e.g., termites, powder post beetles)

(2) Disease vectors and medically important arthropods (e.g., mosquitoes; house, blow, and moth flies; bees, wasps, spiders and other stinging and biting arthropods)

(3) Stored products pests (e.g., rodents)

(4) Ornamental plant and turf pests (e.g., various noctuid caterpillars, scale insects, beetles, etc.)

(5) Undesirable vegetation (e.g., weeds control along fence lines, ditches, roadsides, firebreaks, cantonment area, etc.)

(6) Vertebrate pests (e.g., rodents, mongooses, cats, dogs, birds, etc.)

(7) Household and nuisance pests (e.g., cockroaches, ants, fleas, etc.)

(8) Quarantine pests (i.e., the inspection of cargo for pests such as the brown tree snake)

(9) Other pest management (e.g., removal of dead animals)

The installation pest management plan addresses the sale and distribution of pesticides, health and safety (e.g., hazard communications, pest control vehicle standards, use of spill kits and spill response, fire protection), environmental considerations (e.g., protection of the public, sensitive areas, species of concern, and pollution abatement procedures), and administration (e.g., staffing, facilities, reporting, training, and contracts).

Pest control on the cantonment is managed by USDA/Wildlife Services. Weed control and feral animal control on Bradshaw Army Airfield and in the training areas are conducted by contracted the NRO staff . At this time, animal control is contracted to Keepers of the Land, Inc. Weed control as related to federally listed species is performed by the NRO Weed Crew staff.

Natural Resources (NRO) staff efforts focus on those pest management issues outside of the cantonment. There can be overlap and, as such, some activities need to be coordinated. NRO staff works to minimize the effects of undesirable vegetation (Item 5), vertebrate pests (Item 6) and, with the help of ITAM staff, quarantine pests (Item 8).

## 4.9.2 Invasive Species Management

### 4.9.2.1 Policy and Background

Executive Order 13112 requires all federal agencies to prevent the introduction of invasive species, provide control, and to minimize the economic, ecologic, and human health impacts that invasive species may cause. The effects of invasive species is further addressed in an Army Policy Guidance (*Management and Control of Invasive Species*) distributed June 2001. The requirement to implement invasive species management is identified in the U.S. Army Environmental Program Requirements

under the Sikes Act for natural resources stewardship requirements, the Endangered Species Act when protecting or managing listed species and critical habitat, and the Clean Water Act when invasive species are involved in erosion control and wetlands (DA 2001). Installations are required to "monitor invasive species populations, and track the presence and status of invasive species over time to determine when control measures are necessary and to evaluate the effectiveness of prevention, control/eradication, and restoration measures."

Invasive species are defined as non-native species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Invasive species include plants, animals, and other organisms (e.g., microbes). These species are typically introduced by human actions; however, they can be unconsciously carried to new locations by other organisms (e.g., seed in a bird's gullet), wind, and water. Invasive species can be a threat to natural resources, impact local economies, and adversely affect the military mission. An invasive species is further defined as any species part, including its seeds, eggs, spores, or other biological material, capable of propagating that species.

The purpose of the USAG-HI invasive species program is to detect and manage invasive species and to inhibit negative impacts to federally listed species, the environment, and military training operations. Objectives of the program are to:

- Conduct periodic surveys for invasive species including vegetation, birds, insects, and mammals.
- Include invasive species surveys into planning level surveys and use data collected from Range and Training Land Assessments.
- Determine the location (map) and extent of invasive species and document this information in a Geographic Information System (GIS).
- Determine management priority of an invasive species.
- Develop and implement a management plan to inhibit movement of invasive species within the installation and between installations.

### 4.9.2.2 Invasive Plant Species Management

Stable ecosystems are thought to be invasion-resistant, and a combination of species assemblages that effectively exploit resources in balance with productivity for their maintenance (Smith 1985). However, fire, non-native grazers, and non-native introductions have extensively altered the environment of Hawai‘i. Disturbance facilitates the success of many non-native species. Successful non-natives capture space and other resources such as light and nutrients faster than native species. Over time, non-native species can affect native species, the persistence of communities (Vitousek 1985), and landscape characteristics.

Control of invasive plant species is extremely important for the management of federally listed species in Hawai‘i. Approximately 61 percent of the NRO staff's invasive plant management field time is spent controlling non-native weed species around rare plants; along fuel breaks, fences and roads.

The goal of the weed control program is to aid the recovery and continuance of federally listed species and to prevent weeds from occupying areas with high natural resource value. Ultimately, an effective weed control program reduces fine fuel load and increases native plant numbers.

Systematic weed control consists of hand pulling plants within one meter of a federally listed plant, herbicide application beyond the one-meter boundary during favorable weather conditions, and maintenance of a weed-free zone with a gas-powered weed-wacker. Quarterly maintenance is necessary and may take two to three years to gain control, especially with fountain grass (*Pennisetum setaceum*). Other species, such as fireweed (*Senecio madagascariensis*), require long-term control measures. Fireweed is a growing problem and requires year-round management. Seeds are windblown, quick to germinate, and invade new habitats. Chandelier plant (*Kalanchöe tubiflora*) propagates vegetatively and is an aggressive invasive species in some areas, forming dense mats on a‘a lava. The species is becoming an increasing problem. Banana poka (*Passiflora mollissima*) is designated by the Hawai‘i Department of Agriculture as noxious and for eradication. A woody climber, the species both self- and cross-fertilizes. The species is increasing its spread in the Kīpuka ‘Alalā fence units.

### Current Management

The 2003 USFWS Biological Opinion requires the Army to implement a non-native plant monitoring program to control invasive species in and adjacent to landing zones, trails, around federally listed species, and along roadsides. In addition, all vehicles are to be thoroughly cleaned at a wash rack facility prior to returning to O‘ahu to minimize the risk of spreading non-native plant species. To address these and other pest management issues outside the cantonment, the NRO staff has developed an invasive plant management and control section as part of the installation’s Implementation Plan.

Currently, the NRO staff manages some 98 weed control buffers that range in size from 0.5 acres to 20 acres. The ultimate goal of the weed control program is to provide a favorable microclimate for native ecosystem restoration and conservation of listed species (USAG-HI 2010).

Not all non-native species require management. As such, non-native species have been ranked, based on invasiveness, extent, ability to outcompete native species, amount of fine fuel created, and the ability to be contained. Two species, *Pennisetum setaceum* (fountain grass) and *Senecio madagascariensis* (fireweed), are ranked highest in need of control. They are widespread, altering the landscape, and create fine fuels. Priority 2 species include *Passiflora mollissima* (banana poka), *Kalanchöe tubiflora* (chandelier plant), *Senecio mikanioides* (German ivy), and *Salsola kali* (Russian thistle). The latter species have the potential of becoming Priority 1 species. Five additional species are not as widespread or have limited impacts on native species and/or the landscape. They include *Lophospermum erubescens* (creeping gloxinia), *Aesclepias physocarpa* (balloon plant), *Verbascum thapsus* (mullein), *Solanum pseudocapsicum* (Jerusalem cherry), and *Cersium vulgare* (bull thistle). There is a Priority 4 species, *Nicotiana glauca* (tree tobacco) that is considered incipient, but is not yet understood well enough to rank as a species that requires immediate control.

Specific controls will be outlined for each species in the Pōhakuloa IP (USAG-HI 2010).

## 4.9.2.3 Invasive Animal Species Management

Ungulates and predatory mammal control are the main categories of animal control on Pōhakuloa. The members of this group are a unique and introduced life form to the islands of Hawai‘i, where the Hawaiian hoary bat (*Lasiurus cinereus* semotus) is the only native representative.

Some of the first non-native species to affect the Hawaiian landscape include pigs (*Sus scrofa*), dogs (*Canis familiaris*), and rats (*Rattus* spp.). These species were introduced and spread by Polynesians (Kirch 1985; Hawai‘i Natural Heritage Program 1998). Europeans increased the types and diversity of mammal introductions, which included cattle (*Bos taurus*), goats (*Capra hircus*), and sheep (*Ovis aries*). The European mouflon (an undomesticated form of *Ovis aries*) was introduced to the Hawaiian Island in the 1950s. The feral mouflon was crossbred with domestic sheep and released on

Mauna Kea in 1962 (Tomich 1986; Griffin 1982). Feral mammal populations (e.g., cats—*Felis catus* and mongoose—*Herpestes auropunctatus*) have moved from lower, populated areas on the Island of Hawai‘i to the saddle area.

Trampling and removing native vegetation as well as disturbing, carrying, and opening areas can facilitate the spread of non-native plants, thereby enhancing fire frequency and intensity and altering the composition and form of plant communities. Such changes affect native vegetation integrity and structure that could ultimately affect roosting sites for the ‘ope‘ape‘a (Hawaiian hoary bat—*Lasiurus cinereus semotus*) as well as native plant species.

### Current Management

Non-native invasive animal species control focuses on four principal areas: ungulate control, rodent control, other vertebrate animal control, and invertebrate control.

### Ungulate Control

The Army has contracted Keepers of the Land, Inc., to dispatch the remaining ungulates in existing fence units where there are radio-collared animals. In newer and smaller units, ungulates will be driven out. Seven fence units are scheduled to be built over the next four to five years. As each unit is completed, public hunting will be allowed to remove as many animals as possible (see Section 4.13.3 *Outdoor Recreation*). When public hunters are no longer an effective force, contracted hunters will be used. As with the public hunters, when contracted hunters are no longer effective, radio-collared animals will be used to attract remaining individuals and to extirpate all feral ungulates.

### Rodent Control

Rodents girdle twigs and eat seeds, arthropods, and eggs and hatchlings of birds. Rodents are considered a key threat to endemic Amastrid land snails (25th ID (L) and U.S. Army Hawai‘i 2001). House mice, rats (*Rattus rattus*), Norway rats (*R. norvegicus*) and Polynesian rats (*R. exulans*) are the principal rodents of concern, and eat endangered plant seeds, disperse weeds and invasive plants, and parasitize bird nests. Rodent damage has been documented on the federally endangered ma‘aloa (*Neraudia ovata*) and popolu ku mai (*Solanum incompletum*).

Poison-bait grids have been established to control rodents, using Ramik® minibars, which contain 0.005% diphacinone. The reduction of rodents should enhance native plant populations. All bait blocks are placed in secured bait stations that are approved by USFWS. Bait boxes are placed in a grid pattern; boxes are spaced 25 meters apart[3], and the grids are centered on the rare and listed plant species. Grids are maintained monthly.

Bait stations require continued monitoring for ongoing effectiveness. Maintaining bait stations can be cost prohibitive. Ultimately, long-term protection will require an alternative method, possibly aerial application of rodenticide by aerial broadcast.

The Army is a member of the Toxicant Working Group, which has successfully secured labeling for aerial application of the rodenticide, Diphacinone. The USFWS Biological Opinion (2003) required the Army pursue the registration and NEPA compliance for this action. Over the next few years, the Army will continue to work with the USFWS to complete the NEPA documentation for aerial broadcast on the main Hawaiian Islands.

[3] Grid spacing of 16 toxic bait stations were tested in 2006. A spacing of 20 m was determined to be the most effective per bait station.

### Other Animal Control

Cats (*Felis catus*) and mongoose (*Herpestes auropunctatus*) pose a threat to native wildlife, especially birds. Currently, cats and mongoose are lived-trapped, and Pōhakuloa will continue using this control method until other strategies are deemed more effective. Traps are baited with canned cat food or canned fish. Traps are checked every 24 hours. The traps are nestled in brush and covered with natural vegetation. The animals in their cages are carried to the closest road and driven to the nearest Humane Society location.

There are no known snakes or lizards on Pōhakuloa; however, the USFWS Biological Opinion (2003) requires all sighting of snakes and lizards be reported to the installation's NR Office immediately. These sightings are also reported to the Hawai'i DoFAW.

New plant and animal introductions are possible with increased training at Pōhakuloa. The 2003 USFWS Biological Opinion requires all new introductions of an alien animal be identified, and source and time documented. The area will be treated with an appropriate pesticide to eradicate other individuals. An adequate area will be searched for additional individuals and treated.

### Invertebrate Control

There are no native ant species in Hawai'i. Several ant species have been documented on Pōhakuloa, and all are predators on other arthropods (USAG-HI 2003). The Argentine ant (*Linepithema humile*) is a proven threat to native species and has been implicated in native faunal declines (USAG-HI 2003). A study in 2002 to 2003 documented the Argentine ant in a 62 ha (153 ac) site within Kīpuka 'Alalā. The assumption is that the ants established during the building of the Multi-Purpose Range Complex, given that they were first noticed in the Administration site.

*Rhyncogonus stellaris* is a rare native weevil that is vulnerable to alien predators such as Argentine ants. The Argentine ant is affecting a wide range of native arthropods, including important predator species and pollinators of native plants (Cole et al. 1992). Argentine ants are omnivorous and frequently feed on the honeydew produced by other insects (Introduced Species Summary Project 2004). In doing so, the Argentine ant may reduce the health of federally listed species that are host to insects that produce honeydew, including several federally listed plant species.

Yellow jackets (*Vespula pensylvanica*) are also widespread and abundant on Pōhakuloa, particularly in *Metrosideros polymorpha* forests (Oboyski 1998; Oboyski et al. 2001). The NRO staff will use protocols developed by the USGS Biological Resource Discipline (BRD) to control this species (USAG-HI 2010).

The Pōhakuloa IP includes an Invasive Invertebrate Monitoring and Control Protocol (USAG-HI 2010). Plans are to document all locations of invasive invertebrates, check locations that could provide access to the installation (e.g., Kawaihae Harbor, motor pool, Range Maintenance and Department of Public Works storage areas), use of attractants to identify new locations, and eradicate new introductions before there is extensive spread of the species.

**Goal 1: Remove/minimize the impacts of pest animal and plant species from Pōhakuloa.**

**Objective 1:** Control invasive species adjacent to federally listed and rare plant species.

**Objective 2:** Control invasive species within and adjacent to landing zones, trails and roadsides.

**Objective 3:** Work with USFWS for the permitting of aerial broadcast of rodenticides.

**Objective 4:** Develop a reporting system to document the introduction of new animal and plant species. Develop procedures for the aggressive removal of "new" non-native species.

**Objective 5:** Implement a pest control/invasive species control program plan.

**Objective 6:** Work with outside agencies on bio-controls for non-native invasive species control.

**Objective 7:** Use contracted hunters, public hunters, traps, poisons, and radio-collared animals to control ungulates and other feral animals.

## 4.10 Saddle Road Realignment Support

### 4.10.1 Policy and Background

The background for the Saddle Road Realignment is presented in Section 2.3.3.5, *Section 7 Consultations*. A *Final Supplemental Impact Statement and Final 4(f) Evaluation—Saddle Road (State Route 190) to Milepost 41* was published February 2010. The EIS recommends route W-7 as opposed to route W-3, which was accepted in the 1999 ROD.

### 4.10.2 Current Management

Feral animal control efforts will continue in this area and are described in Section 4.9.2.3. Fire prevention and suppression are ongoing issues that will continue to be addressed by the Army. Two bird species and 19 plant species new to Pōhakuloa were identified during the preparation of the EIS (Hawai‘i DOT and U.S. DOT 2010).

## 4.11 Agricultural Outleasing

Currently, no lands generate funds through agricultural outleasing. Much of the Ke‘āmuku Parcel is grazed as a land maintenance measure to control the fuel load.

## 4.12 Geographic Information Systems (GIS) Management, Data Integration, Access, and Reporting

Geographic information systems (GIS) and their use have rapidly evolved within the Army as decision support tools. USAG-HI consolidates GIS data from multiple sources and users of data such as the Environmental Division: compliance, cultural and natural resources; Utilities Division: infrastructure and wastewater plant; Engineering Division: facilities and plans; Planning Division: Integrated Facility System; Range Division: Range Facilities Management Support System and Integrated Training Area Management GIS program support areas; and others. These data are centrally located on the Directorate of Public Works server system. This consolidation of data allows Soldiers, USAG-HI offices/divisions, and other military users to access data with the latest updates quickly and efficiently.

GIS data meet the Federal Geographic Data Committee standards and Tri-Services Spatial Data Standards, including metadata standards. Data not meeting these standards should not be released.

### 4.12.1 Current Management

Currently, the Pōhakuloa NRO staff is trained in the use of Environmental Systems Research Institute, Inc. (ESRI) products. Hardware and software requirements are updated as needed.

**Goal: Develop, maintain, and share Natural Resources GIS data, which meets Federal Geographic Data Committee standards and Tri-Services Spatial Data Standards, including metadata standards.**

**Objective 1:** Maintain a fully-trained GIS technician on the NRO staff to oversee data quality and storage.

**Objective 2:** Provide accurate and timely GIS support to the NRO staff and other USAG-HI directorates and offices.

## 4.13 Community Involvement & Education

### 4.13.1 Policy and Background

Community involvement is an installation's opportunity to demonstrate measures taken to protect, preserve and enhance the public lands that have been entrusted to it. Effective land management includes addressing local community issues and concerns. An installation typically grows with its neighbors and the community boundaries between the two tends to lessen. Community involvement is an important mechanism for sharing information, resources, and concerns. At Pōhakuloa, this includes the establishment of partnerships for off-site plantings, public involvement in planning documents, recycling, hosting visits to the greenhouse and interpretive garden, granting access to university researchers, and hosting school and scouting groups for educational and community outreach projects.

The Sikes Act Improvement Act and the National Environmental Policy Act describe types of community involvement needs: (1) Public Outreach/Community Planning —involvement in decision-making issues, and (2) Outdoor Recreation and Community Involvement—providing education on resources and land use.

### 4.13.2 Public Outreach/Community Planning

### 4.13.2.1 Policy and Background

DoD uses the term "outreach" for dealing with military issues involving the public; however, outreach implies one-way communication rather than open, two-way communication (DoD 2002). The DoD recognizes that the public requires open, transparent, and inclusive processes for determining how important specific lands are for military use. Far too often, perception does not equal reality. As such, involving the public early and often in the decision-making processes enables public stakeholders to help agencies make cost-effective decisions. Early and often inclusion establishes credibility and trust. DoD Memorandum for Secretaries of Military Departments (*Guidance for Fiscal Years 2006-2011 Sustainable Range Programs*, 26 June 2003) directs that installations "implement sustainment outreach efforts that will improve public understanding of DoD requirements for training and support coalition-building and partnering on range sustainment issues important to DoD readiness." Executive Order 13352 (*Facilitation of Cooperative Conservation*) requires that the DoD implement laws relating to the environment and natural resources "in a manner that promotes cooperative conservation with an emphasis on appropriate inclusion of local participation in Federal decision making." Army Regulation 200-1 provides summaries for Army actions that necessitate public involvement. This regulation notes that public participation should be

included in Installation Restoration (IR), Base Realignment and Closure (BRAC), and Formerly Used Defense Sites (FUDS) cleanup programs' restoration activities.

The Office of Environmental Quality Control, State of Hawai'i, publishes *The Environmental Notice* semi-monthly (http://www.state.hi.us/health/oeqc/notice/index.html). The *Notice* announces the availability of environmental studies and reports under agency or public review. This is a site where the public can find notifications and copies of USAG-HI actions and documents.

## 4.13.3 Outdoor Recreation

### 4.13.3.1 Policy and Background

Outdoor recreation and public access to military lands is supported by the Sikes Act Improvement Act for the sustainable multi-purpose uses of resource which shall include hunting and non-consumptive uses [Sec 670a.(a)(3)(B)] and public access [Sec 670a(a)(3)(C)] when consistent with military use. Section 670c (*Program for Public Recreation*) authorizes the Secretary of Defense to "carry out a program for the development, enhancement, operation, and maintenance of public outdoor recreation." (See Section 3.5, *Public Access*.)

### 4.13.3.2 Current Management

Pōhakuloa may be opened to outdoor recreation activities, provided such activities are consistent with use of lands and do not conflict with the military mission. Requests for such use are made through the Deputy Garrison Commander/Commander at Pōhakuloa, who coordinates such requests with Range Division Hawai'i and others whose operations may be affected. Appropriate access control procedures are established for each approved outdoor recreation activity.

An Outdoor Recreation Plan Report (R.M. Towill Corporation1997) defines three classes of outdoor recreation:

- Class I: Open to the general public on weekends and national holidays, regardless of association with the military or other DoD agencies. Activity occurs on Army lands administered by the State of Hawai'i per lease agreement or previous Memorandum of Agreement.
- Class II: No public recreation. Open to DoD employees and guests on weekend and national holidays. This includes all military and civilian employees of DoD and their dependents, relatives and guests, and retired employees. The Army administers recreational activity.
- Class III: Open to the public for special events on a case-by-case basis. Recreational activities are administered by the Army.

At Pōhakuloa, hunting is the only Class I activity. There are no Class II activities. Recreation archery, biking, and motor sports are categorized as Class III activities on Pōhakuloa. No access is allowed for hiking. Pōhakuloa lacks a resident military contingency (i.e., family housing and services). As such, many of the facilities seen on installations of a similar size have not been developed at Pōhakuloa. Remoteness, limited access, and limited water supplies are some of the reasons.

Examples of outdoor recreation activities are:

- Archery tournaments in Training Areas 5 and 6. Such events must be approved by the Directorate of Community Activities and licensed by DPW, Real Estate Office with approval by the Pōhakuloa Commander.

- Annual bicycle races through Training Areas 1 and 4. The race must be approved by the Directorate of Community Activities and licensed by DPW, Real Estate with approval by the Pōhakuloa Commander.

- Guided hikes, such as those associated with Earth Day, scouting, or environmental education activities with approval by the Pōhakuloa Commander.

- Motor sport races held in May along Redleg Trail through Training Areas 1 and 4. The race must be approved by the Directorate of Community Activities and licensed by DPW, Real Estate with approval by the Pōhakuloa Commander.

Pōhakuloa uses a "hold-harmless" agreement, which outdoor recreationists must sign to limit Army liability while on Army lands.

### Hunting

Hunting is the principal form of outdoor recreation at Pōhakuloa. Other outdoor activities do occur, but such events are handled on an individual basis. Public access is a tradition at Pōhakuloa, which has been open to the public for hunting and other limited recreational uses for more than 50 years. Pōhakuloa is an open post in the truest sense as most of its boundary is not fenced or signed. Access roads entering the installation are not gated. Generally, signs on entry roads indicate installation boundaries. In maintaining a policy of public access, USAG-HI relies on a responsible public to adhere to restrictions placed on range access.

Access to Pōhakuloa falls under the *Entry Regulations for Certain Army Training Areas in Hawai'i* (32 CFR 552.25 Subpart C) and requires written requests be made. The 25th ID and USAG-HI controls access. In regard to hunting, Pōhakuloa is open to the public provided hunters possess applicable state licenses and have an entry permit from the Commander of Pōhakuloa (DoFAW *Rules Regulating Game Mammal Hunting*, January 2003, Title 13, Chapter 122). Range Division Hawai'i is responsible for the opening and closing of areas for hunting access to avoid conflicts with military mission activities. Range Division Hawai'i programs a Hunter Hotline telephone message by which hunters can get information regarding access any given day. The Hunter Hotline is coordinated with the Hawai'i Division of Forestry and Wildlife (DoFAW). Persons hunting on Pōhakuloa must check in at the "Hunter Check Station" across from the DA Police Station. Hunters check in and check out at the hut at the end of their hunt or by sunset. This provides a safety check as well as provides DoFAW a mechanism for collecting harvest data.

Most accessible portions of Pōhakuloa (non-impact and non-dudded areas) are leased from the State of Hawai'i under Lease No. DA-94-626-ENG-80 (State of Hawai'i 1964), which expires 16 August 2029 (65 years). The following provision regarding hunting on these leased lands is described in the lease:

> 17. To the extent permitted by training requirements the Government will cooperate with the Lessor (the state) in the game development and hunting programs of the Lessor and, in connection therewith, the Government agrees that Parcels "A" (all or part of Training Areas 5-9 and 11-20), "B" (Training Area 10 and part of Training Area 11) and "C" (Training Areas 1-4) hereof shall remain available for the aforesaid programs of the Lessor and, further, that Parcels "B" and "C" and all that part of Parcel "A" which lies to the north of the Saddle Road shall be made exclusively available to the Lessor for hunting during the periods 1 July through 15 July and 1 December through 15 January and on national holidays from dawn to midnight and on weekends from midnight Friday through midnight Sunday during the periods 1

November through 30 November and 16 January through 31 January. The Lessor shall also have the right to construct a road along a mutually agreeable route through the northerly portion of Parcel "C" hereof." (Note: parenthetical comments were added for clarity.)

Amendments to the Sikes Act in November 1997 made INRMPs the replacement document for the 1965 Cooperative Agreements between Department of the Army, Department of Interior, and states for Master Fish and Wildlife Management and Habitat Improvement Plans. The State of Hawai'i Division of Forestry and Wildlife manages the hunting program and its associated game management program on Pōhakuloa (DoFAW *Rules Regulating Game Hunting*, January 2003, Title 13, Chapter Birds—122, Mammals—123). DoFAW has primary responsibility for determining legal weapons, bag limits, and season dates. Hunting regulation booklets are made available to the public annually by DoFAW.

Under the DoFAW's Draft Management Guidelines (HI DoFAW Draft), Pōhakuloa is classified with:

- **Birds, A-1** (Game Production—Game is the primary animal management objective for these areas. Season and limits are set for sustained public hunting opportunities).
- **Pigs, A-2** (Mixed Game and Other Uses—Integrated game and other management. Habitat may be manipulated for game enhancement. Game populations are managed to acceptable levels using public hunting.)
- **Sheep and Goats, A-3** (Game Control—Resource protection is the primary objective, with emphasis on native plant communities and watersheds. Seasons and limits are set to reduce impacts on native resources.)

The Pōhakuloa Cooperative Game Management Area falls within two game management units (GMU) (Figure 4.d):

- **Unit E:** TA 1-20 and 22.
- **Unit F:** TA 21; however, the Army has closed the Redleg Trail portion of Unit F in recognition of sensitive archeological resources. Training Area 23 falls within a Unit F; however, this area falls under control of the installation commander.

**Bird Hunting—**Most game bird hunting is from the first Saturday in November through Martin Luther King Day or the third Sunday in January, whichever occurs later. Game bird hunting occurs on Saturdays, Sundays, and state and federal holidays. There is a spring turkey hunt in Unit F from March 1 through March 31. The Mourning dove is the only game bird that is also a migratory species. There are rules specific to the hunting of Mourning doves, including a limit of 10 birds (Hawai'i Administrative Rules 13-122-9). Overall, the DoFAW schedule is more restrictive than federal regulations (50 CFR Part 20, *Migratory Bird Hunting*).

**Wild/Feral Pig, Sheep, and Goat Hunting—**

- **Unit E—**Archery only. Dogs are not permitted. One pig, sheep, and/or goat is allowed daily. Hunting is open year-round. Daily hunting permitted in Pōhakuloa subject to training schedule. Entry permit required from the Commander.
- **Unit F—**Pōhakuloa Commander sets the type of animal hunted, bag limit, and other hunting conditions.

# *Cooperative Game Management Areas on Pohakuloa*

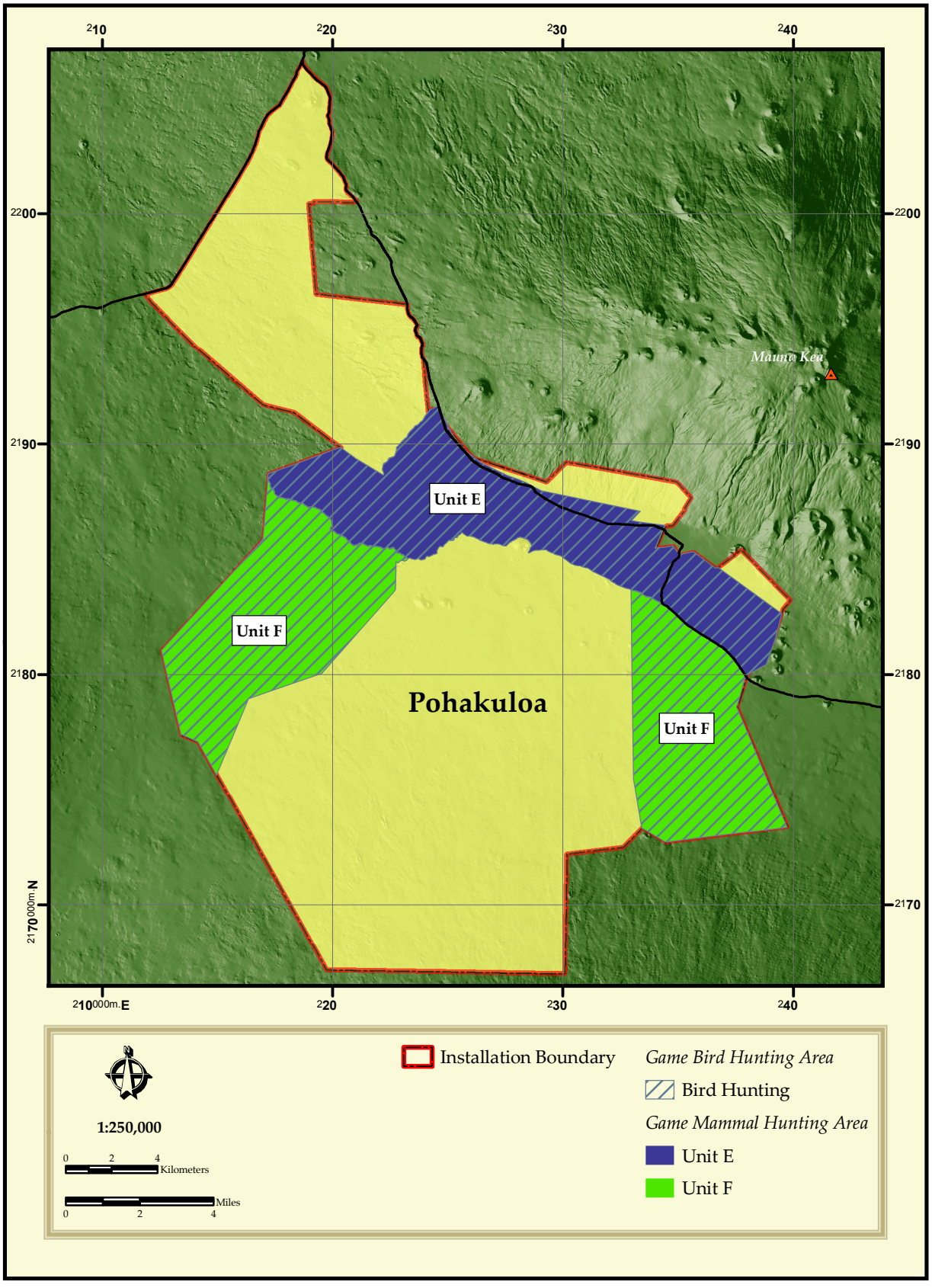



**Figure 4.d**

## 4.13.4 Community Education

### 4.13.4.1 Current Management

Information collected by the NRO staff over the course of a year and staff efforts are made available to the public.

- **Annual reports** summarize activities, research, lessons learned, and discoveries. Reports are available to the public on the Research Cooperation of the University of Hawai‘i website for the U.S. Army Garrison Hawai‘i Natural Resource Program (http://www.botany.hawaii.edu/faculty/duffy/DPW.htm). The NRO staff also creates educational posters and makes presentations at professional meetings, thereby further demonstrating stewardship of installation resources.
- **Stewardship awards** recognize efforts of the USAG-HI and the NRO staff at Pōhakuloa. In 2006, USFWS identified Pōhakuloa as the winner of the 2006 Military Conservation Partner Award. USAG-HI Pōhakuloa Natural Resources Office, and USFWS have a cooperative work relationship that has created a win-win situation between federally listed species and military training.
- **Hawai‘i Army Weekly** serves USAG-HI, 2$^{5th}$ ID and USARHAW and is an effective means to educate military personnel, civilian personnel, and military family members of general conservation issues at Pōhakuloa.
- **The Ecosystem Management Program Bulletin** provides installation information to the public about various topics of interest (e.g., endangered species, wildfires, cultural resources).
- **Other media** (television and outside newspapers) cover various aspects of natural resources management at Pōhakuloa (e.g., wildfires, endangered species). These are coordinated with the Public Affairs Office (PAO).
- **The World Wide Web** is an under-utilized resource. USAG-HI, 25$^{th}$ ID and USARHAW provided Pōhakuloa natural resources information to the Ecosystem Management Programs.
- **Earth Day** tours and events occur annually. The event is advertised to the public. Participants can take a tour of Pōhakuloa, see an Intensive Management Unit, see several endangered plant species, and go through an ‘ōhi‘a lehua (*Metrosideros polymorpha*) forest.
- **Other Groups—**The NRO staff works to accommodate all requests to visit rare plant sites, the greenhouse and interpretive garden, or to pull some weeds.

Natural and cultural resources personnel developed an interpretive garden just outside their offices at Building T-93 in the Pōhakuloa cantonment. The garden contains common native plants, listed plants, and archeological features. It provides a visual experience for military personnel and the public with regard to issues involving natural and cultural management. The garden is fenced to exclude ungulates, particularly feral pigs. The next phase of this project will be the addition of a cultural resources phase. Visitors are provided an interpretive flyer of the garden.

In 1996, an environmental video was produced for use in Hawai‘i by the Army to explain its programs. This video needs updating and other topics could be considered, such as nonnative species control, installation projects, and stewardship efforts. Given today’s technology, production is the principal cost, not duplication. Programs on CD ROM can be widely distributed at a lower cost than videos to schools, organizations, and other agencies.

Efforts to involve people and target groups (groups interested in environment issues, individuals with experience in environment, and people with a diverse mix of interests and backgrounds) is ongoing. Additional work could be focused on identifying and targeting local community groups, creating printed information materials, encouraging visits by professional organizations and the environmental community (e.g., Audubon society, Sierra Club), and so on. Public involvement requires identifying audiences, providing information, and being involved.

Pōhakuloa NRO staff participated in regional initiatives, including the following:

- Dryland Forest Working Group
- Hawai‘i Rare Plant Restoration Group – shares ideas to restore rare plants. Includes about two dozen groups and agencies including USAG-HI, Environmental Division and Pōhakuloa
- Palila Working Group
- Hawai‘i Hoary Bat Working Group
- Nēnē Working Group

While ITAM works to educate Soldiers about natural and cultural resources and the potential effects of careless activities during training, the NRO staff will consider how to best educate construction workers. This is a unique challenge that the 2003 USFWS Biological Opinion requires the staff to address. A number of construction projects are planned over the next five years and construction employees must be instructed on the potential effect they can have on native species by transporting invasive plant and animal species on vehicles and on clothes. They will need to access Pōhakuloa with “clean” vehicles and to properly dispose of petroleum, oils, and lubricants (POLs) when working on-site. The NRO staff has developed best management practices to address these issues.

**Goal 1: Maintain current and explore new outdoor recreational opportunities at Pōhakuloa.**

**Goal 2: Provide educational materials about Pōhakuloa’s natural resources.**

**Goal 3: Develop an active volunteer program where volunteers are used to help complete required natural resource management actions.**

**Objective 1:** Involve the hunting community in clearing ungulates from new exclosures.

**Objective 2:** Continue to review and update hunting SOPs that address when (time), where (locations to hunt, times for hunting, getting information), and how (weapon types) activities take place.

**Objective 3:** Develop and distribute educational materials to hunters, Soldiers, installation visitors, neighbors, installation workers, other agencies, etc. about the natural resources of Pōhakuloa, stewardship activities, and how to protect resources.

**Objective 4:** Continue with existing programs, develop new community activities, and participate in regional and national initiatives.

**Objective 5:** Hire two outreach coordinators for the Natural Resources Office to develop all outreach materials, conduct community relations (COMREL) activities, and develop a volunteer and outreach program.

## 4.14 Bird/Animal Aircraft Strike Hazard

### 4.14.1 Policy and Background

Birds and other wildlife can cause hazards with aircraft (Bird/Animal Air Strike Hazards or BASH) and the potential is present within Pōhakuloa airspace. The USARHAW Installation Standardization Committee *Aviation Local Flying Rules* (October 2001) notes that areas need to be inspected and identified hazards addressed.

Bird control programs has been in effect at all USAG-HI airfields since 1989 (M. Leong, per. com. 2010). The Army's BASH plan was developed using guidance from the U.S. Department of Agriculture. At Pōhakuloa, control work includes removing hazards including feral dogs, cats, and pigs. A Work/Financial Plan notes the objective at Bradshaw Army Airfield is to control nuisance wildlife typically by trapping and hazing. Daily BASH activities are reported quarterly. The BASH policy is an integral component of the installation's Pest Management Plan as required by AR 200-1 *Environmental Protection and Enhancement* and DoD Directive 4150.07, *Department of Defense Pest Management Plan* (M. Leong, per. com. 2010).

### 4.14.2 Current Management

USAG-HI currently implements the BASH prevention program at Bradshaw Army Airfield (BAAF) through the USAG-HI Integrated Pest Management Plan. USAG-HI's Directorate of Public Works has contracted the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (USDA-APHIS-WS), to conduct bird aircraft strike hazard control and to control nuisance birds and feral animals, which present health, safety and maintenance problems at BAAF (USAG-HI 2008c).

Any bird and bat strikes are documented and the NRO staff notified. If there are sufficient remains, the materials are turned over to the NRO staff for identification. If the remains are identified as those of a listed species, the USFWS is notified (USACE 2003).

**Goal: Reduce bird aircraft strike hazards to the lowest possible level.**

**Objective 1:** Document all bird/wildlife strikes and report to Pest Manager. Have remaining materials identified.

**Objective 2:** Manage wildlife and the area surrounding Bradshaw Army Airfield to prevent strike hazards.

## 4.15 Wildland Fire Management

### 4.15.1 Policy and Background

The development and implementation of an Integrated Wildland Fire Management Plan is necessary to address safety, land management, and environmental compliance. "Installations with unimproved grounds that present a wildfire hazard and/or installations that use prescribed burns as a land management tool" are required to have an Integrated Wildland Fire Management Plan (AR 420-90 *Facilities Engineering, Fire and Emergency Services*, 8-3; 4 October 2006). The plan is to be compliant with and integral to an installation's INRMP and an installation's existing fire and

emergency services program (DA Memorandum *Army Wildland Fire Policy Guidance*, 4 September 2002).

A Integrated Wildland Fire Management Plan was completed October 2003 (25th, ID(L) and U.S. Army, Hawai‘i) and a programmatic environmental assessment for the implementation of the plan in June 2006 (25th ID (L) and USARHAW 2006b). This plan is currently being updated. It lays out methods and protocols to control fire frequency, intensity, and size on USARHAW lands to comply with federal and state laws and to meet USARHAW's land stewardship responsibilities (25th ID(L) and USARHAW 2003). The Integrated Wildland Fire Management Plan intends to use fire prevention, pre-suppression, and suppression in support of land management plans goals and objectives. The plan recognizes the need to avoid damage in areas of high natural resource value during fire suppression activities.

The Hawaiian ecosystem is not fire dependent, and any fire in native vegetation is considered detrimental. Fire is a major disturbance and accelerates the conversion of native-dominated communities to non-native dominated ones (25th ID(L) and USARHAW 2003).

## 4.15.2 Current Management

Within the Integrated Wildland Fire Management Plan are the Pōhakuloa standard operating procedures. Many of the procedures focus on the protection of federally listed species and their habitats. During live fire, Soldiers must be aware of and adhere to the Fire Danger Rating System restrictions for incendiary ammunition and/or pyrotechnics. The FDRS takes into account Pōhakuloa's fire history, fuels, fire behavior models, and weather/climatology; and determines a Fire Danger Class for six areas on the installation (i.e., PTA East—TA 1-6 and 21; PTA Portable—TA 7-17, PTA Kīpuka ‘Alalā–TA 23; PTA West—TA 18-20 and 22; PTA Kīpuka ‘Alalā—Impact Area; and PTA West—Ke‘āmuku Parcel). The Integrated Wildland Fire Management Plan details the minimum staffing requirements, training, equipment and supplies, and helicopter fire bucket support as well as fire suppression actions and post-fire analysis surveys.

Fire access roads, along with fuel management corridors, are part of the fire control system at Pōhakuloa. Fire access roads are the Army's first defense to fires initiated off the installation. Four fuel management corridors will be established in the western portion of Pōhakuloa proper. Fire access roads will be 20 ft wide with 10 and 30 ft buffer area of reduced vegetation. Improvements will be made to existing roads not meeting this standard. Fire access roads will be maintained twice a year and fuels controlled with herbicides or vegetation cutting. As of June 2006, approximately 27 km (17 mi) of access roads exist in the northwest portion of Pōhakuloa proper with an additional 24 km (15mi) requiring improvements. These values are under revision as improvements are made. An additional 10 km (6.4 mi) of construction is necessary (USAG-HI 2006). The newly aligned Saddle Road will serve as approximately 16.4 km (10 mi) of fire access road for the northern portion of the installation (25th ID (L) and USARHAW 2006b). Existing roads border most of three sides of the Ke‘āmuku Parcel. Existing roads along the southwestern boundary will be improved or constructed. No fire access road would be established within Waiki‘i Ranch properties.

The fuel corridors help reduce the chance of a catastrophic wildfire event (USFWS 2003). Each corridor is approximately 100 to 300 m (328 to 984 ft) wide. Canopy cover is not to exceed 20 percent. Four fuel management corridors will be constructed and are located in areas with little or no existing fuel. The formation of Fuel Management Areas allows for the outplanting of listed species on-site and reduces the risk of species loss due to large, catastrophic wildland fires (USFWS 2003).These corridors consist of the (25th ID (L) and USARHAW 2006b):

- **Keʻāmuku Fuel Management Corridor.** This corridor runs from Bobcat Trail northwest along the center of the Keʻāmuku lava flow.
- **Eastern Fuel Management Corridor.** North end of Redleg Trail, east to the installation boundary along the Keʻāmuku lava flow.
- **ʻAlalā Fuel Management Corridor.** Runs along the 1859 lava flow at the southwestern edge of the installation proper. This corridor is lightly vegetated and runs to the east of the Kīpuka ʻAlalā, thereby isolating the kīpuka from the rest of the installation.
- **Southern Fuel Management Corridor.** Starts at the southern end of Redleg Trail, following the Old Hilo Road west to the ʻAlalā Fuel Management Corridor. The area is sparsely vegetated. Mechanical or herbicide application may be necessary is some areas.

Two dip tanks, each with an 80,000 gallon capacity, are under construction along the western boundary of Pōhakuloa proper, one near the MPRC Quarry and one near Old Kona Highway, and three tanks are planned for the Keʻāmuku parcel (25th ID (L) and USARHAW 2006b). These additional five dip tanks will bring the number on Pōhakuloa up to eleven.

Prescribed burns would be conducted as part of firefighting activities should a fire originate to the west of the installation boundary near the Kīpuka Kālawamauna and pose a threat to the installation. If prescribed burns are used as an ongoing management procedure, the Army will consult with the USFWS and perform Section 106 consultation prior to implementation (25th ID (L) and USARHAW 2006b).

Surveys will be conducted prior to the construction and improvement of fire access roads, establishment of fire corridors, and construction of dip tanks (see above). Work is ongoing for the construction and maintenance of fire roads and corridors. The Integrated Wildland Fire Management Plan is being updated and will address roads that will be constructed. Roads will be monitored and measures taken to reduce erosion. Palliatives for dust suppression are applied when necessary. Access roads will be kept clear of vegetation.

The Army actively works to consider all possible fire prevention and management options, knowing that any fire on Pōhakuloa is more significant than in most other places because of its native communities and federally listed species. Information will be included in all pamphlets (e.g., hunting, Soldier field cards, etc.) as to the need to prevent fire (e.g., no smoking, don't drive vehicles with catalytic converters off roads), the valuable resources that can be lost, as well as who to contact in case of a fire.

**Goal 1: Support wildland fire initiatives to minimize future fires.**

**Objective 1:** Reduce non-native fuels where possible to protect federally listed and rare species on Pōhakuloa.

**Objective 2:** Develop environmental awareness materials to include signage to remind troops about using the Fire Danger Rating System, pamphlets on fire prevention at Pōhakuloa, posters, information kiosks in training areas, etc.

# 4.16 Training of Natural Resources Personnel

## 4.16.1 Policy and Background

The USAG-HI Natural Resources Program Manager requires the Pōhakuloa NRO staff to complete various environmental training as required by DoD policy, DA policy, and Army regulations. Normal day-to-day training requirements such as Equal Employment Opportunity, safety in the work place, etc. are not covered in this INRMP. The intent is to maintain an efficient and well-trained environmental staff. To perform the tasks stated in an INRMP, AR 200-1 states that there be "sufficient numbers of trained professional natural resources management personnel."

DoD Instruction 4715.10 (*Environmental Education, Training, and Career Development*) states DoD policy to:

- Establish a highly qualified group of environmental professionals who can successfully fulfill their environmental duties and responsibilities.
- Promote certification of professionals and technicians in their disciplines and specialties by encouraging continuing educational programs, membership in professional organizations, and as active committee members.
- Ensure appropriate environmental awareness training.
- Fund all mandatory environmental training requirements in federal laws and regulations.
- Two possibly applicable environment-related, federally-mandated training included Pesticide Applicators Certification (Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), 40 CFR Part 171.9) and Natural Resources Management (Sikes Act). Additionally, to the extent practicable using available resources, training is required for the enforcement of federal natural resources law (16 USC 670e1-2, *Natural Resources Management Services*).

NRO personnel in charge of contracted projects are required to attend and complete Contract Officer's Representative or Contract Officer's Technical Representative training.

## 4.16.2 Current Policy

All natural resources personnel involved in pest management are certified. NRO staff attends natural resource workshops annually. In 2009, all of the NRO staff received a week's training in geographical information systems as well as in first aid. Members of the ITAM team regularly attend the Sustainable Range Program/Training Support Systems Workshop.

Other training is available at the Professional Development Support Center, USFWS National Conservation Training Center, and others (see http://aec.army.mil/usaec/training/index.html).

**Goal 1: Maintain a professionally trained natural resources staff in the latest scientific techniques and theories; knowledge of federal, state and local government laws and policies; DoD policies; and Army policies, directives and regulations**.

**Objective 1:** Federal employees complete all annual and job related DoD and DA training requirements.

**Objective 2:** Contractor employees complete all annual and job related training required by USAG-HI Natural Resources Program Manager.

## 4.17 Coastal/Marine Management

Pōhakuloa uses Kawaihae Harbor for staging the mobilization and de-mobilization of troops and training equipment/supplies. The port authority is the Hawai‘i Department of Transportation. As such, there is no coastal or marine management on the Island of Hawai‘i by the Army.

## 4.18 Floodplains Management

There are no floodplains on Pōhakuloa.

## 4.19 Watershed Management

Watershed management is a component of the Clean Water Act. Watershed management cannot be effective unless it includes soil erosion controls, pollution prevention, and storm water pollution prevention best management practices, all being implemented by a partnership of government entities, communities, and private landowners located within a defined watershed.

On the Island of Hawai‘i, there are few well-defined watersheds due to the young, highly permeable rock and soil deposits that tend to absorb precipitation without forming stream channels. Pōhakuloa lies in the Northwest Mauna Loa and the West Mauna Kea watersheds. There are no perennial surface streams, lakes, or other water bodies within the installation’s boundaries due to porous soils and lava substrates. However, there are at least seven intermittent streams that drain surface water off the southwest side of Mauna Kea. None of these streams are listed as Impaired Waters in Hawai‘i according to 303(d) Clean Water Act (Koch et al. 2004).

## 4.20 Water Quality Management

There are no perennial water sources on Pōhakuloa. The cantonment and Bradshaw Army Airfield slope gently to the west, which facilitates runoff. Temporary flooding and localized ponding is possible during heavy rain events; however, the soils in the area are permeable and the underlying lava flows contain sufficient secondary permeability that infiltration is rapid.

Drinking and facilities water is trucked onto Pōhakuloa. Waste water is processed through septic tanks and underground injection well and managed in accordance with federal and state regulations. The Army uses septic tanks and has an Underground Injection Control (UIC) permit issued by the State Department of Health, Safe Drinking Water Branch.

## 4.21 Sustainable Range Program and Integrated Training Area Management

### 4.21.1 Policy and Background

The Sustainable Range Program (SRP) works to maximize Army capability, availability, and accessibility of ranges and training lands to support doctrinal requirements, mobilization, and deployment under normal and surge conditions (AR 350-19, *The Sustainable Range Program*). The Range and Training Land Program (RTLP) and Integrated Training Area Management (ITAM) are the two core parts of SRP. RTLP provides central management, programming, policy, modernization of the Army’s ranges, and day-to-day range operations. ITAM provides Army Range Officers the

capability to manage and maintain training lands and support training readiness by integrating mission requirements with environmental requirements and sound land management practices with the intent of establishing policies and procedures that achieve optimum, sustainable use of training and testing lands.

The ITAM program is the Army's formal strategy to address optimum and sustained use of training lands. This uniform training land management program helps to ensure no net loss of training capability, a Sikes Act requirement. ITAM includes inventorying and monitoring land conditions, integrating training requirements with training land carrying capacity, educating land users to minimize adverse impacts, and providing for training land rehabilitation and maintenance. The effective integration of stewardship principles into training land and conservation practices ensures that Army lands support training missions in a sustainable manner. Force readiness depends on the availability of high quality, realistic training lands. Several documents provide policy and procedural guidance for the ITAM program.

The ITAM program relies on its four components and integrated management from HQDA, Office of the Director of Environmental Programs (ODEP), TRADOC Program Integration Office-Live (TPIO-Live), Army Commands (ACOM), and the installations to accomplish its mission. The four ITAM components are Training Requirements Integration (TRI), Range and Training Land Assessment (RTLA), Land Rehabilitation and Maintenance (LRAM), and Sustainable Range Awareness (SRA).

- **Training Requirements Integration (TRI)** is the decision support component that integrates training requirements for land use with natural resources conditions and capabilities to support doctrinal requirements.
- **Land Rehabilitation and Maintenance (LRAM)** programs, plans, designs, and executes land rehabilitation and maintenance projects to support and sustain the military mission.
- **Range and Training Land Assessment (RTLA)** inventories and monitors short and long-term effects of military activities on the physical and biological resources of Pōhakuloa. RTLA also identifies potential LRAM projects and monitors LRAM project success.
- **Sustainable Range Awareness (SRA)** improves land users' appreciation and understanding of the environment and the potential effects of unnecessary damage to training lands.

The Geographic Information System (GIS) is a foundational support element in SRP that provides location information and assists land managers in making their decisions.

USAG-HI, Integrated Training Area Management (ITAM) prepares a Five-Year Plan (currently FY 2008-2012) that describes multi-year ITAM programs and resource requirements for seven sub-installations (O'ahu—Dillingham Military Reservation, Kahuku Training Area, Kawailoa Training Area, Mākua Military Reservation, and Schofield Barracks Military Reservation; Hawaii—Pōhakuloa and Ke`āmuku LTA). The plan reflects direction and guidance provided by the Chief, Range Division and the Installation Range Steering Committee. These two sources establish (1) project requirements and prioritization of projects that support current and future training operations, (2) enable coordination and integration of longer-term ITAM plans across the garrison, (3) serve as a driver for other plans (e.g., Range Development Plan), and (4) enable a quality annual work plan. The ITAM staff works closely and coordinates efforts with the NRO staff to ensure project compliance with state and federal regulations and laws as well as to complement work efforts when possible.

### Scope of ITAM

USAG-HI Integrated Training Area Management (ITAM) programs focus on training land management. Training lands include the following facility category groups: impact areas, maneuver areas, ordnance ranges, other mission-related training facilities, and roads, bridges, and tank/maneuver trails. ITAM funding supports the ITAM mission, goals, and objectives. ITAM funding is not intended to address or correct statutory compliance or conservation requirements, perform routine range maintenance or modification, or replace normal base operations activities on training lands normally funded by other avenues.

## 4.21.2 Training Requirements Integration

### 4.21.2.1 Policy and Background

Training Requirements Integration (TRI) is the component of the ITAM program that incorporates training requirements with land management, training management, and natural and cultural resources management processes. Integration of requirements occurs through continuous consultation between the Directorate of Plans, Training, and Mobilization (DPTM), Natural and Cultural Resources Managers, and the NRO staff. Managed by the ITAM Coordinator at Pōhakuloa, TRI has the direct contact with Range and Training Managers, and the rest of the ITAM staff (e.g., RTLA and LRAM Coordinators).

Land-use planning and management decisions meet training needs and regulatory compliance through interaction and coordination during the TRI process. Commanders rely on TRI to test the feasibility of new training demands and the recommendation for courses of action.

TRI is typically a responsibility of the ITAM Coordinator. In Hawai‘i, the ITAM Coordinator is stationed on O‘ahu. The LRAM Coordinator is the conduit to the ITAM Coordinator and provides TRI assistance on Pōhakuloa.

### 4.21.2.2 Current Management

- Successful implementation requires coordination between Range Division Hawai‘i personnel, ITAM personnel, and the NRO staff. TRI at Pōhakuloa falls under the responsibilities of the Land Rehabilitation and Management (LRAM) Coordinator because the ITAM Coordinator is headquartered at Schofield Barracks Military Reservation. The LRAM Coordinator participates in weekly staff calls and is aware of range and natural resource issues. The statewide ITAM Coordinator participates in USAG-HI Range staff calls on a biweekly basis. Issues affecting Pōhakuloa are passed to the LRAM Coordinator.
- Use of in-house support for projects (e.g., 411$^{th}$ Engineers).
- The LRAM Coordinator makes recommendations on land use, facility designs, and addresses trainer and planners concerns. The LRAM Coordinator works with Range Control, the Natural Resources Office, and the Command on Pōhakuloa TRI issues.
- Identification and the allocation of funds for LRAM and RTLA work supporting TRI is coordinated through the ITAM Coordinator in the Workplan Analysis Module (WAM).
- Initiate work orders, construction review, and NEPA process to site military missions and facilities in locations best suited to sustain resources.
- Include mission needs when prioritizing planning level surveys.

### 4.21.2.3 Future Considerations

- Utilization of the ATTACC and Land Condition Models—These models help determine natural resource condition and training carrying capacity of installation lands.
- Utilize the Encroachment Condition Model to assist in identifying locations with limited training restrictions or compatible use and for future stationing of exercises.
- Mission Safety—Assessment and identification of sites requiring LRAM efforts for safety and improved training conditions (e.g., revegetation, application of palliatives, etc.).
- Mission Siting—Assessment and identification of new sites to support future training needs. TRI utilizes LRAM and RTLA expertise to identify areas that physically and environmentally meet training needs. Further discussion and validation with the NRO staff supports subsequent NEPA efforts.
- Review and comment on training restrictions with an understanding of training and environmental needs.
- Provide trainers with scenarios to complement training restrictions.
- Evaluate the need for rest-rotation of training lands in terms of mission and environmental cost/benefits. Rest-rotation may be a consideration in the Keʻāmuku Parcel.

**Goal 1: Ensure sustained accessibility of lands to meet training standards that are realistic and in natural condition.**

**Goal 2: Provide military trainers and land managers with the necessary technical and analytical information and support to integrate doctrinally-based training and testing with land constraints to maintain training carrying capacity.**

**Objective 1:** Coordinate and communicate land use needs and land management efforts between the range and natural resources communities.

**Objective 2:** Request natural resource data and/or assistance in developing training land use models (Land Condition Model, Encroachment Condition Model).

**Objective 3:** Incorporate natural resources agendas (e.g., sensitive areas, rare species, etc.) into training restrictions and guidance.

## 4.21.3 Land Rehabilitation and Maintenance

### 4.21.3.1 Policy and Background

Military activities can severely affect lands. In some instances, site conditions permit natural recovery. In other cases, intervention is required. In those situations, the Land Rehabilitation and Maintenance (LRAM) program is the Army's first line of defense to repair and rehabilitate training lands. LRAM is a foundational program dedicated to sustaining realistic training conditions, and supporting training and testing personnel, weapons, vehicles, and mission requirements on an installation. LRAM is "land stewardship." The program provides preventative and corrective rehabilitation and maintenance procedures for long-term benefits. LRAM uses shovels and heavy equipment to enhance and maintain training lands and the military mission.

Each installation identifies and executes projects specific to its installation. Projects are programmed, planned, designed, and executed. LRAM projects are designed to maintain quality military training lands, minimize rehabilitation and repair costs, prevent damage to vehicles and other equipment, and

to remedy safety issues. LRAM projects can prevent non-compliance status (e.g., excessive soil deposition into waters and potential violation of the Clean Water Act; application of palliatives to reduce airborne particulate matter) and are used as an expert resource for mitigation projects.

LRAM is an important link between the training and natural resources community.

### 4.21.3.2 Current Management

#### General Projects/Tasks

- LRAM Coordinator is responsible for identifying and prioritizing LRAM projects, developing scopes of works, submitting work requests to appropriate authorities, monitoring project execution to ensure compliance with environmental constraints, and verifying all request work was completed satisfactorily.
- LRAM Coordinator works closely with Range Control; DPW, Real Property; and the Environment Office to address pending concerns and projects as well as with the 65th, 84th, and 411th Engineers and the U.S. Marine Corps to execute projects.
- LRAM provides site assessments for new ranges, addressing project specifications descriptions.
- LRAM installs Siebert stakes and signage for troop safety and to protect sensitive areas in construction areas.

#### Dust and Related Projects

- Tree plantings at firing points to reduce the effects of wind and dust, and to provide concealment.
- Project to document pre-Stryker contributions to PM10 and PM2.5. The study will continue with Strykers present. This and the fugitive dust study are conducted with DPW Clean Air and Safe Drinking Water.
- Application of palliative along Redleg Trail and at firing points to limit dust obscuring vision and affecting breathing.
- Renovation of firing points using a'a lava to harden specific pads for military activities (e.g., artillery firing, bivouac, and helicopter operations) and to reduce dust.
- Determination of soil characteristics and issues on the Ke'āmuku Parcel prior to training.

#### Plantings

- Propagate, install, and maintain shrubs and trees to reduce wind and wind damage, and to provide concealment.
- Use of native plants for outplanting projects.

#### Maintenance

- LRAM Coordinator uses best management practices and other resources and documents issues, design descriptions, materials, and costs for projects.
- Use of 411th U.S. Army Reserve to improve trails and access to the new KD Range.
- Combat trails and range ingress/egress roads are periodically inspected by LRAM to determine maintenance needs. Unnecessary trails are closed.
- Artillery firing point maintenance and maneuver land restoration are ongoing LRAM tasks.

- Use of pre-suppression techniques, such as firebreaks around the impact area, to minimize the impacts of mission-caused wildfires.

### 4.21.3.3 Future Tasks/Considerations

#### General Projects/Tasks

- Provide documentation to DPW, Real Property and Natural Resources of the locations of base stationing areas, maneuver trails, and the locations of other improvements on the Keʻāmuku Parcel.
- Involve DPW, Real Property and Natural Resources in the location and establishment of the new quarry.
- Provide DPW, Real Property and Natural Resources with Go-No/Go maps for validation.
- Provide DPW, Real Property and Natural Resources with data results from various monitoring projects (e.g., PM 10, PM 2.5, other fugitive dust studies, vegetation studies, etc.
- Establish Siebert stakes as needed in the Palila Critical Habitat.

#### Dust and Related Projects

- Monitor fugitive dust on the Ke`āmuku Parcel to understand the relationship between training, dust production, and site sustainability.
- Apply palliatives to mitigate training dust on trails and at firing points.
- Establish a vegetation buffer around Waikiʻi Ranch to mitigate and obstruct noise, dust, and line-of-sight to training.

#### Maintenance/Project Siting

- Improve and maintain trails in the Keʻāmuku Parcel and Pōhakuloa proper.
- Repair trails around the base of Puʻu KeeKee to provide better access to the KeeKee gate. Improve access between Puʻu KeeKee and the Keʻāmuku Parcel.
- Establish one to three Battalion Support Areas. This will require creating a trail network.
- Develop a plan to determine trails needing improvement in the Keʻāmuku Parcel and key trails leading into the parcel from Pōhakuloa proper.
- USFWS Biological Opinion (2003) requires that 12% ground cover be maintained in off-road maneuver areas.

#### Plantings

- USFWS Biological Opinion (2003) requires all plant material purchased by ITAM for revegetation be certified free of invasive species prior to moving plants to any natural area for planting.
- USFWS Biological Opinion (2003) requires grass seed used to revegetate an area be monitored periodically for invasive species, which will need to be removed.

**Goal 1: Sustain long-term training/testing missions on lands held under the stewardship of USAG-HI, Pōhakuloa, and the U.S. Army.**

**Goal 2: Sustain the overall condition of Pōhakuloa lands to ensure long-term military viability.**

**Goal 3: Coordinate long-term land maintenance plans with other real property management programs on USAG-HI and Pōhakuloa.**

**Goal 4: Apply best management practices for design and execution of LRAM to ensure rehabilitation, repair, and maintenance results are commensurate with the applied resources.**

**Goal 5: Execute LRAM projects cited in the 2003 USFWS Biological Opinion.**

**Objective 1:** Ensure coordination (what? where? when?) and communication (maps, results) of projects with DPW, Real Property and the Environment Office.

**Objective 2:** Work with Natural Resources on projects of common interest (e.g., fugitive dust, revegetation, etc.).

**Objective 3:** Work with Natural Resources when siting new training activities.

**Objective 4:** Maintain off-road maneuver areas with 12% or more ground cover as required by the USFWS Biological Opinion (2003).

**Objective 5:** Ensure nursery stock used and seeding mixes are weed-free (USFWS 2003).

## 4.21.4 Range and Training Land Assessment

### 4.21.4.1 Policy and Background

Range and Training Land Assessment (RTLA) focuses on sustaining doctrinal training. To accomplish this mission, RTLA monitors and assesses natural resource conditions and manages and analyzes natural resource information. These data are essential in evaluating current and potential land condition and the ability of resources to support (sustain) future training needs. RTLA collects biological and physical data and looks toward remote sensing to assist and meet future training community's needs. Assessments can be short or long-term. Recent program changes have called for each installation with RTLA to prepare a program plan that provides goals and objectives for each project, outlines how projects will be accomplished, and the data used and presented.

A secondary role for RTLA is to act as the knowledge center and to support the information needs of Installation Status Reports (ISR), NEPA, ATTACC, and LCM, installation management plans, assessing internal encroachment issues, and the identification and evaluation of LRAM projects. The role to "identify and evaluate LRAM projects" emphasizes the need to address degrading biological conditions and other project considerations prior to initiating work, and to review and report on the success, and/or effect of a project on completion, if appropriate. RTLA is one component, along with LRAM, TRI, NRO staff, and the training community, to consider the availability, suitability, accessibility and capacity of training lands.

### 4.21.4.2 Current Management

#### Monitor & Report

- Establish vegetation monitoring plots throughout the Keʻāmuku Parcel to describe vegetative characteristics (e.g., species composition; percent plant cover, bare ground, litter, and canopy cover; percent/density woody plant cover; soil erosion status; air-borne dust) and changes to those characteristics due to training.

- Monitor LCTA plots on Pōhakuloa proper. Evaluate data.
- Evaluate LCTA plots in Palila Critical Habitat and determine if data addresses USFWS 2003 Biological Opinion requirements on the effects of Strykers.
- Establish and execute a protocol that determines the impact of foot traffic on federally listed species (USFWS 2003).

### Program Assistance

- Provide LRAM project assessments.
- Use high-resolution multi-spectral satellite imaging to evaluate training effects in the Keʻāmuku Parcel.
- Determine/site two Battalion Staging Areas.
- Site the main supply route through the Keʻāmuku Parcel.

**Goal 1: Assess impacts of live training and testing activities and recommend options for sustained usage at Pōhakuloa.**

**Goal 2: Prioritize and assess land management activities external to training to maximize the capability, accessibility, and availability of Pōhakuloa lands to meet the training mission.**

**Goal 3: Participate in training land use planning (e.g., Range Master Plan, Installation Master Plan, NEPA, etc.) for USAG-HI and Pōhakuloa.**

**Goal 4: Meet the data assessments required by the USFWS 2003 Biological Opinion.**

**Objective 1:** Involve the Environment Office in RTLA project identification, prioritization, and results.

**Objective 2:** Coordinate projects identified in the USFWS Biological Opinion (2003) with the Natural Resources Office to ensure requirements are properly and completely met: (1) monitor the effects of Strykers in the Palila Critical Habitat, (2) monitor the effects of foot traffic on federally listed species, (3) monitor revegetated areas for invasive plant species, and (4) assess off-road maneuver areas for percent ground cover.

**Objective 3:** Provide and support data needs of the Environment Office for the preparations of plans and NEPA documents.

## 4.21.5 Sustainable Range Awareness

## 4.21.5.1 Policy and Background

Warfare, by its very nature, is destructive to humans and their natural environment. Environmental damage is a consequence of combat. However, the U.S. military has historically exercised restraint, limiting damage to churches, monuments, archives, and libraries during times of war. Restraint has been incorporated into the decision-making process, and unnecessary environmental damage protects training areas for future use. Soldiers are required to prevent environmental problems by caring for those resources entrusted to them. This responsibility includes financial, material, and environmental stewardship.

*The Army will integrate environmental values into its mission to sustain readiness, improve the soldier's quality of life, strengthen community relationships, and provide sound stewardship.*

Vision Statement, 15 June 2000
FM 2-100.4, Environmental Considerations in Military Operations

Sustainable Range Awareness (SRA) is a component of the ITAM program that develops and distributes educational materials to users of range, training, and testing land assets. The intent is to reduce avoidable impacts to natural and cultural resources by informing land users of restrictions, policies, and proactive actions. SRA is integrated into existing command and installation operational awareness activities and events (AR 350-19, *The Sustainable Range Program*, 30 August 2005), thereby applying appropriate environmental protection procedures during all types of operations (FM3-100.4, *Environmental Considerations in Military Operations*, 15 June 2000).

Typical SRA materials include Soldier Field Cards, Leader/Soldier Handbooks, posters, news articles, briefings, pamphlets and brochures, website and multi-media presentations, and maps and overlays designed to educate and support Soldiers, leaders, and commanders in understanding their responsibilities to integrate environmental and natural resources conservation procedures, policies, and requirements into mission training events. Some materials are generic and supplied through the Installation Support Training Division (ISTD) (e.g., playing cards).

### 4.21.5.2 Current Management

- Pōhakuloa has a Soldier Field Card that provides basic information needs for safe and environmentally responsible training. These cards are generic to all installations.
- The external standard operating procedures provide current restrictions and environmental considerations to be taken during training (see Appendix 9, *Installation Documents. Standard Operation Procedures*).

### 4.21.5.3 Requirements and Considerations

- Posters illustrating sensitive species, training precautions (e.g., safe handling of POL), and success stories (e.g., Earth Day, Public Lands Day, etc.) should be developed on a regular basis. Posters should be displayed in common areas throughout the base camp.
- The USFWS Biological Opinion (2003) requires new Soldiers be educated on how to avoid listed species, especially in Training Areas 19, 22, and 23.
- Develop educational materials on transporting invasive species (plants and animals) between installations. Soldiers need to be instructed on how to clean gear and vehicles. This is required by the USFWS Biological Opinion (2003).
- Publish ITAM "success" stories in the Sustainable Range Program Newsletter. While articles are written for the training community, they can be distributed for public consumption. The USARPAC issue is published during the winter (February/March time frame).

**Goal 1: Minimize resource damage by indoctrinating land users on how their activities impact the environment and to instill Soldier pride and stewardship responsibility at Pōhakuloa.**

**Goal 2: Meet the educational requirements cited in the USFWS Biological Opinion (2003).**

**Objective 1:** Educate Soldiers on how to use and respect the training lands and facilities at Pōhakuloa.

**Objective 2:** Assist NRO staff in the development of Environmental Awareness materials for the public, neighbors, contractors, etc.

**Objective 3:** The USFWS 2003 Biological Opinion requires (1) new Soldiers be educated on how to avoid impacting listed species, and (2) instructions to avoid transporting invasive species (plants and animals) between installations on equipment and on clothes.

# CHAPTER 5

# IMPLEMENTATION

# CHAPTER 5 IMPLEMENTATION

The Sikes Act Improvement Act (SAIA) requires not just preparation and update of an Integrated Natural Resources Management Plan (INRMP), but "implementation" of the INRMP. The following section discusses the definition and funding implications of implementation.

Implementation anticipates the execution of all "must fund" projects and activities in accordance with specific timeframes identified in the INRMP. A Plan is considered to be implemented if an installation:

- Actively requests, receives, and uses funds for "must fund" projects and activities.
- Ensures that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the Integrated Natural Resources Management Plan.
- Coordinates annually with all internal and external cooperating offices.
- Documents specific Integrated Natural Resources Management Plan action accomplishments undertaken each year.

Natural resource requirements defined by the Office of the Secretary of Defense as environmental "must fund" are those projects and activities required to meet recurring natural resources conservation management requirements or current natural resources compliance needs. The Army equivalent to Office of the Secretary of Defense's "must fund" projects are projects as described in classes 0, 1 and 2 in current Army policy and guidance for identifying Environmental Program requirements.

All projects listed in an INRMP are not necessarily environmental class 0 or 1. Implementation of INRMPs is a shared responsibility among those activities that use the land (e.g., trainers, facility managers, provost marshal) as well as those who ensure compliance and provide overall program oversight. Accordingly, projects necessary to implement Integrated Natural Resources Management Plans are not limited to environmental funds. However, Integrated Natural Resources Management Plans should include all projects.

Projects are contained in Appendix 2, *Lists of Projects* of this Integrated Natural Resources Management Plan and will be reviewed and updated annually upon completion of Army review and validation processes.

## 5.1 Natural Resources Implementation Goals and Objectives

Natural resources program management includes all the tasks required to plan, organize, implement, and operate the natural resources program for USAG-HI, Pōhakuloa. The annual goals for the Natural Resources Office are:

- Prepare, update, and submit an NRO "must fund" projects.
- Develop, update, and execute an NRO work plan.
- Obtain and execute 100 percent of natural resource funding.

- Contribute to Installation Status Report and Army Environmental Database – Environmental Quality report.

and to:

- Execute conservation implementation plans.
- Meet training needs of designated natural resources professionals.
- Recruit and train adequate staff to conduct natural resources.
- Prepare, update, and execute cooperative agreements, Memoranda of Understanding, and Memoranda of Agreement to accomplish natural resources management.

## 5.2 Achieving No Net Loss of Training Lands to Military Mission

The Natural Resources Program through this INRMP (as well as the Integrated Training Area Management program) provides mitigation support for the military mission. Therefore, full implementation of this plan is required to achieve no further net loss of training lands to the military mission. Most of the projects outlined in this document are required by the USFWS through their 2003 Biological Opinion. The NRO staff has developed a detailed program and has submitted their Implementation Plan for review. The plan outlines the Army's concurrence and willingness to meet USFWS directions to support no net loss to the military mission at Pōhakuloa. The plan details actions that support the persistence and habitat enhancement of federally listed species on Army lands through the construction of fencing, removal of ungulates and feral animals, creation of a 72.5 km (45 mi) fuel break system, weed removal, genetic banking, and plant propagation, augmentation, and outplanting. Surveys are being conducted to determine the extent that some birds and a listed bat utilize the resources at Pōhakuloa and if military actions are having an adverse affect. The Army will work with the USFWS to ensure the military mission is sustained.

## 5.3 Supporting Sustainability of Military Mission

This Integrated Natural Resources Management Plan is written with the intention of supporting military mission sustainability. Full implementation of this plan is required to achieve mission sustainability. Funding Category 1 projects is essential for meeting core requirements and addressing USFWS mandates.

## 5.4 Implementation Related Plans and Planning

### 5.4.1 Integrated Natural Resource Management Plan

Natural resource planning includes preparing, updating, implementing, and reviewing the Integrated Natural Resources Management Plan annually.

### 5.4.2 Conservation Program Budget Planning

The Natural Resources program and Cultural Resources program make up the Conservation program. The purpose for the USAG-HI Conservation (Natural Resources) Program budget planning is to gain approval and provide programmatic guidance to program managers and coordinators. The Sikes Act, as amended in 1998, and AR200-1 stipulate that planning level surveys, integrated natural resources management plans, endangered species management plans (where required), and the implementation

of these plans are required on all Department of Defense lands. This INRMP outlines the steps and identifies the resources necessary to comply with the Sikes Act by supplementing the USAG-HI Conservation program.

### 5.4.3 Conservation and Integrated Training Area Management Work Plans

The USAG-HI Conservation Annual Work Plan of the Army Environmental Cost Standardization Program tracks funding, obligations, and the execution of natural resource projects and tasks. Each project contains the following information: project name, priority, project number and name, description, funding required, funding allocated, funding obligated, year funded, agency (in-house or contractor), National Environmental Policy Act requirements, National Historic Preservation Act Section 106 requirements, other permit requirements, primary USAG-HI point of contact, project status, and comments.

The Integrated Training Area Management Work Plan is created by the Integrated Training Area Management Coordinator, submitted to the Director of Plans. Training, Mobilization, and Security through the U.S. Army Hawaii Garrison, validated by U.S. Army Installation Management Command - Pacific, and turned in to the Department of the Army Mobilization & Operations Army Training Division for Integrated Training Area Management program funding.

### 5.4.4 USFWS Mandatory Threatened and Endangered Species Management Plans

The *Biological Opinion on Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light), U.S. Army Installations on the Island of Hawai'i, (1-2-2003-F-002)* (2003) is used by the USAG-HI Natural Resources Office (NRO) staff for planning, budgeting, and implementing for endangered species management on Pōhakuloa. The Pōhakuloa Implementation Plan (2010) is based off of this and the USFWS 2008 Biological Opinion (*Reinitiation of the December 2003 Section 7 Consultation on Training at Pōhakuloa Training Area, Hawai'i*).

## 5.5 Reporting

USAG-HI is responsible for submitting reports for funding requirements, funding work plans, and environmental quality status. USAG-HI must annually submit the Army's funding program (Environmental Cost Standardization Program), Army Environmental Database – Environmental Quality, the Installation Status Report; Part II, Environmental and Reimbursable Project Tracking System. The Environmental Program Requirements report, the previous method for reporting environmental funding requirements, was discontinued in 2005.

## 5.6 Cooperative Agreements

A priority for partnering and accomplishing work to implement this plan is through cooperative agreements. When applicable, an installation should enter into cooperative plans, in accordance with 16 USC 670a, with state and federal conservation agencies for the conservation and development of fish and wildlife, soil, outdoor recreation, and other resources.

### 5.6.1 Fish and Wildlife Cooperative Plan

As per the 1997 amendments to the Sikes Act, INRMPs replaced Fish and Wildlife Cooperative Plans by incorporating the planning, development, maintenance, and coordination of fish, wildlife, and game conservation.

### 5.6.2 Department of Defense Agreements

Memoranda of Understanding between Department of Defense and other resources agencies provide the authority for installations to develop their own cooperative agreements in attainment of mutual conservation objectives with these agencies.

Memoranda of Understanding have been established between the Department of Defense and the Departments of Agriculture (March 27, 1963) and Interior (April 7, 1978). The memoranda authorize execution of cooperative agreements in attainment of mutual conservation objectives. Installations may develop cooperative agreements with the following:

- Department of Agriculture functioning through the Agriculture Research Service, the Soil Conservation Service, and the Forest Service.

- The Department of the Interior functioning through the U.S. Fish and Wildlife Service for the conservation of fish and wildlife resources and through the National Park Service for the development and management of outdoor recreation activities.

- The Department of Agriculture functioning through the Animal and Plant Health Inspection Service and Animal Damage Control for animal damage control on military installations.

The Cooperative Agreement between the Department of Defense and The Nature Conservancy (December 13, 1988) declared a policy of cooperation and establishes procedures for planning and conducting cooperative efforts between The Nature Conservancy and Department of Defense on Department of Defense lands. Under this agreement, installation commanders can obtain technical assistance from The Nature Conservancy and State Heritage Programs, as well as allowing The Nature Conservancy to study significant ecosystems under the Army's control.

In June 1999, the heads of participating federal agencies signed a Memorandum of Understanding establishing the Cooperative Ecosystem Studies Unit Network. Department of Defense joined the network in September 2000 and now serves as a council member and technical advisor on one of the Cooperative Ecosystem Studies Units. Cooperative Ecosystem Studies Units (CESU) provide research, technical assistance, and education to Federal land management, environmental, and research agencies, and their partners. The CESU Network has several benefits: a broadened scope of scientific services for federal agencies, increased technical assistance to resource managers, additional scientific resources and opportunities for universities, and increased diversity of research scientists and institutions.

### 5.6.3 Other USAG-HI Agreements

USAG-HI has developed the following cooperative agreements to implement this plan and the conservation program.

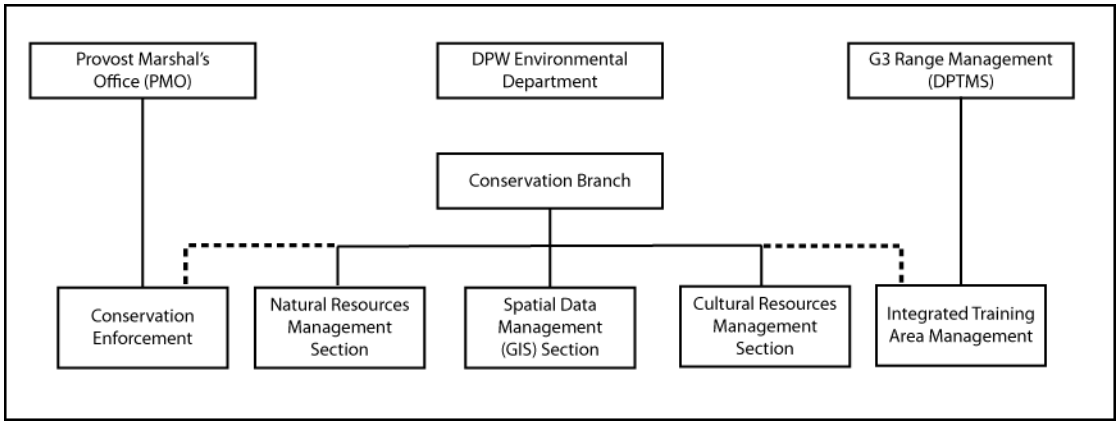



**Figure 5-1 Conservation Branch Organizational Chart.**

- Cooperative Agreement with The Trust for Public Lands in the facilitating of Army Compatible Use Buffer Program land purchases.
- Cooperative Agreements with other natural resources agencies (e.g., Palila Working Group/USGS-BRD, Federal Highways, Hawaiian Hoary Bat Working Group/DoFAW, Three Mountain Alliance).

## 5.7 Organizational Enhancement, Roles, and Responsibilities

### 5.7.1 Organization

The Conservation Branch is a sub-component of the USAG-HI's Environmental Resources Department. Other branches within Environmental Resources Department include Planning Branch, Compliance Branch, and Clean-up Branch. The Natural Resources Section is a part of Conservation Branch. The conservation enforcement section reports directly to the Provost Marshal's Office, while the Integrated Training Area Management Section reports directly to the Director of Plans, Training, Mobilization, and Security –Installation Range Office. Both of these sections are integrated in terms of personnel and implementation of projects with the Conservation Branch.

### 5.7.2 Staffing

The management and conservation of natural resources under Army stewardship is a government function. Therefore, the provisions of Army Regulation (AR) 5-20 (*Competitive Sourcing Program*) do not apply to the planning, implementation, enforcement, or management of Army natural resources management programs. This includes all positions (for example, professional, technical, equipment operators, natural resources law enforcement professionals, laborers, and so on) that have been validated as a requirement to perform natural resources management. However, support to the natural resources program, where it is severable from management, planning, implementation, or enforcement actions of natural resources, may be subject to the provisions of this regulation. Personnel positions associated with activities that support (on an as-needed basis), the natural resources program (e.g., equipment operators or laborers from a pool or another shop) may be subject to the provisions of AR 5-20.

The ideal situation would be for all positions to be fulltime, permanent federal positions. The USAG-HI is anticipating the addition of 61 new government positions. The workforce will remain a blended

workforce, but with greater federal employee oversight and participation. USAG-HI will pursue options to fill staff positions in a manner that will accomplish the most efficient blended workforce as possible.

To ensure the necessary technical guidance in the planning and execution of this natural resources program, natural resources and natural sciences professionals should comprise the staffing. USAG-HI will establish positions as needed and fill validated positions in accordance with current Department of Defense/Department of Army policy. Positions required that meet Sikes Act requirements for the implementation of this Integrated Natural Resources Management Plan are shown below in Table 5.a.

### 5.7.2.1 Staffing Requirements

Full implementation of all Class 1,2, and 3 category projects in this INRMP requires oversight by the NR Section Chief based in O‘ahu, a full-time federal NRO Biologist at Pōhakuloa, and assistance from USAG-HI’s partners and cooperators, both signatory and otherwise (Table 5.a). Specific needs from organizations external to USAG-HI are indicated throughout this document. It is impossible for USAG-HI to hire the specialized expertise needed for some projects within this Integrated Natural Resources Management Plan. USAG-HI will require expertise support from universities, agencies, and contractors to accomplish some tasks. USAG-HI will reimburse parties for their assistance.

#### Federal In-house Capabilities

USAG-HI has very limited in-house federal positions as a result of manpower restrictions. To meet the intent of the Sikes Act, an additional two to three federal positions are required for the planning, management, and enforcement of natural resources.

#### Federal Agency Support

USAG-HI could utilize personnel support from other federal agencies; however, this option has not been used previously and is not anticipated to be used from 2010 to 2014. These types of personnel meet Sikes Act requirements for “Government in Nature” positions for planning, management, and enforcement of natural resources.

#### State Agency Support

The Intergovernmental Personnel Act of 1972 (IPA) is a means to obtain personnel support. The IPA is a system where a federal or state agency “borrows” other federal or state agency personnel for a limited time for a specific job. Any state or federal agency is authorized to participate. The installation pays the borrowed employee’s salary and administrative overhead. Major advantages are that personnel are not considered contractors and, therefore, can represent and obligate the federal government. Manpower authorizations are not required. An IPA employee would be considered part of the USAG-HI staff and could be directly supervised by a federal employee. IPA employees are bound by ethics rules of both their home state/federal agency as well as federal ethics regulations of the organization they are temporarily assigned. These personnel meet Sikes Act requirements for “government in nature” positions for planning, management, and enforcement of natural resources.

#### Oak Ridge Institute for Science and Education Support

Another “borrowed personnel” option for securing manpower assistance is through the Oak Ridge Institute for Science and Education. Oak Ridge Associated Universities manage and operate the Oak Ridge Institute for Science and Education research participation program for the U.S. Department of Energy. Oak Ridge Institute for Science and Education is a consortium of 88 doctoral-granting colleges and universities, providing students and post graduates opportunities to gain experience in their respective fields by working on Army installations. Oak Ridge Institute for Science and Education program coordinators at the Army Environmental Command are points of contact for the

**Table 5.a USAG-HI Pōhakuloa Training Area Positions Required Implementing the Integrated Natural Resources Management Plan.**

| Department | Position Title | Current Positions | Category | Position Changes Addition/ Category |
|---|---|---|---|---|
| NRO Program | Natural Resources Section Chief | 1 | Federal | |
| NRO Program | NRO Biologist | 1 | Federal | |
| NRO Program | Administrative Program Manager | 1 | Contract | |
| NRO Program | Administrative Assistant | 1 | Contract | |
| NRO Program | Outreach Coordinators | 0 | Contract | 2 |
| NRO Program | Equipment Manager | 1 | Contract | |
| NRO Program | GIS & Database Program Manager | 1 | Contract | |
| | GIS & Database Technician | 1 | | |
| NRO Program | Botanical Program Manager | 1 | Contract | Federal |
| NRO Program | Plant Monitoring & Plant Propagation | 13 | Contract | |
| NRO Program | Wildlife Program Manager | 1 | Contract | Federal |
| NRO Program | Wildlife Monitoring, Feral Animal Control, Invasive Animal Control | 5 | Contract | |
| NRO Program | Invasive Plant Program Manager | 1 | Contract | |
| NRO Program | Invasive Weed Control &Fuel Break Maintenance | 23 | Contract | |
| NRO Program | Fencing Program Manager | 1 | Contract | |
| NRO Program | Fence Construction & Maintenance | 19 | Contract | |
| NRO Program Total | | 71 | | 4 |
| Range Division Hawai‘i | LRAM Coordinator | 1 | Contract | |
| Range Division Hawai‘i | LRAM/RTLA Assistant | 1 | Contract | |
| Range Division Hawai‘i | GIS Analyst | 1 | Contract | |
| Range Division Total | | 3 | | |
| DA Police | Game Warden | 0 | Federal | 1 |
| DA Police Total | | | | 1 |

program. Oak Ridge Institute for Science and Education personnel are appointed research participants who gain hands-on experience by completing multiple tasks for the duration of their employment.

Stipends are equivalent to salaries for employees hired with similar educational backgrounds with a 30 percent overhead. Oak Ridge Institute for Science and Education personnel can be appointed for a maximum three-year term. Installations may assist in the selection of Oak Ridge Institute for Science and Education personnel. These personnel support positions are not considered “government in nature.”

### University Assistance

Support to the natural resources program, where it is a severable form of management, planning, implementation, or enforcement, may be provided by on-site contract personnel. Due to the Sikes Act preference for other federal and state agencies with natural resource expertise, state universities are a preferred source of contract personnel support. USAG-HI has used several universities in recent years to help with specialized needs. The University of Hawaii has been the principal source of support to USAG-HI on O‘ahu installations and Colorado State University at Pōhakuloa. These on-site support positions are not considered “government in nature.”

#### Contractor Support

As a final option for manpower assistance, USAG-HI contracts businesses for tasks that are severable from management, planning, implementation, or enforcement of natural resources. Contractors give USAG-HI access to a wide variety of expertise. Contractors may be used for projects such as plan preparation, National Environmental Policy Act documentation, aerial census and photography, Land Rehabilitation and Maintenance implementation, and similar activities.

### 5.7.3 Coordination and Training

Staff coordination and communication can be challenging as conservation staff reside at various locations on Oʻahu and Hawaiʻi, hundreds of miles apart. A significant strength of the conservation program is the integration with other Army directorates, namely the Provost Marshall's Office and the Directorate of Plans, Training, Mobilization and Security (DPTMS). However, this split chain of command also makes communication and coordination difficult. In some cases, supervisors work in different locations from their staff. A blended workforce consisting of federal employees, Intergovernmental Personnel Agreement (IPA) staff, university personnel, and contract personnel contributes to chain of command challenges. Therefore, USAG-HI has instituted a framework of natural resource teams, in-progress reviews, and periodic training to meet these challenges.

#### 5.7.3.1 Conservation Team

The USAG-HI Conservation Team exists to promote integration and enhance project execution. All natural and cultural resources employees of USAG-HI are members of the conservation team. The conservation team was created to allow free exchange of ideas and information amongst the members on all three posts. The conservation team exists to tackle technical scientific issues necessary to carry out projects. Ad hoc committees include the ecosystem management team and the Range and Training Land Assessment team. Conservation personnel often serve on a number of permanent and ad hoc teams.

#### 5.7.3.2 Training

Interdisciplinary training is essential for Department of Defense natural resource managers. Training addresses job disciplines, statutory compliance requirements, applicable Department of Defense/Department of Army regulations, pertinent State and local laws, and current scientific and professional standards as related to the conservation of our nation's natural resources. The natural resource training objective is to identify technical requirements as well as the resources (cooperative agreements, Legacy, Integrated Training Area Management, Memoranda of Understanding, and so forth) available to implement and execute a successful and proactive program. The goal is to maintain and enhance the military mission, biodiversity, conservation stewardship, and management of the total ecosystem from the practical standpoint of day-to-day operations as well as long-term planning.

## 5.8 Decision Support

Decision support system goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. Decision support system goals and objectives are:

- Provide a decision support capability to natural resources, range, and engineer planners and managers.

- Develop and maintain USAG-HI Geographic Information System spatial database and data layers.

- Maintain Geographic Information System data in accordance with Federal Geographic Data Committee standards and Tri-Services Spatial Data Standards, including metadata standards.

- Coordinate and synchronize the three decision support systems: Geographic Information System, Range Facility Management Support System, and Integrated Facility System.

### 5.8.1 Geographic Information Systems

The USAG-HI Geographic Information System is a foundational capability of natural resource management. The Geographic Information System is a computer-based tool capable of assembling, storing, manipulating, and displaying geographically referenced information, (i.e., data identified according to their locations). The system can be used to analyze and model (manipulate, overlay, measure, compute, and retrieve) the digital spatial data and display the new map products and tabular resources information showing the results of the spatial analysis. Geographic information System technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps. These abilities distinguish Geographic Information System from other information systems.

### 5.8.2 Range Facilities Management Support System

The Range Facilities Management Support System is a multi-user, personal computer, web-based software package that automates the real property inventory, scheduling, firing (operations) desk, and management functions at an installation Range Control Center. Range Facilities Management Support System was developed to optimize the scheduling, use, and operations and maintenance functions for an installation's live-fire ranges, maneuver training areas, and other related training facilities and assets under Army Regulation 210-21. The data from this system allows land managers (i.e., natural resources and ITAM managers) in identify ranges and training areas that may be overly impacted by training use and that some appropriate action be taken such as allowing an area to be rested and/or rehabilitated.

### 5.8.3 Integrated Facility System

The Integrated Facility System is a facility engineer automated information evaluation system that encompasses life cycle management of real property resources, and is the Army Chief of Staff for Installation Management's official source of real property information. The current version is the Integrated Facility System – Micro or Mini. In addition to real property information, the system performs a wide variety of other functions, such as work estimating and work-order tracking. The system has two levels; one for installation level and one for headquarters level (now called Executive Information System). The U.S. Army Corps of Engineers' Center for Public Works manages the Integrated Facility System. The data from this system allows land managers (i.e., natural resources managers, ITAM managers, DPTM Range Division, and DPW personnel) identify property owners, Directorate or Office of responsibility, and the appropriate funding mechanisms that is allowed to maintain the identified infrastructure, facility, or land.

## 5.9 Outreach

Outreach is another extremely foundational component of natural resources implementation. Each natural resource program conducts outreach activities, and the natural resources program management function integrates these efforts through the conservation web page, conservation newsletter, and participates in other outreach events. (See Section 4.13.2 *Public Outreach/Community Planning*).

## 5.10 Financial Management

Another significant component of USAG-HI natural resource program management is financial management. Financial management consists of funding, budgeting, and contracting. These three components all are important to USAG-HI's ability to implement this plan.

### 5.10.1 Funding

This document identifies the natural resources management and conservation requirements necessary for sustaining viable ecosystems, the military mission and compliance with relevant environmental laws (i.e., Endangered Species Act). However, full implementation of this INRMP, and all associated natural resources projects, is contingent upon the availability of funds. If funding does not meet the level needed for full implementation, projects and efforts will be prioritized based on importance for mission sustainability and statutory compliance.

Projects are categorized as Class 0, 1, 2, and 3, as defined in DoDI 4715.3 *Environmental Conservation Program*, Enclosure 4 (*Programming and Budgeting Priorities for Conservation Programs*), May 3, 1996.

- Class 0: Recurring Natural and Cultural Resources Conservation Management Requirements. Class 0 shall contain any INRMP action necessary to rehabilitate or prevent resource degradation that may affect military readiness.

- Class 1: Current Compliance Requirements. Class 1 shall contain requirements to manage species and habitats of concern to prevent listing of species that could affect military readiness.

- Class 2: Maintenance Requirements

- Class 3: Enhancement Actions beyond Compliance.

Class 0 and 1 projects are deemed "must funds" by DoD definition. "Must Fund" conservation requirements are those projects and activities that are required to meet recurring natural and cultural resources conservation management requirements or current compliance needs. Per DoD policy, accomplishment of all Class 0 and 1 "must fund" projects constitutes the minimal acceptable level of implementation. "Must fund" projects and actions include those required to:

- Meet the USFWS special management criteria for threatened and endangered species management.
- Provide for qualified NRO personnel.
- Prevent resource loss or degradation (e.g., sol loss, other maintenance activities) that may affect military readiness.

Not all projects listed in this INRMP are necessarily "must funds." This INRMP includes valid Class 2 and 3 projects and actions that would enhance an installation's natural resources.

Funding for INRMP projects are projected 5 years in advance through the Program Objective Memorandum (POM). Proper planning and management are necessary to set goals and objective years in advance. In general, there are three main focus areas for funding: staffing, compliance activities, and stewardship activities.

1. Staffing of federal employees is considered a "must fund" for budgeting purposes. (See Section 5.7.2, *Staffing*).
2. Activities and projects driven by requirements to comply with federal laws, applicable state laws, and applicable executive orders (EOs) are given the next priority for funding. Although compliance is often split into two tiers of "must fund" and "will fund if funds are available" For the purposes of this INRMP, the top tier compliance activities include the Endangered Species Act, Migratory Bird Treaty Act, and National Environmental Policy Act. The second tier compliance activities include the Sikes Act and Invasive Species EO. Projects that are for compliance purposes are noted in Appendix 2, *List of Projects*.
3. Stewardship, the responsibility to manage and conserve natural resources for the future, is essential to ensure sustainability of military lands for the mission and the environment. Oftentimes, stewardship efforts include natural resource projects that are proactive, noncompliance conservation efforts to maintain or enhance an installation's natural resources that demonstrate environmental leadership and stewardship, conducting baseline surveys, and long-term monitoring. Projects that are for stewardship purposes are noted in Appendix 2 *Lists of Projects*. Stewardship projects that are not compliance/mission driven are the lowest priority and accomplished when funding is available or alternate sources for completion are identified.

Natural resources management relies on a variety of funding mechanisms, some of which are self-generating and all of which have different applications rules. In this section are general discussions about different sources of funding to implement an INRMP. (Not all of these are currently used by USAG-HI.) Additional information on programming and budgeting can be found in *Department of Defense Instruction* (DoDI) *4715.3, Environmental Conservation Program* (03 May 96) Enclosure 4, *Programming and Budgeting Priorities for Conservation Programs*.

#### 5.10.1.1 Environmental Program Funding

The request for environmental funds by an installation begins a minimum of six years out. This budget requests is reviewed by U.S. Army Installation Management Command, forwarded to the Department of the Army, and then to U.S. Congress for review and approval. Projects work their way through the six year review process. Only in extenuating cases are new environmental projects funded sooner, which usually results in the delay of other projects.

The Environmental Program Requirements process was formerly used to govern environmental funding. In 2005, the Army decided to adopt the Environmental Cost Standardization (ECS) model to develop an installation's environmental requirements that are predictable. The ECS model uses three processes: identifying requirements, programming for funds, and allocation of dollars actually received. The ECS model is still in development and each U.S. Army Installation Management Command – Region uses its own methods to identify requirements, programming funds, and fund allocation. Environmental funding requirements are divided into two major areas: conservation and compliance.

Non-recurring projects (one-time projects) are addressed with the IMCOM web-based Status Tool for the Environmental Program (STEP). The tool is accessed through the Army Environmental Reporting Online (AERO) portal. The data entered into STEP facilitates project review, approval, and prioritization process and the allocation and timing of funds. The project narrative and project priority are the two most important sections of STEP from the Garrison perspective.

### Environmental Conservation Funding

The purpose of environmental conservation funding is to enable the Army mission through the characterization, monitoring, compliance, and oversight of installation natural and cultural resources. Conservation funding allows Army managers to exercise stewardship of natural and cultural resources by the facilitation of the planned management via the Integrated Natural Resources Management Plan and Integrated Cultural Resource Management Plan. Coordination with facility managers, trainers, and other land users and implementing of projects that help preserve, maintain, repair, and improve natural and cultural resources accomplishes sustaining mission requirements. (See Appendix 2, *Lists of Projects*)

### Environmental Compliance Funding

The purpose of environmental compliance funding is to enable the Army mission, through the implementation of mandated actions, to protect and enhance environmental media from the negative effects of pollution and human alteration and allow sustained access to and use of operational ranges to meet doctrinal training requirements. Most of these funding requirements are not covered in this Integrated Natural Resources Management Plan; however, a few projects are intertwined with natural resources management. (See Appendix 2, *Lists of Projects*)

## 5.10.1.2 Conservation Reimbursable Funding

Reimbursable programs support military readiness and land management, and revenues from these programs supplement base operations and other funding. Agriculture/grazing out-leases are authorized by 10 USC 2667(d), commercial forestry is authorized by 10 USC 2665, and the collection of fees to hunt, trap, or fish is authorized by 16 USC 670a. Reimbursable program may be used to enhance and maintain wildlife habitats. Revenues generated through fees to hunt, trap, or fish may be used for the protection, conservation, and management of fish and game. The Army has about 800,000 acres of land leased under agriculture/grazing, and 1.4 million acres under some form of commercial forestry. The Army has executive agent responsibilities over the Department of Defense Forestry Reserve Account.

### Forestry Funds

Forestry funds are generated from sale of forest products on military lands. An installation may be reimbursed for all costs associated with the maintenance and disposition of forest products. Forestry funds must be used only for projects directly related to forest ecosystem management. Such projects include timber management, reforestation, timber stand improvement, inventories, fire protection, construction and maintenance of timber area access roads, purchase of forestry equipment, disease and insect control, planning (including compliance with laws), marking, inspections, sales preparations, personnel training, and sales. No lands on Pōhakuloa are identified for forestry activities.

### Agricultural Outlease Funds

The Army Agriculture/Grazing Outlease Program is a reimbursable program. This means that proceeds from outleases on an installation are first used to cover authorized expenses. Proceeds are allocated to the installations and U.S. Army Corps of Engineer Districts based on the Agricultural/Grazing Outlease protocol. The use of revenue from agricultural and grazing outleases are regulated by law. Revenues may be used for reimbursement of the administrative costs of outleasing and the financing of multiple-land use management activities through established budget procedures. Grazing is used to manage fuel load on Pōhakuloa. No funds are generated.

### Fish and Wildlife Funds

Department of Defense Fish and Wildlife Funds are collected through sales of permits for hunting, trapping, or fishing on military controlled lands. They are authorized by the Sikes Act and regulated

by AR 200-1. These funds may be used only for fish and wildlife management on the installation where they are collected. They cannot be used for recreational activities. They are exempt from equipment purchase amount limitations, and they do not expire (un-obligated funds carry over on 1 October). Pōhakuloa is exploring issuing hunting fees.

### 5.10.1.3 Facilities Program Funding

Army facilities are funded with two types of funding: Base Operating Support, and Facilities Sustainment, Restoration, and Modernization. It is the Army's plan during 2010-2014 to fund both of these accounts at 90 percent of the validated requirement.

#### Sustainment, Restoration, and Modernization

The purpose of sustainment funding is to enable the Army mission by funding the sustainment of range and other facilities in good working order to meet long-term doctrinal training requirements. The purpose of restoration funding is to restore failed or failing facilities, systems, and components damaged by a lack of sustainment, excessive age, fire, storm, flood, freeze, or other natural occurrences, improves facilities to current standards. Modernization funding adapts facilities to meet new standards and includes the erection, installation, or assembly of a new real property facility, the addition, expansion, extension, alteration, conversion, or complete replacement of an existing real property facility (DoD *Financial Management Regulation 7000.14-R* Chapter 8, *Facilities Sustainment, Restoration and Modernization*).

#### Real Property Services

Real Property Services funding provides for those activities of an installation support nature. It includes those support elements and services identified as indirect overhead by Headquarters Department of Army and grounds maintenance activities. This includes abatement and disposal of building hazardous waste resulting from the performance of real property services.

### 5.10.1.4 Sustainable Range Program Funding

There are three types of range program funding that affect the management of natural resources: range operations, range modernization, and Integrated Training Area Management funding. Range operations funding provides for the operation and management of training ranges, range modernization funding upgrades range facilities, and Integrated Training Area Management funding rehabilitates and maintains training areas.

#### Integrated Training Area Management

Integrated Training Area Management (ITAM) funding enables the Army mission by funding the management and maintenance of training lands to sustain and enhance the capability to meet long-term doctrinal requirements.

ITAM program funding is not driven by regulatory statute, but is an integral component of the Army's land stewardship effort. ITAM projects are grouped into four categories (A-D) as defined in the ITAM Workplan Analysis Module Implementation Guidance, July 2007.

Category A: Annual recurring requirements to provide baseline program staffing and operation.

Category B: High priority repair and/or reconfiguration projects required to return degraded training area to useable condition.

Category C: Medium priority repair, reconfiguration, and/or maintenance projects having minimal immediate adverse impact on training, but with potential for near-future significant impact.

Category D: Low priority projects with no immediate adverse impact on training, but with potential for eventual impact. Category D projects may eventually elevate to Category C.

As with other programs in this INRMP, ITAM funding is projected five years in advance through the Program Objective Memorandum (POM). Projects are conceived at the installation, and are validated at Installation Management Command (IMCOM) and HQDA levels prior to funds release. The installation submits an obligation report to IMCOM and HQDA at the end of each fiscal year.

#### Range Operations

Range operations funding enables the Army mission by funding the operation of ranges and training lands to sustain long-term doctrinal training requirement. Range operations funding also provides for record keeping of the number and type of munitions fired, communication and coordination with local public on noise issues, and the design and installation of signage for access controls to ensure safety and security of range facilities.

#### Range Modernization

Range modernization funding enables the Army mission by funding the design and construction of ranges and the acquisition of training lands that are capable of sustaining long-term doctrinal training requirements.

### 5.10.1.5 Other DoD Funding Sources

Installations also have the opportunity to apply for alternative funding from DoD programs.

#### Legacy Program

The DoD Legacy Program funds projects with an emphasis on regional and DoD-wide activities, and not installation-specific projects except for national programs (e.g., National Public Lands Day or demonstration projects). Projects may support the military mission or meet legal or statutory requirements; support or leverage DoD conservation initiatives and programs; or attempt new or innovative conservation management on DoD lands. While USAG-HI may seek Legacy funding, it is not expected to be a viable source for implementing this Integrated Natural Resources Management Plan.

#### Strategic Environmental Research and Development Program (SERDP)

The Strategic Environmental Research and Development Program (SERDP) is DoD's environmental science and technology program, planned and executed in full partnership with the Department of Energy and the Environmental Protection Agency, with participation by numerous other federal and non-federal organizations. To address the highest priority issues confronting the Army, Navy, Air Force, and Marines, SERDP focuses on cross-service requirements and pursues high-risk/high-payoff solutions to the Department's most intractable environmental problems. The development and application of innovative environmental technologies support the long-term sustainability of DoD's training and testing ranges as well as significantly reduce current and future environmental liabilities.

#### Environmental Security Technology Certification Program (ESTCP)

The Environmental Security Technology Certification Program's (ESTCP) goal is to demonstrate and validate promising, innovative technologies that target the most urgent environmental needs of the Department of Defense (DoD). These technologies provide a return on investment through cost savings and improved efficiency. The current cost of environmental remediation and regulatory compliance in the Department is significant. Innovative technology offers the opportunity to reduce costs and environmental risks. ESTCP offers funding in the following four focus areas:

Environmental Restoration, Munitions Management, Sustainable Infrastructure, and Weapons Systems and Platforms.

#### Readiness and Environmental Protection Initiative (REPI)

Under authority of 10 USC 2684a, DoD may partner with state and local governments, and non-governmental organizations to acquire from willing sellers conservation easements on private lands, called Army Compatible Use Buffers (ACUBs) by the Army. REPI serves to forestall incompatible land use and protect high-value habitat so that DoD retains the discretion to use military lands free of encroachment-related restrictions and environmental constraints. With REPI agreements and DoD cost-share funding, the acquisition of conservation easements creates "win-win" situations for all partners. Encroachment Management is managed by Directorate of Community Affairs within USAG-HI.

### 5.10.2 Budgeting

The Environmental program works together with the Directorate of Resource Management to manage the environmental budget. USAG-HI uses work plans to communicate funding requirements to higher headquarters and to help manage the annual budget. USAG-HI uses both an environmental work plan (natural resources and cultural resources) and an Integrated Training Area Management work plan.

The Conservation Annual Work Plan is used to develop requirements, plan spending, and track funding, obligations, and execution for natural resource projects and tasks. Each project contains the following information: project name, priority, project number and name, description, funding required, funding allocated, funding obligated, year funded, agency (in-house or contractor), National Environmental Policy Act requirements, National Historic Preservation Act Section 106 requirements, other permit requirements, primary USAG-HI point of contact, project status, and comments. The Conservation Annual Work Plan is included as part of the environmental program work plan.

The Integrated Training Area Management Program works with the Deputy Chief of Staff for Resource Management to manage the Integrated Training Area Management budget. The installation work plan is developed in the summer and submitted in August of each year to reflect Integrated Training Area Management program requirements in detail for the following six fiscal years. The work plan reflects all Integrated Training Area Management activities for the installation. Once projects are identified, they are prioritized from most to least important. Approval of these projects and priorities is obtained from the U.S. Army Hawaii Installation Range Office prior to completing the work plan. Once the projects are approved, they are entered into the Installation Work Plan Analysis Module database.

### 5.10.3 Contracting

The contracting process includes two primary components, purchase/acquisition and contract management. Purchase and acquisition is necessary to get a contract in place then contract management is necessary to ensure good communication between the government and contractor to enable good contract performance.

### 5.10.3.1 Purchase and Acquisition

The first step in the contract process is purchase and acquisition. USAG-HI Environmental starts the process by clearly defining desired services in a statement of work, estimating costs, and initiating a purchase request. USAG-HI Environmental works together with a contracting agency to develop an acquisition strategy, using the Sikes Act priority to guide decision-making.

### Sikes Act Priority for Contracting

The Sikes Act Committee Report defined natural resources management and conservation as "inherently governmental." Planning, implementation, enforcement, and management of Army natural resources cannot be contracted. The first priority for implementation of this plan will be to use the USAG-HI in-house workforce. USAG-HI in-house capabilities include permanent natural resources employees, other Public Works organizations (such as roads and grounds, carpentry shop, etc.) and troop projects. These methods are usually the least expensive, but tend to be the least flexible. All funds obligated toward in-house work must be expended in the current fiscal year.

Support to the natural resources program, where it can be separated from management, planning, implementation, or enforcement actions of natural resources may be contracted. The Sikes Act outlines priorities for contracting these implementation projects. When entering into contracts for services that implement natural resource management objectives or enforce natural resources laws (i.e., wildlife management and endangered species plans and surveys), priority is given to contracts with federal, state, and local agencies with responsibility for natural resources conservation. In other words, if an installation cannot utilize governmental personnel to do natural resources conservation technical support, then other Federal and State natural resources agencies have, by this law, a "right of first refusal" to accept this work. In such cases, competitive bids are not required.

When in-house staff or cooperating federal and state agencies cannot perform work, USAG-HI looks to various contract mechanisms. The Government Services Administration environmental services schedule provides companies that have already gone through an open bid process to be on the Government Services Administration contract. Contracting to one of these companies is relatively simple and fast. The Job Order Contract in place in USAG-HI provides quick and efficient service. However, when none of these other options is available, USAG-HI can use the open bid process through a contracting agency.

### Documents Required for Acquisition and Purchased

The Economy Act of 1932, as amended, allows federal agencies to obtain services directly from other federal agencies or utilize contracts already in place by other federal agencies. The Military Interdepartmental Purchase Request is used to acquire natural resource conservation services. Natural resources support services may be obtained non-competitively, through contracts with State and local agencies. In this case, a purchase request must be submitted through the directorate of resource management to a contracting agency. Conservation personnel work together with the contracting agency to develop an acquisition strategy, statement of work, and government estimate. The government must prepare a statement of work and government estimate for each purchase request.

### 5.10.3.2 Contract Management

Once a contract is in place, USAG-HI Environmental must nominate a federal Contract Officer's Representative to help the Contract Officer manage the contract. The Contract Officer authorizes the Contract Officer's Representative to verify that the Contractor performs the technical requirements of the contract, perform necessary inspections necessary, maintain liaison and direct communications with the contractor, monitor the Contractor's performance, submit a monthly report concerning performance of services rendered and coordinate site entry for contractor personnel.

## 5.11 Command Support

Command support is essential to implementation of this Integrated Natural Resources Management Plan. Without this support, priority projects for natural resources management will not occur. Failure to execute these projects risks violation of environmental laws, reduced mission readiness, and

negative public reaction to a lack of environmental stewardship. The Installation Commander is responsible for compliance with environmental laws and sets the tone for environmental stewardship. Command emphasis on this Integrated Natural Resources Management Plan ensures a healthy environment, sustainable resources, and quality future training lands.

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# CHAPTER 7 PREPARERS

The following is a list of people who were primarily responsible for preparing and/or reviewing the Integrated Natural Resources Management Plan (INRMP), their titles, years of experience, and educational background.

| Name | Educational Background | Applicable Experience (Years of Experience) | Project Responsibility |
|---|---|---|---|
| Christine Bern | San Francisco State University<br>B.A. (1974), M.A.(1985)<br>Ecology and Systematic Biology | • 25 years natural resources management, ecology<br>• 2 years NEPA experience | Supported document development and the execution of the revision. |
| William Saunders | University of Wyoming<br>B.S. (1984)<br>(Physical and Sedimentary Geology) | • 5 years active duty<br>• 20 years with the Wyoming Army National Guard including as the Environmental Program Manager<br>• 5 years NEPA experience | Oversaw the development and executed the revision of the INRMP. |
| Calvin Bagley | Utah State University<br>B.S. (1984), M.S (1988)<br>Range Science | • 18 years executing ecological monitoring and inventory, natural resources management<br>• 15 years NEPA experience | Supported document development and execution. |
| Mark Miller | Colorado State University<br>B.A. (1997)<br>Range Ecology<br><br>University of Auckland, New Zealand<br>Post Graduate Diploma in Science<br>(Geography) | • 5 years NEPA and GIS Analyst, range inventory and monitoring<br>• 2 years environmental planning | Collected and developed GIS data, developed maps. |
| Glenda Lesondak | Dordt College, B.A.—1988 (Biology)<br><br>Colorado State University<br>M.S.(in progress)<br>Technical Communication | • 14 years technical editing and formatting experience | Editor |

# CHAPTER 8 AGENCIES AND PERSONS CONSULTED

## U.S. Army Garrison, Hawai‘i

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**Peshut, Peter, Ph.D.—**Pōhakuloa Biologist, Natural Resources Office, DPW

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**Timbal, Glenn—**Acting Fire Chief, Pohakuloa

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## Other Army Organizations

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**Garo, Victor—**G3/Directorate of Plans, Training, and Mobilization, Range Division, 25th ID(L) & USARHAW

**Howland, Mark**—ITAM Coordinator, G3/Directorate of Plans, Training, Mobilization, and Security, Range Division

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**Rubinoff, Jay**—Army Environmental Command, Aberdeen Proving Ground

**Langston, Bill—**Former Integrated Training Area Management Coordinator, G3/Directorate of Plans, Training, and Mobilization, Range Division

**Willis, Todd—**Office of the Assistant Chief of Staff for Installation Management (ACSIM)

## Others

**Beavers, Andrew--**Fire Ecologist/Behaviorist, Center for Environmental Management of Military Lands, Colorado State University

**Kam, Roy—**Database Manager, Hawai‘i Biodiversity and Mapping Program

**Zeidler, James—**Archaeologist, Center for Environmental Management of Military Lands, Colorado State University

# Chapter 9 LIST OF ACRONYMS

ac ..... acres
ACOM ..... Army Command
ACUB ..... Army Compatible Use Buffer
ACE ..... Army Corps of Engineers, United States
AEC ..... Army Environmental Command, United States
APHIS ..... Animal and Plant Health Inspection Services
AR ..... Army Regulations
ARTEP ..... Army Training Evaluation Program
ASR ..... areas of species recovery
ATTACC ..... Army Training and Testing Ara Carrying Capacity
BAAF ..... Bradshaw Army Airfield
BASH ..... Bird/Animal Strike Hazard
BRAC ..... Base Realignment and Closure
BRD ..... Biological Resources Division, U.S. Geological Survey
CESU ..... Cooperative Ecosystem Studies Units
COE ..... Corps of Engineers
CS ..... combat support
CSS ..... combat service support
CWCS ..... Comprehensive Wildlife Conservation Strategy
DA ..... Department of Army
DLNR ..... Hawai‘i Department of Land and Natural Resources
DMR ..... Dillingham Military Reservation
DoD ..... Department of Defense
DoDI ..... Department of Defense Instruction
DOFAW ..... Division of Forestry and Wildlife, Department of Land and Natural Resources
DOT ..... Department of Transportation
DPTM ..... Directorate of Plans, Training, Mobilization
DPTMS ..... Directorate of Plans, Training, Mobilization, and Security
DPW ..... Directorate of Public Works
ECS ..... Environmental Cost Standardization
EIS ..... environmental impact statement
EMS ..... Environmental Management System
EO ..... Executive Orders
EPA ..... Environmental Protection Agency
ESA ..... Endangered Species Act, as amended
ESTCP ..... Environmental Security Technology Certification Program
FARP ..... forward arming and refueling point
FDRS ..... Fire Danger Rating System

FEIS ..... Final environmental impact statement
FHWA ..... Federal Highway Administration
FMWRC ..... Family and Morale, Welfare and Recreation Command
FONSI ..... finding of no significant impact
FUDS ..... Formerly Used Defense Sites
FY ..... fiscal year
GMU ..... game management units
GIS ..... geographical information system
ha ..... hectares
HBMP ..... Hawai‘i Biodiversity and Mapping Program
HMMWV ..... high mobility multipurpose wheeled vehicle
HQDA ..... Headquarters, Department of Army
ICM ..... improved convention munitions
IMA ..... Installation Management Agency
IMCOM ..... Installation Management Command
IMCOM_PAC ..... Installation Management Command-Pacific
INRMP ..... Integrated Natural Resources Management Plan
IP ..... implementation plan
IPA ..... Intergovernmental Personnel Act
IPMP ..... Integrated Pest Management Plan
IT ..... implementation team
ITAM ..... Integrated Training Area Management
IWAM ..... ITAM Workplan Analysis Module
IWFMP ..... Integrated Wildland Fire Management Plan
KD ..... known distance
KLOA ..... Kawailoa Training Area
KTA ..... Kahuku Training Area
L ..... Light, 2nd Brigade 25th Division (L)
LCM ..... land condition model
LCTA ..... Land Condition-Trend Analysis
LRAM ..... Land Rehabilitation and Management
LZ ..... landing zone
MBTA ..... Migratory Bird Treaty Act
METL ..... Mission Essential Task List
MOU ..... Memorandum of Understanding
MOUT ..... military operations and urban terrain
MPRC ..... Multi-purpose Range Complex
NCGRP ..... National Center for Genetic Resources Preservation
NDAA ..... National Defense Authorization Act
NEPA ..... National Environmental Policy Act
NMFS ..... National Marine Fisheries Service
nMRA ..... non-readiness activities
NRO ..... Natural Resources Office

NRCS ..... Natural Resources Conservation Service
NSF ..... National Science Foundation
ODEP ..... Office of the Director of Environmental Programs
ORISE ..... Oak Ridge Institute for Science and Education
PM ..... particles, micrometers
POL ..... petroleum, oils, and lubricants
POM ..... Program Objective Memorandum
RCMP ..... Range Complex Master Plan
RCUH ..... Research Corporation of the University of Hawai‘i
REPI ..... Readiness and Environmental Protection Initiative
ROD ..... record of decision
RTLA ..... Range and Training Land Assessment
RTLP ..... Range and Training Land Program
RTLPD ..... Range and Training Land Program Development Plan
SAIA ..... Sikes Act Improvement Act of 1997
SBCT ..... Stryker Brigade Combat Team
SBER ..... Schofield Barracks East Range
SBMP ..... Schofield Barracks Main Post
SBMR ..... Schofield Barracks Military Reservation
SDFIE ..... Spatial Data Standards for Facilities, Infrastructure and Environment
SERDP ..... Strategic Environmental Research and Development Program
SOP ..... standard operating procedures
SRA ..... Sustainable Range Awareness
SRAA ..... South Range Acquisition Area
SRP ..... Sustainable Range Program
TA ..... training area
TOW ..... tube-launched optically-tracked wire data link, guided missile.
TPIO ..... TRADOC Program Integration Office
TRADOC ..... Training Doctrine Command
TRI ..... Training Requirement Integration
TSC ..... Theater Support Command
UAV ..... unmanned aerial vehicles
UIC ..... underground injection control
USACE ..... U.S. Army Corps of Engineers
USAEC ..... U.S. Army Environmental Command
USAG-HI ..... U.S. Army Garrison, Hawai‘i
USAMPB-HI ..... U.S. Army Military Police Brigade, Hawai‘i
USARHAW ..... U.S. Army Hawai‘i
USPACOM ..... U.S. Pacific Command
USARPAC ..... U.S. Army Pacific Command
USASCH ..... U.S. Army Support Command
USC ..... United States Code
USDA ..... U.S. Department of Agriculture

USDOT ..... U.S. Department of Transportation
USFS ..... U.S. Forest Service
USFWS ..... U.S. Fish & Wildlife Service
USGS ..... U.S. Geological Survey
WAAF ..... Wheeler Army Airfield
WAM ..... Workplan Analysis Module
WS ..... Wildlife Services, APHIS