Final Environmental Assessment

High-Altitude Mountainous Environment Training

September 2011

Prepared for:

Department of the Army
25th Combat Aviation Brigade
Schofield Barracks, Hawai‘i 96857-5000

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Finding of No Significant Impact / Anticipated Negative Determination

High-Altitude Mountainous Environment Training

September 2011

ACTION

Environmental Assessment (EA) for Training the 25th Infantry Division–25th Combat Aviation Brigade (CAB) in High-Altitude Mountainous Environment Flight Operations.

BACKGROUND INFORMATION

The need for well-prepared aviation brigades to conduct combat operations in Afghanistan led the U.S. Army Forces Command to prioritize the development of standardized training for high-altitude (up to 14,000 ft [4,267 m]) mountainous conditions. High-Altitude Mountainous Environment Training (HAMET) was developed to ready experienced helicopter pilots for success in combat operations as part of their train-up for deployment under Operation Enduring Freedom (U.S. Army 2009). HAMET adapts the National Guard's program for individual mountain helicopter training taught at the National Guard's training site in Gypsum, Colorado, with helicopter training that individual Army CABs have been conducting as part of their regular training operations for the past several years (Gould 2010).

On December 23, 2010, the USAG-HI released, for public comment, an EA and draft finding of no significant impact (FNSI) for the proposed action to conduct HAMET for 300-400 25th CAB aviators over the course of one year. The public comment period occurred from December 23, 2010, to January 23, 2011. After review of the comments, the USAG-HI revised its alternatives, expanded its agency and public outreach activities, collected additional information, and prepared a revised EA. The revised EA was published April 23, 2011 for a 30-day public comment period. The EA incorporated input received by the public and agencies of both the State of Hawaii and federal government. The proposed action was reduced to train 260 aviators for approximately 45 days over the course of three non-consecutive months.

In addition, the State of Hawaii requested that our EA not only meet Federal Regulations but also be compliant with Hawaii Revised Statutes (HRS) Chapter 343 and Hawaii Administrative Rules (HAR) §11-200.

In light of the comments received during the various public comment periods and the need to accomplish training in advance of the 25th CAB's impending 2012 deployment, the following changes were made to the Action Alternatives:

- Proposed HAMET alternatives would be conducted with two aircraft types (i.e., Black Hawks and Chinooks) rather than three types; the Kiowa Warrior would not be flown for HAMET

- Fewer flights are proposed, up to 90 aviators will be trained, total flying time at the 6 LZ's will average 180 hours, and training is projected to be needed between October 3 and October 31, 2011.

- Flight paths for the Proposed Action were redesigned to reduce the size of the flight path and also to avoid Mauna Kea State Recreation Area and to be farther from the Natural Area Reserve.

- All alternatives were re-examined.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The Proposed Action is to train up to 90 helicopter pilots and crews for high-altitude missions in preparation for deployment to Afghanistan and to satisfy mandatory annual training requirements. HAMET would be taught in three phases. Phase I would consist of academic classroom instruction and simulator training conducted at Wheeler Army Air Field and Schofield Barracks, O'ahu. Phase II would be an element of annual and pre-deployment individual flight technique training conducted on high-altitude landing zones (LZs) in mountainous environments, with aviators in their assigned aircraft (approximately 180 hours). Phase III would be collective (group) training based at Bradshaw Army Air Field, Pōhakuloa Training Area (PTA), and Schofield Barracks, where tactical and mission flight training would be conducted inside military training areas. HAMET is an incremental training process that proceeds from lower to higher elevations, building upon skills acquired at each altitude.

The EA for HAMET for the 25th CAB (USAG-HI 2011) evaluates a range of alternatives considered to be reasonable under the following screening criteria; availability; the number of pilots that can be trained; feasibility (i.e., time and cost); and, quality of life for the Soldiers and their Families.

The Action Alternatives that were considered are as follows:

- Alternative 1 – Preferred Alternative. HAMET flights would be conducted from Bradshaw Army Airfield at PTA to three pre-existing Mauna Kea LZs and three pre-existing Mauna Loa LZs (USAG-HI 2011).

- Alternative 2 – Mauna Kea. HAMET flights would be conducted from Bradshaw Army Airfield at PTA to three pre-existing Mauna Kea LZs (USAG-HI 2011).

- Alternative 3 – Mauna Loa. HAMET flights would be conducted from Bradshaw Army Airfield at PTA to three pre-existing Mauna Loa LZs (USAG-HI 2011).

- Alternative 4 – Other High-Altitude Locations in the State of Hawai'i. HAMET would be conducted at other high-altitude state or federal lands located in the State of Hawai'i (USAG-HI 2011).

- Alternative 5 – Other High-Altitude Training Sites (Continental United States (CONUS)). HAMET would be conducted at an offsite flight training center in Gypsum, Colorado; Fort Carson, Colorado, or, El Paso, Texas (USAG-HI 2011).

- No Action Alternative. HAMET Phase II flight training would not be conducted if no action were taken (USAG-HI 2011).

After a screening process that considered facility availability, throughput, time and cost, and quality of life for the Soldiers, the Preferred Alternative (Alternative 1) and Alternatives 2 and 3 were analyzed in the EA for their potential environmental impacts.

Under Alternatives 1, 2 and 3, Phase II is the only phase that needs to be conducted outside the Army training area, and it is estimated that it would take 2 hours of training per pilot to complete. Under Alternatives 1, 2 and 3, HAMET Phase II would require no more than 180 flight hours and would be conducted during October 2011. Pilots would fly at high altitudes and land at designated high-altitude LZs using varying angles of approach, headings, and air speeds to reach proficiency in tasks such as, but not limited to, visual - metrological-conditions takeoff and approach, reconnaissance over high-altitude LZs, slope operations, and night-time operations. Pilots would be trained using the UH-60 Black Hawk and the CH-47 Chinook aircraft. All aircraft would be unarmed (i.e., no pyrotechnic devices, ordnance, etc.). The LZs are pre-existing, have been used for previous HAMET activities, and are in alpine stone deserts, with sparse vegetation scattered over lava and barren rock and cinders. No more than two aircraft would be in or around the LZs on Mauna Kea and not more than three aircraft on Mauna Loa at any given time

HAMET entails aviation aircrews only and would not be used in conjunction with ground-maneuver training activities. Aircraft landing in the LZs would not be picking up or dropping off troops or supplies. Aircraft will be spending a minimal amount of time in the LZs, and ground time should not exceed 10 minutes per landing.

SUMMARY OF ENVIRONMENTAL EFFECTS

The Proposed Action alternatives were evaluated with respect to their potential effects to the valued environmental components, which include climate, air quality, geology and soils, water resources, biological resources, cultural resources, socioeconomics and environmental justice, land use, recreation, noise, visual and aesthetic resources, human health and safety, traffic and circulation, and public services and utilities.

Through discussions with subject matter experts and after performing reconnaissance-level surveys at each LZ on Mauna Loa and Mauna Kea, it was determined that there are no historic properties within any of the LZs. Two rock mounds (of unknown nature) were found near LZ-5, one within 328 ft (100 m) and a second within 474 ft (144 m) from the center of the LZ There is one rock mound located 183 ft (56 m) from the center of LZ-6. The rock mounds were monitored during, and once at the end of the March 2011 data collection training period, and it was found that there were no effects from the presence of helicopters. In the 2011 survey, no historic properties were found within 328 ft (100 m) of the Mauna Loa LZs. The flight paths that were chosen under the alternatives were designed to minimize the area of over flight and avoid

the vast majority of known cultural properties on both mountains. The helicopter presence will be infrequent and temporary, will not offer any modifications to the landscape, and therefore will not have an adverse effect or significant impact on the qualities that make Mauna Kea culturally significant to Native Hawaiians.

Federal- and state-listed threatened and endangered species, or sensitive species, that could potentially occur on Mauna Kea and Mauna Loa are: the Hawaiian goose or nēnē (*Branta sandvicensis*); the Hawaiian hawk or ʻio (*Buteo solitaries*); the Hawaiian hoary bat or ʻopeʻapeʻa (*Lasirus cinerus semotus*); the Hawaiian Dark-rumped petrel or ʻuaʻu (*Pterodroma sandwichensis*); the Band-rumped storm petrel or ʻake ʻake (*Oceancodroma castro*); the Palila (*Loxioides bailleui*); the Wekiu bug (*Nysius wekiuicola*); and, the Mauna Kea Silversword (Argyoxiphium sandwicense). In February, March, May and June 2011, biological surveys were conducted at the Mauna Kea and Mauna Loa LZs to determine if any threatened and endangered species, or species of concern, occur within the operational areas of the LZs (Peshut 2011; Peshut and Doratt 2011a, 2011b, 2011c; Peshut and Evans 2011; Peshut and Schnell 2011a, 2011b). These surveys did not identify any threatened or endangered flora or fauna species, or any species of concern, within a survey area of up to 2,000 ft radius of the LZs. The nearest known population of the Mauna Kea Silversword (Argyoxiphium sandwicense) is approximately 8,202 ft (2,500 m) west of Mauna Kea LZ-5. HAMET operations are not expected to impact the Silversword. Overall, vegetation within the vicinity of all LZs is extremely sparse to absent, and consists of common natives and introduced species.

Due to the geography, elevation, and the lack of resources within the vicinity of the LZs, and based on biological surveys, encounters with wildlife are expected to be rare. The flight route to access the Mauna Kea LZs does cross occupied palila critical habitat, but the minimum 2,000 ft to 3,000 ft AGL path is a sufficient mitigation to minimize the impact of noise on that species. In accordance with Federal Aviation Administration Advisory Circular 91-36C *Visual Flight Rules (VFR) Near Noise Sensitive Areas*, there are no Federal Aviation Administration airspace restrictions over this area; therefore other aircraft may fly well below the HAMET self-imposed AGL altitude over flight mitigation over palila habitat. Additionally, the Army changed its flight route to access the LZ's away from the Mauna Kea State Recreation Area and the Mauna Kea Ice Age Natural Area Reserve. Airstrikes of palila is not considered likely because birds are expected to remain within close proximity of the forest canopy the majority of the time. Overall, airstrike of forest birds, sea birds, or bats is not considered likely because the density of these species is expected to be extremely low along flight paths and in the vicinity of the LZs, as indicated from a review of the scientific literature and the biological surveys.

Additional mitigation efforts include the inspection and washing of aircraft to minimize the spread of non-native ant and plant species. As an added protection, helipads at Bradshaw Army Airfield will have pesticide and herbicide applied in advance of HAMET.

The likelihood of a helicopter crash enroute to any LZ is considered to be extremely remote. This is based on the number of hours flown without a crash resulting in a wildfire and the fire safety technology built into the aircraft, the precedent of hundreds of tourist helicopters flying uncontrolled over palila critical habitat each year without incident, and the overall extreme rarity of aircraft crashes worldwide based on number of flight hours logged.

Existing hazards that could threaten human health and safety within the proposed LZs themselves are related to human factors (operator error) and include hazards associated with being at high elevation with high winds, extreme temperatures, and night/low visibility. HAMET would provide pilots experience in high-altitude night-time operations (i.e., flights); however, it should be noted that the pilots will already be proficient at night-time operations as a result of prior training accomplished apart from HAMET.

Impacts from noise on humans are not anticipated. Noise modeling was performed to determine day-night averages associated with the proposed helicopter training. In addition, noise sampling was conducted for areas of potential concern to recreationists, cultural practitioners, and biological resources. The anticipated noise levels are acceptable for current land uses in these areas. The noise sampling results did not measure maximum decibel level discernable above background levels for areas of concern to cultural practitioners or recreationists. Levels measured within the flight path did not show concerning levels for biological resources.

Particulate matter emissions resulting from helicopter rotor wash on the LZs was evaluated along with pollutants emitted from the aircraft. Based on modeling, the impact of fugitive dust from helicopter activity on either Mauna Loa or Mauna Kea LZ areas would be less than significant. Observation during training flights confirmed this conclusion.

Because there are scientific observatories located on the summits of both mountains, the HAMET flight paths were chosen to reduce the possibility of operating conflicts between aircraft pilots and observatory operations.

LZs have minimal vehicle and pedestrian use. That use is generally limited to intermittent and dispersed recreationists or cultural resource practitioners that happen upon them. The LZs are not destinations for either group. Both groups mostly use areas outside of the area identified for HAMET flights. HAMET flights may be perceived as a noise and visual distraction but will not result in any closures or cessation of activities or in any access restrictions to either group.

Overall, impacts were found to be less than significant or of no impact under all Action Alternatives. Valued environmental components would not be significantly affected by the Action Alternatives.

CONSERVATION MEASURES

The following conservation measures will be implemented:

- Have firefighting resources on standby while training, and have transportation available for firefighting personnel.
- Notify Mauna Loa Observatory air-quality instrumentation personnel prior to conducting HAMET missions (requested by National Oceanic and Atmospheric Administration personnel).
- Notify the public, through press releases, of training schedules.
- Notify the US National Park Service (USNPS)

- Maintain an altitude of 3,000 (915 m) and a minimum altitude of 2,000 ft (610 m) in the flight path (e.g., when flying over palila critical habitat).
- Inspect the exterior of the aircraft pre-flight and if need, clean the aircraft to reduce the potential for spread of invasive species.
- Apply pesticides and herbicides, if applicable, to helicopter landing pads at the Bradshaw Army Airfield.
- Continue to participate in open communication with Native Hawaiians, other land use groups, and other interested parties to identify resources and reduce impacts.
- Conduct cultural awareness training for all HAMET personnel, with particular emphasis on intangible resources and their importance to Native Hawaiians.

PUBLIC INVOLVEMENT

The public's participation is essential to a successful National Environmental Policy Act (NEPA) and HRS Chapter 343 analysis. The Council on Environmental Quality and 32 Code of Federal Regulations 651 and HAR § 11-200 provide for opportunities for the public to participate in the EA process. In accordance with these public notification requirements, the U.S. Army Garrison-Hawai'i provided the opportunity for the public to participate in the NEPA/Chapter 343 process to promote open communication and assist in the decision-making process.

All persons and organizations having an interest in the Proposed Action were encouraged to participate in the EA process. A public notice of availability (NOA) of the draft EA and draft FNSI/ Anticipated Negative Determination was published in the *West Hawaii Today* newspaper. An NOA was also published in the State of Hawai'i Office of Environmental Quality Control "Environmental Notice" on July 23, 2011, which started the 30-day period for formal public review and comment on the draft EA and draft FNSI/Anticipated Negative Determination.

The draft EA and draft FNSI/Anticipated Negative Determination documents were made available for public review at the Hilo Public Library, Kailua-Kona Public Library, and Thelma Parker Memorial Public and School Library. In addition an electronic copy was made available at the Office of Environmental Quality and Control (OEQC) website.

Copies were accepted by the NEPA Program Manager by mail at the Directorate of Public Works, Environmental Division (IMPC-HI-PWE), Attn: Mr. William Rogers, 948 Santos Dumont Avenue, Building 105, Wheeler Army Airfield, Schofield Barracks, 96857-5013.

CONCLUSION AND DECISIONS

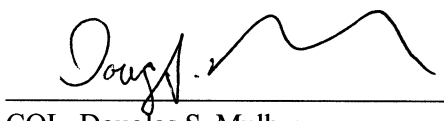
The analysis fulfills the requirements of the NEPA and associated Council on Environmental Quality Regulations, as well as requirements of 32 CFR 651, *Environmental Analysis of Army Actions* and HRS Chapter 343. The EA supports the issuance of this FNSI/Negative determination. As such:

1. Based on careful review of the analysis and conservation measures set forth in the EA (USAG-HI 2010, Subsection 6.3), and public comments received as part of this process, implementing the Preferred Alternative would result in no significant direct, indirect, or cumulative impacts on the resources previously discussed. Thus, taking all the information into consideration, I have decided to select the preferred alternative to accomplish the CAB's HAMET requirement.

2. Implementing the Preferred Alternative is not a major federal or state action that would significantly affect the quality of the environment.

3. Accordingly, the preparation of an Environmental Impact Statement for this Proposed Action is not required and will not be undertaken.

Pursuant to 32 CFR 651



COL. Douglas S. Mulbury
U.S. Army Garrison, Hawaii
Commanding

6 SEP 2011
Date

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ENVIRONMENTAL ASSESSMENT FOR HIGH-ALTITUDE MOUNTAINOUS ENVIRONMENT TRAINING (HAMET)

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EXECUTIVE SUMMARY

The U.S. Army Garrison-Hawai‘i (USAG-HI) prepared this environmental assessment (EA) to publicly disclose the results of an environmental impact analysis of High-Altitude Mountainous Environment Training (HAMET) for the 25th Combat Aviation Brigade (CAB), Hawai‘i. If approved, HAMET would train up to 90 helicopter pilots and crew for high-altitude missions in preparation for deployment to Afghanistan and to satisfy mandated annual training requirements.

The need for well-prepared aviation brigades to conduct combat operations in Afghanistan led the U.S. Army Forces Command to prioritize the development of standardized training for high-altitude (up to 14,000 ft [4,267 m]) mountainous conditions. HAMET was developed to ready helicopter pilots for success in combat operations as part of their train-up for deployment under Operation Enduring Freedom. HAMET adapts the National Guard's school for individual mountain helicopter training taught at the National Guard's High-Altitude Aviation Training Site in Gypsum, Colorado, with helicopter training that individual Army CABs have been conducting as part of their regular training operations for the past several years.

Six alternatives are evaluated in this EA:

1. The Preferred Alternative: HAMET flights conducted from Bradshaw Army Airfield at Pōhakuloa Training Area (PTA) to three existing Mauna Kea landing zones (LZs) and three existing Mauna Loa LZs. Under this alternative the training outside the Army training area is estimated to take 2 hours for each pilot to complete, requiring no more than 180 flight hours. This training would be conducted from October 3-31, 2011.

   The existing LZs proposed for use lie on State of Hawai‘i lands. To use these LZs, the USAG-HI will seek a right-of-entry (ROE) document from the Department of Land and Natural Resources (DNLR) Land Board for permission to land the helicopters on state land. The completed EA and its decision documents will accompany the Army's ROE request to the Board.

   The Board reviews the information and may approve the request without comment or may approve the request with additional conditions to those already presented in the EA and decision document. A ROE document is the instrument by which the State of Hawai‘i can regulate USAG-HI's use of Mauna Kea and Mauna Loa.

2. Mauna Kea Alternative: HAMET would be conducted from PTA and Bradshaw Army Airfield to three existing Mauna Kea LZs (i.e., the same LZs and processes identified under the Preferred Alternative).

3. Mauna Loa Alternative: HAMET flights would be conducted from PTA and Bradshaw Army Airfield to three existing Mauna Loa LZs (i.e., the same LZs and processes identified under the Preferred Alternative).

4. Other High-Altitude Locations in the State of Hawai‘i Alternative.

5. Other High-Altitude Training Sites on the Continental United States (CONUS) Alternative.

6. No Action Alternative.

Under these alternatives, up to 90 helicopter aviators, newly assigned to 25th CAB as well as instructor pilots, would be trained for mountainous, high-altitude flights. Pilots would fly at high altitudes

and land at designated high-altitude LZs using varying angles of approach, headings, and air speeds to reach proficiency in tasks such as, but not limited to, visual-meteorological-conditions takeoff and approach, reconnaissance over high-altitude LZs, slope operations, and night-time operations. For Hawai‘i Action Alternatives, pilots would be trained using the UH-60 Black Hawk and the CH-47 Chinook aircraft. All aircraft would be unarmed (i.e., no pyrotechnic devices, ordinance, etc.). Training conducted under non-Hawai‘i alternatives could use additional aircraft types, as available at the specific training facility.

The No-Action Alternative would result in no HAMET being conducted and the newly assigned aviators or instructors not being properly trained prior to deployment to Afghanistan. The No Action Alternative would be impracticable, undesirable, and costly when trying to capture the training needs of new pilots assigned to the CAB during this time and those pilots who need to conduct additional training to meet the advanced requirement. Familiarity with this specialized high-altitude environment is critical in saving the lives of our 25th CAB aircrews and the soldiers they transport when operating in support of Operation Enduring Freedom in Afghanistan.

Alternative 4, Other High-Altitude Locations (elevations above 8,000 ft [2,438 m]) in the State of Hawai‘i, including other federal lands on Mauna Loa and lands on the island of Maui, was not considered further because of the following:

- Wilderness areas, including the federal lands on Mauna Loa and surrounding the summit in Haleakalā National Park, cannot be used for motorized vehicles
- Federal lands on Maui are designated National Park Service (NPS) wilderness areas and require aviators to avoid overflights below 2,000 ft (610 m)
- Other areas on the island of Maui best suited for HAMET flights would require sharing airspace with hang gliders, paragliders, and other types of unregulated sport flyers considered incompatible with military helicopters and would be extremely unsafe
- HAMET operations would require the use of Kahului Airport, a civilian facility requiring permissions and extensive coordination with airfield management, which would push the timeline for HAMET operations past the October 2011 target start date.

Alternative 5, High-Altitude Training Sites on the Continental United States (CONUS) Alternative, was not considered further because of the following:

- The decrease in dwell time that would result from mainland training in light of upcoming overseas deployment
- The estimated to cost totaling approximately $2M to send pilots and keep aircraft and maintenance crews on the mainland longer
- The excess time the logistical challenges would require that could risk the CAB’s ability to be trained prior to deployment

After conducting its evaluation, the USAG-HI determined that Alternatives 1, 2, and 3 satisfied the purpose and need, and those alternatives were further evaluated in this EA. As required by the National Environmental Policy Act (NEPA) and Hawaii Revised Statutes (HRS) Chapter 343, the No Action Alternative, although considered unreasonable because it does not meet the purpose or need, is also evaluated further in this EA.

Impact of Action Alternatives

The Action Alternatives were evaluated with respect to their potential effects to the valued environmental components, which include climate, air quality, geology and soils, water resources, biological resources, cultural resources, socioeconomics and environmental justice, land use, recreation, noise, visual and aesthetic resources, human health and safety, traffic and circulation, and public services and utilities.

Climate

Impacts to local and regional climate conditions were evaluated, and it was determined that impacts to climate are not anticipated under the Action Alternatives. The climate at the proposed LZs, and the island of Hawai‘i overall, would remain cool and tropical (upper montane to alpine), with no impacts on average temperatures, rainfall, or wind patterns.

Air Quality

Particulate Matter 10 (PM_{10}) emissions resulting from helicopter rotor wash on the LZs were evaluated along with pollutants emitted from the aircraft. Impacts to air quality under the Action Alternatives are anticipated to be less than significant. Based on modeling, the impact of fugitive dust from helicopter activity on either Mauna Loa or Mauna Kea LZ areas would be less than significant. The maximum concentration at 1,093 yd (1,000 m) away from the center of the LZ(s) is less than 17.98 $\mu g/m^3$, which is below the state and U.S. Environmental Protection Agency (EPA) emission standards.

The Army concludes that the cumulative air quality impacts on ozone or other secondary pollutants would be less than significant under the Action Alternatives, and that these Action Alternatives, when considered in combination with other past, present, and reasonably foreseeable future actions, would not be cumulatively significant.

Geology, Topography, and Soils

Adverse impacts to existing geologic conditions, including soil loss, sedimentation, and exposures to people or structures from geologic hazards, were evaluated. Impacts to geology and soils are not anticipated under the Action Alternatives. There would be no impact to geology or topography, because no construction to the LZs would be required. The soils present may be compacted or crushed by the weight of the helicopter. However, the soils are very resilient to wind forces, and fugitive dust has been modeled to be below state and EPA emission standards. The Army concludes that the Action Alternatives do not contribute to slope-stability or geology-disturbing direct or cumulative impacts and contribute only negligibly to cumulative soil disturbance, because existing LZs would be used.

Water Resources

Degradation of water quality, impacts on availability, and compliance with water quality standards were evaluated. Based on this evaluation, impacts to water resources are anticipated to be less than significant under the Action Alternatives. No impacts to surface water are expected as a result of the Alternative Actions, because there are no perennial streams or other surface water resources that could potentially be affected. The only potential, but unlikely, impact to groundwater would be contamination of an aquifer through an unlikely spill. Based on depth and geological formations, the spill constituents are not anticipated to reach an aquifer. Additionally, Army helicopters have self-sealing primary and auxiliary fuel systems for rotary winged aircraft to reduce the possibility of leakage, fire, and explosion

during impact. When considered in combination with other past, present, and reasonably foreseeable future actions, in the unlikely event of a crash resulting in a spill, would not result in significant cumulative impacts.

Biological Resources

Comprehensive physical (pedestrian) surveys were conducted for each of the LZs to identify vegetation, birds, bats, and arthropods that could be potentially impacted by HAMET operations. The potential for impacts to endangered and threatened species, other species of concern, or habitat in general, are anticipated to be less than significant. No plant species of concern were identified within the operational areas of the LZs. Moreover, vegetation within the operational areas of LZs is extremely sparse to absent. Habitat use by faunal species of concern within the LZ operational areas was determined to be minimal, extremely limited, or transitory. Concerning the potential for wildfires in the unlikely event of a helicopter crash, Army helicopters have self-sealing primary and auxiliary fuel systems for rotary winged aircraft to reduce the possibility of leakage, fire, and explosion during impact. The CAB has logged thousands of hours of flight time in Hawaii without a crash resulting in a wildfire. As a precautionary measure, crews capable of assisting in fighting wildland fires will be on standby.

Potential impacts associated with avian species are discussed and additional information is provided in the Memorandums for Record included in the appendices of this document. Along the projected flight paths, no impact is anticipated to any avian species of concern.

Measures in place to reduce the impacts from invasive species, noise and wildfires are expected to result in, as a whole, impacts to biological resources that are less than significant.

Cultural Resources

The areas proposed for activities were studied through thorough literature review, archaeological surveys, and consultation with Native Hawaiians. In addition discussions with subject matter experts and reconnaissance-level surveys were performed at each LZ on Mauna Loa and Mauna Kea. The project was discussed with the PTA Cultural Advisory Committee at four meetings between November 2010 and May 2011. The PTA Cultural Advisory Committee advises the PTA Commander on stewardship of the land and resources at PTA. They are Native Hawaiians who volunteer to contribute to the Army's stewardship of cultural resources and the land at PTA. Members include J. Curtis Tyler III, Ruby McDonald, Ululani Sherlock, Clarence Ku Ching, E. Kalani Flores, Leiola Garmon-Mitchell, Leina'ala Benson, Leilani Hino, Danny Akaka Jr., Lucky Puhi, Kaleo Kuali'i, and Frank Trusdell Efforts were made to identify cultural practices that take place in the vicinity of the landing zones on Mauna Kea during the proposed training dates.

It was determined that there are no historic properties within any of the LZs. Several features were identified near but outside the LZs. There was nothing associated with these features to indicate either date of construction or function. However, it was determined that these resources would not be impacted as a result of HAMET.

Mauna Kea is of cultural significance to Native Hawaiians as an ancestor and as a place to communicate with the gods. The Army has concluded that the cumulative impacts associated with the Action Alternatives would be less than significant on cultural resources, and that these alternatives, when considered in combination with other past, present, and reasonably foreseeable future actions, would not be significant, because access would not be restricted, flights would avoid known cultural resources, noise modeling showed insignificant impacts, the inherent cultural values associated with Mauna Kea would not be compromised, the presence of the helicopters would be temporary and of relatively short duration,

and the proposed LZs have no historic properties to alter or destroy. The flight paths that were chosen under the alternatives were designed to minimize the area of overflight and avoid the vast majority of known cultural properties on both mountains.

Socioeconomics and Environmental Justice

The potential impacts to unemployment rate, changes in total income, and business volume along with the impacts on local housing markets were evaluated. Disproportionate affects to any social, economic, physical, environmental, or low-income or minority groups or children were analyzed. Impacts to sociological resources, economic resources, environmental justice, and environmental health effects on children are not anticipated under the Action Alternatives. The alternatives would not alter the current state of the current conditions.

Land Use

Impacts to land use are not anticipated under the Action Alternatives. Basic land use would not change with the Action Alternatives. HAMET would not restrict access to any areas. Prior to any HAMET activities, the USAG-HI would notify the National Park Service and the DNLR in addition to the providing press releases. The Proposed Action does not involve acquiring land or rezoning land for use. As such, the Proposed Action and the use of the LZs would not result in any changes in current or planned land uses or zonings and thus would not cumulatively impact land use.

Recreation

Impacts to recreation are not anticipated under the Action Alternatives. Overflights may be perceived as a slight noise and visual distraction by people in the immediate area of any of the Action Alternatives, but HAMET would not significantly impact or result in the cessation of any recreational activities or access to them, including Mauna Loa Observatory Access Road, Saddle Road, and Mauna Kea Summit Access Road. The Action Alternatives also do not alter use of land for recreation and thus do not cumulatively impact recreation.

Noise

Impacts from noise on humans are not anticipated under the Action Alternatives. Noise modeling was performed to determine day-night averages associated with the proposed helicopter training. In addition, noise sampling was conducted for areas of potential concern to recreationists, cultural practitioners, and biological resources. The anticipated noise levels are acceptable for current land uses in these areas. The noise sampling results did not measure maximum decibel level discernable above background levels for areas of concern to cultural practitioners or recreationists. Levels measured within the flight plan did not show levels of concern for biological resources. The noise could impact sensitive species by causing the wildlife to flee the area and interrupting life-cycle events like breeding; however, it was determined that wildlife activities return to normal when the disturbance is over, and wildlife often adapt to frequent noise. Design features of the alternatives (e.g., flight-corridor and minimum-elevation requirements through the flight corridor) also result in less-than-significant impacts.

While noise sensitivity is species specific and varies among individuals within each species, average noise levels for the combination of any of the Action Alternatives with existing and future noise sources are unlikely to cause excessive disruption or annoyance in noise-sensitive locations. Thus, the Army concludes that the cumulative noise impacts associated with implementing any of the Action Alternatives would be negligible.

Visual and Aesthetic Resources

Sixteen representative view points were selected based on what were considered sensitive to cultural practitioners, sight seers, and residents. Spatial analysis was used to determine the potential that people at these locations could see a helicopter. Impacts to visual and aesthetic resources are anticipated to be less than significant under the Action Alternatives. The visual sensitivity associated with HAMET would have less-than-significant impacts, because the areas are not identified as areas of high scenic quality and are not readily accessible to, or used by, large numbers of people. HAMET flights would be unlikely to obstruct one's view of natural beauty sites within the Hamakua and North Hilo planning districts. In addition, air-quality impacts to visibility are less than significant, intermittent, and of short duration and, in combination with other past, present, and reasonably foreseeable future actions, would not be cumulatively significant.

Human Health and Safety Hazards

Impacts to human health and safety are anticipated to be of no impact for hazardous materials under the Action Alternatives. A less-than-significant determination was made for the remote possibility of a crash that results in wildfire in vegetation that could sustain a wildfire. There is no such habitat at the LZs. A less-than-significant determination was made for LZ safety, because it is possible, but highly unlikely, for the public to be in the vicinity of operations. A less-than-significant determination was made for accident/incident investigation and recovery because of the CAB's safety record and the low potential for future accidents.

Traffic and Circulation

Impacts to traffic and circulation are anticipated to be less than significant under the Action Alternatives. The airspace will remain Class G uncontrolled. Pilots performing HAMET operations will use the Island Traffic Advisory Frequencies and the Common Traffic Advisory Frequency for communications and deconfliction with other aircraft. Impacts to air traffic would be less than significant because of the small volume of commercial and recreational air traffic involved and the ability for recreational pilots to be redirected temporarily through air traffic control and use of the Common Traffic Advisory Frequency in response to HAMET missions. During periods of HAMET activity, the incremental increase in air traffic by HAMET is 3% over current levels. This increase is not considered cumulatively significant.

Public Services and Utilities

Impacts to public services and utilities are not anticipated under the Action Alternatives. Activities at the LZs would not require public services or utilities. While HAMET could marginally increase the demand for public services at PTA, current services are adequate.

Conservation Recommendations

Under the Action Alternatives, the following conservation recommendations would be implemented.

General

- Have firefighting resources on standby while training, and have transportation available for firefighting personnel.

- Notify Mauna Loa Observatory air-quality instrumentation personnel prior to conducting HAMET missions (requested by National Oceanic and Atmospheric Administration personnel).

- Notify the NPS prior to conducting HAMET (as requested).

- Notify the public, through press releases, of training schedules.

Biological Resources

- Unless severe weather and safety conditions dictate a need to fly at 2,000 ft (610 m) AGL, helicopters will maintain at an altitude of 3,000 ft (914 m) AGL when they are over the palila critical habitat.

- Inspect the exterior of the aircraft for the presence of invasive ants and parts of invasive plants, and clean as required, prior to flight operations to reduce the potential for spread of invasive species.

- Apply pesticides and herbicides, as needed, to the helicopter landing pads located at Bradshaw Army Airfield to reduce the potential for spread of invasive species.

Cultural Resources

- Continue to participate in open communication with Native Hawaiians, other land use groups, and other interested parties to identify resources and reduce impacts.

- Conduct cultural awareness training for all HAMET personnel, with particular emphasis on intangible resources and their importance to Native Hawaiians.

- Avoid hovering directly over possible cultural features in the vicinity of LZs 5 and 6 on Mauna Kea.

Monitoring

- Monitor for the presence of Hawaiian petrel and the band-rumped storm-petrel.

Outreach

After review of the public comments in response to previous environmental analyses, the USAG-HI expanded its agency/organization outreach. Interdisciplinary teams presented to each agency/organization a HAMET briefing that explained the purpose, need, and details of the Preferred Alternative. Other alternatives were also presented and discussed. Dialogue ensued and concerns from the agencies/organization were solicited, discussed, and addressed at the meeting. The results of the outreach program are reflected in this EA.

The Army provided draft copied of the July 2011 EA to all who commented on the April 2011 EA. In addition advertisements of the notice of availability was provided in the in the Office of Environmental Quality Control environmental notice as well as in two local newspapers that circulate on the Island of Hawaii. Furthermore the Army invited members of the public and state agencies to PTA to attend an informational meeting and demonstration flight. Results of the demonstration flight did not indicate significant impacts to the environment.

Cultural Consultation

In compliance with Section 106 of the National Historic Preservation Act, the USAG-HI submitted a letter to the Hawai‘i State Historic Preservation Division (SHPD) and other consulting parties on the Proposed Action in October 2010. The letter determined that the project constitutes an undertaking, identified the area of potential effect, and made a no historic properties affected determination. The other consulting parties included the NPS, which concurred with the USAG-HI's determination of no effect to historic properties in the LZs. However, the NPS did express concern regarding traditional practitioner access and disturbance from HAMET activities. The SHPD formally responded to both the Section 106 consultation letter and the December 2010 NEPA EA on January 31, 2011. Concerns from both the NPS and SHPD consultation were addressed as part of the public comment analysis. The USAG-HI responded to the SHPD on April 15, 2011.

The SHPD reviewed the USAG-HI letter dated April 15, 2011, and the revised EA issued in July 2011. The SHPD noted that new information and program modifications address their Section 106 and NEPA concerns noted in the USAG-HI memo dated January 31, 2011. SHPD informally noted that the new information provided and modifications in the EA comply with state law. The informal response from the SHPD indicated that they concur that there will be no adverse effect to historic properties for the single 20-day training period proposed for October 2011.

The Proposed Action was also presented to the PTA Cultural Advisory Committee during the November 2010 meeting, at which no serious concerns were raised. The PTA Cultural Advisory Committee has also been involved in subsequent consultation with Kahu Ku Mauna, an advisory committee to the Office of Mauna Kea Management.

Public Involvement

The formal opportunity to comment involves a 30-day period for public review of the draft EA and draft Finding of No Significant Impact (FNSI)/Anticipated Negative Determination. A notice of availability of the draft EA and draft FNSI/Anticipated Negative Determination was published in the State of Hawai‘i's Office of Environmental Quality Control Notice and website on July 23, 2011. Also, a public notice was published in the *Hawaii Tribune Herald* and *West Hawaii Today* newspapers to notify interested persons and organizations. Copies of the draft EA were provided to the Hilo Public Library, 300 Waianuenue Avenue, Hilo, Hawai‘i; the Kailua-Kona Public Library, 75-138 Hualalai Road, Kailua-Kona, Hawai‘i; and the Thelma Parker Memorial Public and School Library, 67-1209 Mamalahoa Highway, Kamuela, Hawai‘i. Copies also were mailed to the following interested individuals, organizations, Native Hawaiian organizations, and government agencies:

Hawaii Volcanoes National Park
United States Fish and Wildlife Service
Sierra Club (Deborah Ward)
Sierra Club (Moku Loa Group)
Office of Mauna Kea Management
Office of Hawaiian Affairs
Ms. Cory Harden
Jose Martinez
Kahu Ku Mauna
KAHEA
Joe Estores
Hanalei Fergerstrom

Division of Fish and Wildlife
State Historic Preservation Division

Summary of Comments Received and Responses

The USAG-HI reviewed comments received during the public comment period to determine whether the Proposed Action had potentially significant impacts that could not be reduced to less than significant with appropriate mitigation. Twenty-seven comment letters were received from individuals and groups. All comment documents were read in their entirety to identify unique issues. The comments identified were grouped by similarity to reveal themes. The following themes resulted from the public comment analysis:

The following provides a summation of the comments received and responses provided in general themes.

Theme: Support for our troops (the common reason cited by supporters of the action)
Response: Thanks for your comment

Theme: Concern that public involvement and consultation were inadequate
Response: The Army provided draft copied of the July EA to all who commented on the April EA. We also advertised out notice of availability in the OAQC environmental notice as well as in two local newspapers that circulate on the Island of Hawaii. All comments received on this as well as our responses are provided as an appendix in the final EA. Section 1-7 (pages 1-5 to 1-7) provides a description of the outreach and consultation the Army performed in support of this EA. Through efforts, the Army feels that we have met the consultation requirements for a project of this scope.

Theme: Concern that the Fort Carson Alternative was not considered
Response: The Fort Carson alternative was considered. However, the proposed action in this EA is assesses the impacts of training air crews who cannot make it to Fort Carson to receive this training and therefore the alternative was not considered for further evaluation.

Theme: Concern regarding noise disturbances to threatened and endangered species
Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the draft EA. In addition concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell, 4 pp). These documents are provided as an appendix to the final EA.

Theme: The EA is inadequate and EIS is required
Response: Through the EA process the Army has come to the conclusion that there are no significant impacts and an EIS is not required.

Theme: Cultural impact assessment was not adequate.
Response: The Army relied on published documentation concerning the cultural resources and cultural significance of both Mauna Kea and Mauna Loa in preparation of the EA. Native Hawaiians were consulted, as were SHPD and OHA. Concerted efforts were made to identify persons with lineal ties or attachment to consult with concerning the proposed action and the impacts specific to the LZ areas. No persons with lineal ties or attachment were identified. Surveys were conducted on the area of potential effect, no historic properties were identified, no significant impacts from the proposed action were identified.

Theme: Concern that there are significant impacts to cultural resources and their sacredness, which are not mitigatable, and that these impacts are not understood by the Army
Response: The Army does understand the cultural landscape of Mauna Kea and Mauna Loa. Based on the information that has been gathered the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians; there appears to be a difference of opinion on what should be the subject of study. The only surveys of these areas are those conducted by archaeologists working for the Army. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties, it does not require that they do not disturb the properties.

Theme: Concern that the peace and safety of nearby neighbors are threatened and that there are no mechanisms for citizens to complain about problems they experience during training operations.
Response: The Army acknowledges that there are hazards to nonmilitary personnel or wildlife in the vicinity of LZs. During HAMET flights would be mitigated by the pilot conducting a reconnaissance flyover prior to conducting any HAMET maneuvers. During the reconnaissance flyover, pilots would visually inspect the LZ to ensure landing would not create an unreasonable risk to human health or safety. This procedural step would ensure that unauthorized personnel or wildlife are not exposed to the hazards associated with the training exercises.

In accordance with Chapter 343 of the Hawai‘i Revised Statutes, the USAG-HI has provided responses to each of the individuals and groups that provided written comments on the draft EA. These comments are included as an appendix to the final EA.

The USAG-HI has determined that, after the application of mitigation measures, it will prepare this final EA and sign the final FNSI/Negative Determination, after which the Proposed Action can be implemented.

CONTENTS

FIGURES

TABLES

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ACRONYMS

AAQS	ambient air quality standards
ADNL	A-weighted day-night average sound level
AGL	above ground level
amsl	above mean sea level
APE	area of potential effect
ARFORGEN	Army Force Generation
ARPA	Archaeological Resources Protection Act
bgs	below ground surface
CAB	combat aviation brigade
CAC	Cultural Advisory Committee
CARA	California Association for Research in Astronomy
CCC	Civilian Conservation Corps
CDNL	C-weighted day-night level
CDUP	Conservation District Use Permit
CEMML	Center for Environmental Management of Military Lands
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMP	comprehensive management plan
CONUS	Continental United States
CSO	Caltech Submillimeter Observatory
CTAF	Common Traffic Advisory Frequency
dBA	A-weighted decibel
dBC	C-weighted decibel
DLNR	Department of Land and Natural Resources
DNL	day-night average sound level

DoD	Department of Defense
DOFAW	Department of Fish and Wildlife
EA	environmental assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FM	field manual
FNSI	finding of no significant impact
GMA	game management area
GPS	Global Positioning System
HAMET	High-Altitude Mountainous Environment Training
IWFMP	integrated wildland fire management plan
km/h	kilometers per hour
kWh	kilowatt hour
LUPZ	Land Use Planning Zone
LZ	landing zone
MBTA	Migratory Bird Treaty Act
MGD	million gallons per day
MLO	Mauna Loa Observatory
mph	miles per hour
NAR	natural area reserve
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NNL	National Natural Landmark

NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRHP	National Register of Historic Places
NSF	National Science Foundation
NVG	night vision goggles
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
OMKM	Office of Mauna Kea Management
OSHA	Occupational Safety and Health Administration
PCH	palila critical habitat
PM	particulate matter
ppb	parts per billion
ppm	parts per million
PTA	Pōhakuloa Training Area
ROE	right of entry
ROI	region of influence
RP	release point
SHPD	State Historic Preservation Division
SHPO	State Historic Preservation Officer
SONMP	statewide operational noise management plan
TacOps	Tactical Operations
TCP	traditional cultural property
TIGER	Topologically Integrated Geographic Encoding and Referencing (system)
TLV	threshold level value
TM	training and readiness manual
USAG-HI	United States Army Garrison-Hawai‘i

USFWS	U. S. Fish and Wildlife Service
VEC	valued environmental component
VIS	visitor information station
VMC	visual meteorological conditions

Environmental Assessment for High-Altitude Mountainous Environment Training (HAMET) for the 25th Combat Aviation Brigade, Hawai‘i

1. INTRODUCTION

The need for well-prepared aviation brigades to conduct combat operations in Afghanistan led the U.S. Army Forces Command to prioritize the development of standardized training for high-altitude (up to 14,000 ft [4,267 m]) mountainous conditions. High-Altitude Mountainous Environment Training (HAMET) was developed to ready pilots for success in combat operations as part of their train-up for deployment under Operation Enduring Freedom (OEF) (U.S. Army 2009). HAMET adapts the National Guard's school for individual mountain helicopter training taught in Gypsum, Colorado, with helicopter training that individual Army Combat Aviation Brigades (CABs) have been conducting as part of their regular training operations for the past several years (Gould 2010).

For operations in Afghanistan, Army helicopters have become a crucial means of transport for ground forces and supplies and for air assaults on remote Taliban-occupied villages and cave complexes located in the northern mountainous provinces along the Pakistan border and in the northern and western mountainous regions of Afghanistan (Gould 2010). Aviation brigades deploying to mountainous regions of Afghanistan must have confidence in their ability to conduct aviation operations at high altitude, where aircraft performance and power can be severely limited (U.S. Army 2009). Figure 1-1 shows ground forces being deployed by a single-wheel landing at high altitude.

Figure 1-1. High-altitude military operations.

By order of the commanding officer, the 25th Infantry Division – 25th CAB, based at Schofield Barracks on the central plateau of the island of O'ahu in the State of Hawai'i, will undergo HAMET prior to its upcoming deployment (date classified) for OEF (Lundy 2010).

1.1 25th Combat Aviation Brigade

The 25th Aviation Brigade was constituted on February 1, 1957, in the Regular Army as the 25th Aviation Company, assigned to the 25th Infantry Division, and activated at Schofield Barracks, Hawai'i. In 2006, the 25th Aviation Brigade began a transition to the U.S. Army's new modular force structure as part of an overall transformation of the 25th Infantry Division. The unit was reorganized and renamed the 25th CAB.

The mission of the 25th CAB is to prepare for worldwide deployment and, when directed, conduct day and night combat or other military operations (Pike 2010). Over the past 10 years, the CAB has deployed five times in support of operations, including Operation Joint Forge, Operation Iraqi Freedom (OIF), and OEF. Most recently, the CAB returned from a 12-month deployment in September 2010 and only has a "dwell time" of approximately 14 months before it has to re-deploy in early 2012. ("Dwell time" is defined as the time needed to recover from 1 year of deployment.)

1.2 Proposed Action

In preparation for deployment in support of OEF in Afghanistan, and to satisfy mandated annual training requirements, the 25th CAB proposes to train helicopter air crews for high-altitude, mountainous-environment flights through the HAMET program.

1.3 Purpose of the Proposed Action

The *purpose* of the Proposed Action is to provide up to 90 helicopter air crews mandatory high-altitude flight operations training, while recognizing Army environmental and social stewardship responsibilities within the affected region.

1.4 Need for the Proposed Action

The *need* for the Proposed Action is to ready helicopter air crews to be successful in the combat theater to support the operational and mission requirements of the 25th CAB, 25th Infantry Division, set forth by the Department of Army and Department of Defense (DoD). It is vitally important to conduct HAMET in order to prepare our aircrews. This training is critical to save the lives of our 25th CAB aircrews and the Soldiers they transport when operating in support of Operation Enduring Freedom in Afghanistan.

High altitudes and mountainous terrain pose several challenges to Army helicopter pilots. High altitudes are associated with high wind, high-density altitude (i.e., pressure altitude that is corrected for temperature and humidity), turbulence, and atmospheric instability. These factors greatly affect the performance of a helicopter engine and the handling characteristics of an aircraft. For example, an increased density altitude decreases the effectiveness of the rotor blades in providing both overall lift and thrust power to the tail rotor for directional control (i.e., increasing density altitude increases "drag"). Thus, an increased angle of attack and increased power are required to offset the increased drag. Simultaneously, the engine is less capable of producing power in the thinner air of higher altitudes, and the higher the altitude, the greater these effects have on the aircraft. As such, it is imperative that pilots

master performance planning, power management, and high-altitude flight techniques to compensate for decreased aircraft performance in high-altitude, mountainous environments (Munger 2010a).

To conduct HAMET at a CONUS location, the 25th CAB aircrews will spend up to an additional 45 days away from Families prior to the upcoming deployment; and helicopters and maintenance crews will spend additional time on the mainland. When combined the impact are referred by the military as "perstempo". Perstempo is defined as the time an individual spends away from home station. Additionally, increased costs would accrue from the aircrews, helicopters, and equipment staying on the mainland longer. Furthermore, while the offsite HAMET would be occurring, the CAB's ability to perform other mandatory pre-deployment training would be severely limited.

The Proposed Action satisfies Department of Army and DoD flight requirements. The intent of these flights is to conduct high-altitude helicopter training in accordance with the following:

- ARCENT/CFLCC 95-1, which contains flight regulations that provide flying procedures in Iraq and Afghanistan. All 25th CAB aircrews are required to complete high-altitude training prior to deploying to the theater.

- *OEF Aviation Planning Guide*, dated July 31, 2009, which lists the minimum tasks and documentation required prior to deploying to the theater. High-altitude training is required prior to deployment for all aircrews.

- "25th CAB Flight Standardization Standard Operating Procedures," which contain academics, tasks, and documentation requirements for high-altitude training. Training on these procedures is required for all crews prior to conducting operations at the Pōhakuloa Training Area (PTA).

- Training and readiness manuals (TMs) for Black Hawk helicopters (UH60A/L/M, TM 55-1520-237-10) and Chinook helicopters (CH47D/F, TM 55-1520-240-10).

- Field Manual (FM) 3-04.126, *Air Calvary Squadron and Troop Operations*, dated February 16, 2007; FM 3-04.203, *Environmental Flight*, dated May 7, 2007; FM 3-18.12, *Air Assault Operations*, dated March 16, 1987; FM 3-18.12, *Air Assault Operations*, dated March 16, 1987; FM 25-100, *Training the Force*, dated October 22, 2002; and Training Circular 1-210, "Aircrew Training Program," dated June 20, 2006.

- "25th CAB Aviation Standardization Message 10-001 High Altitude and Environmental Training Guidance" (Lundy 2010).

1.5 Document Scope

The U. S. Army Garrison, Hawai'i (USAG-HI) prepared this environmental assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 USC § 4321 et seq.); the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR V §§ 1500–1508); "Environmental Analysis of Army Actions" (32 CFR V §§ 651.32–651.39 and 67 FR 61); Hawaii Revised Statutes (HRS) Chapter 343 Environmental Impact Statements and Hawaii Administrative Rules (HAR) Title 11 Department of Health Chapter 200, Environmental Impact Statement Rules (April 2008).

The intent of this EA is to ensure that there is comprehensive and systematic consideration given to potential impacts on the natural and human environment that may be caused by implementing the Proposed Action. This EA serves as an environmental decision document that identifies the purpose and need of the Proposed Action, reasonable alternatives, existing environmental conditions, potential

environmental impacts, and measures to mitigate such impacts. The purpose of the EA is to provide USAG-HI and the State of Hawaii department of Land and Natural Resources (DLNR) decision-makers and the public with a complete, objective appraisal of the environmental impacts associated with implementing the various activities associated with the proposed action. The impact evaluations presented in this EA provide the basis for determining whether such impacts are significant enough to warrant the preparation of an environmental impact statement (EIS) or whether a finding of no significant impact (FNSI)/Negative Determination is appropriate.

1.6 Document Organization

- Section 2 of this EA, Description of the Proposed Action and Alternatives, considers five Action Alternatives and the No Action Alternative in meeting the purpose and need of the Proposed Action. Alternatives that were also considered, but not further analyzed because they did not meet the purpose and need and/or other screening criteria, are also presented in Section 2.

- Section 3, Affected Environment, describes existing conditions of valued environmental components (VECs) that constitute the baseline for analyzing potential effects of the Proposed Action. Section 3 further identifies, evaluates, and documents the environmental impacts of the Action Alternatives and the No Action Alternative with an analysis of the direct impacts (those directly caused by a specific action and occurring at the same time and place) and indirect impacts (those caused by an action but occurring late or physically disconnected from the action but within a reasonably foreseeable time or geographic area).

- Section 4, Environmental Consequences, presents a summary of the potential environmental impacts from the Action Alternatives and the No Action Alternative on the VECs.

- Section 5, Cumulative Impacts, presents the direct and indirect effects of the Proposed Action's incremental impacts when considered in the context of other past, present, and reasonably foreseeable future actions regardless of who carries out the action.

- Section 6, Conclusions, presents the results of the consequences analysis.

- Section 7, Consultation and Coordination, lists the people and organizations contacted during the preparation of the EA.

- Section 8, Preparers, lists the personnel who conducted the analysis.

- Section 9, References, lists the literature used in the analysis.

- Appendix A, Notices of Availability

- Appendix B, Comments received and Responses

- Appendix C, Section 7 Consultation

- Appendix D, Section 106 Consultation

- Appendix E, Aircraft for Use in High-Altitude Mountainous Environment Training

- Appendix F, Memorandums for the Record

- Appendix G, Spatial Data References Used to Generate the EA Maps.

1.7 Agency and Public Involvement, Outreach, and Consultation

To present, HAMET EAs have been released for two full 30-day public comment periods. Each time the Army acknowledged and incorporated relevant input from the commenter's. Each EA had a reduced scope for the proposed action.

On December 23, 2010, the USAG-HI released, for public comment, an EA and draft FNSI for the proposed action to conduct HAMET over the course of one year for 300-400 25th CAB aviators. The public comment period occurred from December 23, 2010, to January 23, 2011. After review of the comments, the USAG-HI revised its alternatives, expanded its agency and public outreach activities, collected additional information, and prepared a revised EA. The revised EA was published April 23, 2011 for a 30-day public comment period. The EA incorporated input received by the public and agencies of both the State of Hawaii and federal government. The proposed action was reduced to train 260 aviators for approximately 45 days over the course of three non-consecutive months.

Within this EA are the details related to the changes made by the USAG-HI in response to the public comments, the available time to conduct HAMET in the State of Hawaii, and the need to comply with HRS Chapter 343. In overview, the following changes were made to the Action Alternatives:

- Proposed HAMET on Hawaiian Island alternatives would be conducted with two aircraft types (i.e., Black Hawks and Chinooks) rather than three types; the OH58 Kiowa Warrior would not be flown for Hawaiian Island HAMET

- Fewer aviators will be trained (from 260 to 90), and the timeline for the Proposed Action has been refined from 3-three week periods in June, August, and October to only October 3 thru October 31, 2011.

- Flight paths between the December and April EAs for the Proposed Action were redesigned to reduce the size of the over flight area and avoid the Mauna Kea State Recreation Area and proximity to the Mauna Kea Ice Age Natural Area Reserve.

- All alternatives were re-examined.

In conjunction with changes to the Action Alternatives, the USAG-HI also performed the following:

- Additional research and surveys regarding biological resources

- Additional cultural resource research and surveys

- A noise level study

- A view plane analysis

- A re-analysis of valued environmental components.

1.7.1 Outreach

After review of the public comments, the USAG-HI expanded its agency/organization outreach. Interdisciplinary team members, including members of the CAB, PTA, and Department of Public Works, conducted meetings with representatives of the following agencies/organizations:

- The Office of Mauna Kea Management (OMKM)
- Waimea Rotary Club
- Hawai‘i Island Economic Development Board
- Hawai‘i Leeward Planning Conference
- Department of Land and Natural Resources
- U.S. Fish and Wildlife Service (USFWS)
- Department of Fish and Wildlife (DOFAW)
- State Historic Preservation Officer (SHPO)
- U.S. National Park Service (USNPS)
- Kahu Ku Mauna
- Mauna Kea Neighbors
- Office of Hawaiian Affairs (OHA)

Interdisciplinary teams presented to each agency/organization a HAMET briefing that explained the purpose, need, and details of the Preferred Alternative. Other alternatives were also presented and discussed. Dialogue ensued and concerns from the agencies/organization were solicited, discussed, and addressed at the meeting. The results of the outreach program are reflected in this EA.

1.7.2 Cultural Consultation

In compliance with the NHPA, the Department of the Army consulted the Hawai‘i SHPD on the Proposed Action. A letter initiating Section 106 consultation, dated October 20, 2010, was sent on October 25 to the SHPD at the Kapolei Office to request concurrence with a no-historic-properties-affected determination (Appendix D). This initiated the 30-day consult period. The Army also sent letters requesting review and comments to other consulting parties, including the NPS, Office of Hawaiian Affairs, Hawai‘i Island Council of Hawaiian Civic Clubs, Hui Malama I Na Kupuna O Hawa‘i Nei, and the Hawaii Island Burial Council. NPS responded by expressing concern regarding traditional practitioner access and disturbance from HAMET activities (Appendix D). These latter concerns are addressed in Subsection 4.7.6.

The larger Proposed Action was also presented to the PTA Cultural Advisory Committee at the November 2010 meeting. No serious concerns were raised at that time. In January 2011, SHPD provided a memo in response to the EA that also covered Section 106 concerns. The Army responded with a letter dated April 15, 2011.

The SHPD reviewed USAG-HI letter dated April 15, 2011, and the revised EA issued July 2011 and noted that new information provided and program modifications made address their Section 106 and NEPA concerns noted in our January 31, 2011, memo and to comply with State law. The SHPD informally communicated that they feel that there will be no adverse effect to historic properties for the single 20-day training period proposed for October 2011.

The Office of Mauna Kea Management and its advisory council, Kahu Ku Mauna, expressed concerns about the Proposed Action and its impacts on cultural resources and cultural practices. On February 25, 2011, Kahu Ku Mauna joined the PTA Cultural Advisory Committee for a meeting. The meeting provided a good opportunity for discussion. Lieutenant Colonel Robinson of the CAB attended and provided an overview of the training. The entire group was then invited to view a static display of helicopters and talk with crew members and instructors. Members of the PTA CAC requested a special meeting on March 11, 2011, to discuss the concerns raised particularly by OMKM and Kahu Ku Mauna, to be followed by another meeting with Kahu Ku Mauna. Lieutenant Colonel Niles assured members of Kahu Ku Mauna that their concerns would be addressed in the revised EA. Lieutenant Colonel Niles provided a digital copy of the EA comments to members of the PTA CAC. The meeting was held on March 11, 2011, at which steps being taken to address the concerns that had been raised were discussed. A follow-up meeting was held with Kahu Ku Mauna on May 11, 2011. In addition, PTA representatives met with Kealoha Pisciotta, representing Mauna Kea Anaina Hou on May 25, 2011 to discuss the proposed project and concerns regarding Mauna Kea.

1.7.3 Biological Consultation

Endangered Species Act Section 7 consultation requirements were satisfied and are reported in the Biological Resources section of this EA, and described in Memoranda for Record (Appendix F), as referenced.

1.7.4 Public Involvement

The formal opportunity to comment involves a 30-day period for public review of the draft EA and draft Finding of No Significant Impact (FNSI)/Anticipated Negative Determination. A notice of availability of the draft EA and draft FNSI/Anticipated Negative Determination was published in the State of Hawai‘i’s Office of Environmental Quality Control Notice and Web site on July 23, 2011. Also, a public notice was published in the *Hawaii Tribune Herald* and *West Hawaii Today* newspapers to notify interested persons and organizations. Copies of the draft EA were provided to the Hilo Public Library, 300 Waianuenue Avenue, Hilo, Hawai‘i; the Kailua-Kona Public Library, 75-138 Hualalai Road, Kailua-Kona, Hawai‘i; and the Thelma Parker Memorial Public and School Library, 67-1209 Mamalahoa Highway, Kamuela, Hawai‘i. Copies also were mailed to the following interested individuals, organizations, Native Hawaiian organizations, and government agencies:

Hawaii Volcanoes National Park
United States Fish and Wildlife Service
Sierra Club (Deborah Ward)
Sierra Club (Moku Loa Group)
Office of Mauna Kea Management
Office of Hawaiian Affairs
Ms. Cory Harden
Jose Martinez
Kahu Ku Mauna
KAHEA
Joe Estores

Hanalei Fergerstrom
Division of Fish and Wildlife
State Historic Preservation Division

The USAG-HI reviewed comments received during the public comment period to determine whether the Proposed Action had potentially significant impacts that could not be reduced to less than significant with appropriate mitigation. The USAG-HI prepared this final EA and signed the final FNSI/Negative Determination.

1.8 Regulatory Framework

A decision on whether to proceed with the Proposed Action depends on numerous factors, such as mission requirements, permission from the State of Hawaii to utilize their LZs, schedule of proposed activities, availability of funds, and environmental considerations. In addressing environmental considerations, the USAG-HI is guided by the National Environmental Policy Act (NEPA) of 1969, the Army's NEPA implementing regulations 32 CFR 651, HRS Chapter 343 and its implementing regulation HAR 11-200, and all other applicable state and federal statutes and regulations.

Key provisions of these statutes and regulations are described in more detail in later sections of this EA if they are needed to better understand their application. Appendix C contains correspondence generated in conjunction with coordination activities under Section 7 of the ESA. Appendix D contains correspondence generated in conjunction with coordination activities under Section 106 of the NHPA.

2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

U.S. Army aviators have a need to better understand the aerodynamics and atmospheric effects on their aircraft at high altitudes (generally up to 14,000 ft [4,267 m]) to be capable and successful in theater (U.S. Army 2009). Much of the aviation force has experienced multiple deployments to the relatively flat desert terrain of Iraq. As the shift toward OEF and other operations in Afghanistan continues, HAMET will expose OIF veterans and newcomers to the challenges of high-altitude flight planning and aircraft operations in mountainous environments.

The Proposed Action is to train 90 25th CAB helicopter aviators for mountainous, high-altitude flights, satisfying the compulsory aviation training requirements defined in ARCENT/ CFLCC 95-1, which contains flight regulations that provide flying procedures in Iraq and Afghanistan. All 25th CAB aircrews are required to complete high-altitude training before deploying to the theater.

Specifically, the EA addresses the actual aircraft flight and maneuvers component of the HAMET program. The USAG-HI has developed five Action Alternatives discussed in Subsection 2.7, Action Alternatives, to accomplish its Proposed Action.

The following subsections present an overview of the HAMET program and its objectives, HAMET aircraft, PTA, annual training activities at PTA, previous HAMETs, the CAB's safety record, Action Alternatives, alternative screening, alternative evaluation, and alternatives not considered further.

2.1 HAMET Training Overview and Objectives

In overview, HAMET training includes academic classroom instruction, simulator training, individual flight technique training, and collective (group) training. The individual flight technique training component is a hands-on, incremental process in which pilots proceed from lower to higher elevations, building on skills acquired at each altitude. The individual flight technique training component is required by the CAB Commander to be conducted in environments at or above 8,000 ft (2,438 m) (Lundy 2010) to replicate conditions in theater. Optimally, altitudes should range from 8,000 ft (2,438 m) to the highest altitude available, because pilots, upon deployment to theater, would routinely encounter altitudes in excess of 10,000 ft (3,048 m).

The individual flight technique training component of HAMET would be integrated with other scheduled flight training. Flight time is estimated to be approximately 2 hours for each pilot, depending on the ability of the pilot to reach proficiency in the required maneuvers.

During individual flight technique training, pilots must master performance planning, power management, and high-altitude flight techniques used to compensate for the decreased aircraft performance. Pilots would fly at high altitudes and land at designated high-altitude LZs using varying angles of approach, headings, and air speeds, under both day and night conditions, to reach proficiency for the following tasks:

- Visual-meteorological-conditions (VMC) takeoff.
- VMC approach (typically 10 degrees) to a landing or to a 3-ft hover.
- Abort and go-around procedures – climb-out maneuvers performed when conditions are no longer suitable for landing. A go-around procedure is a planned diversion around an LZ; for instance, it could be performed for weather-related reasons. An abort procedure is an unplanned diversion around an LZ.

- Elevated (100–500 ft [30–152 m]) reconnaissance over high-altitude LZs.
- Slope operations – landing operations performed on an angled, uneven surface (i.e., LZ).
- Pinnacle or ridgeline operations – landing operations performed on a pinnacle, or a formation similar to a pinnacle, that is a high point on a hill (or LZ).

2.2 HAMET Aircraft

The following aircraft would be used under all Action Alternatives for all HAMET missions. More detailed descriptions of these aircraft are provided in Appendix E. All aircraft used for HAMET would be unarmed (i.e., no pyrotechnic devices, ordinance, etc.).

2.2.1 Black Hawk

The UH-60 Black Hawk is a dual-engine, four-bladed utility tactical transport helicopter (Figure 2-1). The UH-60, with a crew of four (two pilots and two crew chiefs), can lift an entire 11-man, fully equipped infantry squad in most weather conditions. The aircraft's critical systems are armored or redundant, and its airframe is designed to progressively crush on impact to protect the crew and passengers. The Black Hawk is used to provide air assault, general support, aero-medical evacuation, command and control support, and special operations support for combat operations and stability-and-support operations (U.S. Army 2010a). Specifications for the UH-60 Black Hawk are as follows:

- Maximum gross weight: 23,500 lb (10,659 kg)
- Empty weight: 10,624 lb (4,819 kg)
- Height: 16 ft, 10 in. (5.1 m)
- Length: 64 ft, 10 in. (19.8 m)
- Rotor diameter: 53 ft, 8 in. (16.4 m)
- Maximum cruise speed: 159 knots (294.5 km/h).

Figure 2-1. UH-60 Black Hawk.

2.2.2 Chinook

The CH-47 Chinook is a twin-engine, tandem-rotor helicopter designed to transport cargo, troops, and weapons during day, night, visual, and instrument conditions (Figure 2-2). The minimum crew for tactical operations is four people: two pilots, one flight engineer, and one crew chief. The Chinook has served as the prime mover for the U.S. Army and other military forces for decades. Its principal mission is transporting troops, artillery, ammunition, fuel, water, barrier materials, supplies, and equipment on the battlefield (U.S. Army 2010b). Specifications for the CH-47 Chinook are as follows:

- Maximum gross weight: 50,000 lb (22,680 kg)
- Empty weight: 23,401 lb (10,615 kg)
- Height: 18 ft, 11 in. (5.8 m)
- Length: 98 ft, 10 in. (30.1 m)
- Rotor diameter: 60 ft, 0 in. (18.3 m)
- Maximum cruise speed: 170 knots (315 km/h).

2.3 Pōhakuloa Training Area

As shown in Figure 2-3, PTA is located in the north-central portion of the island of Hawai‘i just to the west of Humu‘ula Saddle, or plateau, formed by Mauna Loa and Mauna Kea. PTA is about a 1-hour drive (36 miles [58 kilometers]) from the eastern-shore city of Hilo and about a 1.5-hour drive (50 miles [80 kilometers]) from the western-shore city of Kailua-Kona. The town of Waimea is 25 miles (40 kilometers) from PTA. A third volcanic mountain range, Hualalai, lies to the west but does not affect the topography of PTA.

PTA was established as a multi-functional training facility in 1956 for the U.S. Army Western Command and other Pacific Command units. The installation encompasses approximately 132,000 acres (53,419 hectares), with a central impact area of approximately 51,000 acres (20,638 hectares). Total acreage includes the recently acquired Ke‘āmuku Maneuver Area, or Ke‘āmuku Parcel.

PTA supports training for a variety of services, including the Army, Army National Guard, Navy, Marine Corps, Air Force, Special Operations Forces, and allied armed forces from the Pacific region. Transportation of military personnel and cargo to PTA involves the use of several alternative land, sea, and air routes that employ commercial and military transportation systems. PTA includes Bradshaw Army Airfield, which is directly west of the cantonment area and includes a 90- by 3,696-ft (27.4- by 1,127-m) paved runway (USAEC and COE 2009).

The primary mission of PTA is to operate and maintain a safe, modern, major training area for the USAG-HI, Army, Pacific, and other U.S. Pacific Command military units. PTA is a primary tactical training area for conducting military Mission-Essential-Task-List training and contributes to the Army’s training mission by providing resources and facilities for active and reserve component units that train on the installation each year. PTA assets are geared toward maneuver unit live fire, maneuver training, and artillery live fire. The largest live-fire range and training complex belonging to USAG-HI is located on PTA. Additionally, PTA is the base of operations for low-level helicopter training of the 25th CAB.

Figure 2-2. CH-47 Chinook.

2.4 25th CAB's Training at PTA

The 25th CAB's training plan is a modeled to be in accordance with the Army Force Generation (ARFORGEN) cycle. The ARFORGEN cycle is broken into three phases of reset/train, ready for deployment, and available for deployment. As part of the reset/train phase, the 25th CAB conducts individual and collective training on the island of O'ahu and at the National Training Center, California; the Joint Readiness Training Center, Louisiana; and/or PTA, Hawai'i. Aviators, in addition to their basic soldier skills, must undergo additional annual training to maintain flight proficiency. This training includes task and iteration requirements of certain flight maneuvers, annual proficiency and readiness testing, instrument evaluation, and collective flight training tasks. HAMET would be conducted in conjunction with an aviator's individual and collective training.

The CAB uses PTA for approximately 4,500 aviation training hours each year. The addition of HAMET would increase those hours by 180 (to qualify 260 UH-60 and CH-47 pilots).

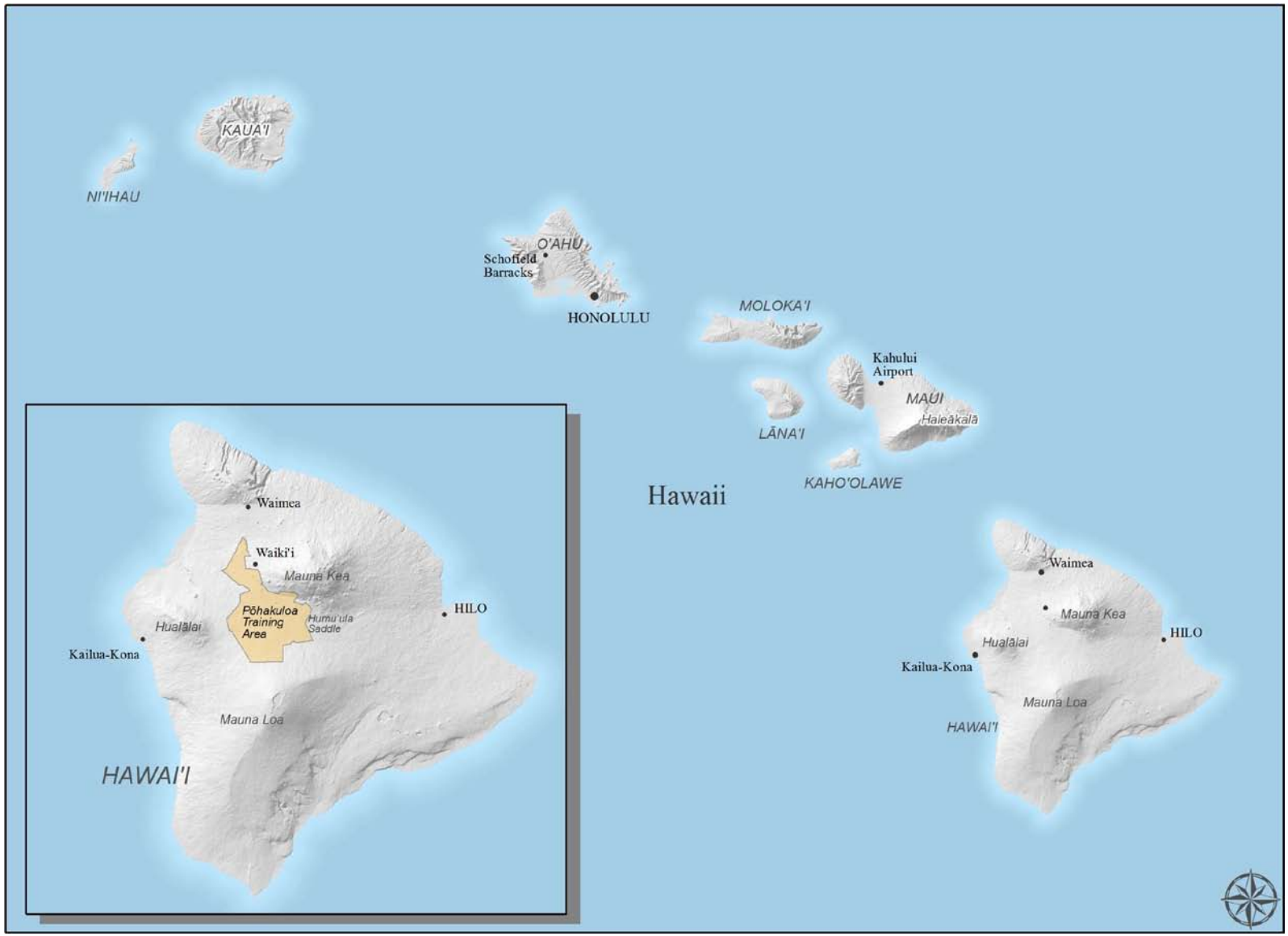

Figure 2-3. The State of Hawai‘i, including areas of interest on the island of Hawai‘i.

2.5 Previous HAMET and the 25th CAB

The 25th CAB has conducted the individual flight technique component of HAMET at PTA on the island of Hawai‘i on four previous occasions as summarized below:

- October – December 2003: The 25th CAB requested the use of the State of Hawai‘i land north of PTA to establish six LZs to conduct high-altitude training under a special use permit (DACA84-9-04-9) granted through the Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW), on October 2, 2003 (U.S. Army 2003a). Three of the six LZs established at this time are described in this document as LZ-4 through LZ-6 on Mauna Kea. The training within this area was considered critical to aviators deploying to Afghanistan from April 2004 to May 2005 as part of OEF. The 25th CAB conducted all landings above the tree line to avoid active hunting locations, and a sentry was posted at a nearby intersection to ensure hunters and unauthorized personnel did not access the sites when training was under way (U.S. Army 2003a). In November 2003, while performing high-altitude training on the slopes of Mauna Kea, a U.S. Army Black Hawk helicopter landed about 3.5 miles (6 kilometers) east of the designated LZs within the Mauna Kea Ice Age Natural Area Reserve (NAR) within the boundaries of the Mauna Kea Adze Quarry. Subsequent to the incident, the USAG-HI was requested to implement additional mitigations to avoid future related impacts during the training period (Young 2003). The USAG-HI responded (Brown 2003) with the following requirements for the aircrews:

  - Participation in an environmental-awareness briefing conducted by the PTA environmental office prior to commencing training. A participant roster was kept, and the brief was valid for the duration of the training.

  - Participation in a cultural-awareness briefing conducted by the PTA cultural office prior to commencing training. A participant roster was kept, and the brief was valid for the duration of the training.

  - Installation of an operational Global Positioning System (GPS) device on each aircraft.

  - Participation in a detailed crew brief prior to each day’s training, during which it was emphasized to land only at approved LZs.

  - PTA Cultural Resources staff also conducted mitigation in the form of providing copies of Mauna Kea adze quarry maps held at the Bishop Museum to the SHPO, and assisted in collecting submeter GPS coordinates for features in the adze quarry and assessing conditions of the features.

- August 2004: The 25th CAB requested the use of the State of Hawai‘i land north of PTA to revisit the LZs to conduct high-altitude training under a special use permit (DACA84-9-04-86) granted through the DLNR, DOFAW, on August 3, 2004 (U.S. Army 2004a). The training within this area was to cycle through all of the aviators within the units who were unable to participate in previous training iterations. This training was considered critical to the aviators deploying to Afghanistan as part of OEF. The 25th CAB conducted all landings above the tree line in order to avoid active hunting locations, and a sentry was posted at a nearby intersection to ensure hunters and unauthorized personnel did not access the sites when training was under way (U.S. Army 2004a).

- January – February 2006: The 25th CAB requested the use of the State of Hawai‘i land north of PTA to revisit all six LZs to conduct high-altitude training under a special use permit (DACA84-9-

06-16) granted through the DLNR, DOFAW, on December 16, 2005 (U.S. Army 2005a). The training within this area was considered critical to aviators deploying to Afghanistan. The 25th CAB conducted all landings above the tree line to avoid active hunting locations. Control measures were implemented to ensure no aircraft landed in unapproved locations. However, an incident did occur when an aircraft hovered too low over critical habitat. To avoid incidents concerning the critical habitats and mitigate environmental concerns, the use of three LZs was discontinued (Gordon 2006). Crews were also briefed to abort landings and reposition to another LZ if any civilians were seen in the area during training to ensure there were no incidents between civilians and Army aircraft (U.S. Army 2005a). The LZs that remained in use were LZ-4, LZ-5, and LZ-6 described in this document.

- March–April 2011: The 25th CAB requested the use of the State of Hawai‘i land (a portion of Mauna Kea Forest Reserve, North Kona) to conduct a 2-week data collection training period. This included noise monitoring, observing potential effects of and on rotor wash, wildlife, and cultural resources. These studies were conducted under a special use permit (DACA84-9-11-194; DOFAWHA-2011-02, Special Use Permit Forest Reserve System) granted through the DLNR, DOFAW, on March 15, 2011 (U.S. Army 2011a). The mission used three aircraft to and 11 pilots over 8 days. The operations executed during this exercise were conducted in accordance with the conditions specified in the special use permit. No incidents occurred during the exercises conducted under this permit.

2.6 25th CAB Safety Record

In the past 10 years, the 25th CAB has flown more than 480,000 hours in training and in support of contingency operations throughout the world. This figure includes more than 26,000 flight hours operating at high altitudes and mountainous terrain in support of OEF in Afghanistan. To date, the CAB has had zero accidents related to flight at high altitude, both in theater and in and around Hawaii (Lugo 2010). The 25th CAB has had two Class A accidents involving rotary-wing aircraft on the island of O‘ahu in February 2001 and May 2009. The 2001 incident was during an air-assault training operation in the Kahuku training area, and the 2009 incident was during a general maintenance test flight on Wheeler Army Airfield.

2.7 Action Alternatives

The following alternatives were identified and considered (67 FR 61) in meeting the Proposed Action:

- Alternative 1 – Mauna Kea/Mauna Loa (Subsection 2.7.3, Preferred Alternative)
- Alternative 2 – Mauna Kea (Subsection 2.7.4)
- Alternative 3 – Mauna Loa (Subsection 2.7.5)
- Alternative 4 – Other High-Altitude Locations in the State of Hawai‘i (Subsection 2.7.6)
- Alternative 5 – Other High-Altitude Training Sites CONUS (Subsection 2.7.7).

A sixth alternative, conducting HAMET entirely through simulation, was considered briefly but dismissed. Such an alternative would not address purpose and need, because it does not meet the mandatory in air training requirements.

2.7.1 Features Common to All Action Alternatives

Features that are common to all Action Alternatives are as follows:

- The 25th CAB aviators/crews would train on aircraft internal to the aviation brigade
- These proposed 90 25th CAB pilots would be trained under all Action Alternatives
- The anticipated start date for HAMET would be October 2011
- The Proposed Action/Alternatives involve leaving no assets post-activity.

2.7.2 Features Common to Alternatives 1, 2, and 3

The features common to Alternatives 1, 2, and 3 are the training requirements, HAMET flight details, HAMET conduct, the LZs selected, and the use of LZs. HAMET is a temporary aerial exercise. HAMET is not an expansion of PTA or any of its facilities. The USAG-HI is requesting use of the LZs from the State of Hawai‘i under permit; the USAG-HI is not acquiring LZs under the Proposed Action. Under Alternatives 1, 2, and 3, HAMET would be executed as described in the following subsections.

2.7.2.1 Training Requirements. The following training requirements would be common to Alternatives 1, 2, and 3:

- HAMET would be taught in three phases. Phase I would consist of academic classroom instruction and simulator training conducted at Wheeler Army Air Field and Schofield Barracks, O‘ahu.
- Phase II would be an element of annual and pre-deployment individual flight technique training conducted on high-altitude LZs in mountainous environments with aviators in their assigned aircraft.
- Phase III would be collective (group) training based at Bradshaw Army Air Field, PTA, and Schofield Barracks, where tactical and mission flight training would be conducted inside military training areas.

2.7.2.2 HAMET Flight Details. Aircrews would pilot helicopters in the following manner under Alternatives 1, 2, and 3:

- Aircrews would ascend from PTA to a minimum of 2,000 ft (610 m) above ground level (AGL) prior to exiting the PTA boundary.
- The aircraft will maintain an altitude of 3,000 ft (914 m) AGL unless severe weather and safety conditions dictate a need to fly at 2,000 ft (610 m) AGL when they are over the core palila population. Minimum altitude for all HAMET helicopters would be 2,000 ft (610 m) AGL while departing PTA and enroute to an inbound release point (RP). The designated flight path is 1,640 ft (500 m) left and right of the centerline of the route. Figure 2-4 shows a flight maintaining a minimum 2,000 ft (610 m) AGL to the inbound RP.

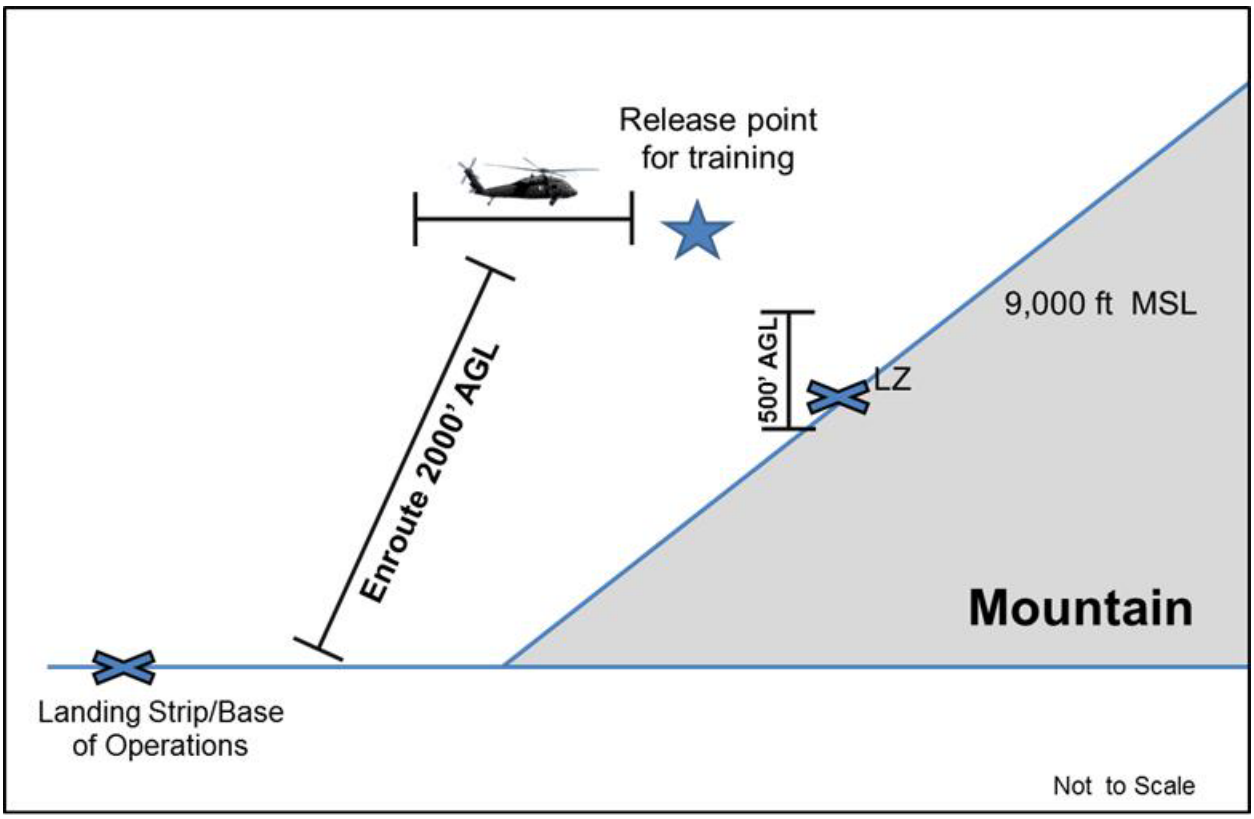

Figure 2-4. Vertical simulated view of HAMET flight to an LZ on a mountain.

- After passing the inbound RP, the aircrew would begin their descent directly to an LZ. Flight around the LZs would be conducted at 500 ft (152 m) and above until a final approach path has been established. Once established on final approach, the pilot would make a controlled descent to the selected LZ. Figure 2-5 shows a helicopter flying from an RP to an LZ.

- The area 3,280 ft (1,000 m) from the center of each LZ would be the training area where helicopters would be expected to be at terrain flight altitudes of 200 ft (61 m) AGL.

- On departure from the LZs, and because of descending terrain, the maximum elevation the aircraft could attain is 500 ft (152 m) AGL above the LZ as the aircraft proceeds along a horizontal course to meet a minimum 2,000 ft (610 m) AGL at the outbound RP. The aircraft will maintain an altitude of 3,000 ft (914 m) AGL unless severe weather and safety conditions dictate a need to fly at 2,000 ft (610 m) AGL when they are over the core palila population.

- Aircraft would remain above a minimum 2,000 ft (610 m) AGL from the outbound RP until back inside the PTA property line.

- Aircraft may only deviate from the protocol stated in the HAMET Flight Details section during actual aircraft emergencies.

- The maximum number of helicopters training on any mountain at one time would be three.

- Army aircraft are flown in accordance with the Federal Aviation Administration (FAA) regulations and within recommended altitudes established by the FAA, the State of Hawai‘i, and restricted airspace (R-3103) over PTA.

- Army helicopters would be using the Island Traffic Advisory Frequency when outside of PTA and while conducting HAMET. This Island Traffic Advisory Frequency is the same radio frequency that all the civilian airplanes, tour helicopter companies, and military helicopters use to de-conflict air traffic and communicate (DOT 2010a, p. 14).

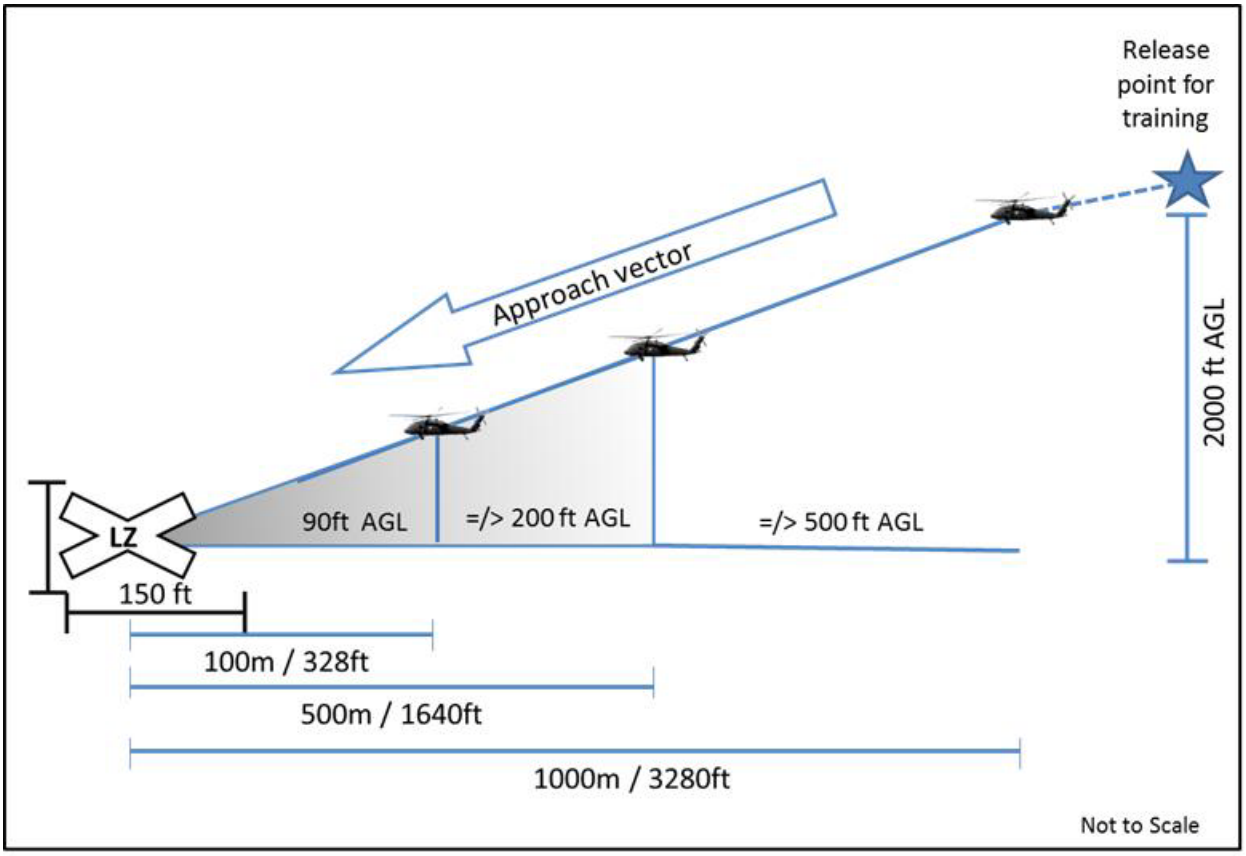

Figure 2-5. Simulated vertical view of HAMET flight from an RP to an LZ.

2.7.2.3 HAMET Conduct. HAMET conduct would be as follows for Alternatives 1, 2, and 3:

- Phase II would be an element of annual and pre-deployment individual flight technique training conducted on high-altitude LZs in mountainous environments with aviators in their assigned aircraft. This is the only phase that needs to be conducted outside the Army training area, and it is estimated that it will take 2 hours of training per pilot to complete. HAMET Phase II would require approximately 180 flight hours and will be conducted during October 2011.

- No HAMET flights would be conducted on weekends or during any known scheduled ceremonies. Flights will not be conducted on: October 10, Columbus Day.

- Training will be scheduled for 20 days and will not exceed 10 hours per day. October HAMET is required for approximately 90 Army aviators. On average, each aircrew will spend 2 hours of flight training around the LZs, with ground time in the LZ not to exceed 10 minutes. Aircrews will

fly defined routes and land at designated LZs using varying angles of approach, headings, and airspeeds to achieve proficiency in tasks such as, but not limited to, visual / meteorological-conditions takeoff and approach, reconnaissance over high altitude LZs, slope operations, and night-time operations.

- USAG-HI aircrews are trained, proficient, and equipped with modern technology using night vision goggles (NVG). As shown in Figures 2-6 and 2-7, NVG are light intensifiers that allow the wearer to "see in the dark." Night flights would involve crews equipped with and using NVG during HAMET.

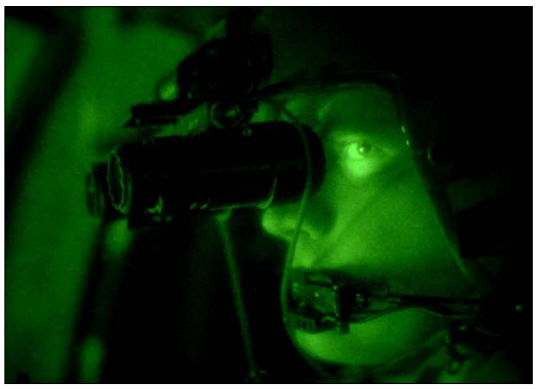

Figure 2-6. Pilot using night vision goggles.

Figure 2-7. Pilot's view through night vision goggles.

- HAMET entails aviation aircrews only. HAMET would not be used in conjunction with ground-maneuver training activities or for picking up/dropping off troops or supplies.
- No sling-loading would be conducted.
- At no time would any aircraft involved carry ammunition.
- All flight paths are designed to avoid designated wilderness areas and to increase the distance from recreation and cultural areas.
- All aircraft would be staged at PTA when used for training exercises.

2.7.2.4 LZ Selection. Under Alternatives 1, 2, and 3, LZs were chosen for their training-appropriate characteristics (i.e., high-altitude mountainous terrain, uneven surfaces, and pinnacle/pinnacle-like and ridge/ridge-like features) but also with safety as a consideration so as to not harm pilots or damage aircraft. Generally, an LZ is an area that can contain one or more helicopter landing sites. The terrain condition, slope, and overall topography of the LZ are taken into consideration when selecting an LZ. For example, sandy soil and other loose impediments might become airborne when disturbed by rotor wash. Sites chosen for LZs must have soil conditions that are capable of supporting the weight of the aircraft to prevent aircraft from being mired, creating excessive dust, or blowing snow. Loose material can cause obscuring visual conditions.

The proposed LZs for Alternatives 1, 2, and 3 are pre-existing landing areas that are approximately 150 by 150 ft (46 by 46 m). The nature and extent of previous use for LZs 1–3 (located on Mauna Loa) are not fully known, but their disturbed surface areas indicate evidence of previous use. LZs 4–6 (located on Mauna Kea) were established by the 25th CAB and used for previous HAMETs under special-use

permits, as described in Subsection 2.5. No modifications to the LZs are needed for the Proposed Action. LZs chosen for consideration under these alternatives met the following criteria:

- They would require aircraft to operate at HAMET elevations (>8,000 ft [2,438 m]) (Lundy 2010)
- Their locations do not interfere with observatory operations
- They do not contain historic properties or threatened and endangered species
- They are pre-existing, used areas that need no modification to make them suitable for HAMET use.

The six LZs proposed to be used under Alternatives 1, 2, and 3 that met the criteria above are shown in Figures 2-8 through 2-13.

The LZs proposed for use lie on State of Hawai‘i lands. To use these LZs, the USAG-HI is required to submit for, and receive, a right-of-entry (ROE) document. The USAG-HI does this by formal request to the Department of Army, Real Estate Branch, of the Hawai‘i DLNR Board (i.e., Board). For HAMET, the military requests use/access of State of Hawai‘i land, in which the LZs lie, that is managed by the DOFAW. The EA and its decision document accompany the request. The request and environmental documents are forwarded to the Board for consideration. The Board reviews the information and may approve the request without comment, or the Board may approve the request with modifications or conditions in addition to the ones already presented in the EA and decision document. Board-added conditions could involve the Army (e.g., curtailing flight on certain days) and/or the public (e.g., implementing temporary access restrictions or closure of areas). When the request is approved, the DOFAW provides a ROE document for the specified use and time described in the Army's formal request.

2.7.2.5 Use of LZs.

HAMET use of LZs would be as follows under Alternatives 1, 2, and 3:

- Maneuvers conducted at LZs would include VMC takeoff; VMC approach to a landing or a 3-ft (1-m) hover; go-around, slope operations; and pinnacle or ridgeline operations. Pilots would execute multiple touch-and-go, hover, short-stop approach, full-stop landing, and elevated (100–500 ft [30–152 m]) reconnaissance over the high-altitude LZs.
- All hovering, take-offs, and landings would occur inside the LZ(s).
- Avoid flying directly over identified mounds in the vicinity of LZ's 5 and 6 located on Mauna Kea.
- Aircraft would spend a minimal amount of time (not to exceed 10 minutes) in the LZs.
- At any given time, no more than two aircraft would be in an individual LZ.
- Pilots may receive a short in-cockpit instruction after a full-stop landing before take-off from an LZ.
- LZs would not be used to transport or off-load personnel for ground-based training.
- No personnel would exit the helicopter on the LZ, except that a crew member may exit the helicopter to perform an aircraft inspection on an as-needed basis.
- No drop zone operations would need to be executed.
- No physical modifications of the existing LZs would be made.

Figure 2-8. LZ-1 – Mauna Loa at latitude 19°36'5.64"N, longitude 155°28'14.64"W, and 7,889-ft (2,405-m) elevation.

Figure 2-9. LZ-2 – Mauna Loa at latitude 19°36'0.48"N, longitude 155°28'37.74"W, and 8,049-ft (2,453-m) elevation.

Figure 2-10. LZ-3 – Mauna Loa at latitude 19°34'32.10"N, longitude 155°29'21.78"W, and 8,955-ft (2,729-m) elevation.

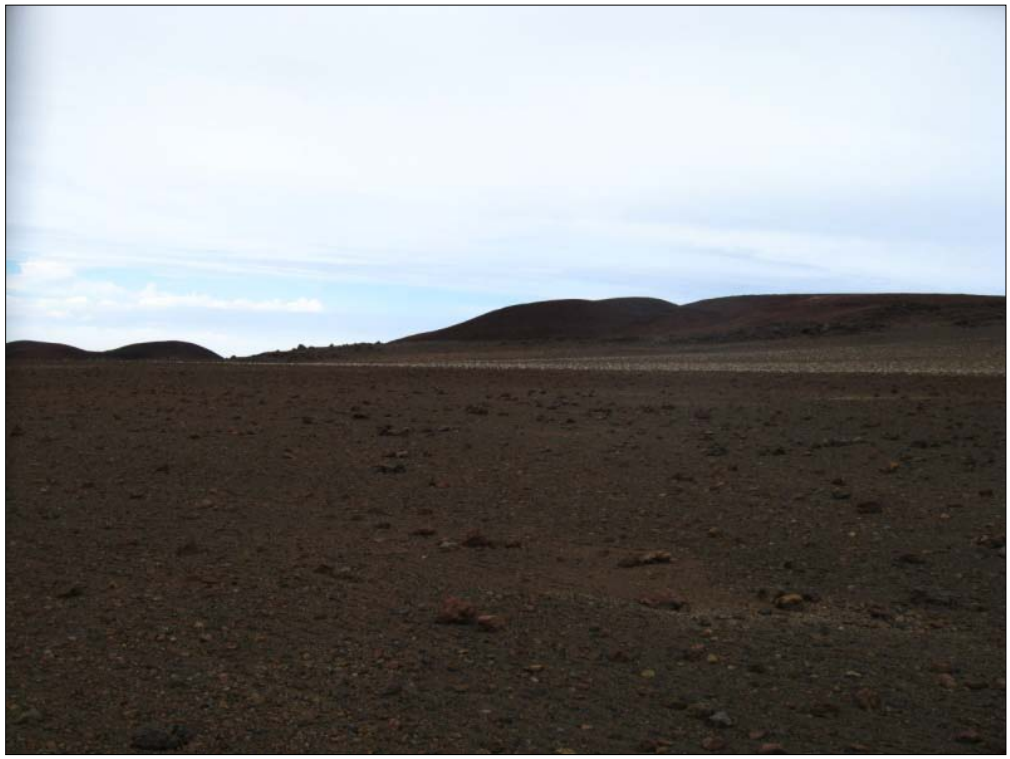

Figure 2-11. LZ-4 – Mauna Kea at latitude 19°49'26.243"N, longitude 155°31'23.509"W, and 11,208-ft (3,416-m) elevation.

Figure 2-12. LZ-5 – Mauna Kea at latitude 19°49'28.315"N, longitude 155°31'47.004"W, and 11,324-ft (3,452-m) elevation.

Figure 2-13. LZ-6 – Mauna Kea at latitude 19°49'12.106"N, longitude 155°31'16.313"W, and 11,539-ft (3,517-m) elevation.

2.7.3 Alternative 1 (Preferred Alternative) – Mauna Kea/Mauna Loa

Alternative 1 for the Proposed Action is to conduct HAMET flights from Bradshaw Army Airfield at PTA to three established Mauna Kea LZs and three established Mauna Loa LZs that would provide critical realistic training in a high-altitude, mountainous environment. Within the State of Hawai‘i, Mauna Kea and Mauna Loa on the island of Hawai‘i (see Figure 2-3) provide suitable terrain and altitude to accomplish this training task.

Alternative 1 is the Army's preferred alternative for several reasons. The availability of six LZs at various high elevations on two mountains:

- Allows pilots to realistically experience, and complete training for, a full spectrum of high-altitude helicopter operational effects
- Affords the CAB more flexibility by as it increases the probability that the Army can continue flights to non-affected LZs when local weather patterns, particularly diurnal cloud ceiling fluctuations, make some LZs inaccessible
- Decreases use of an individual LZ by spreading total use across a larger number of LZs
- Increases pilot and public safety by increasing the temporal and spatial distancing among flights
- Decreases potential conflicts with hunters/hikers, and other users can be avoided in that the pilot would move to another LZ or another mountain until the potential conflict is gone.

This alternative uses all six LZs presented in Subsection 2.7.2.4, LZ Selection, allowing for completion of HAMET Phase II for 90 aircrew in approximately 20 flying days. The estimated flight time from Bradshaw Army Airfield to the Mauna Kea LZs (approach time) is approximately 7 minutes, and estimated flight time from Bradshaw Army Airfield to the Mauna Loa LZs is approximately 13 minutes. Flight paths of this alternative avoid designated wilderness areas and are designed to avoid close proximity to Kipuka ‘Ainahou Nene Sanctuary, Mauna Kea State Recreation Area, the Natural Area Reserve and fly high enough over palila critical habitat as not to disturb palila, if present. The proposed LZs and the aerial extent of the conduct of HAMET are shown in Figure 2-14. Figures 2-15, 2-16, and 2-17 show vertical and horizontal simulated views of HAMET flights on Mauna Kea, and Figures 2-18, 2-19, and 2-20 show vertical and horizontal simulated HAMET flights on Mauna Loa.

2.7.4 Alternative 2 – Mauna Kea

Alternative 2 for the Proposed Action is to conduct HAMET missions from PTA and Bradshaw Army Airfield to three established Mauna Kea LZs that would provide critical realistic training in a high-altitude, mountainous environment. Within the State of Hawai‘i, Mauna Kea on the island of Hawai‘i (see Figure 2-3) provides suitable terrain and altitude to accomplish this training task.

HAMET training requirements, flight details, conduct, LZ selection, and use of LZs are the same as detailed in Section 2.7.2, Features Common to Alternatives 1, 2, and 3. This alternative uses only LZ-4, LZ-5, and LZ-6 (i.e., Mauna Kea LZs) presented in Subsection 2.7.2.4, LZ Selection. The estimated flight time from Bradshaw Army Airfield to the Mauna Kea LZs (approach time) is approximately 7 minutes. All flight paths in this alternative are designed to avoid close proximity to Mauna Kea State Recreation Area, the Natural Area Reserve and fly high enough over palila critical habitat as not to disturb palila, if present. The proposed LZs and the aerial extent of the conduct of HAMET under Alternative 2 are shown

in Figure 2-21. Figures 2-15, 2-16, and 2-17 show vertical and horizontal simulated views of HAMET flight on Mauna Kea.

2.7.5 Alternative 3 – Mauna Loa

Alternative 3 for the Proposed Action is to conduct HAMET missions from PTA and Bradshaw Army Airfield to three established Mauna Loa LZs that would provide critical realistic training in a high-altitude, mountainous environment. Within the State of Hawai‘i, Mauna Loa on the island of Hawai‘i (see Figure 2-3) provides suitable terrain and altitude to accomplish this training task.

HAMET training requirements, flight details, conduct, LZ selection, and use of LZs are the same as detailed in Section 2.7.2, Features Common to Alternatives 1, 2, and 3. This alternative uses LZ-1, LZ-2, and LZ-3 (i.e., Mauna Loa LZs) presented in Subsection 2.7.2.4, LZ Selection. The estimated flight time from Bradshaw Army Airfield to the Mauna Loa LZs is approximately 13 minutes. All flight paths in this alternative are designed to remain clear of all designated federal wilderness areas and the Kipuka ‘Ainahou Nene Sanctuary. The proposed LZs and the aerial extent of the conduct of HAMET under Alternative 3 are shown in Figure 2-22. Figures 2-18, 2-19, and 2-20 show vertical and horizontal simulated views of HAMET flight on Mauna Loa.

2.7.6 Alternative 4 – Other High-Altitude Locations in the State of Hawai‘i

Other high-altitude locations in the State of Hawai‘i include federal lands on Mauna Loa. Hawai‘i Volcanoes Wilderness is a federally designated wilderness area within Hawai‘i Volcanoes National Park. Wilderness designation was established as part of the 1964 Wilderness Act and prohibits development and motorized and mechanized travel, including bicycles. The U.S. Congress designated the Hawai‘i Volcanoes Wilderness in 1978 with 123,100 acres (49,817 hectares), and it was later expanded to 130,790 acres (52,928 hectares). The area is managed by the National Park Service (NPS). Wilderness designation covers the northwestern extension of the national park (where high-altitude conditions exists), including Moku‘aweoweo, the summit of the volcano Mauna Loa.

Other than on the island of Hawai‘i, the only land in the State of Hawai‘i above 8,000 ft (2,438 m) in elevation is located on the island of Maui (see Figure 2-23). Haleakalā, or the East Maui Volcano, is a massive shield volcano that comprises more than 75% of the island of Maui. The tallest peak of Haleakalā, at 10,023 ft (3,055 m), is Pu‘u ‘Ula‘ula (Red Hill). Surrounding the summit is Haleakalā National Park, a 30,183-acre (12,215 hectare) area, of which 24,719 acres (100,003 hectares) is wilderness.

State lands on Maui above 8,000 ft (2,438 m) include parcels west and south of Haleakalā National Park. The State Department of Hawaiian Homelands manages lands southwest of Haleakalā National Park as well. Three privately owned areas are also located above 8,000 ft (2,438 m). These areas include Haleakalā Ranch, located northwest of Haleakalā National Park; KJZ, located west of Haleakalā National Park, and Kaonoulu Ranch, located west of Haleakalā National Park. There are eight forest reserve areas (Ko‘olau, Makawao, Waihou, Hana, Kula, Kahikinui, Kipahulu, and West Maui) (Hawai‘i Forestry 2007). The seven forest reserve areas around the Haleakalā summit as can be seen in Figure 2-23. There is one commercial airport (Kahului Airport) on the island. The Army has no aviation support facilities on the island of Maui.

Public Law 100-9 prohibits flight of visual-flight-rules helicopters or fixed-wing aircraft below 9,500 ft mean sea level over the following areas in Haleakalā National Park: Haleakalā Crater, Crater Cabins, Scientific Research Reserve, Halemau‘u Trail, Kaupa Gap Trail, or any designated tourist viewpoint. In addition to Public Law 100-9, noise abatement areas exist on the island of Maui

(DOT 2010b). Specifically, noise abatement areas cover most of the accessible points above 8,000 ft (2,438 m) in the Haleakalā National Park. Figure 2-24 shows the noise abatement areas on the island of Maui.

A potential landing area for HAMET is located near the 10,000-ft (3,048-m) elevation on the southwest ridge of Haleakalā. This area is located on state land outside of the forest reserves and the Halelakalā National Park. This area is roughly 5 by 0.25 miles (8 by 0.4 kilometers). Figure 2-23 also shows four glider activity areas. "Guided" paragliders launch from Polipoli Flight Park located in Polipoli Spring State Recreation Area, the main paragliding site on Maui. It is flyable an average of 330 days a year. Located on the lee side of Mount Haleakalā, this area is protected from the trade winds. The geography allows an area of calm air to set up each morning, which heats up by the sun and allows launches as early as 2 hours after sunrise. The highest launch site is Ferns Launch at 6,500 ft (1,981 m) mean sea level and provides for a 3,000-ft (914-m) decent to the nearest LZ (Proflyght Paragliding 2011**)**. On the other side of Halelakalā, where winds are stronger, powered hang gliders are operated. It is unknown how many "unguided" aerialists use vendor launches and other launch sites for sport-flying activities throughout this vicinity of the islands.

2.7.7 Alternative 5 – Other High-Altitude Training Sites on the CONUS Alternative

Offsite HAMET could be conducted at the Army National Guard training site in Gypsum, Colorado, which provides mountainous operations for rotor-wing military pilots. Training at the Gypsum site is approximately 1 week, which includes 1 day of classroom instruction to learn power management in high-altitude, mountainous terrain and 4 days of tactical high-altitude (6,500–14,000 ft [1,981–4,267 m]) terrain training. Aircraft located at the Gypsum facility that may be available for loan include the OH-58C Kiowa and UH-60A Black Hawks (Colorado National Guard 2010). However there are no training slots available to schedule.

Another possible offsite location for HAMET that the 25th CAB considered is at Fort Carson in Colorado Springs, Colorado. Although most of the 25th CAB is going to conduct a majority of the HAMET requirement at Fort Carson, it is undesirable and exorbitantly expensive to capture the training needs of new pilots assigned to the CAB and those pilots who need to conduct additional training to meet the advanced requirement during this time. Aircrews will spend up to an additional 45 days away from Families prior to the upcoming deployment; and helicopters and maintenance crews will spend additional time on the mainland, which when combined, impacts what is referred by the military as "perstempo". Perstempo is defined as the time an individual spends away from home station.

Additionally, HAMET was considered outside Fort Bliss in El Paso, Texas. The Fort Bliss location has desert-like mountains, which are quite different than the terrain found at Gypsum, Colorado, but the Texas site does allow pilots to become partially familiar with terrain similar to that found in Afghanistan (Futrell 2010). Most important to consider is that there are no available aircraft to loan at Fort Bliss and no training slots available to schedule.

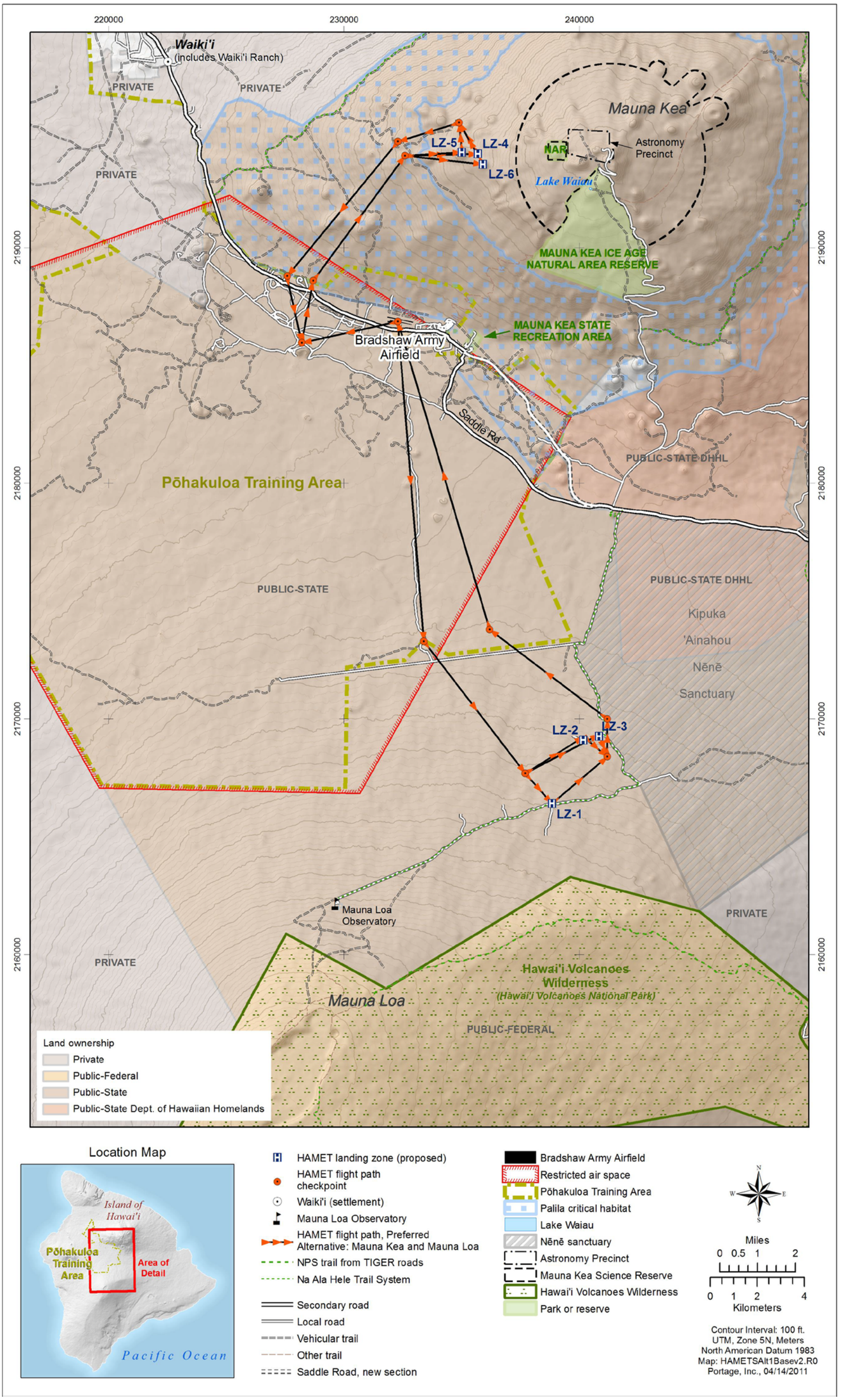

Figure 2-14. HAMET Alternative 1: Mauna Kea and Mauna Loa (Preferred Alternative).

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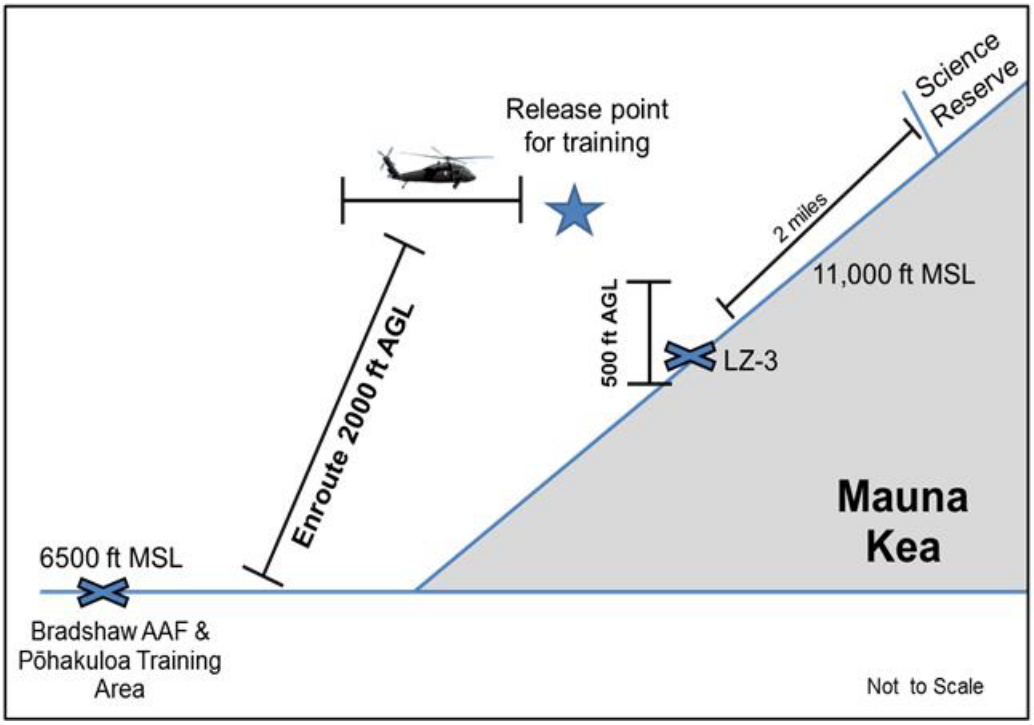

Figure 2-15. Vertical simulated view of HAMET flight on Mauna Kea.

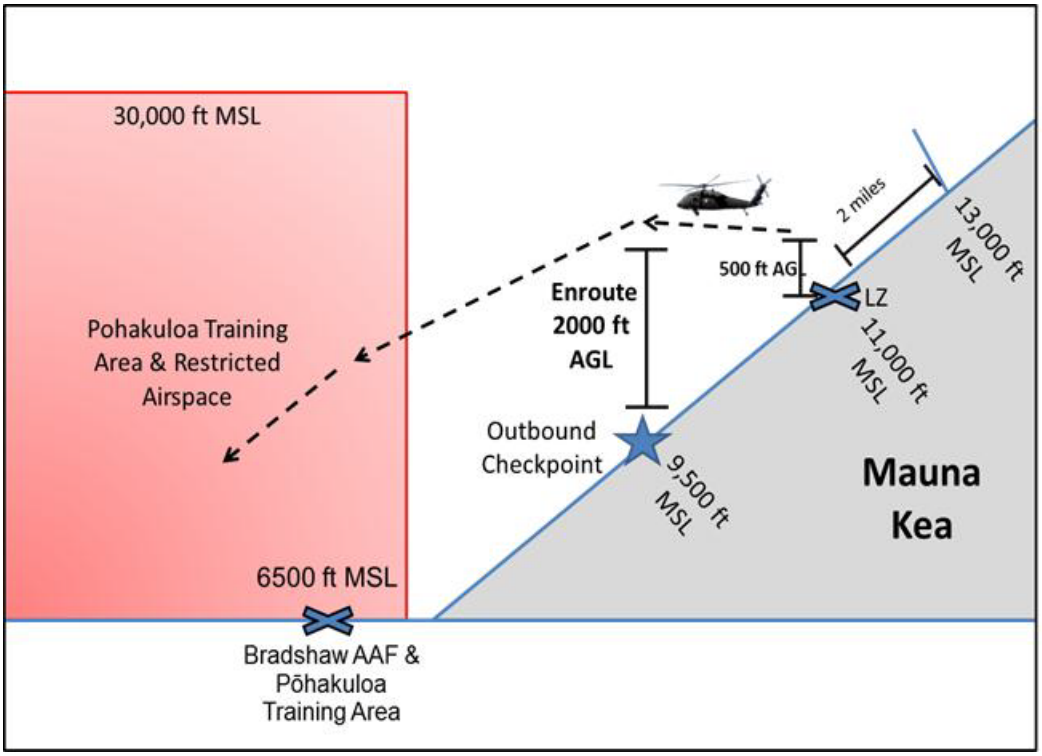

Figure 2-16. Vertical simulated view of HAMET return flight on Mauna Kea.

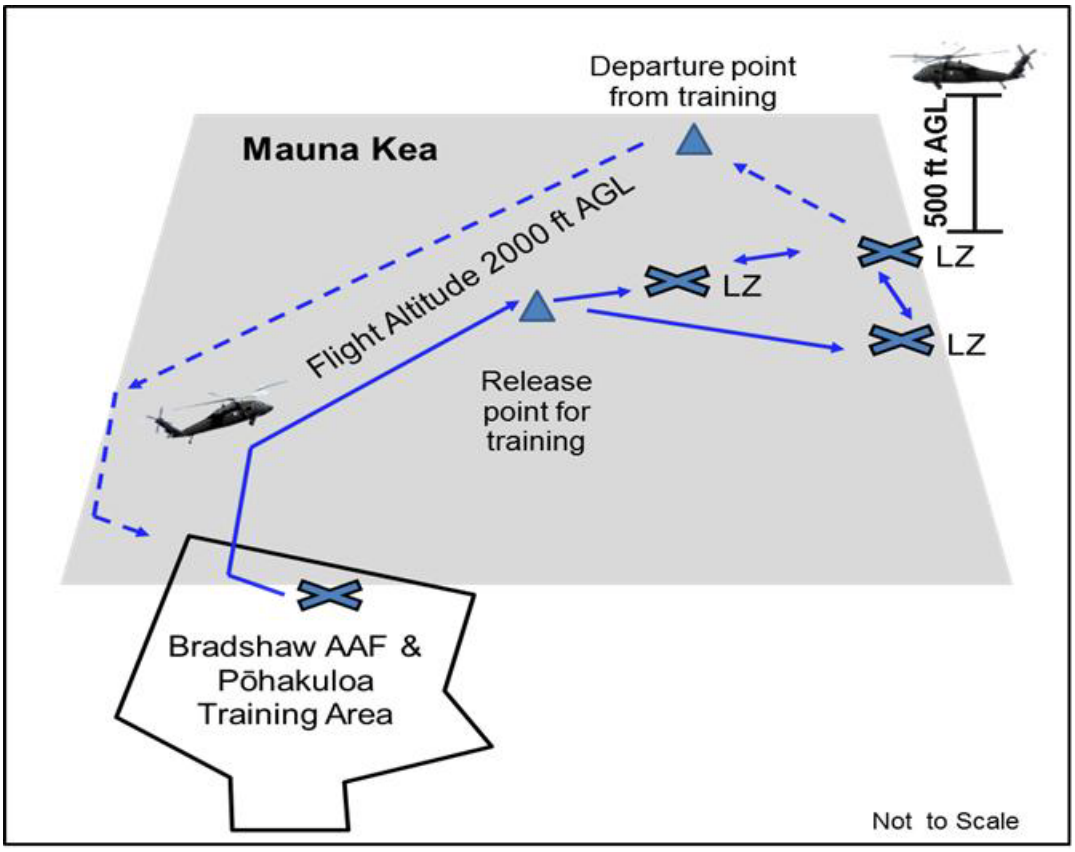

Figure 2-17. Horizontal simulated view of HAMET flight on Mauna Kea.

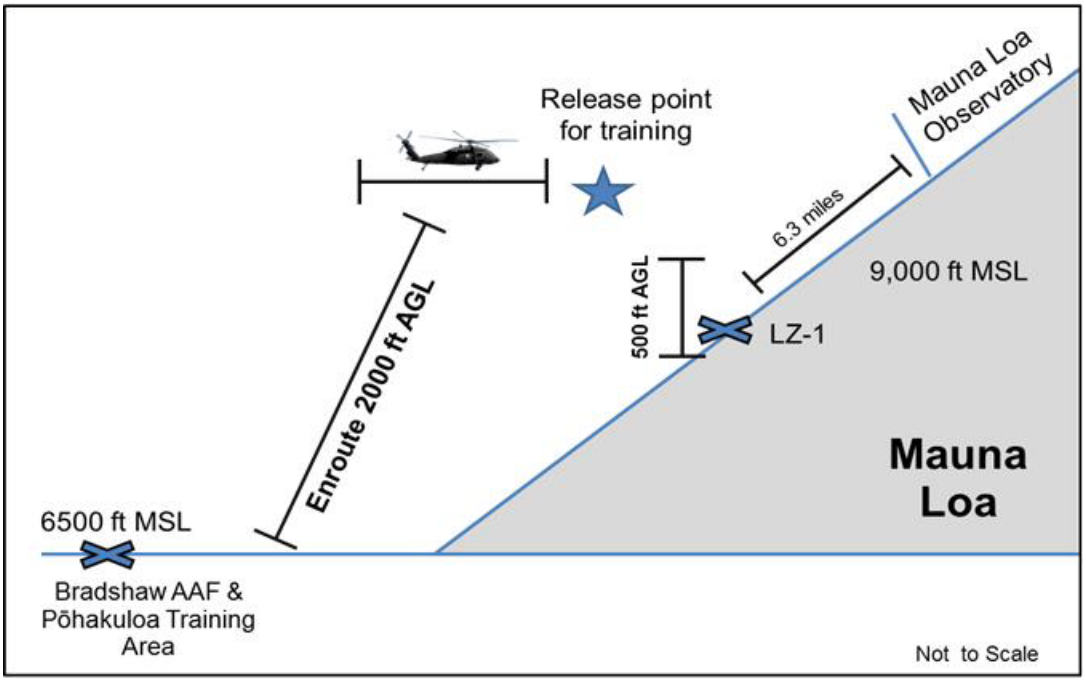

Figure 2-18. Vertical simulated view of HAMET flight on Mauna Loa.

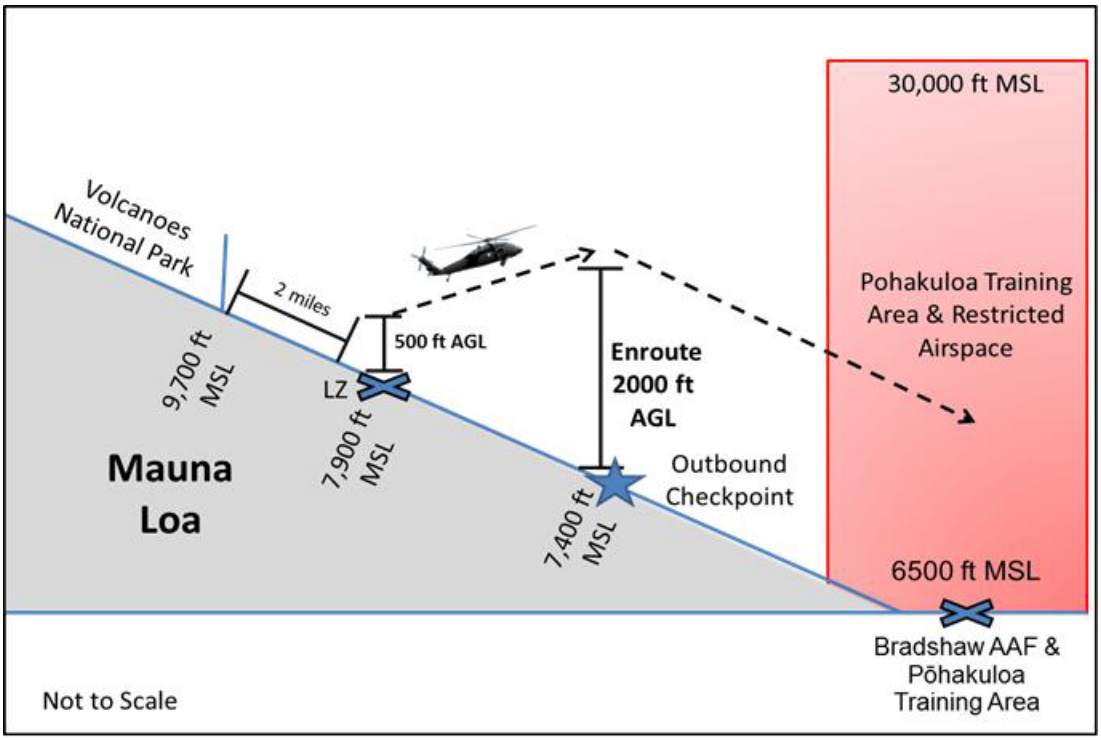

Figure 2-19. Vertical simulated view of HAMET return flight on Mauna Loa.

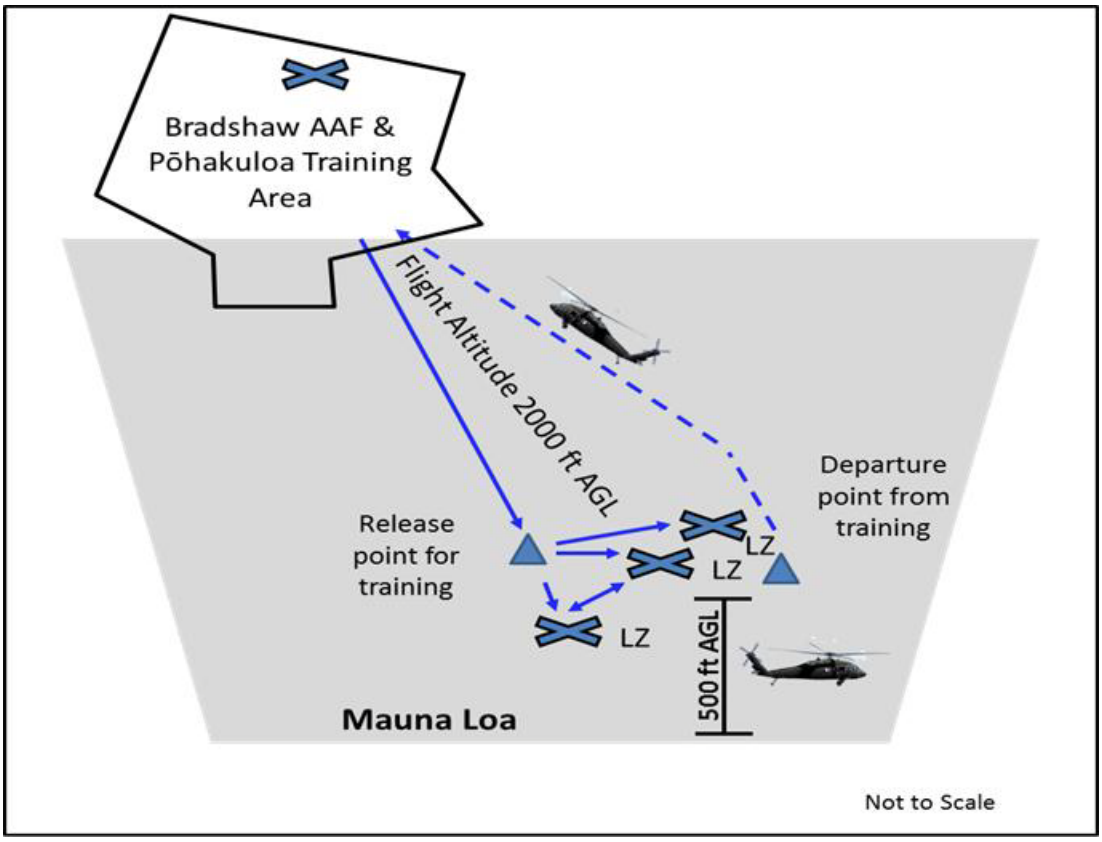

Figure 2-20. Horizontal simulated view of HAMET flight on Mauna Loa.

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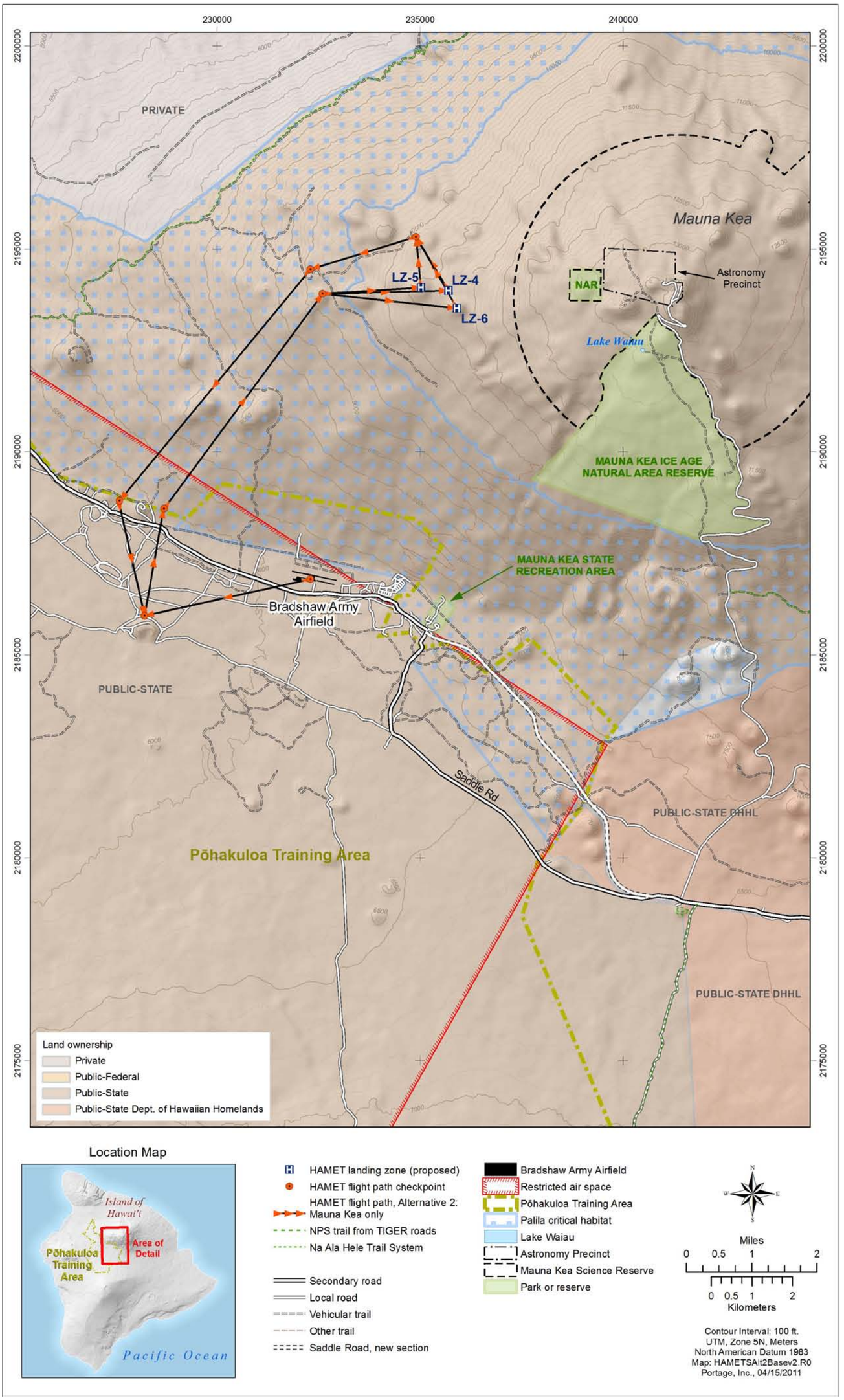

Figure 2-21. HAMET Alternative 2: Mauna Kea.

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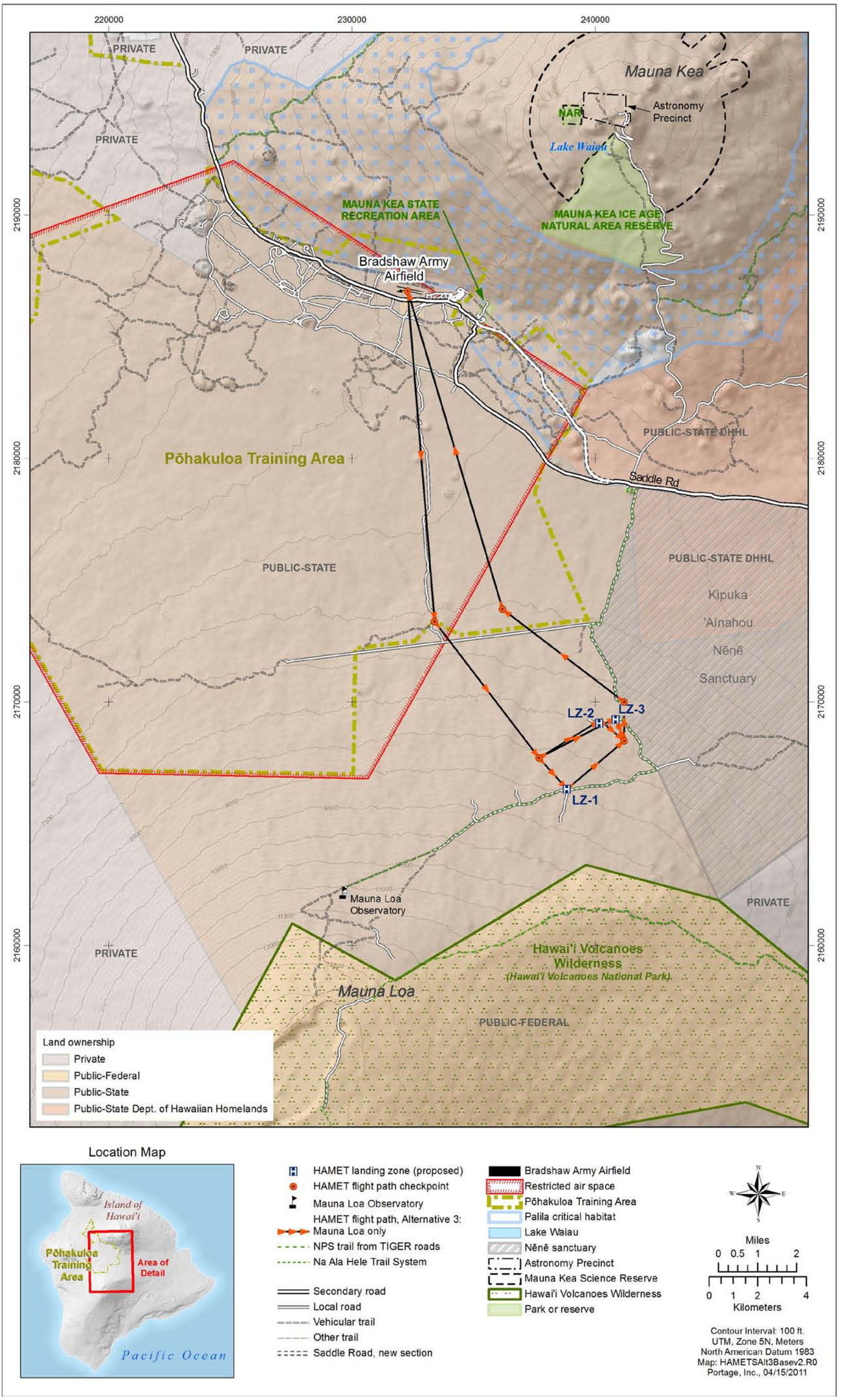

Figure 2-22. HAMET Alternative 3: Mauna Loa.

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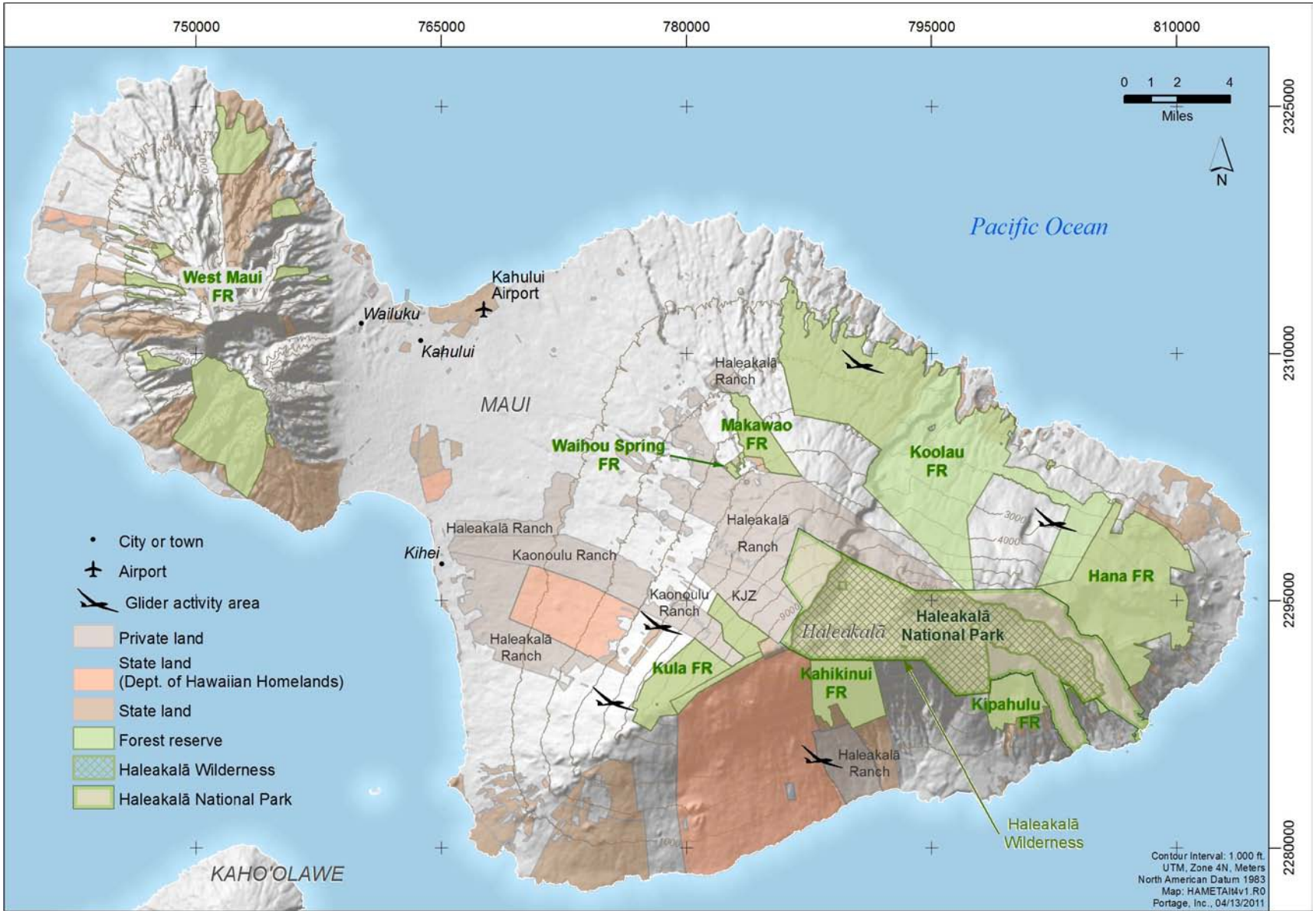

Figure 2-23. Forest Reserve System on Maui.

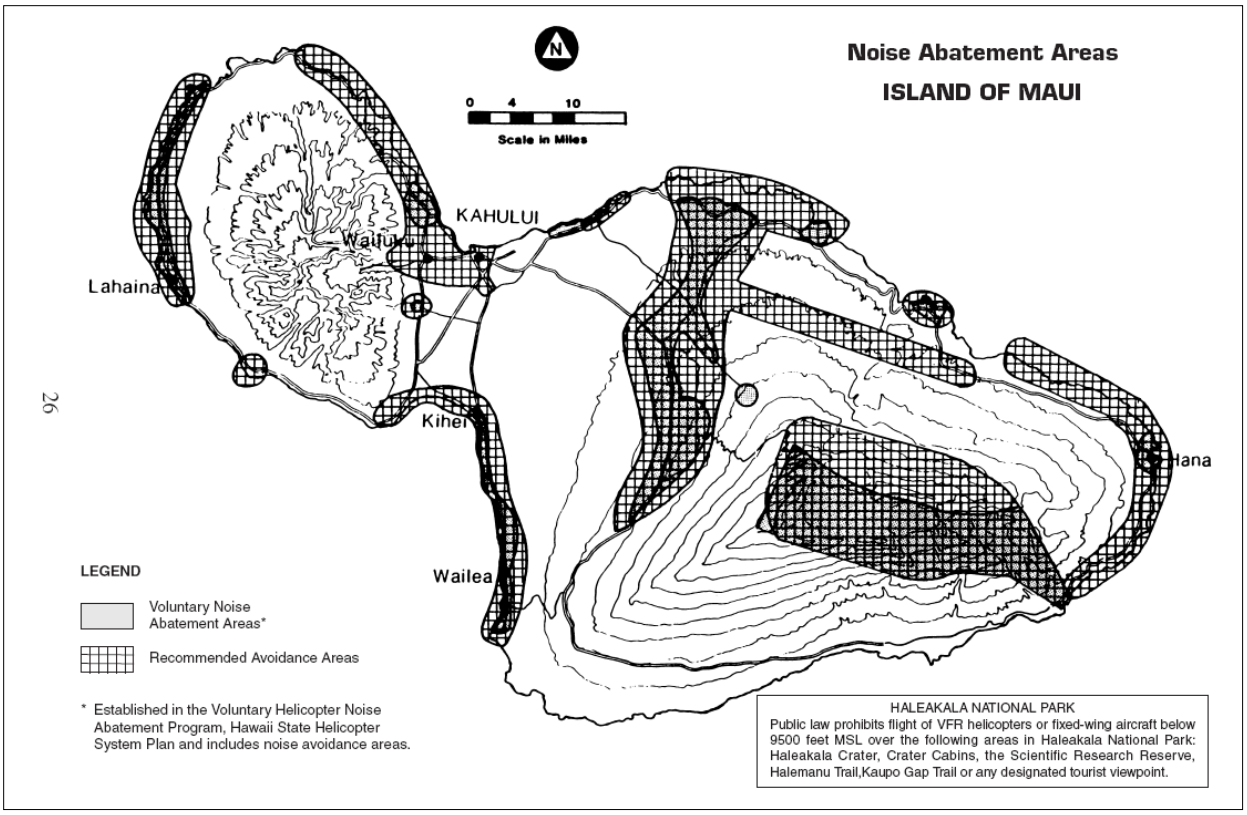

Figure 2-24. Noise abatement areas on the island of Maui from DOT (2010b).

2.7.7.1 Features of the Alternative. This alternative would require the physical relocation to the mainland of the proposed 90 trainees and many additional aircraft. Two methods of physical transport of aircraft from Wheeler Army Airfield in Hawai‘i to the mainland and then to Gypsum, Colorado, or Fort Bliss in Texas, could be used: sealift and/or airlift. Sealift would require between 28 and 50 days (round trip) for aircraft to leave Hawai‘i, arrive in Colorado (or to arrive at Fort Bliss) and be returned to Hawai‘i through the following steps:

- Two days are required for aircraft to be prepared for shipping and loaded for transport from O‘ahu via the Honolulu Harbor commercial port.

- Aircraft would then be set to sail for 6 days to reach Long Beach California or the San Diego, California, commercial port or for 21 days to reach the Beaumont, Texas, commercial port.

- At any of the three ports, 3–4 days would be required to unload and reassemble aircraft prior to flight. Flight time to Gypsum, Colorado, is 2 days from Texas and 4 days from the California ports. Flight time to Fort Bliss is between 6 and 8 hours from the Beaumont, Texas, commercial port.

Airlift would require between 14 and 16 days (round trip) for aircraft to leave Hawai‘i, arrive in Gypsum, Colorado, (or at Fort Bliss, Texas) and be returned to Hawai‘i through the following steps:

- Two days are required to load helicopters for airlift onto military transports at Hickam Air Force Base, O‘ahu.

- Aircraft and pilots would be transported via an 8-hour flight to either Fort Carson, Colorado, or to the Colorado Springs Airport. Aircraft and pilots would be transported via a 10-hour flight to Fort Bliss, Texas.

- At any of the three airports, 3–4 days are required to unload and reassemble aircraft prior to flight.

- While offsite, helicopter maintenance could require shipment of parts from Wheeler, which could result in training downtime (Mansoor 2010). Additionally, specialized aircraft mechanics, inspectors, and maintenance test pilots would need to be deployed, impacting the home station mission.

- Pre-deployment helicopter training for non-HAMET pilots is occurring at present and would continue at Wheeler Army Airfield and PTA. Offsite HAMET pilots would require the availability of the same bench-stock and maintenance personnel who would be supporting the current pre-deployment training (Mansoor 2010).

- To remain current in mountain operations for deployment when an offsite training location is used, training would have to be conducted close to the actual date of a unit's deployment. Offsite locations would have to accommodate this need (Mansoor 2010).

2.7.7.2 Training Requirements. Training requirements are the same those as detailed in Subsection 2.7.2, Features Common to Alternatives 1, 2, and 3, and in Subsection 2.7.2.1, Training Requirements, except:

- HAMET Phase II would be a stand-alone exercise based out of Gypsum, Colorado, or Beaumont, Texas, based on facility availability

- UH-60 Black Hawks and CH-47 Chinooks would be transported to Gypsum, Colorado, or Beaumont, Texas, based on facility availability.

2.7.7.3 HAMET Flight Details, HAMET Conduct, LZ Selection, and Use of LZs. HAMET flight details, conduct, LZ selection, and use of the LZs would be in accordance with the requirements of the Gypsum, Colorado, (or the Fort Bliss) facility(ies).

2.7.8 The No Action Alternative

As required by the CEQ, the No Action Alternative serves as a benchmark against which the Action Alternatives can be evaluated. Because the Proposed Action analyzed in this EA is for the USAG-HI to conduct high-altitude, mountainous-environment training in preparation for deployment in support of OEF and future related theater actions (as well as to satisfy compulsory aviation training doctrine), HAMET Phase II would not be conducted if no action were taken.

2.8 Alternative Screening

This EA carries forward for evaluation a range of alternatives considered to be reasonable. In determining whether an alternative was reasonable, each identified alternative was evaluated against the stated purpose and need in Subsections 1.3 and 1.4. Summarized, the need of the Proposed Action is to ready helicopter crews to be successful in the combat theater to support the operational and mission requirements for deployment in support of operations in Afghanistan and future related theater actions.

To evaluate all proposed alternatives and determine which of those could meet this need, and thus be carried forward for full evaluation, the following screening criteria were developed:

- Availability: A reasonable alternative should have the availability (both time and space) to begin training 25th CAB pilots in October 2011 to allow the CAB to meet available-for-deployment status. A reasonable alternative should also possess the facilities to meet HAMET requirements specified in Section 1, including the requirement to train at an elevation of 8,000 ft (2,438 m) or higher.

- Throughput: Throughput is the number of pilots that can be put through a process. A reasonable alternative from a throughput standpoint for the Proposed Action would be the number of soldiers that can be trained to proficiency prior to December 31, 2011.

- Time and Cost: These pilots must be trained beginning in October 2011 and have completed training by December 31, 2011, for the CAB to meet available-for-deployment status. This means that training facilities must be available within a geographic distance that allows pilots to deploy logistically, and with aircraft, to and from training locations to complete essential training tasks within established timeframes. Each unit has a limited amount of time and money to achieve training requirements. The time and cost of transport cannot be so excessive that they compromise the CAB's ability to meet all mission-essential tasks and readiness requirements.

- Quality of Life: A reasonable alternative should ensure that soldiers are not separated from their families for unreasonable periods. Quality of life for soldiers and their families is critical to retaining experienced soldiers. This is especially so when world events require many soldiers to deploy overseas for more than 1 year at a time. One of the Army's priorities is to increase dwell time from the current 12–18 months to 2 years by the end of 2011 (Daniel 2010).

2.9 Alternative Evaluation

After the five alternatives were detailed, the USAG-HI reevaluated them against the purpose, need, and screening criteria presented previously, and the results are shown in Table 2-1. To be considered a reasonable alternative and carried forward for full analysis, an alternative had to meet the purpose and need and had to satisfy all four screening criteria. All screening criteria were considered independently.

After conducting its evaluation, the USAG-HI determined that Alternatives 1, 2, and 3 satisfied the need criteria; these alternatives are evaluated further in this EA. As required by NEPA, the No Action Alternative, although considered unreasonable because it does not meet the purpose or need, is also evaluated further in this EA.

The USAG-HI concluded that Alternative 4, Other High-Altitude Locations in the State of Hawai‘i, is not feasible as a result of the following:

- Wilderness areas, including the federal lands on Mauna Loa and surrounding the summit in Haleakalā National Park, cannot be used for motorized vehicles.

- Federal lands on Maui are designated NPS areas and require aviators to avoid overflights below 2,000 ft (610 m).

- The area best suited for HAMET flight would require sharing airspace with hang gliders, paragliders, and other types of unregulated sport flyers. According to FAA regulations, gliders have the right-of-way over rotorcraft (i.e., helicopters) (14 CFR I § 91.113). Military helicopters

and personal-powered and unpowered aircraft are incompatible uses of the airspace and extremely unsafe.

- HAMET operations would require the USAG-HI to conduct operations from Kahului Airport, a civilian facility. Permissions and extensive coordination with airfield management would be required for co-use of civilian facilities. This coordination would push the timeline for start of HAMET operations past the June 2011 target date**.**

Table 2-1. HAMET alternatives evaluation**.**

Screening Criteria[a]	1 Mauna Kea and Mauna Loa	2 Mauna Kea	3 Mauna Loa	4 Another Hawai‘i Site	5 Continental U.S. site
Availability	X	X	X	–	X
Throughput	X	X[b]	X[b]	X[b]	X
Time/Cost	X	X	X	–	–
Quality of Life	X	X	X	X	–

a. Each criterion is considered independently.

b. Throughput can be achieved but will require additional training days.

X = Meets criteria.

— = Does not meet criteria.

Alternative 5, Other High-Altitude Training Sites, The USAG-HI concluded that Alternative 5, Other High-Altitude Training Sites, was considered unreasonable, because of the following:

- The decrease in dwell time that would result from mainland training in light of upcoming overseas deployment

- Estimated to cost approximately $2M to send pilots and keep aircraft and maintenance crews on the mainland longer.

- Logistical challenges would require excess time that could risk the CAB’s ability to be trained prior to deployment

- The high cost and time associated with transporting soldiers, keeping aircraft, and support staff on the mainland and the disruption of other deployment-required training in Hawai‘i that mainland HAMET could incur.

Thus, as shown in Table 2-1, the Army determined that Alternatives 4 and 5 did not satisfy the needed criteria, were unreasonable, and/or did not meet the screening criteria. Therefore, these alternatives were eliminated from further review.

2.10 Alternatives Not Considered Further

As a result of their evaluation, Alternative 4, Other High-Altitude Locations in the State of Hawai‘i, and Alternative 5, Other High-Altitude Training Sites, were not further considered in the analysis.

3. AFFECTED ENVIRONMENT

This section provides an overview of the existing VECs that occur within the vicinity of the Proposed Action and the Action Alternatives. The region of influence (ROI) overall is the area that potentially can be directly or indirectly affected by the Action Alternatives. The ROI may vary depending on the specific VEC. However, only resource areas relevant to the Proposed Action are presented in this EA. These resources include climate; air quality; land use; recreation; geology and topography; soils and hydraulic properties; water resources; biological resources, vegetation, and wildlife; cultural resources; socioeconomics and environmental justice; noise; visual and aesthetic resources; human health and safety; traffic and circulation; and utilities and public services.

The ROI, unless stated otherwise in a specific VEC discussion, is the designated flight path and the area 3,280 ft (1,000 m) from the center of the LZs, as defined by each specific Action Alternative.

3.1 Climate

The most prominent feature of the circulation of air across the tropical Pacific Ocean is the persistent trade-wind flow in a general east-to-west direction. The trade winds blow across Hawai‘i primarily from the northeast quadrant throughout the year, with the windiest months being from May through September. The trade winds blow approximately 80% of the time in the summer and 50% of the time in the winter. In addition to the trade winds, wind patterns are influenced by major storm systems and by topographic features that alter or channel prevailing wind directions. Topographic features have additional influences on local wind patterns in coastal areas, with upslope/downslope flow patterns often reinforcing sea-breeze/land-breeze patterns. Local winds tend to move inland from the coast during midmorning to early evening periods, then reverse direction and flow offshore during night and early morning hours. The onshore sea breeze component tends to be stronger than the offshore land breeze component. Sea/land breeze patterns are most common on the south and west coasts of the Hawaiian Islands.

The combination of a dominant trade-wind pattern and limited seasonal changes in the length of day and night combine to limit seasonal variations in weather conditions in Hawai‘i. Weather conditions in Hawai‘i show a two-season pattern, with a winter season of 7 months (October through April) and a summer season of 5 months (May through September). The summer months generally are warmer and drier than the winter months. Most major storms occur during the winter season. Seasonal variations in temperature conditions are mild at lower elevations, with daytime temperatures commonly between 75 and 85°F (24 to 29°C) and nighttime temperatures between 65 and 75°F (18 to 24°C).

In the summit regions, winter temperatures range from 10 to 40°F (–12 to 4°C), but wind chill can bring the temperature to below 0°F (–18°C); summertime temperatures recorded at the summit range from less than 30 up to 60°F (–1 to 15°C). Annual precipitation ranges from approximately 20 in. (51 cm) at an altitude of 12,600 ft (3,840 m) to approximately 15.5 in. (39 cm) (including snowfall) at an altitude of 13,375 ft (4,077 m). Storms, including wintertime cold fronts, upper-level and surface low-pressure systems, tropical depressions, and hurricanes, provide most of the annual precipitation over a very short period. Varying amounts of snow and ice regularly fall near the summit, concentrated during January through March and rarely from June to September.

Wind velocities usually range from 10 to 30 miles per hour (mph) (16 to 48 kilometers per hour [km/h]) in the summit region. During severe winter storms, though, winds can exceed 100 mph (161 km/h) on exposed summit areas, such as the tops of cinder cones. High winds are also common due to atmospheric anomalies, such as the jet stream dipping down or low- and high-pressure systems that

create vortexes. Other unique characteristics found in the summit regions include minimal cloud cover, with about 325 days per year being cloud free, and low water vapor level, which means the atmosphere is more transparent. The dry and breezy conditions facilitate high rates of evaporation at the summit and maintain the cool, dry atmosphere.

The typical climate around the proposed LZ elevations would be similar to that at Hale Pōhaku, at 9,200 ft (2,804 m), with a temperature range between 30 and 70°F (–1 and 21°C) throughout the year. At Hale Pōhaku, it is not uncommon for winds to reach upwards of 20 mph (32 km/h). Annual precipitation ranges from 12 to 20 in. (30 to 50.8 cm), with most rain occurring between November and March. Fog is common, and snow is rare.

The climate at elevations below the LZs at PTA is classified as cool and tropical (upper montane to alpine). The average annual temperature is 55°F (12.8°C), with small fluctuations. Diurnal temperature fluctuations are greater than seasonal variations.

Meteorological conditions that may impact the island and the LZs on a daily basis are the effects of the diurnal wind patterns and temperature inversions. Diurnal wind patterns consist of localized winds that tend to move inland from the coast during the day and then reverse direction and flow offshore at night and in the early morning. Temperature inversions occur when hot air, which normally rises without restriction, is trapped by cooler air above. This situation happens at the 5,000- to 7,000-ft (1,524- to 2,133-m) elevations and above land masses. Both Mauna Kea and Mauna Loa are high enough for temperature inversions to develop.

Temperature inversions develop most frequently in the summer when the air above the island becomes warmer. Moisture is forced from the rising trade winds at the inversion layer, where it is trapped below the inversion zone. Orographic rainfall may be a result. If the mountain is above the inversion zone, dryer air released from below may rise to the mountaintop, creating desert-like conditions above the inversion zone.

The formation of the inversion layer may result in moist air in the form of clouds or fog being trapped at the inversion layer, causing restricted visibility. As shown in Figure 3-1, clouds or fog trapped at the inversion layer will generally rise as daytime ambient temperatures rise and the daytime diurnal wind pattern flow is up the mountain. Conversely, clouds or fog trapped at the inversion layer will drop in elevation as nighttime temperatures fall and the diurnal wind pattern is down the mountain. The result is that during inversion conditions, cloud cover or fog may lift or fall to cover the LZs, potentially impacting training operations. Also, because the LZs on Mauna Kea and Mauna Loa differ in elevation by more than 1,000 vertical ft (305 m), the visibility at the LZs could be impacted only on Mauna Kea, only on Mauna Loa, or at both locations (Millen 2010).

3.2 Air Quality

Air pollution levels in Hawai‘i generally are low due to the small size and isolated location of the state. The state’s isolated location means that upwind areas do not contribute significant background pollution levels. The state’s small size limits opportunities for locally generated air pollutants to accumulate or recirculate before being transported offshore and away from land areas. Locally generated contributors to air pollution in the area of the LZs include vehicle exhaust and fugitive dust. However, dust and other emissions quickly dissipate, while smoke from wildland fires can last longer (Gene Stout & Associates and DPW 2002).

Figure 3-1. Clouds trapped in the inversion layer in the valley between Mauna Kea and Mauna Loa (seen in the distance). Photograph courtesy of M. Lasky (taken March 21, 2010).

Localized fugitive dust can be generated by wind effects on exposed soils and unpaved roads, and this dust would be expected from the high-altitude aviation training operations. High concentrations of suspended particulate matter can occur in some lower-elevation areas, mostly due to agricultural burning or fireworks (U.S. Army 2004b). The entire state is classified as being in compliance with federal ambient air quality standards, or "in attainment" (USAEC 2008).

The Mauna Kea LZs are located approximately 2 to 3 miles (3.5 to 4.5 kilometers) away from the summit of Mauna Kea and its observatories. The Mauna Loa LZs are located approximately 6 to 8 miles (10 to 12 kilometers) away from the summit of Mauna Loa and its observatory. The LZs are also located approximately 2,000 to 3,000 ft (610 to 914 m) below the summits and, for the most part, downwind of the summits.

The Mauna Loa Observatory (MLO) is located on the north flank of Mauna Loa Volcano at an elevation of 11,135 ft (3,394 m). MLO is best known for its measurements of rising anthropogenic carbon dioxide concentrations in the atmosphere. MLO also measures ozone, solar radiation, and both tropospheric and stratospheric aerosols. Data from MLO are also used to calibrate and verify data from satellites and stations around the world.

3.2.1 Ambient Air Quality Standards for Criteria Pollutants

Ambient air quality is the atmospheric concentration of a specific compound experienced at a particular geographic location that may be some distance from the source of the relevant pollutant emissions. The U.S. Environmental Protection Agency (EPA) has established ambient air quality standards for several different pollutants that often are referred to as criteria pollutants (ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, suspended particulate matter, and lead). The term "criteria pollutants" is derived from the requirement that the EPA must describe the characteristics and potential health and welfare effects of these pollutants. Suspended particulate matter is any solid or liquid that can remain suspended in the atmosphere for more than a few minutes. Standards for suspended particulate matter have been set for two size fractions—inhalable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$). Federal ambient air quality standards are based primarily on evidence of acute and chronic (or short- and long-term) health effects. Federal ambient air quality standards apply to outdoor locations to which the general public has access.

Hawai‘i, along with other states, has adopted ambient air quality standards that are in some areas more stringent than the comparable federal standards and address pollutants that are not covered by federal ambient air quality standards. The state ambient air quality standards are based primarily on health effects data but can reflect other considerations, such as protection of crops, protection of materials, or avoidance of nuisance conditions (such as objectionable odors). Table 3-1 summarizes federal and state ambient air quality standards applicable in Hawai‘i.

3.2.2 Hazardous Air Pollutants

Federal air quality management programs for hazardous air pollutants focus on setting emission limits for particular industrial processes rather than setting ambient exposure standards. Some states have established ambient exposure guidelines for various hazardous air pollutants and use those guidelines as part of the permit review process for industrial emission sources.

Hawai‘i has adopted ambient concentration guidelines for hazardous air pollutants. Those guidelines are used as part of the permit review process for emission sources that require state or federal air quality permits. The Hawai‘i ambient exposure guidelines for hazardous air pollutants include the following (State of Hawai‘i 2003):

- For noncarcinogenic compounds, an 8-hour average concentration equal to 1% of the corresponding 8-hour threshold level value (TLV) adopted by the Occupational Safety and Health Administration (OSHA)

- For noncarcinogenic compounds, an annual average concentration equal to 1/420 (0.238%) of the 8-hour TLV adopted by OSHA

- For noncarcinogenic compounds for which there is no OSHA-adopted TLV, ambient air concentration standards set by the Director of Health on a case-by-case basis so as to avoid unreasonable endangerment of public health with an adequate margin of safety

- For carcinogenic compounds, any ambient air concentration that produces an individual lifetime excess cancer risk of more than 10 in 1 million assuming continuous exposure for 70 years.

While these guidelines exist, they apply only to point sources and do not apply to mobile sources, such as aircraft (e.g., HAMET aircraft), automobiles, and trucks (State of Hawai‘i 2003).

Table 3-1. State and national ambient air quality standards (AAQS) applicable in Hawai‘i.

Air Pollutant	Measure	Hawai‘i AAQS	Federal Primary Standard	Federal Secondary Standard
Carbon monoxide	1-hr average	9 ppm	35 ppm	None
	8-hr average	4.4 ppm	9 ppm	None
Nitrogen dioxide	1-hour average	None	100 ppb	None
	Annual average	0.04 ppm	0.053 ppm	Same as primary
PM_{10}	24-hr block average	150 $\mu g/m^3$	150 $\mu g/m^3$	Same as primary
	Annual average	50 $\mu g/m^3$	None	None
$PM_{2.5}$	24-hr block average	None	35 $\mu g/m^3$	Same as primary
	Annual average	None	15 $\mu g/m^3$	Same as primary
Ozone	8-hr rolling average	0.08 ppm	0.075 ppm	Same as primary
Sulfur dioxide	1-hr average	None	75 ppb	None
	3-hr block average	0.5 ppm	—	0.5 ppm
	24-hr block average	0.14 ppm	0.14 ppm	—
	Annual average	0.03 ppm	0.03 ppm	—

Notes:

ppb = parts per billion

ppm = parts per million

All standards except the national PM_{10} and $PM_{2.5}$ standards are based on measurements corrected to 77°F (25°C) and 1 atmosphere pressure.

The national PM_{10} and $PM_{2.5}$ standards are based on direct flow volume data without correction to standard temperature and pressure.

The “10” in PM_{10} and the “2.5” in $PM_{2.5}$ are not particle size limits; these numbers identify the particle size class (aerodynamic diameter in microns) collected with 50% mass efficiency by certified sampling equipment. The maximum particle size collected by PM_{10} samplers is about 50 microns. The maximum particle size collected by $PM_{2.5}$ samplers is about 6 microns.

Data Sources:

40 CFR § 50, 2010, “National Primary and Secondary Ambient Air Quality Standards.”

State of Hawai‘i, 2001, “Ambient Air Quality Standards,” Hawai‘i Administrative Rules, Title 11, Chapter 59, State of Hawai‘i, Clean Air Branch, September 15, 2001.

State of Hawai‘i, 2010, *Federal and State Ambient Air Quality Standards*, Clean Air Branch, Hawai‘i Department of Health, Honolulu, Hawai‘i, online via: http://hawaii.gov/health/environmental/air/cab/cab_misc_pdf/naaqs_sep_2010.pdf.

3.2.3 Air Quality Planning Programs

The federal Clean Air Act (42 USC 85 § 7401 et seq.) requires each state to identify areas that have ambient air quality in violation of federal standards. States are required to develop, adopt, and implement a state implementation plan to achieve, maintain, and enforce federal ambient air quality standards.

The status of areas with respect to federal ambient air quality standards is categorized as nonattainment, attainment (better than national standards), unclassifiable, or attainment/cannot be

classified. Unclassifiable areas are treated as attainment areas for most regulatory purposes. All of Hawai‘i is categorized as attainment or unclassifiable for each of the federal ambient air quality standards.

3.2.4 Clean Air Act Conformity

The Clean Air Act requires federal agencies to ensure that actions they undertake in nonattainment and maintenance areas are consistent with federally enforceable air quality management plans for those areas. No portions of Hawai‘i are classified as nonattainment or maintenance areas. Consequently, Clean Air Act conformity analysis procedures do not apply to Army actions in Hawai‘i.

3.2.5 Existing Air Quality Conditions

Hawai‘i currently operates five monitoring stations on the island of Hawai‘i. All of the monitoring stations are in coastal regions, and many are in or near urban areas. None of the monitoring stations is sited at or near Army training areas. The monitoring stations on the island of Hawai‘i have been located primarily to monitor the impacts of emissions from volcanic eruptions and geothermal development. Based on available monitoring data and the locations of recognized emission sources, the EPA has concluded that no locations in Hawai‘i exceed federal ambient air quality standards.

Most of the monitoring data collected on Hawai‘i in recent years show that ambient air quality levels are well below the values of the relevant state and federal ambient air quality standards.

3.3 Geology and Topography

The Hawaiian Islands formed as the Pacific Plate moved over a relatively permanent hot spot in the mantle beneath the Pacific Plate (USAEC 2008), which is currently under the island of Hawai‘i. The Hawaiian Islands are seismically active. Earthquakes on the islands are caused by molten rock rising through the earth’s crust or the earth’s crust settling under the weight of accumulated lava.

The island of Hawai‘i consists of five volcanic mountains: Kohala Mountain, Mauna Kea, Mauna Loa, Hualālai, and Kilauea (Macdonald and Abbott 1970). All five of these volcanic mountains are considered young. Kohala Mountain is the oldest and is now extinct. It dates approximately 700,000 years old by potassium-argon dating. Mauna Kea is younger as its eruptions bury parts of the Kohala Volcano. Mauna Kea is considered dormant. Hualālai is located on the west side of the island and is younger than Mauna Kea but older than Mauna Loa, as evidenced by magmatic evolution stages. Kilauea is located to the southeast of Mauna Loa. Both Kilauea and Mauna Loa are considered active. Differing magmatic stages between Mauna Loa and Kilauea indicate separate magma bodies feeding each, so it is believed that Kilauea is a completely independent volcano. This is also supported by the difference in their eruptive centers, one at 13,000 ft (3,962 m) above mean sea level (amsl) and the other at less than 4,000 ft (1,219 m) amsl.

The principal features of each volcano are listed in Table 3-2. Mauna Loa takes up the bulk of the island at 50.5%; Mauna Kea follows as the second largest area on the island with 22.8%. Mauna Kea and Mauna Loa are also the two highest peaks on the island, with their summits reaching 13,796 and 13,680 ft (4,200 and 4,169 m) amsl, respectively (Stearns 1985).

The stratigraphy of Hawai‘i is outlined in Table 3-3, and the geologic map is shown in Figure 3-2. Paleomagnetism studies on the island have indicated none of the rocks on the island has reversed magnetism (Stearns 1985). The last reversal of magnetism occurred 750,000 years ago. This concludes that all rocks on the island of Hawai‘i must be Pleistocene in age or younger.

The Pahala ash is found on many parts of the island (MacDonald and Abbot 1970). It is named for the town of Pahala, which contains the remnants of the Ninole Volcano. The ash is more than 50 ft (15 m) thick and is yellowish. It contains vitric ash and fragments of pumice. The thickness of the ash varies across the island. The ash is often altered by weathering, which disguises the original composition of the material, making its source uncertain. However, as shown in Figure 3-2, it is the only rock formation that is found on more than one of the volcanic mountains, making this unit quite noteworthy (Stearns 1985). The ash provides a means of correlating volcanic activity, though it is not certain the Pahala ash is of the same age everywhere across the island.

Table 3-2. Principal features of the volcanoes on the island of Hawai‘i from Stearns (1985).

Name	Length (miles)	Width (miles)	Area (square miles)	Percentage of Hawai‘i Island	Summit Elevation (ft amsl)
Mauna Loa	75	64	2,035	50.5	13,680
Kilauea	51	14	552	13.7	4,090
Hualālai	24	20	290	7.2	8,251
Mauna Kea	51	25	919	22.8	13,796
Kohala	22	15	234	5.8	5,505

Table 3-3. Stratigraphic units from Stearns (1985).

STRATIGRAPHIC ROCK UNITS IN THE ISLAND OF HAWAII

(The volcanic rocks of Mauna Loa, Mauna Kea, and Hualalai, those of Mauna Kea and Kohala, and those of Mauna Loa and Kilauea interfinger)

Age	Hualalai	Kohala Mountain	Mauna Loa	Kilauea	Mauna Kea
Historic	Historic member of the Hualalai volcanic series (1800–01)	Unconsolidated alluvium, dunes and landslides	Historic member of volcanic series (1832–1950); Mud flow of 1868	Historic member of the Puna volcanic series (1790–1965)	Ribbons of gravel and small alluvial fans
Holocene	Prehistoric member of the Hualalai volcanic series		Dunes; Prehistoric member of the Kau volcanic series	Dunes; Prehistoric member of the Puna volcanic series	Upper member of the Laupahoehoe volcanic series; Glacial debris and fluvial conglomerates
Late Pleistocene		Fluvial conglomerates			Lower member of the Laupahoehoe volcanic series
	Pahala ash (exposed on Waawaa volcanics only)	Pahala ash (not differentiated)	Pahala ash	Pahala ash	Local erosional unconformity; Pahala ash
Early and middle Pleistocene	Waawaa volcanics and lower unexposed part of Hualalai volcanic series	Fluvial conglomerates; Hawi volcanic series	Kahuku volcanic series	Hilina volcanic series	Hamakua volcanic series
Early Pleistocene		Great erosional unconformity; Pololu volcanic series	Ninole volcanic series		

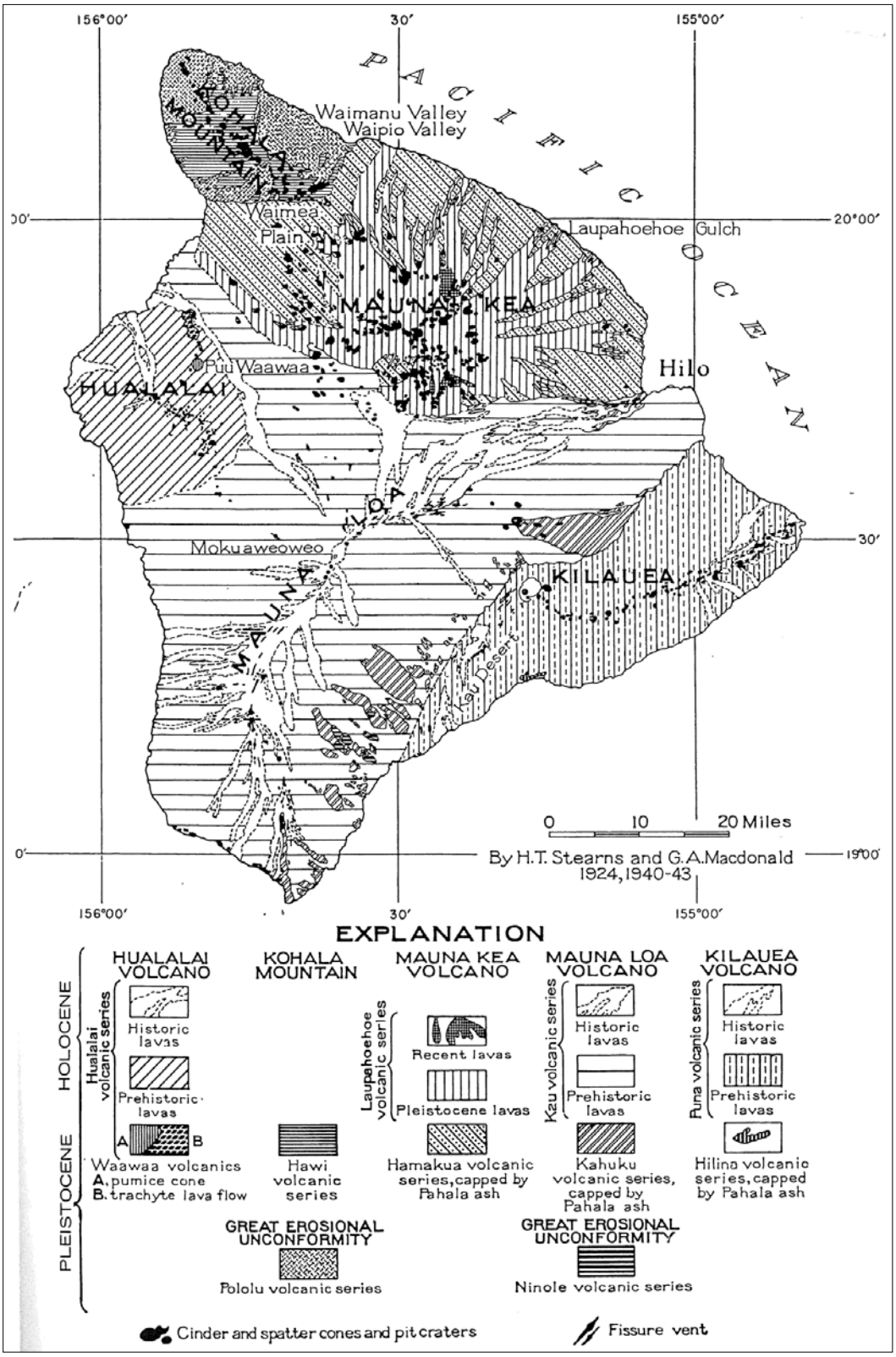

Figure 3-2. Geologic map of the island of Hawai‘i from Stearns (1985).

3.3.1 Mauna Kea

This dormant shield volcano is the highest of the five at 13,796 ft (4,200 m) amsl, and it is the highest mountain in the interior Pacific Basin. Because of its elevation, Mauna Kea's summit has been repeatedly glaciated during the past few hundred thousand years and preserves the best glacial record of any oceanic volcano on Earth (University of Hawai‘i 2010).

Mauna Kea has erupted 12 times within the past 10,000 years, and though it has been at least 4,600 years since its last eruption, it is anticipated that the volcano will erupt again; such an eruption would likely occur on the flanks of the volcano, below the summit and astronomical facilities (University of Hawai‘i 2010).

The potential for renewed volcanic activity in this region in the foreseeable future is extremely remote. The most significant geologic hazard is seismic activity (University of Hawai‘i 2010). The island of Hawai‘i is one of the most seismically active areas on Earth, and about two dozen earthquakes with magnitude of 6 or greater have been documented on Hawai‘i since the devastating earthquakes of 1868. Earthquakes will continue to impact the Mauna Kea summit area in the future, and any future construction must include design considerations for significant seismic forces (University of Hawai‘i 2010).

No soils in the conventional sense are present, because the only fragmental material present has not had enough time to weather and become soil in the arid, alpine environment (University of Hawai‘i 2010). This fragmental material is present in most low-lying areas, though, and could be classified as nonweathered soil. It consists of unconsolidated debris derived from glacial erosion and mechanical weathering of the adjacent lavas, and nowhere is it more than 1 or 2 ft thick (0.3 to 6.1 m).

Lake Waiau is located below the summit of Mauna Kea at an elevation of 13,020 ft (3,968 m) amsl. Slopes are as steep as 8 degrees southward in the north/upper area but less than 2 degrees in the south/ lower portion. The prospective LZs lie on the southeast side of Mauna Loa between 10,800 and 11,500 ft (3,291 and 3,505 m) amsl, as shown on Figure 2-14.

The stratigraphy on Mauna Kea is divided into two series: Hamakua Volcanic Series and the younger Laupāhoehoe Volcanic Series (Stearns 1985). The geologic map of these series is shown in Figure 3-3.

The Hamakua Volcanic Series has upper and lower members. The lower member of the Hamakua Series has tholeiitic basalts, olivine basalts, and oceanites (Stearns 1985). It is exposed along Hamakua Coast north of Hilo. These rocks are thin beds of pāhoehoe and ‘a‘ā and grade gradually upward to the upper member. The upper member consists of alkali olivine basalts, hawaiites, and ankaramites. They are well exposed in highway cuts along Hamakua Coast and are covered by Pahala ash that is 6–25 ft (1.8–7.6 m) thick.

The Laupāhoehoe Series is found on the top of Mauna Kea. It consists of hawaiite, with lesser amounts of alkali olivine basalt and ankaramite (MacDonald and Abbott 1970). The hawaiite flows are well exposed along the highway between Honoka‘a and Kamuela. These flows are thick with hummocky tops. The Laupāhoehoe Series built big cinder cones, some more than 1 mile (1.6 kilometers) across and several hundred feet tall. These cinder cones are well exposed on the Humu‘ula Saddle, between Mauna Kea and Mauna Loa.

Mauna Kea started as a broad shield volcano that is buried by the cones of the Laupāhoehoe Series and the upper member of the Hamakua Series. It is probable that a former caldera lies beneath these later lava flows (MacDonald and Abbott 1970).

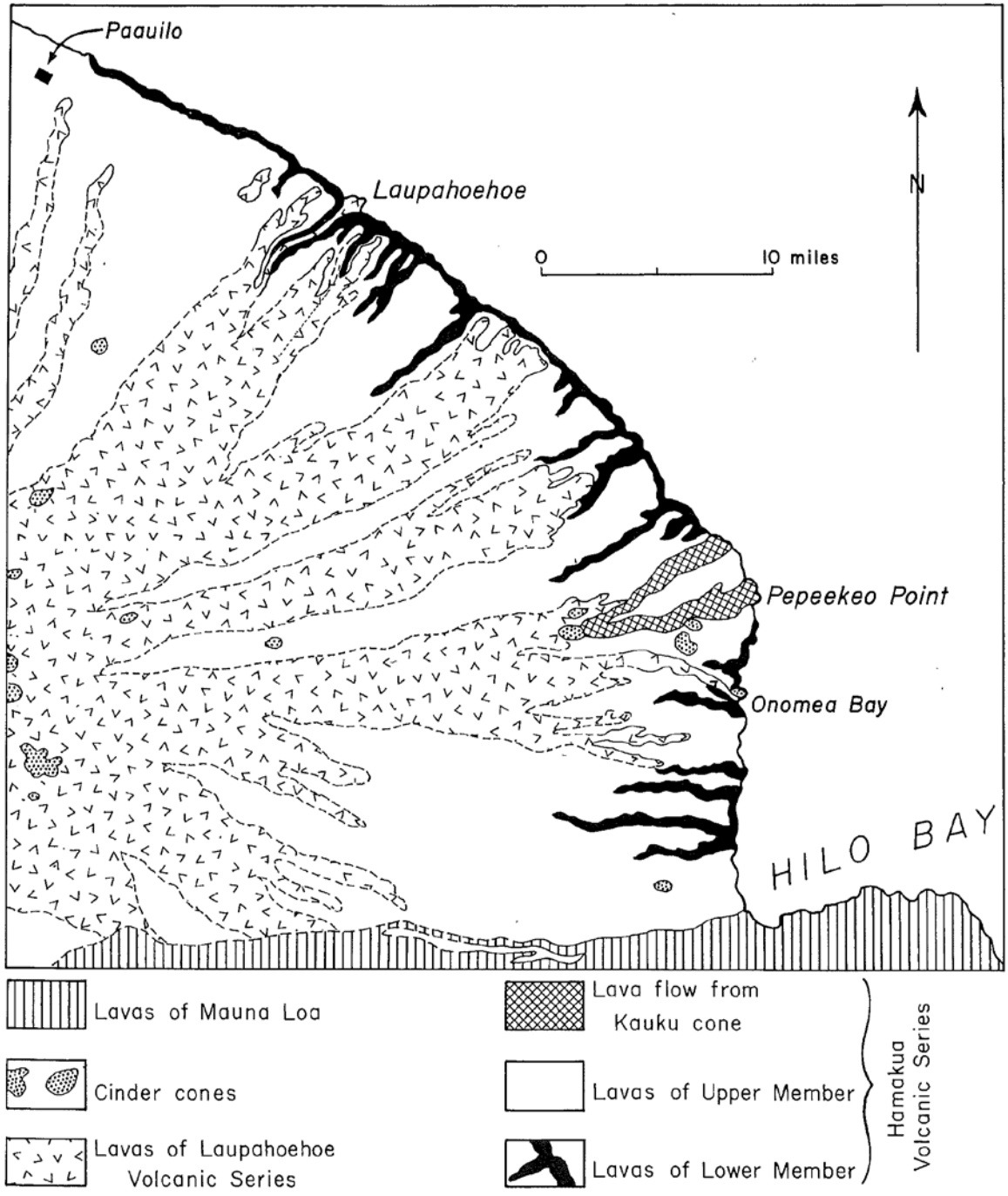

Figure 3-3. Geologic map of Mauna Kea from MacDonald and Abbott (1970).

3.3.2 Mauna Loa

Mauna Loa is a shield volcano comprising at least three separate shield volcanoes built around three separate eruptive centers (MacDonald and Abbott 1970). Mauna Loa is about 75 miles (121 kilometers) long and about 64 miles (103 kilometers) wide (Table 3-2). It is one of the most productive volcanoes on Earth. Since 1832, Mauna Loa has averaged one caldera outbreak every 4 years and a lava flow every 7 years, though the latest eruption was in 1984 (Table 3-4) (Stearns 1985). Mauna Loa contains a caldera named Moku‘aweoweo at its summit.

Mauna Loa has well-defined, southwest-northeast rift zones and a weak northerly rift zone (Stearns 1985). Most eruptions from Mauna Loa start in the caldera as high, short-lived lava fountains and then change to lava pouring out from vents along the rifts. The rift zones are marked by scores of open cracks that range from just inches to 10 ft (3 m) wide. More than 160 fissures and cinder-and-spatter cones have been found on Mauna Loa.

The eruption in 1984 began as a sudden eruption that followed 3 years of increasing earthquake activity (USGS 2004). Lava broke through the surface of Moku‘aweoweo caldera on March 25, 1984. The eruptive fissures migrated rapidly down the southwest rift zone to 12,750 ft (3,886 m) amsl (Flow A on Figure 3-4). Lava fountains extended across the northeast half of Moku‘aweoweo caldera and into the upper reaches of the northeast rift zone (Flow B on Figure 3-4). A narrow flow moved about 3 miles (4.8 kilometers) down the southeast flank toward Kilauea Volcano (Flow C on Figure 3-4). Four parallel flows moved down the northeast flank (Flow D on Figure 3-4). By March 26, 1984, the vents were feeding lava to a fast-moving flow that had advanced 5.5 miles (8.8 kilometers) to the northeast (Flow E on Figure 3-4) and three less active, shorter flows (Flow D on Figure 3-4) that were advancing toward Kulani Prison. On March 29, 1984, a levee along the lava channel broke, and lava from Flow E diverted into a subparallel flow (Flow F on Figure 3-4); on April 5, 1984, a third subparallel flow (Flow G on Figure 3-4) was formed as another levee broke. The eruption ended on April 15, 1984. Lava flows extended no more than 1.2 miles (1.9 kilometers) from the vents.

The stratigraphy of Mauna Loa is composed of tholeiitic basalts, olivine basalts, and oceanites. There are three stratigraphic series on Mauna Loa (Table 3-3): The Ninole Volcanic Series is the oldest, followed by the Kahuku Volcanic Series, and the youngest is the Ka‘u Volcanic Series (Stearns 1985). The Ninole Volcanic Series has thin layers of pāhoehoe and ‘a‘ā exposed in the sides of the Ninole Shield. This series forms the core of the mountain. A steep, angular, erosional unconformity separates the Ninole Series from the overlying Kahuku Series. The Kahuku Series is approximately 600 ft (182 m) thick and is overlain by 5–15 ft (1.5–4.5 m) of Pahala ash. Overlying the Pahala ash is the Ka‘u Series, which consists of fairly fresh lavas and contains the most recent eruptions. The rocks in the Ka‘u Series are rarely more than 25 ft (7.6 m) thick, except in the upper part of Mauna Loa, where they are more than 800 ft (243 m) thick.

The summit of Mauna Loa is 13,680 ft (4,169 m) amsl. The LZs lie on the north face of Mauna Loa, northeast of the summit. LZ-1 is at about 7,840 ft (2,390 m) amsl, LZ-2 is at about 8,010 ft (2,441 m) amsl, and LZ-3 is at about 8,880 ft (2,707 m) amsl. The slopes for LZ-1 and LZ-3 are approximately 9%. The slope for LZ-2 is about 10.4%.

Table 3-4. Historic eruptions of Mauna Loa from Stearns (1985).

Date of commencement		Approximate duration (days)		Location of principal outflow	Altitude of main vent (feet)	Approximate repose period since last eruption (months)	Area of lava flow (square miles)	Approximate volume of lava (cubic yards)
Year	Month and day	Summit eruption	Flank eruption					
1832	June 20	21	(?)	Summit	13,000(?)	.....	.....	.....
1843	Jan. 9	5	90	N. flank	9,800	126	20.2	250,000,000
1849	May	15	....	Summit	[4]13,000	73	.....	.....
1851	Aug. 8	21	(?)	Summit	13,300	26	6.9	90,000,000
1852	Feb. 17	1	20	NE. rift	8,400	6	11.0	140,000,000
1855	Aug. 11	.....	450	NE. rift	10,500(?)	41	[2]12.2	150,000,000
1859	Jan. 23	<1	300	N. flank	9,200	26	[3]32.7	[3]600,000,000
1865	Dec. 30	120	....	Summit	13,000	73	.....	.....
1868	Mar. 27	1	[5]15	S. rift	3,300	23	[3]9.1	[3]190,000,000
1870	Jan. 1(?)	14	....	Summit	13,000	21	.....	.....
1871	Aug. 1(?)	30	....	Summit	13,000	18	.....	.....
1872	Aug. 10	60	....	Summit	13,000	11	.....	.....
1873	Jan. 6	2(?)	....	Summit	13,300	3	.....	.....
1873	Apr. 20	547	....	Summit	13,000	3	.....	.....
1875	Jan. 10	30	....	Summit	13,000	2	.....	.....
1875	Aug. 11	7	....	Summit	13,000	6	.....	.....
1876	Feb. 13	Short	....	Summit	13,000	6	.....	.....
1877	Feb. 14	10	[7]1	W. flank	−180±	12	.....	.....
1880	May 1	6	....	Summit	13,000	38	.....	.....
1880	Nov. 1	.....	280	NE. rift	10,400	6	24.0	[3]300,000,000
1887	Jan. 16	.....	10	SW. rift	5,700	65	[3]11.3	[3]300,000,000
1892	Nov. 30	3	....	Summit	13,000	68	.....	.....
1896	Apr. 21	16	....	Summit	13,000	41	.....	.....
1899	July 4	4	19	NE. rift	10,700	38	16.2	200,000,000
1903	Oct. 6	60	....	Summit	13,000	50	.....	.....
1907	Jan. 9	<1	15	SW. rift	6,200	37	8.1	100,000,000
1914	Nov. 25	48	....	Summit	13,000	94	.....	.....
1916	May 19	.....	14	SW. rift	7,400	16	6.6	80,000,000
1919	Sept. 29	Short	42	SW. rift	7,700	40	[3]9.2	[3]350,000,000
1926	Apr. 10	Short	14	SW. rift	7,600	77	[8]13.4	[3]150,000,000
1933	Dec. 2	17	<1	Summit	13,000	91	2.0	100,000,000
1935	Nov. 21	<1	42	NE. rift	12,100	23	[9]13.8	[1]60,000,000
1940	Apr. 7	133	<1	Summit	13,000	51	[10]3.9	100,000,000
1942	Apr. 26	2	13	NE. rift	9,200	20	[11]10.6	100,000,000
1943	Nov. 21	3	....	Summit	13,000	18	(?)	(?)[12]
1949	Jan. 6	145	2	Summit	13,000	61	5.6	77,000,000
1950	June 1	<1	23	SW. rift	8,000	12	[13]35.0	[13]600,000,000
1975	July 5	2	....	Summit	13,000	181	5.2	32,500,000
1984	Mar. 25	Short	[14]22	NE rift	9,400	108	4.1	[13]232,000,000
Total		1,330	1,374				260.1	4,301,500,000

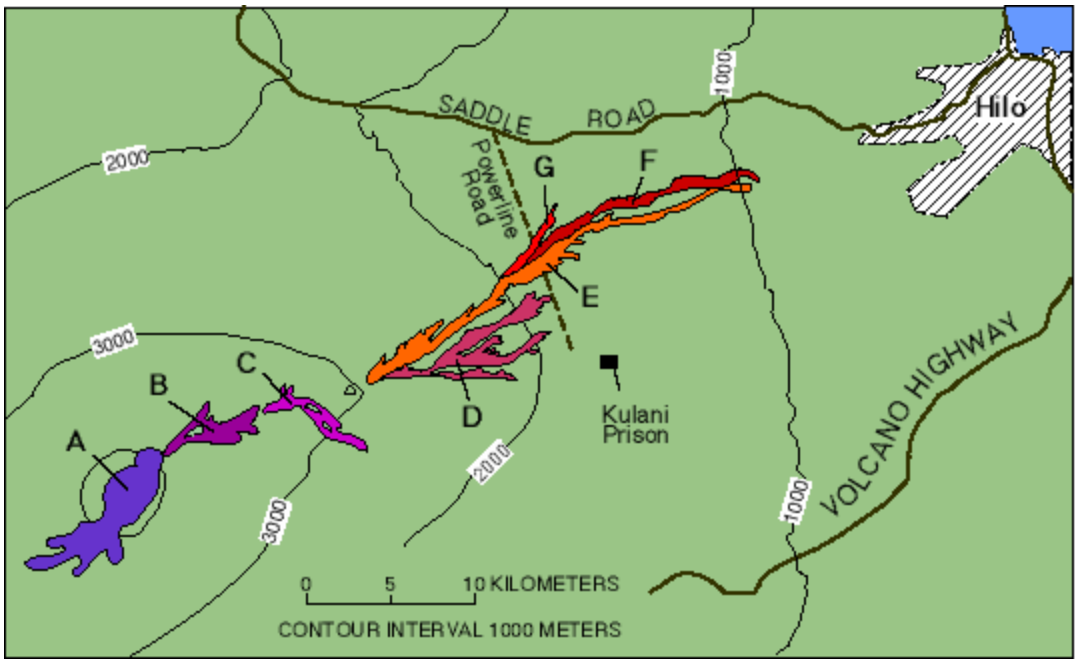

Figure 3-4. Map of Mauna Loa's 1984 flows from USGS (2004).

3.3.3 Kilauea

Kilauea is the youngest and southeasternmost volcano on the Big Island of Hawai‘i. Topographically, Kilauea appears as only a bulge on the southeast flank of Mauna Loa, so for many years Kilauea was thought to be a mere satellite of its giant neighbor, not a separate volcano (USGS 2009). However, research over the past few decades shows clearly that Kilauea has its own magma-plumbing system, extending to the surface from more than 37 miles (60 kilometers) deep in the earth. Since 1952, there have been 34 eruptions. Since January 1983, eruptive activity has been continuous along the east rift zone (USGS 2009). The eruption of Kilauea Volcano that began in 1983 continues at the cinder-and-spatter cone of Pu‘u ‘Ō ‘ō. Beginning in 1983, a series of short-lived lava fountains built the massive cinder-and-spatter cone of Pu‘u ‘Ō ‘ō. In 1986, the eruption migrated 1.8 miles (2.9 kilometers) down the east rift zone to build a broad shield, Kupaianaha, which fed lava to the coast for the next 5.5 years (USGS 2008).

When the eruption shifted back to Pu‘u ‘Ō ‘ō in 1992, flank-vent eruptions formed a shield banked against the west side of the cone (USGS 2008). From 1992 to 2007, nearly continuous effusion from these vents has sent lava flows to the ocean, mainly inside Hawai‘i Volcanoes National Park. Flank vent activity undermined the west and south sides of the cone, resulting in the collapse of the west flank in January 1997.

Since 1997, the eruption has continued from a series of flank vents on the west and south sides of the Pu‘u ‘Ō ‘ō cone (USGS 2008). During this time, the composite flow field has expanded westward, and tube-fed pāhoehoe forms a plain that spans 9.7 miles (15.6 kilometers) at the coast.

Figure 3-5 (USGS 2010a) shows the extent of the various flows starting in 1983 and continuing through today.

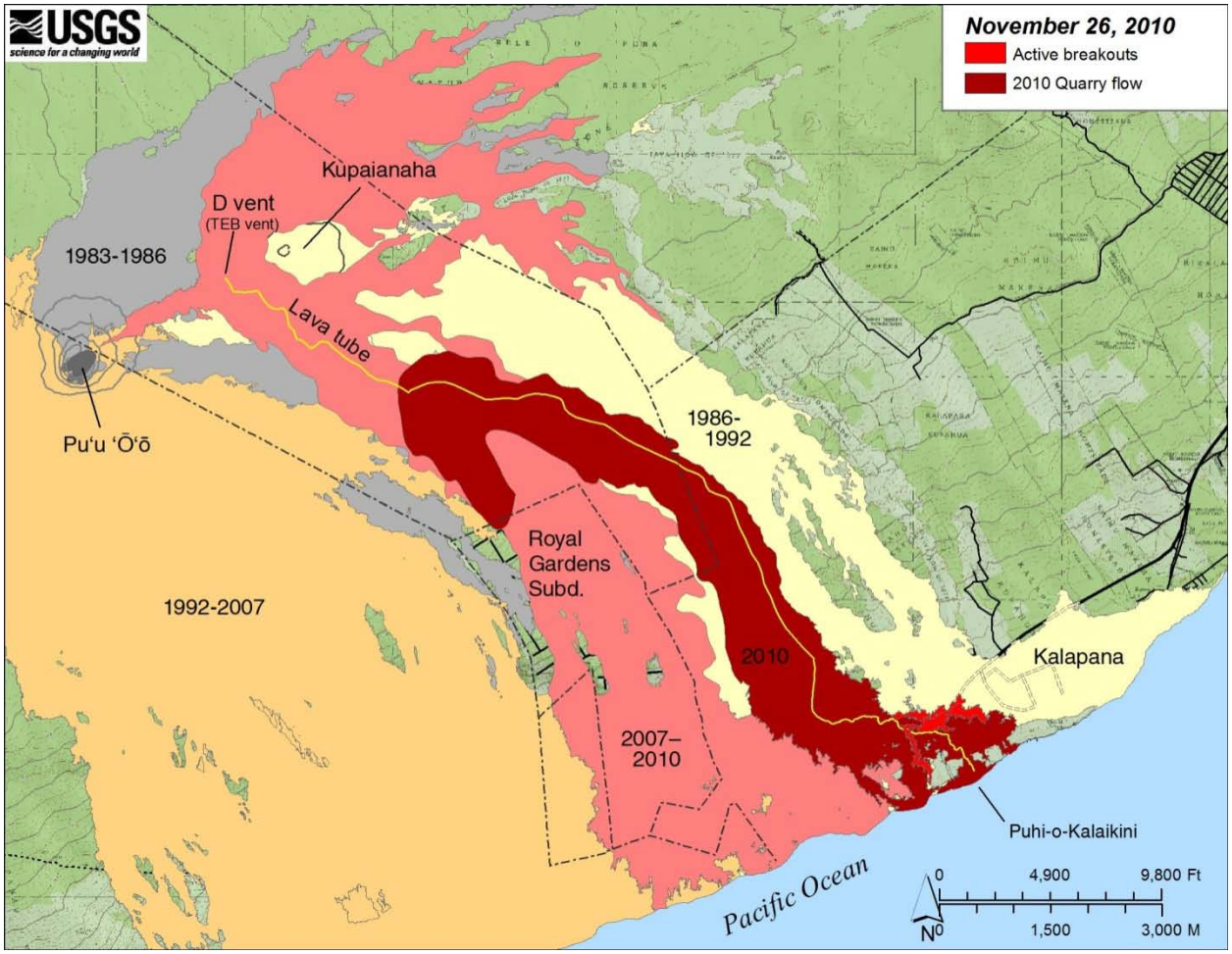

Figure 3-5. Map showing the current extent of the various flows from Kilauea beginning in 1983 from USGS (2010a).

3.4 Soils and Hydraulic Properties

The soils vary across the islands due to differences in climate, slope, drainage, and ages of the islands. There are 11 soil orders found on the islands. Figure 3-6 shows the soil order distribution on the island of Hawai‘i (Lau and Mink 2006). Andisols are volcanic ash soils that have high phosphorus uptake. Andisols, Inceptisols, and several combination orders (Andisols-Inceptisols, Histosols-lava, and Histosols-lava-Andisols) are prevalent in the relatively high-rainfall areas on the island of Hawai‘i. Histosols are thin, highly organic soils that are formed from decomposed forest litter on young lava flows. These soils are well drained and occur in moderate rainforests. Inceptisols from volcanic ash are young soils with a thin mantle and weakly developed horizons on sloping surfaces. Aridisols are desert soils found only in the arid lee areas of the island of Hawai‘i (Lau and Mink 2006).

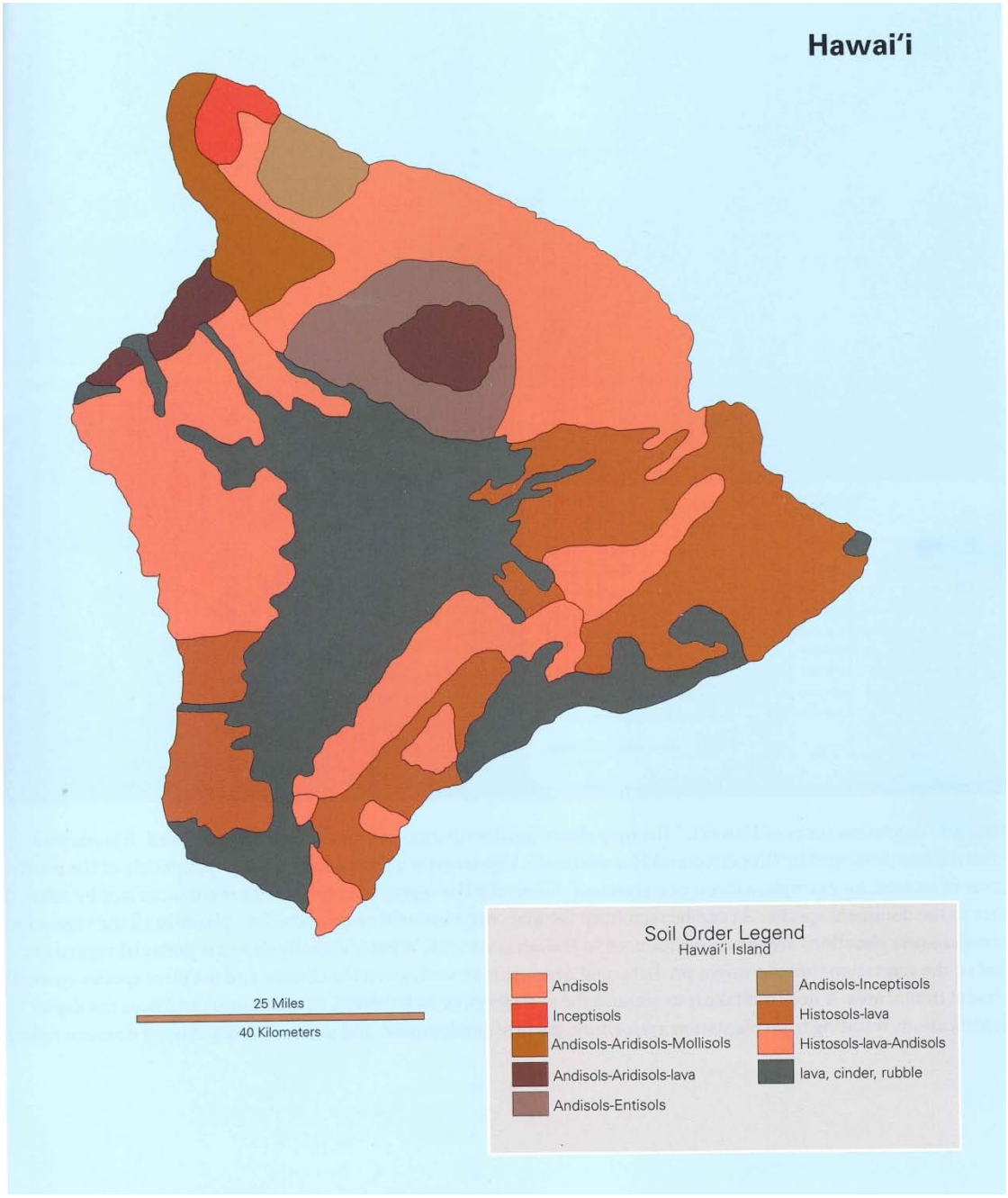

Figure 3-6. Soil orders of the island of Hawai‘i from Lau and Mink (2006).

The three LZs (4, 5, and 6) on Mauna Kea exist on soils composed of cinders (Figure 3-7). LZ-4 lies in the vicinity of neighboring very stony soil. The three LZs (1, 2, and 3) on Mauna Loa exist on soils composed of ʻaʻā lava flows (Figure 3-7). Nearby soils are composed of cinders.

The values of porosity and water-retentive properties are high for virtually all of the great soil groups of Hawaiʻi. Total porosity in Hawaiʻi soils ranges from 68–74%, and macroporosity ranges from 10–18%. Field capacity is within a narrow range of 56–58%, wilting point from 28–38%, and available water from 19–28%. These values differ from other typical values found in the continental United States due to the strongly aggregated structure and the typically non-swelling clay minerals of Hawaiʻi soils (Lau and Mink 2006).

The values of saturated hydraulic conductivity, K_s, in Hawaiʻi soils are typically a few meters per day. However, they are about three orders of magnitude smaller than that for unweathered basalts, the parent rock. Surface crusting and sealing are not common in Hawaiʻi soils (Lau and Mink 2006).

3.5 Water Resources

The ocean surrounding the Hawaiian Islands receives 25–30 in. (63.5–76.2 cm) of rainfall per year. The islands receive 10–15 times as much in some places (Lau and Mink 2006). The maximum rainfall occurs at elevations between 2,000–3,000 ft (610–914 m) and on the windward (eastern) sides of the islands due to the northeasterly trade winds. Rainfall decreases rapidly at elevations higher than 3,000 ft (914 m).

The high permeability of the lava flows on Mauna Kea and Mauna Loa allow for little to no erosion to occur (Lau and Mink 2006). Instead of running off, the water sinks through the porous rock. The bulk of water found on the island is groundwater. The order of potential yield, in general, for basalts is (1) interstitial spaces in ʻaʻā, (2) cavities between lava flow beds, (3) shrinkage cracks, (4) lava tubes, (5) gas vesicles, (6) cracks produced by mechanical forces after the flow has come to rest, and (7) tree mold holes (Lau and Mink 2006). Some lava tubes are 30 ft (9 m) in diameter and are capable of transmitting vast quantities of water.

There is at least one perennial stream, on Hawaiʻi's northern coast. It is called Waikoloa Stream, and it heads in the Kohala Mountains, runs along the foot of Kohala Mountain, and discharges into Kawaihae Bay.

Because of the younger age of the island of Hawaiʻi and continuing volcanic activity, groundwater is not well studied. There are very few groundwater wells on the island of Hawaiʻi. The Commission on Water Resource Management (2009) owns two wells on the western coast. One of these wells (Keopu) is currently under repair and has no water-level measurement data available. The other well (Kahaluʻu) has an average water level at approximately 2 ft (0.61 m) amsl (Commission on Water Resource Management 2009). The USGS (2010b) network of wells on Hawaiʻi contains 13 wells. The closest well to the LZs is located in Hawaiʻi Volcano National Park. The highest water level recorded for this well was 2,060 ft (628 m) amsl, which occurred in 1998 (USGS 2010b).

Aquifers in Hawaiʻi consist of either volcanic rock or sedimentary rock (Lau and Mink 2006). Volcanic aquifers are much larger and more extensive than sedimentary aquifers and constitute the only aquifers capable of supplying potable water. The yield of sedimentary aquifers is almost always brackish water, and usage is restricted to irrigation without further treatment.

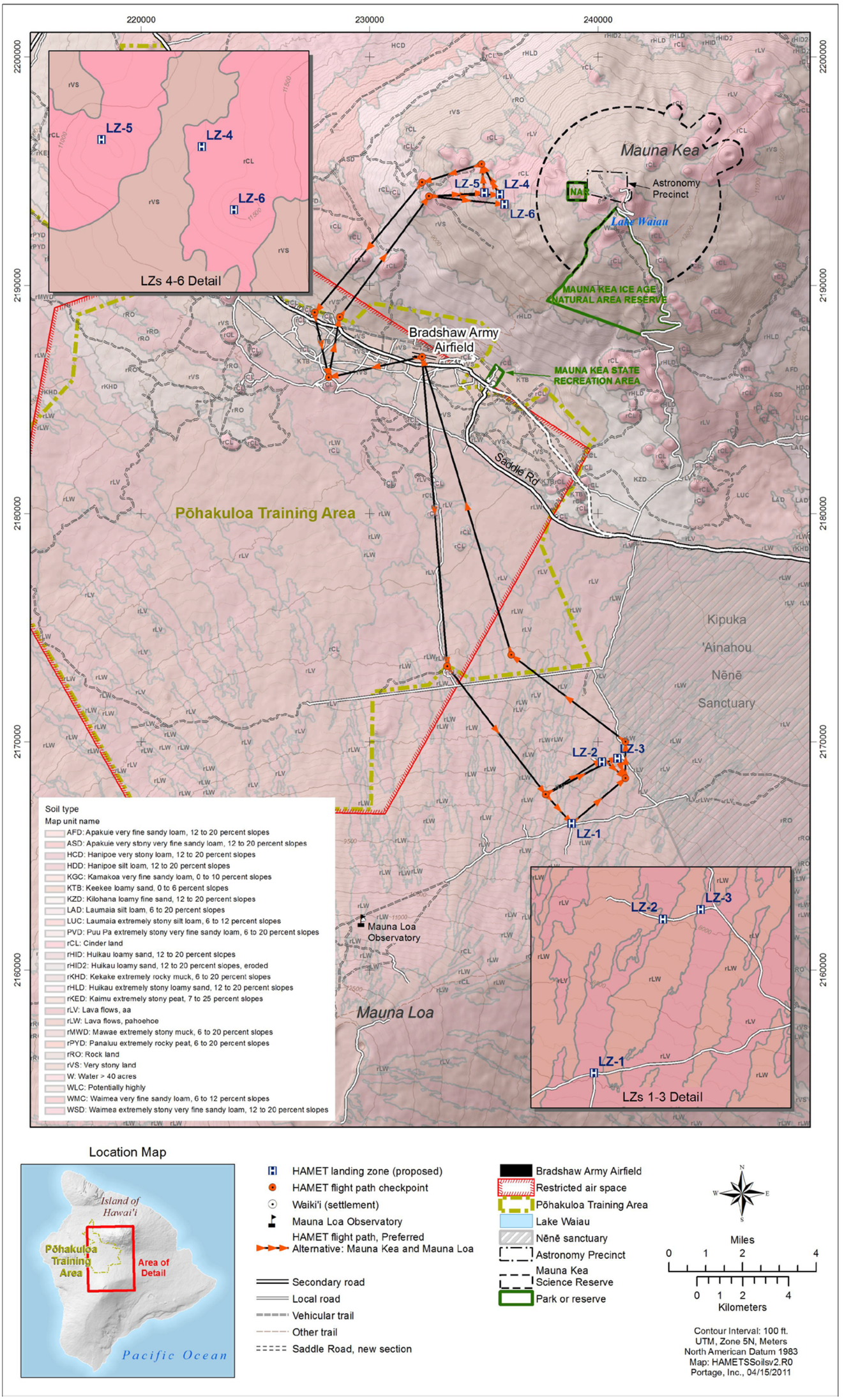

Figure 3-7. Soil types and locations.

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"High-level" and "basal" are the two fundamental varieties of groundwater on Hawai‘i (University of Hawai‘i 2010). High-level groundwater is either isolated from, or beyond the reach of, seawater intrusions. Basal groundwater rests on, and is hydraulically continuous with, underlying seawater.

3.5.1 Mauna Kea

The following subsections describe Mauna Kea water resources.

3.5.1.1 Surface Water. Figure 3-8 shows the perennial streams on the island of Hawai‘i. They are all on the northeast side of the island. There are no regularly flowing or perennial streams in the Mauna Kea Science Reserve or in the vicinity of Hale Pōhaku (University of Hawai‘i 2010). Near the Mauna Kea summit region, the Wailuku River is the only river whose numerous gulches extend along the upper flanks of Mauna Kea, and stream flow is considered to be perennial where gulches comes together, downslope near an elevation of 10,000 ft (3,048 m) amsl. The only surface water present in the summit region is Lake Waiau within the adjacent Mauna Kea Ice Age NAR (University of Hawai‘i 2010).

Lake Waiau is located at the bottom of Pu‘u Waiau and is one of Hawai‘i's few confined surface water bodies and one of the highest alpine lakes in the United States (University of Hawai‘i 2010). The lake freezes almost entirely during colder times of the year and has never been known to dry up. Lake Waiau is believed to have formed approximately 15,000 years ago following the last glacial retreat. It is 300 ft (91 m) in diameter and reaches a depth of approximately 7.5 ft (2.3 m) at full capacity. Topography limits the lake's watershed to about 35 acres (14.2 hectares). The lake's water is mostly snowmelt and precipitation within the watershed. The presence of Lake Waiau is attributable to an impermeable layer within Pu‘u Waiau that creates a perched aquifer, which is limited and occurs above the regional aquifer. Lake Waiau is considered traditional cultural property and is not used for drinking water purposes (University of Hawai‘i 2010).

3.5.1.2 Groundwater. There are several aquifers below Mauna Kea (Figure 3-9) (Commission on Water Resource Management 2008). They are divided into two regions: West and East Mauna Kea. The sustainable yield for each aquifer is listed on Figure 3-9 in million gallons per day (MGD); the total sustainable yield for Mauna Kea aquifers is 412 MGD (1.6 m^3 per day).

The regional aquifer beneath the summit of Mauna Kea (Waimea aquifer) is what is referred to in Hawai‘i as high-level, which means that the aquifer is entirely fresh water (not fresh water floating on salt water), and geologic structures, such as volcanic sills and dikes, isolate the water. Although groundwater is the primary source of drinking water in Hawai‘i, there are no wells extracting groundwater near the summit, because it is considered uneconomical to drill a well deep enough to reach the groundwater and pump it to the surface (University of Hawai‘i 2010). The nearest well is located approximately 12 miles (19 kilometers) away in Waiki‘i Ranch along Saddle Road. The ground elevation at this well is 4,260 ft (1,298 m) amsl, and the static water level in the well in 1988 was measured at 1,280 ft (390 m) amsl.

Near the Hale Pōhaku Facilities, there are modest springs and seeps and shallow groundwater (University of Hawai‘i 2010). The most prominent of these springs and seeps is the series of springs found near Pōhakuloa and Waikahalulu gulches. The gulches are on Mauna Kea's south flank at a distance of 3.25 and 1.25 miles (5.2 and 2.0 kilometers) west of Hale Pōhaku, respectively. Analyses of the water show it comes from rainfall at the summit. Hale Pōhaku is located above the Onomea aquifer system (Figure 3-9). There are no wells in the vicinity, and because the groundwater is at such a great depth, it is uneconomical to use it. Mauna Kea Observatory Support Services has trucks deliver approximately 30,000 gal (114 m^3) of water per week from Hilo to Hale Pōhaku (University of Hawai‘i 2010). Each year, 502,500 gal (1,902 m^3) of water is trucked to the summit observatories.

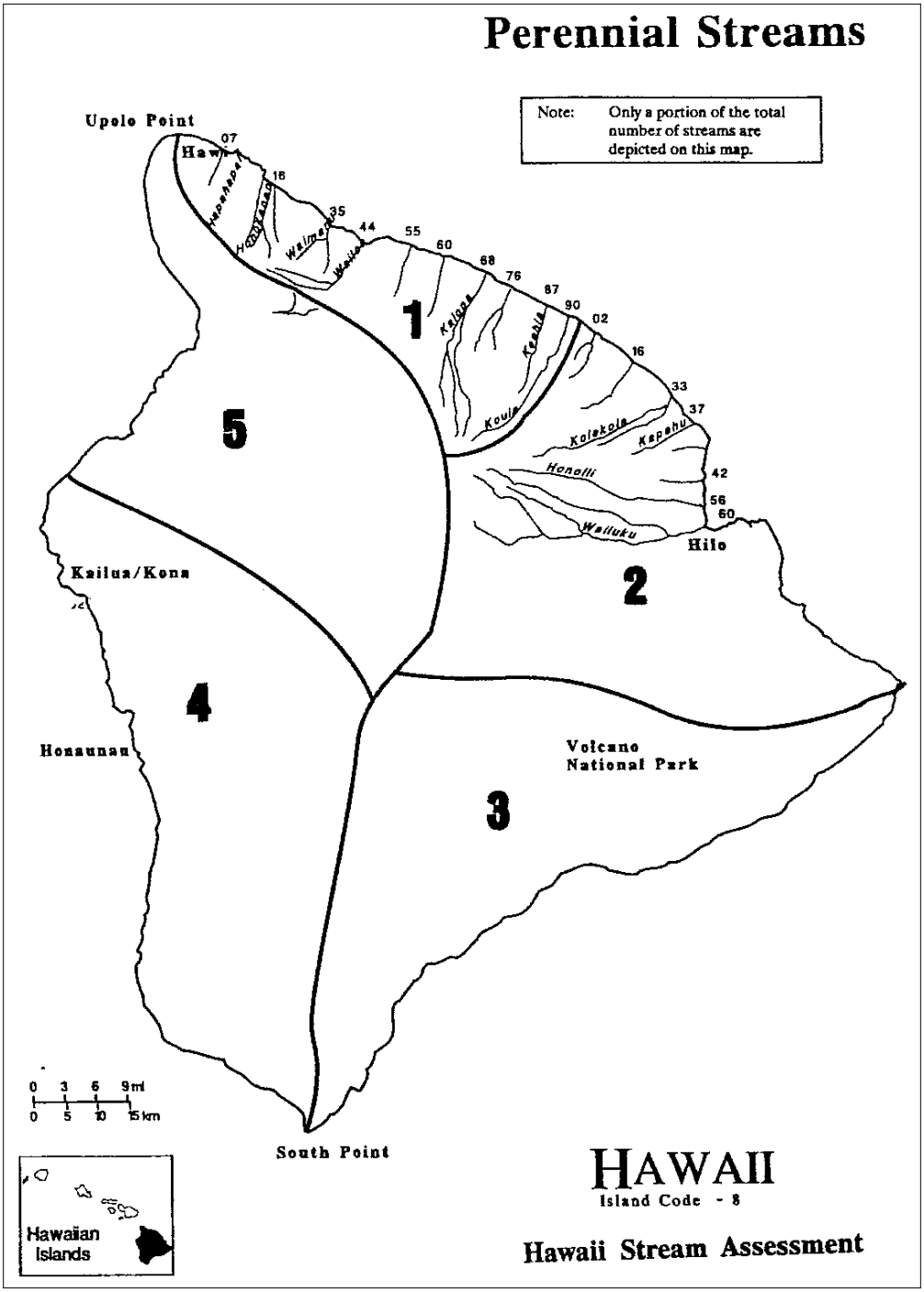

Figure 3-8. Perennial streams on Hawai‘i from Hawai‘i Cooperative Park Service Unit (1990).

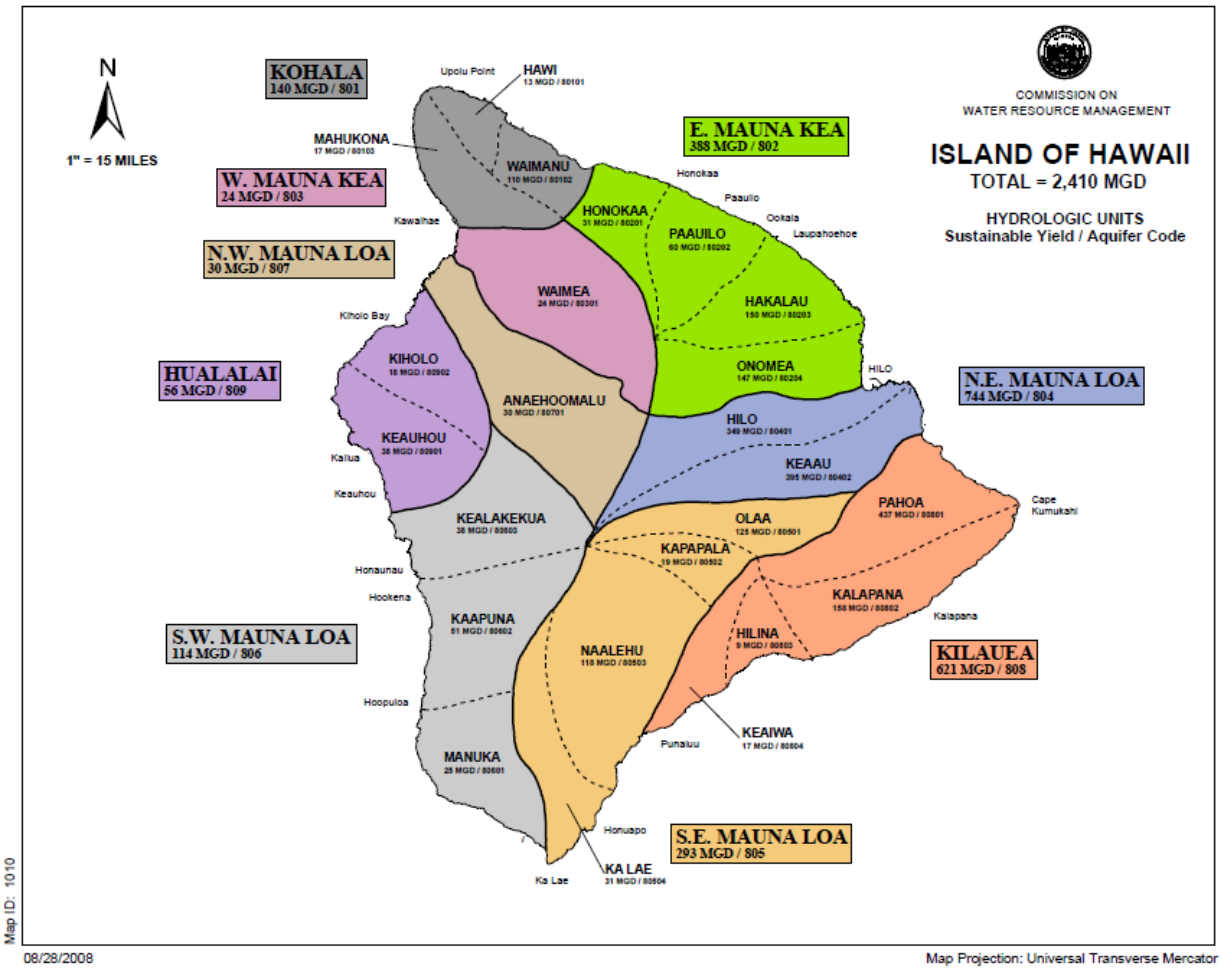

Figure 3-9. Groundwater aquifers on Hawai‘i from Commission on Water Resource Management (2008).

3.5.2 Mauna Loa

The following subsections describe Mauna Loa water resources.

3.5.2.1 Surface Water. Figure 3-8 shows the perennial streams on the island of Hawai‘i. All of them are located on the northeast side of the island. There are no regularly flowing or perennial streams on or near Mauna Loa.

3.5.2.2 Groundwater. There are several aquifers below Mauna Loa (Figure 3-9). They are divided into four regions: Northwest, Northeast, Southeast, and Southwest Mauna Loa. The sustainable yield for each aquifer is listed on Figure 3-9 in MGD; the total sustainable yield for Mauna Loa aquifers is 1,181 MGD (4.5 million m^3 per day) (Commission on Water Resource Management 2008).

The largest basal aquifer in Hawai‘i (Kea‘au aquifer) lies in Mauna Loa flank lavas between the Hilo Coast and the high-rainfall area to about the 5,000-ft (1,524-m) elevation. An enormous volume of cool, fresh groundwater moves through the aquifer to discharge freely at the coast, unimpeded by a caprock. Discharged as a spring, it would be among the most voluminous in the world (Lau and Mink 2006).

Hawaiian Springs, LLC, is a water bottling company established in February 1995. Its source of water is located on Mauna Loa in the Puna District. Hawaiian Springs uses artesian wells at the mountain's base. The company's Web site (Hawaiian Springs 2008) states that its well system uses water from the Hilo and Kea'au aquifers, which are part of the Northeast Mauna Loa aquifer system (Figure 3-9). The pump intake is located 241 ft (73.5 m) below ground surface (bgs). According to the Hawaiian Springs Web site, rainfall on the slopes is up to 200 in. (612 cm) per year (6.7 million gal per square mile). This translates to 1.38 billion gal of rainfall per day, with a recharge rate of 740 MGD. The Kea'au aquifer is described as a basal lens and lies near sea level. Hawaiian Springs claims the water is bottled within approximately 30 days from the time it falls as precipitation. This indicates a very high percolation rate.

3.6 Biological Resources

Biological resources include plant and animal species and the habitats or communities in which species occur. This subsection describes the biological resources that have the potential to occur within or near the proposed alternative flight paths and LZs for HAMET. Threatened and endangered vegetation and wildlife species, special status species, sensitive habitats, and other species of concern that have been recorded in, or that have the potential to be found within, or near the proposed alternative flight paths and LZs are discussed in this subsection (USACE and COE 2009).

The Mauna Loa and Mauna Kea LZs are located in what are essentially alpine stone deserts, with sparse vegetation scattered over lava, barren rock, and cinders. These plant communities consist mostly of the perennial native grasses Hawaiian bentgrass (*Agrostis sandwicensis*) and pili uka (*Trisetum glomeratum*) and the perennial native fern 'iwa'iwa (*Asplenium adiantum-nigrum*). Wildlife inhabiting the alpine stone deserts consists mainly of (a) arthropods, such as the Mauna Loa bug (*Nysius aa*) and wekiu bug (*Nysius wekiuicola*) and (b) vertebrates that include several species of birds, rodents, and a few ungulates (such as feral sheep [*Ovis aries*], goats [*Capra hircus*], and the mouflon sheep [*Ovis musmon*]) (University of Hawai'i 2009). Detailed information and methods on the vegetation, bird, bat, and arthropod surveys conducted at the Mauna Loa and Mauna Kea LZs are found in various memoranda for record (Peshut 2011a; Peshut 2011b; Peshut and Evans 2011; Peshut and Doratt 2011a; Peshut and Doratt 2011b; Peshut and Doratt 2011c; Peshut and Schnell 2011a; Peshut and Schnell 2011b, which are provided in Appendix F). The flight paths from Bradshaw Army Airfield over PTA to the LZs on Mauna Kea and Mauna Loa are above subalpine dry forests and shrublands. These vegetation communities include, but are not limited to, fountain grass (*Pennisetum setaceum*), 'a'ali'i (*Dononaea viscosa*), naio (*Myoprum sandwicense*), 'ulei (*Osteomeles anthyllidifolia*), and māmane (*Sophora chrysophylla*). The flight path is also over a portion of palila critical habitat (PCH), which is made up of a subalpine māmane dry forest. The wildlife in the subalpine dry forests and shrublands include birds, such as the palila [*Loxiodes bailleui*], rodents, and feral ungulates (such as feral sheep [*Ovis aries*], goats [*Capra hircus*], and mouflon sheep [*Ovis mismon*]) (University of Hawai'i 2009). Wildlife and vegetation species under the flight paths are not anticipated to be impacted from HAMET activities.

The biological resources within or near the proposed alternative flight paths or LZs include those designated as threatened and endangered species, sensitive species, and their corresponding habitats. Information presented in this subsection includes findings from vegetation and wildlife surveys conducted in conjunction with other assessments, in the vicinity of the LZs, and surveys conducted for this EA.

Under the ESA (16 USC 35 § 1531 et seq.), vegetation and wildlife species may be listed as either threatened or endangered with the purpose to protect and recover those species and the habitat on which they depend. A species may be listed as endangered when the "species is in danger of extinction throughout all or a significant portion of its range" (16 USC 35 § 1531 et seq.). A species may be listed as

threatened when the species "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (16 USC 35 § 1531 et seq.).

Sensitive species are defined as species that are categorized as special status or regulated by federal or state agencies. Species can be listed as endangered, threatened, candidate, or proposed candidate species (USAEC 2008). Species that experience population declines or habitat loss should also be considered sensitive species (USAEC 2008). Table 3-5 lists sensitive species or potential sensitive species, including wildlife and vegetation potentially occurring below the flight paths to LZs on Mauna Loa and Mauna Kea but not occurring within the LZ survey area.

Critical habitat areas are defined by the ESA as "(1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation." These areas may require special management considerations or protection. The *Final Environmental Impact Statement, Permanent Stationing of the 2/25th Stryker Brigade Combat Team* (USAEC 2008) states, "Critical habitat may be designated on private or government lands, activities on these lands are not restricted unless there is federal involvement in the activities or direct harm to listed wildlife." In addition, USAEC (2008) states, "Federal agencies are required to conduct Section 7 consultation if a proposed action could affect designated critical habitat, even if the effects are expected to be beneficial. The Army, as a federal agency, is prohibited from adversely modifying critical habitat." The Mauna Loa and Mauna Kea LZs are not located in areas that have been designated as critical habitat. Helicopter flight paths to the Mauna Kea LZs maintain a minimum flight elevation of 2,000 ft (610 m) above the PCH.

Recovery plans are documents that detail the management practices, goals, and tasks needed for sensitive species to recover (USACE and COE 2009). Prepared by the USFWS, recovery plans provide guidelines for private, federal, and state agencies to conserve sensitive species and their habitat (USACE and COE 2009). Recovery plans include a description of management plans and goals, criteria for measuring populations and goals to delist the species, and estimates time and costs to carry out recovery goals (USACE and COE 2009).

In February, March, May and June 2011, presence surveys for vegetation, birds, bats, and arthropods were conducted at the proposed LZs on Mauna Kea and Mauna Loa. The surveys were conducted by the Army and the Center for Environmental Management of Military Lands (CEMML). Vegetation surveys were conducted to determine the presence of listed species near the LZs, and no listed species were located within a 328-ft (100-m) radius of the LZs (Peshut and Evans 2011). The nearest known population of silversword is located 2,500 meters (8,202 ft) west of Mauna Kea LZ-5.Surveys for birds occurred within a 2,000-ft (610-m) buffer around each LZ and generally observed limited resources for bird habitat near the LZs, which would limit bird occurrence near those areas (Peshut and Schnell 2011a). The survey for bats concluded that there is little vegetation near the LZs or in the genral region of the LZs where the Hawaiian hoary bats can roost (Peshut and Doratt 2011a). Surveys for arthropods near the LZs on Mauna Kea found no wekiu bugs or invasive ants (Peshut and Doratt 2011b; Peshut and Doratt 2011c).

Table 3-5. Federal- and state-listed endangered, threatened, and candidate species and species of concern (sensitive species) potentially occurring below the flight paths to LZs on Mauna Loa and Mauna Kea but not occurring within the LZ survey area.

Species	Federal Status[a]	State Status[b]	Occurrence in Flight Path[c]
Plants			
Mauna Loa silversword (*Argyroxiphium kauense*)	1	1	5
Mauna Kea silversword (*Argyoxiphium sandwicense*)	1	1	5
Fragile fern (*Asplenium peruvianum* ssp. *insulare*)	1	1	2
Honohono/Hawaiian mint (*Haplostachys haplostachya*)	1	1	4
Kioele/leather leaf sweet ear (*Hedyotis coriacea*)	1	1	3
Ma‘aloa/spotted nettle bush (*Neraudia ovata*)	1	1	4
Kiponapona (*Phyllostegia racemosa* var. *racemosa*)	1	1	3
Po‘e, ‘ihi, ‘ihi makole (*Portulaca sclerocarpa*)	1	1	2
Lanceleaf catchfly (*Silene lanceolata*)	1	1	3
Poplo, popolo ku mai (*Solaum incompletum*)	1	1	3
Hawaiian parsley (*Spermolepis hawaiiensis*)	1	1	3
Creeping mint (*Stenogyne angustifolia*)	1	1	1
Tetramolopium arenarium var. *arenarium*	1	1	4
Hawaiian vetch (*Vicia menziesii*)	1	1	3
Ae/Hawaiian yellow wood (*Zanthoxylum hawaiiense*)	1	1	3
Hawaiian catchfly (*Silene hawaiiensis*)	2	2	2
Makou (*Ranunculus hawaiiensis*)	3	5	6
‘Akoko (*Chamaesyce olowaluana*)	5	5	1
Douglas bladderfern (*Cystopteris douglasii*)	–	5	1
Mauna Kea dubautia or na‘ena‘e (*Dubautia arborea*)	5	5	1
Hawai‘i black snakeroot (*Sanicula sandwicensis*)	–	5	1
Invertebrates			
Blackburn’s sphinx moth (*Manduca blackburni*)	1	–	3
Koa bug (*Coleotichus blackburniae*)	5	–	4
Yellow-faced bee (*Hylaeus difficilis*)	5	5	4
Succineid snail (*Succinea konaensis*)	5	–	3
Zonitid snail (*Vitrina tenella*)	5	–	4
Picture-wing fly (*Drosophilia heteroneura*)	1	3	4

Table 3-5. (continued).

Species	Federal Status[a]	State Status[b]	Occurrence in Flight Path[c]
Picture-wing fly (*Drosophilia mulli*)	1	3	4
Picture-wing fly (*Drosophilia ochrobasis*)	1	–	4
Flying earwig Hawaiian damselfly (*Megalagrion nesiotes*)	4	3	4
Pacific Hawaiian damselfly (*Megalagrion pacificum*)	4	3	4
Black-veined agrotis noctuid moth (*Agrotis melanoneura*)	–	5	4
Wekiu bug (*Nysius wekiuicola*)	5	2	4
Yellow-faced bee (*Hylaeus flavipes*)	–	5	4
Birds			
Nēnē or Hawaiian goose (*Branta sandvicensis*)	1	1	2
Hawaiian Hawk or ʻio (*Buteo solitarus*)	1	1	2
Hammerhead or ʻakiapolaʻau (*Hemignathus munroi*)	1	1	2
Palila (*Loxioides bailleui*)	1	1	2
Hawaiian petrel or ʻuaʻu (*Pterodroma sandwichensis*)	1	1	1
Band-rumped storm petrel or ʻake ʻake (*Oceancodroma castro*)	3	1	1
Hawaiʻi ʻelepaio (*Chasiempis sandwichensis*)	5	–	3
ʻAmakihi (*Hemignathus virens virens*)	5	–	4
ʻApapane (*Himatione sanquinea*)	5	–	4
Kolea (*Pluvialis fulva*)	5	–	4
Mammals			
Hawaiian hoary bat or ʻopeʻapeʻa (*Lasiurus cinereus semotus*)	1	1	2

a. Federal status definitions:	b. State status definitions:	c. Occurrence status:
1. Endangered	1. Endangered	1. Species may occur
2. Threatened	2. Threatened	2. Species confirmed
3. Candidate	3. Candidate	3. Species unlikely
4. Proposed	4. Proposed	4. Potential habitat, but species not known to occur
5. Species of Special Concern	5. Species of Special Concern	5. Potential habitat; species may have occurred historically; species is not known to occur
		6. No potential habitat, and species is not known to occur

Sources: The *Mauna Kea Comprehensive Management Plan* (University of Hawaiʻi 2009), PTA EA (U.S. Army 2004b), Mākua EIS (USACE and COE 2009), *Hawaiʻi's Comprehensive Wildlife Conservation Strategy* (Mitchell et al. 2005), *Hawaiian Islands Plants* (USFWS 2010a), *Hawaiʻi Islands Animals* (USFWS 2010b), Stryker Brigade Combat Team final EIS (USAEC 2008)

3.6.1 Endangered and Threatened Species

Table 3-5 lists the endangered and threatened vegetation and wildlife species that could potentially occur in the ROI. An assessment of the likelihood of a species occurring was made based on the habitat requirements of the species, geographic distribution of the species, and biological surveys (USAEC 2008). Descriptions of endangered and threatened species of vegetation and wildlife that could potentially occur within or near the flight paths or LZs are provided below, and specific locations, if known, are shown in Figures 3-10 and 3-11.

3.6.1.1 Fragile fern (Asplenium peruvianum ssp. insulare). Fragile fern (*Asplenium peruvianum* ssp. *insulare*) is a federally listed endangered species that is found on PTA (USFWS 2010a). Fragile fern has been identified in montane wet, mesic, and dry forest habitats as well as subalpine dry forests and shrubland. There are several populations on PTA, and fragile fern can occur at elevations from 5,250–7,800 ft (1,600–2,377 m) (Belfield and Pratt 2002). Locations of fragile fern (*Asplenium peruvianum* ssp. *insulare*) are shown in Figure 3-10.

3.6.1.2 Po‘e (Portulaca sclerocarpa). The po‘e is a federally listed endangered species that is found on PTA (USFWS 2010a). The po‘e (*Portulaca sclerocarpa*) is a perennial herb with long stems and grayish-green leaves and white or pink flowers. The po‘e is found in dry habitats at elevations from 3,300–5,300 ft (1,006–1615 m) (University of Hawai‘i 2000a). Locations of the po‘e (*Portulaca sclerocarpa*) are shown in Figure 3-10.

3.6.1.3 Honohono (Haplostachys haplostachya). The honohono (*Haplostachys haplostachya*) is a listed endangered species found on PTA (USFWS 2010a). The honohono (*Haplostachys haplostachya*) is endemic to the Hawaiian Islands. It has long stems, broad leaves, and white flowers (USBG 2010). The honohono is particularly sensitive to the affects of grazing and invasive species (USBG 2010). Locations of honohono (*Haplostachys haplostachya*) are shown in Figure 3-10.

3.6.1.4 Hawaiian Catchfly (Silene hawaiiensis). The Hawaiian catchfly is a federally listed threatened species that is found at several locations on PTA (USFWS 2010a). The Hawaiian catchfly (*Silene hawaiiensis*) is a sprawling shrub with slender leaves and greenish-white flowers. This plant is endemic to the Big Island of Hawai‘i and is usually found in dry forests, shrublands, and grasslands on lava flows and ash deposits at elevations from 3,000–4,300 ft (900–1,300 m) (Mitchell et al. 2005). Locations of the Hawaiian catchfly (*Silene hawaiiensis*) are shown on Figure 3-10.

3.6.1.5 Hawaiian Hawk or ‘Io (Buteo solitarius). The Hawaiian hawk or the ‘io (*Buteo solitarius*) is an endangered species that is a small, broad-winged hawk and is endemic to the Hawaiian Islands, but it mostly occurs on the island of Hawai‘i. This solitary hawk is a territorial bird that remains in areas where it is nesting in native forests. Being opportunistic predators, however, these hawks have been known to use broad ranges to forage for foods (USFWS 2010c). The Hawaiian hawk is listed as a federal and state endangered species, but, as of 2008, the USFWS was proposing to remove the bird from its list of endangered and threatened wildlife because of stable populations for the past 20 years (USFWS 2008). Based on anecdotal information, the Hawaiian hawk’s habitat has been recorded over the Mauna Loa LZs, and the helicopter flight path from Bradshaw Army Airfield to the LZs would cross Hawaiian hawk locations. However, with the lack of vegetation and wildlife resources near the LZs, the Hawaiian hawk would not likely frequent the area, and it is anticipated that the population densities of ‘io at the LZs on Mauna Loa and Mauna Kea is zero (Peshut and Schnell 2011a). The range of the Hawaiian hawk or the ‘io (*Buteo solitarius*) is shown on Figure 3-11. Further analysis of the Hawaiian hawk is provided via the discussion of endangered and threatened species in Subsection 4.6.

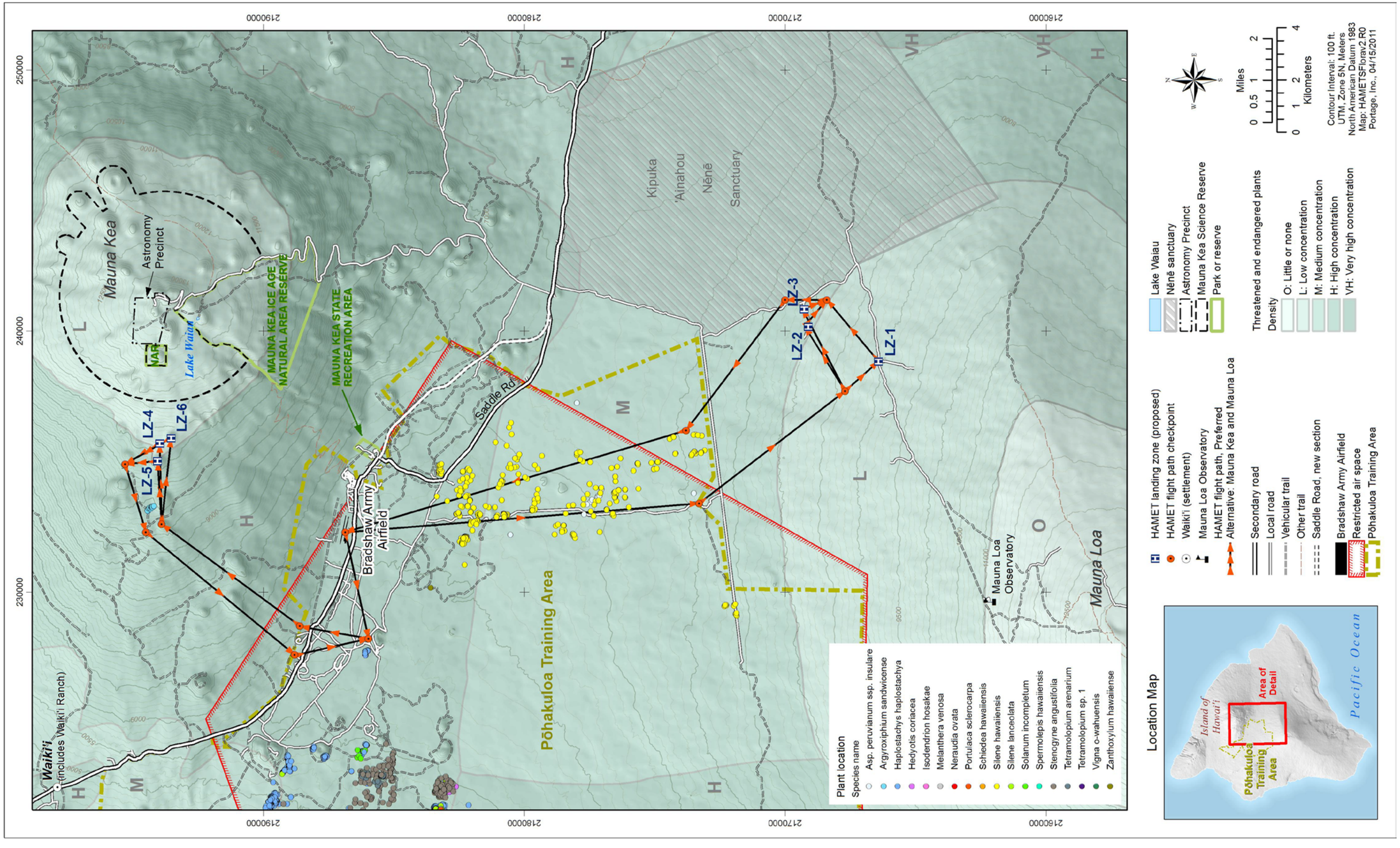

Figure 3-10. Threatened and endangered plant density and locations.

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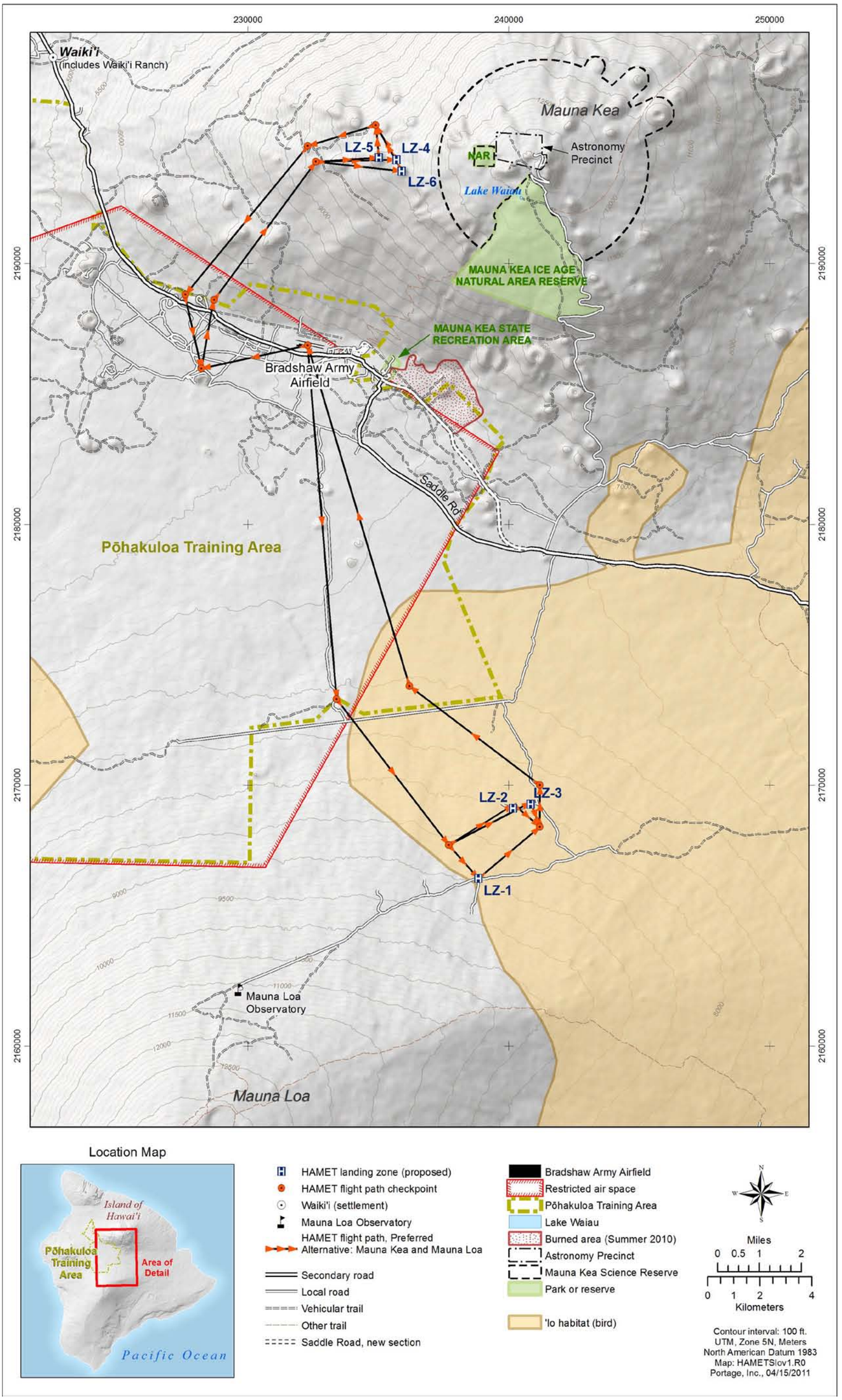

Figure 3-11. Range of the Hawaiian hawk or 'io (*Buteo solitarius*).

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3.6.1.6 Hawaiian Hoary Bat or ʻOpeʻapeʻa (Lasiurus cinereus semotus). The Hawaiian hoary bat or ʻopeʻapeʻa (*Lasiurus cinereus semotus*) is listed as an endangered species, has a range from sea level to 7,500 ft (2,286 m) on the island, and has been spotted at the mountain summits; these bats have been known to occur near the elevations of the LZs but would not be expected to depend on this habitat for resources, because the bats are mostly associated with their native vegetation (Jacobs 1994; USFWS 1994; Peshut and Doratt 2011a). The Hawaiian hoary bat is solitary, is only active from sunset to sunrise, and roosts in trees in forested areas (USFWS 2010d). The USFWS has issued reasonable and prudent measures to minimize incidental take of the Hawaiian hoary bat from PTA activities (USAEC and COE 2009). However, with the lack of vegetation and wildlife resources in the vicinity of the LZs, the Hawaiian hoary bat would not likely frequent these areas, and sightings of this bat are rare. Currently, there is no designated USFWS critical habitat for the Hawaiian hoary bat (USFWS 1994). Further analysis of the Hawaiian hoary bat is provided via the endangered and threatened species discussion in Subsection 4.6.

3.6.1.7 Palila (Loxioides bailleui). The palila (*Loxioides bailleui*) is a listed endangered species, is endemic to Hawaiʻi, and has a range from 6,000–9,000 ft (1,829–2,743 m) (USFWS 2010e). The palila has a golden-yellow head and breast, with a gray back and gray/white belly (USFWS 2010e). The palila (*Loxioides bailleui*) is concentrated on the west slope of Mauna Kea, where the palila is dependent on the māmane tree as a food source in the subalpine māmane dry forest (USGS 2006; Peshut and Schnell 2011a). As part of the recovery plan, the USFWS established the PCH in 1977 with 60,187 acres (24,356 hectares) (USAEC 2008). In August 2010, a wildfire burned approximately 1,387 acres (561 hectares) of PCH prior to containment. The 2,000-ft (610-m) AGL minimum flight elevation has been established to protect the palila and its habitat from planned operations. The range and the designated critical habitat for the palila (*Loxioides bailleui*) are shown on Figure 3-12. Further analysis of the proposed activities is included in Section 4.6.

3.6.1.8 Hammerhead or ʻAkiapolaʻau (Hemignathus munroi). The hammerhead or ʻakiapolaʻau (*Hemignathus munroi*) is a listed federal and state endangered species, is endemic to Hawaiʻi, and only lives in the high-elevation forests near the tree line on the island of Hawaiʻi (USFWS 2010f). The hammerhead has a curved bill with a yellow head and olive-green upper body. The habitat of the hammerhead is to the west and the south of the Mauna Kea LZs at the tree line. Currently, there is no USFWS designated critical habitat for the hammerhead. The helicopter flight path is above the hammerhead range on Mauna Kea and, with established mitigation measures operations, should have no effect. The range of the hammerhead or ʻakiapolaʻau (*Hemignathus munroi*) located within the area shown on Figure 3-13. Further analysis of the hammerhead is provided via the endangered and threatened species discussion in Subsection 4.6.

3.6.1.9 ʻUaʻu or Hawaiian Dark-Rumped Petrel (Pterodroma sandwichensis). The Hawaiian dark-rumped petrel or Hawaiian petrel (*Pterodroma sandwichensis*) is a federal endangered bird species that could potentially occur within the proposed flight path and near the LZs on Mauna Loa. The Hawaiian petrel has a dark-gray head, wings, and tail with a white forehead (USFWS 2010g). The Hawaiian petrel is a nocturnal seabird that nests in burrows in areas of sparse vegetation at elevations above 7,200 ft (USFWS 1983). The Hawaiian petrel feeds on crustaceans, squids, and other marine wildlife during the day and returns to the nests at night (Peshut and Schnell 2011b).

Breeding colonies of the Hawaiian petrel have been documented within the Hawaiʻi Volcanoes National Park, south of the proposed LZs on Mauna Loa (Swift and Burt-Toland 2009). There are no identified active petrel breeding colonies near (within the 2000-ft radius survey area) the Mauna Kea and Mauna Loa LZs (Peshut and Schnell 2011a; Peshut and Schnell 2011b). It has been documented that while Hawaiian petrels are flying toward their breeding colonies, they will fly close to the terrain (Swift and Burt-Toland 2009). Several conservation actions are in place to manage current populations. These

actions include protecting suspected habitat, controlling nonnative predatory species, determining the distribution of the populations, controlling direct mortalities, and minimizing the effects of artificial lighting (USFWS 1983). Currently, there is no USFWS designated critical habitat for the Hawaiian petrel (USFWS 2010g). The Hawaiian petrel is not expected to be affected by the Proposed Action; thus, further analysis of the Hawaiian petrel is via the endangered and threatened species discussion in Subsection 4.6.

3.6.2 Sensitive Species

Sensitive species that have the potential to occur within the ROI but not within the direct flight paths or LZs are described below and listed in Table 3-5. Locations and descriptions of these sensitive species are based on botanical and wildlife surveys, habitat requirements, and geographic distribution of the species, EISs, and suspected habitats.

In March 2011, surveys were conducted to determine the presence of Migratory Bird Treaty Act (MTBA) listed species that potentially could occur within a 2,000-ft (610-m) buffer for the proposed LZs (16 USC 7 § 703-712 et seq.; Peshut and Schnell 2011a). The results of the survey found two house finches (*Carpodacua mexicanus*) near the Mauna Kea LZs (Peshut and Schnell 2011a). It is expected that these birds were commuting between forested areas and not using this habitat (Peshut and Schnell 2011a). Results of the survey at the Mauna Loa LZs observed 32 ʻapanane (*Himatione sanguine*), 40 ʻōmaʻo (*Myadestes obscures*), and three house finches (*Carpodacua mexicanus*). The observed species near the LZs are not expected to be negatively impacted by HAMET operations (Peshut and Schnell 2011a). Other MTBA-listed species that could potentially occur near the LZs are the Hawaiʻi ʻamakihi (*Hemignathus virens*), northern mockingbird (*Mimus ployglottus*), sky lark (*Alauda arvensis*), Pacific golden-plover (*Pluvialis fulva*), barn owl (*Tyto alba*), and pueo (*Asio flammeus sandwichensis*). It is not anticipated that the HAMET operations will impact these bird species because of the lack of suitable cover and habitat. In addition, it is anticipated that birds would vacate the area while noise levels are high and return to the area once noise levels have abated (Peshut and Schnell 2011a). Further analysis of MTBA listed species is via the sensitive species discussion Subsection 4.6.

3.6.2.1 ʻAkeʻakē or Band-Rumped Storm-Petrel (Oceanodroma castro). The band-rumped storm-petrel (*Oceanodroma castro*) is a federal candidate species and a state listed endangered species that could potentially occur within the proposed flight path and near the LZs on Mauna Loa. The band-rumped storm petrel is blackish-brown with a white band across the rump area (Mitchell et al. 2005). The band-rumped storm petrel is a nocturnal seabird that is suspected to nest in burrows at above 3,900 ft (1,189 m) on barren lava flows within Hawaiʻi Volcanoes National Park (Mitchell et al. 2005). Currently, little is known about the population size and distribution on Hawaiʻi, and no known colonies or nests have been found within Hawaiʻi Volcanoes National Park south of the proposed LZs on Mauna Loa, but there is one suspect nest and evidence that these birds breed within the park (Swift and Burt-Toland 2009). Additionally, use of the habitat in the Saddle region by band-rumped storm-petrels has been documented (Peshut and Schnell 2011a). There are no identified active band-rumped storm petrel breeding colonies near (within the 2000-ft radius survey area) the Mauna Kea and Mauna Loa LZs (Peshut and Schnell 2011a; Peshut and Schnell 2011b).Several conservation actions are in place to manage current populations. These actions include protecting suspected habitat, controlling nonnative predatory species, identifying hazardous substances that could affect the species, and minimizing the effects of artificial lighting (Mitchell et al. 2005).

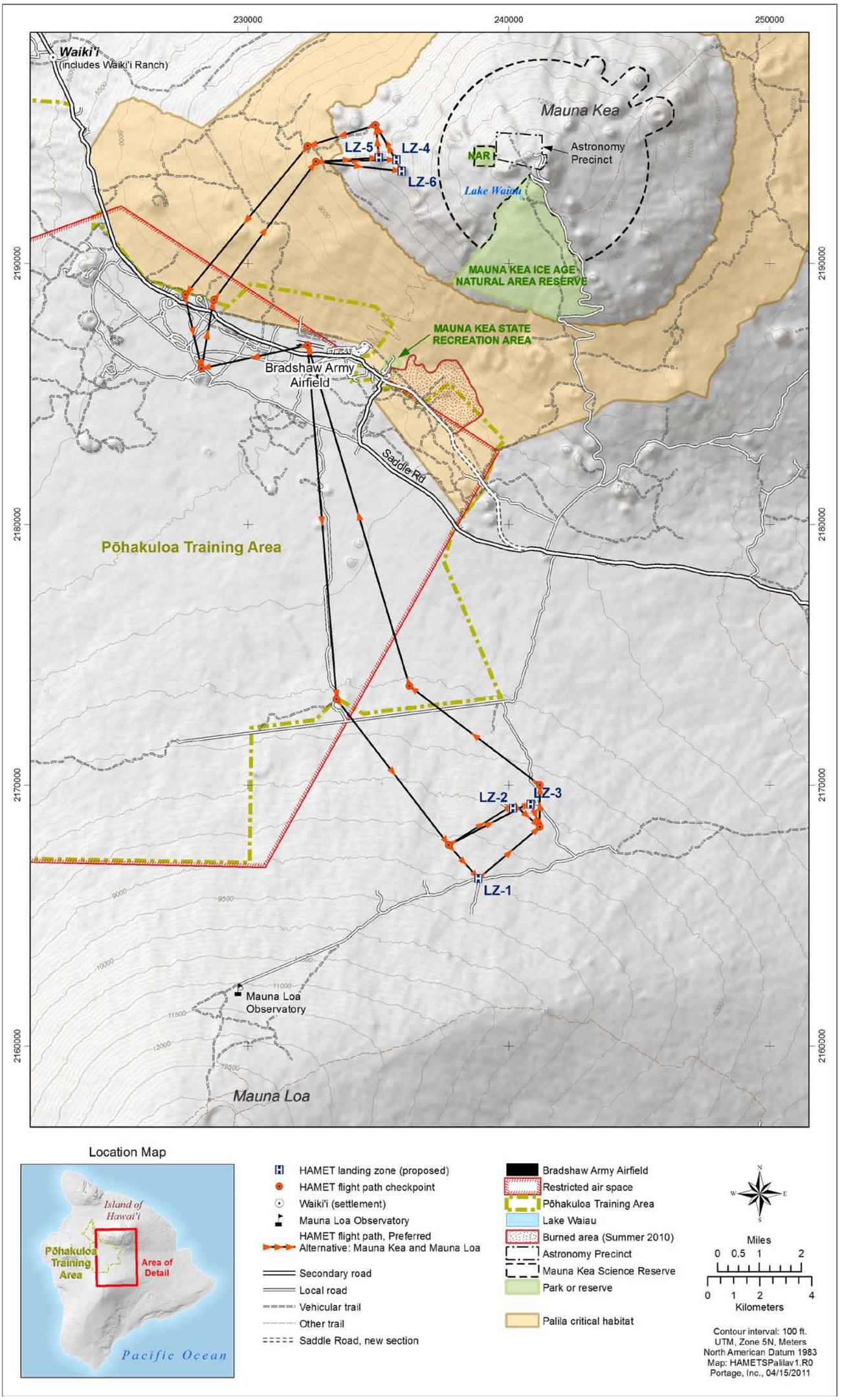

Figure 3-12. Range of the palila (*Loxioides bailleui*).

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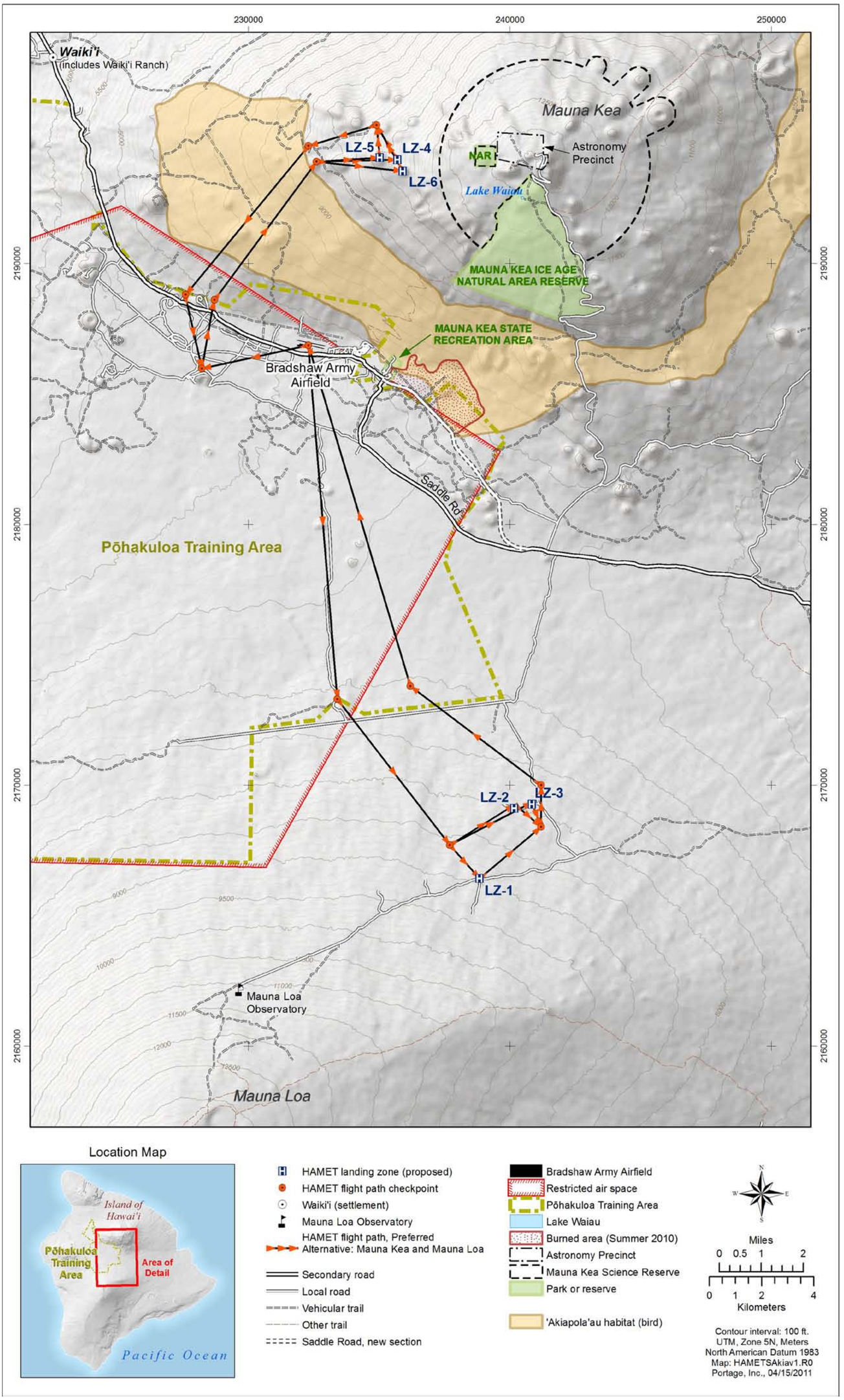

Figure 3-13. Range of the hammerhead or ‘akiapola‘au (*Hemignathus munroi*).

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Currently, there is no designated critical habitat for the band-rumped storm-petrel (Mitchell et al. 2005). The band-rumped storm-petrel shares similar habitat to the Hawaiian petrel, and additional surveys will be conducted between May and August (Peshut and Schnell 2011a). The band-rumped storm-petrel is not expected to be affected by the Proposed Action; thus, further analysis of the band-rumped storm petrel is via the sensitive species discussion in Subsection 4.6.

3.6.2.2 Nēnē or Hawaiian Goose (Branta sandvicensis). The nēnē (*Branta sandvicensis*) is a listed endangered species that could potentially occur within the ROI. The State of Hawai‘i has established the Kipuka ‘Ainahou Nēnē Sanctuary (State of Hawai‘i 1981). It is a designated area for the nēnē populations and is located to the east of planned LZs on Mauna Loa. The nēnē is endemic to the Hawaiian Islands. It is mostly dark brown, has a black face and crown, and has black streaks and cream-colored cheeks (Mitchell et al. 2005). The nēnē habitat consists of lowland dry forest, shrublands, grasslands, sparsely vegetated low- and high-elevation lava flows, alpine deserts, alpine grasslands, and shrublands from sea level to 8,000 ft (2,438 m) (Mitchell et al. 2005; USFWS 2004). Recently, studies have shown that the nēnē moves between Hawai‘i Volcanoes National Park and the Hakalau Forest National Wildlife Refuge, north and east of the PTA, and to the south slopes of Mauna Kea (Peshut and Schnell 2011a). In addition, the nēnē has been known to cross the PTA from the Kipuka ‘Aunahou Nēnē Sanctuary to Mauna Kea, but specific flight paths of the nēnē are not known at this time, and research by the USGS is continuing (Peshut and Schnell 2011a). Several conservation actions are in place to manage current populations. These actions include captive propagation, predator control, habitat enhancement, and research with continued monitoring (USFWS 2004). Currently, there is no USFWS designated critical habitat for the nēnē (USFWS 2004). The range of the nēnē (*Branta sandvicensis*) within the Proposed Action area is shown on Figure 3-14. Further analysis of the nēnē is via the sensitive species discussion in Subsection 4.6.

3.6.2.3 Wekiu Bug (Nysius wekiuicola). The wekiu bug (*Nysius wekiuicola*) is a federal candidate species being considered for listing as a threatened species (University of Hawai‘i 2009). The wekiu bug has been observed mostly in the Mauna Kea Science Reserve; however, recent field surveys for the wekiu bug found no species at elevations similar to those for the proposed LZs on Mauna Kea (Englund et al. 2005). The wekiu bug has been observed mostly near crater rims of cinder cones and edges of glaciers and snowfields. A key part of the wekiu bug habitat is the aeolian drift that carries food sources from lower elevations (University of Hawai‘i 2009). Another key part of the wekiu habitat is the presence of ants. Ants are not native species and are a wekiu bug predator. Surveys for arthropods near the LZs found no wekiu bugs or ants (Peshut and Doratt 2011a; Peshut and Doratt 2011b). Currently, there is no USFWS-designated critical habitat for the wekiu bug. The Proposed Action is not anticipated to have any effect on the wekiu bug (*Nysius wekiuicola*) because of the distance of the LZs from the known habitat. Detailed information and the range of the wekiu bug’s habitat can be found in the *Mauna Kea Comprehensive Management Plan, UH Management Areas* (CMP) (University of Hawai‘i 2009). Further analysis of the wekiu bug is covered via the sensitive species discussion in Subsection 4.6.

3.6.3 Other Vegetation and Wildlife Species

Vegetation and wildlife species that are not listed as endangered or threatened or those that have been designated sensitive species have been recorded throughout PTA within or near to the proposed flight paths and LZs. These species have been recorded in botanical and wildlife field surveys by the University of Hawai‘i, the Bishop Museum Hawaiian Heritage Program, the CEMML, and other organizations (USAEC 2008). In February, March, May and June 2011, surveys for birds, bats, arthropods, and vegetation within survey areas up to 2,000-ft (610-m) radius of LZs on Mauna Kea and Mauna Loa were conducted to determine whether significant resources were present, and no significant resources were found at those locations (Peshut and Evans 2011; Peshut and Doratt 2011a; Peshut and Doratt 2011b; Peshut and Doratt 2011c; Peshut and Schnell 2011a; Peshut and Schnell 2011b).

Vegetation and wildlife species found include endemic and nonnative species. Examples of the vegetation species found are lichens, such as *Stereocoulon vulcani*; ferns, such as *Pellea ternifolia*; shrubs, such as *Dodonaea viscosa*; and trees, such as *Myoporum sandwicense* (USAEC 2008). Examples of the wildlife species found include native invertebrates, such as *Helicoverpa confusa*; native birds, such as *Himatone sanguine*; nonnative reptiles, such as *Anolis carolinenesis*; nonnative amphibians, such as *Rana catesbeiana*; and nonnative mammals, such as *Herpestes auropunctatus* (USAEC 2008). No aquatic systems are within the proposed flight paths or LZs.

3.7 Cultural Resources

The following cultural summary is detailed further in the Mauna Kea CMP (University of Hawai‘i 2009) and the *Final Environmental Impact Statement, Thirty Meter Telescope Project, Island of Hawai‘i* (University of Hawai‘i 2010). Additional cultural resources investigation information was gathered from the *Final Environmental Impact Statement, Permanent Stationing of the 2/25th Stryker Brigade Combat Team* (USAEC 2008); *Environmental Assessment for Range Modernization Pōhakuloa Training Area, Island of Hawai‘i* (U.S. Army 2004b); *Final Environmental Impact Statement, Military Training Activities at Mākua Military Reservation, Hawai‘i* (USACE and COE 2009); *Mauna Loa Trail System Feasibility Study* (Nature Conservancy of Hawai‘i 2005); and three Army Memoranda for the Record (Godby 2003; Godby and Head 2003; Rumsey 2009).

Cultural resources are defined as historic properties or those that are eligible for listing on the National Register of Historic Places (NRHP), cultural items, archaeological resources, sacred sites, or collections subject to protection under the NHPA (16 USC 1A § 470 et seq.), ARPA (16 USC 1B §§ 470aa-mm), Native American Graves and Repatriation Act (25 USC 32 § 3001 et seq.), Executive Order 13007– Indian Sacred Sites (61 FR 104), American Indian Religious Act (42 USC 1996a and 1996b), American Antiquities Act of 1906 (16 USC 431-433), and the guidelines on “Curation of Federally Owned or Administered Archaeological Collections” (36 CFR I § 79). Native Hawaiian cultural resources to be considered are those of importance to Native Hawaiian groups and include cultural beliefs and practices, sacred sites, prehistoric and historic archaeological sites, historic buildings and structures, and areas of cultural importance. Areas of cultural importance include traditional resources, use areas, and sacred sites that are potentially eligible for the NRHP as traditional cultural properties (TCPs) (U.S. Army 2004b). A TCP is generally defined as “one that is eligible for inclusion in the National Register [of Historic Places] because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identity of the community” (U.S. Army 2004b, p. 3-72).

Also important to the consideration of Native Hawaiian resources are concepts, culture, and landscapes. The *Final Environmental Impact Statement, Permanent Stationing of the 2/25th Stryker Brigade Combat Team* (USAEC 2008) defines five cultural landscape types that “reflect the importance of culturally significant natural resources and man-made resources such as archaeological sites.” They include the following:

1. Areas of naturally occurring or cultivated resources used for food, shelter, or medicine

2. Areas that contain resources used for expression and perpetuation of Hawaiian culture, religion, or language

3. Places where known historical and contemporary religious beliefs or customs are practiced

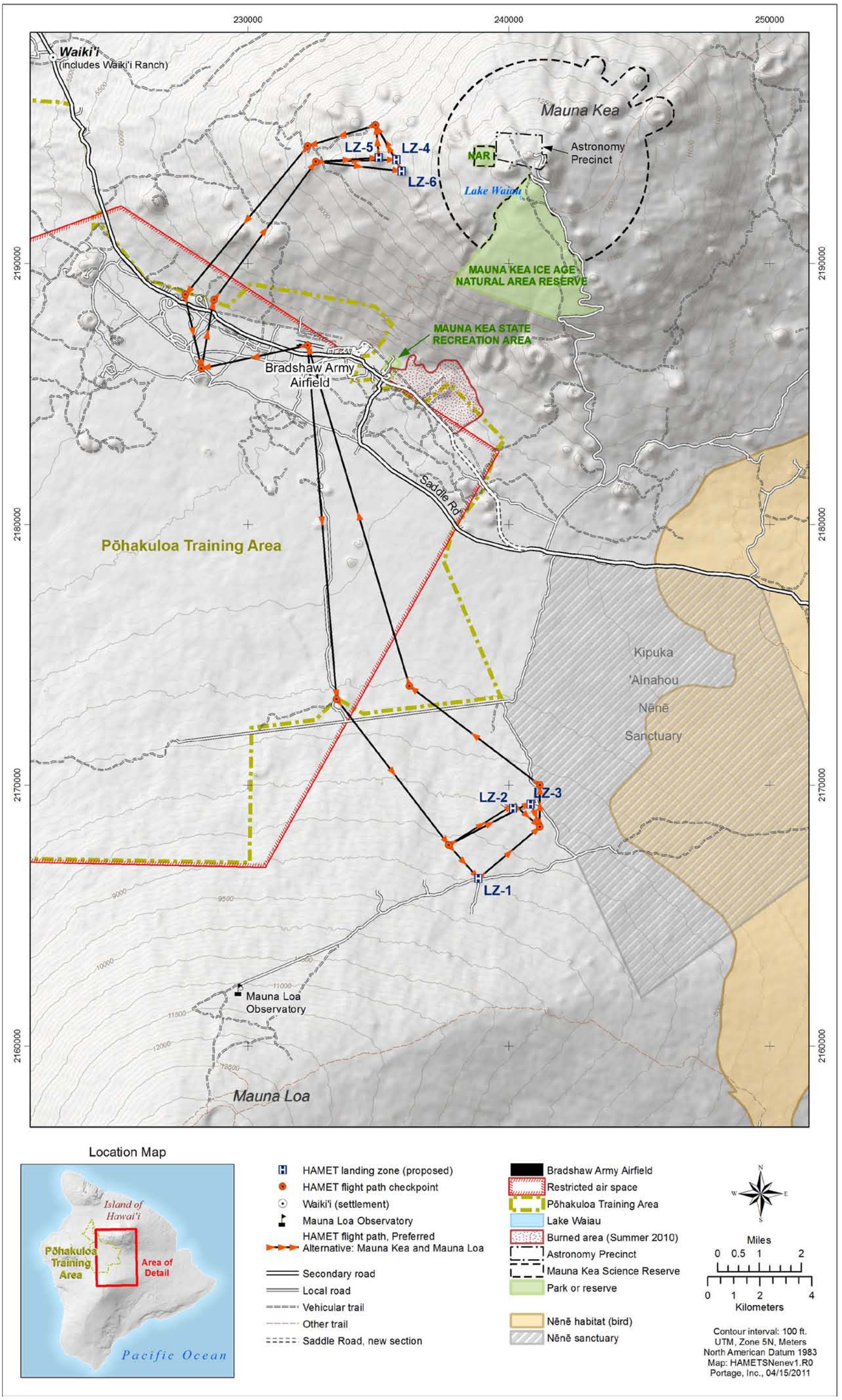

Figure 3-14. Range of the Hawaiian goose or nēnē (*Branta sandvicensis*).

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4. Areas where natural or cultivated endangered terrestrial or marine flora and fauna used in Native Hawaiian ceremonies are located or where materials for ceremonial art and crafts are found

5. Areas that provide natural and cultural community resources for the perpetuation of language and culture, including place names and natural, cultural, and community resources for art, crafts, music, and dance.

A literature search was conducted for this study, including gathering information on cultural significance and field surveys. The results of this search are summarized in following subsections.

3.7.1 Cultural Overview

It was the nature of place that shaped the cultural and spiritual view of the Hawaiian people. "Cultural attachment" comprises both the tangible and intangible values of a culture – how a people identify with and personify the environment around them. It is the intimate relationships (developed over generations of experiences) that people of a particular culture feel for the environment that surrounds them – their sense of place. This attachment is deeply rooted in the beliefs, practices, cultural evolution, and identity of a people (Kent et al. 1995).

In Hawaiian culture, natural and cultural resources are one and the same. Native traditions describe the formation (literally the birth) of the Hawaiian Islands and the presence of life on and around them in the context of genealogical accounts. All forms of the natural environment from the skies and mountain peaks, to the watered valleys and the lava plains, and to the shoreline and ocean depths are believed to be embodiments of Hawaiian gods and deities.

In 1778, British explorer Captain James Cook arrived in Hawai‘i and began a period of sustained contact between Hawaiians and westerners that began to change Hawaiian culture (University of Hawai‘i 2009, p. 5-18). In 1782, Kamehameha I became the ruler of Hawai‘i Island and began his conquest of the other islands to unite them under a single rule. Following Kamehameha I's death in 1819, his son, Kamehameha II, succeeded him. Up until that time, Hawaiian life was regulated under laws of *kapu* (taboo). Kamehameha II ordered the end to the state *kapu* system and placed restrictions on traditional religious practices. He subsequently allowed Protestant missionaries to settle in Hawai‘i, thus altering Hawaiian cultural and religious systems (NPS 2009). However, traditional beliefs and practices continued to be passed down covertly, especially in places far from the Christian centers (University of Hawai‘i 2009, p. 5-5). Although some traditional religious beliefs and knowledge were likely lost, individual familial religious practices remained and continue.

Colonial expeditions, traders, whalers, and other foreigners visited the Hawaiian Islands following the Cook expedition. Some of these people took up residence in the islands, and some introduced new species. In 1792, Captain George Vancouver presented Kamehameha I with cattle and goats and requested that they be allowed to propagate for 10 years. Kamehameha I sent the cattle and goats into the mountains of Hawai‘i Island and placed a *kapu* on killing them. Over the next decades, *kapu* continued, especially on cattle, in an effort to increase the herd. In the mid to late 1800s, land tenure was modified by the Kingdom of Hawai‘i, with the result that ranch owners could control individually held land. Today, sheep and goats are actively hunted to control their impacts on the fragile ecosystem (University of Hawai‘i 2009, pp. 6-11–6-16). Evidence of the early ranching and grazing activities are extant on the island of Hawai‘i (University of Hawai‘i 2009, pp. 5-17–18).

The ROI considered for cultural resources includes Mauna Kea and the three existing LZs on Mauna Kea, Mauna Loa and the three existing LZs on Mauna Loa, and the flight paths. The ROI falls within the ahupua‘a of Ka‘ohe, Hāmākua District. Ka‘ohe Ahupua‘a begins as a narrow strip of land on

the east coast of Hawai‘i Island, but after 5 kilometers it broadens, and 12 kilometers further upslope it broadens again to encompass most of Mauna Kea. The ahupua‘a continues to the west and south to Mokuaweoweo, the crater at the summit of Mauna Loa. Ka‘ohe Ahupua‘a encompasses the complete range of ecotones found on Hawai‘i Island. The following discussion considers those portions of Ka‘ohe within which the project area lies. Recent traditional historical research was consulted for this document (e.g., McCoy, Collins, Clark & Park 2009; Maly 1997, 1999; Maly & Maly 2005) In addition, several organizations representing Native Hawaiian interests on Mauna Kea were consulted. The literature consulted acknowledges the significance of Mauna Kea in Native Hawaiian culture but seeks to find a balance with modern activities. Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain.

3.7.2 Mauna Kea Cultural Aspects

The following subsections describe the cultural aspects of Mauna Kea.

3.7.2.1 Mauna Kea Cultural Beliefs and Practices. Mauna Kea is described as the “most sacred and culturally significant location on the island of Hawai‘i, if not in the whole of Hawai‘i” (University of Hawai‘i 2009, p. 1-3). Native Hawaiians generally believe that the Hawaiian Islands are the sacred keiki (children) of Wākea (sometimes translated as “Sky Father”) and Papahānaumoku (literally, the firmament or wide place who gives birth to islands, also referred to as Papa, the creator goddess of Hawai‘i), who conceived and gave birth to the islands of Hawai‘i. Wākea and Papahānaumoku also gave birth to Komoawa and Ho‘ohōkūkalani. Komoawa is both son and high priest of Wākea. Ho‘ohōkūkalani means the “creator of stars.” She, in union with Wākea, becomes the celestial womb from which Hawai‘i the original native being takes root, gestates, and is born into a sacred landscape (University of Hawai‘i 2009, p. i). Mauna Kea is the piko or navel of the island of Hawai‘i (University of Hawai‘i 2009, p. i). Poli‘ahu (snow), Lilinoe (mist), and Waiau were sister goddesses who are female forms of water, and the three locations on Mauna Kea - cinder cones or pu‘u and a lake - that bear their names are important religious sites (University of Hawai‘i 2009, p. 5-4). Lake Waiau was created by Kane for his daughter Poli‘ahu (University of Hawai’i 2009, p. 5-4). Mauna Kea is believed to be the union between heaven, earth, and stars and, as the highest point throughout Pacific Polynesia, is likened to a sacred alter.

Native Hawaiian traditions state that ancestral *akua* (gods, goddesses, deities) reside within the summit area. These personages are embodied within the Mauna Kea landscape – they are believed to be physically manifested in earthly form as various pu‘u and as the waters of Waiau. Because these *akua* are connected to the Mauna Kea landscape in Hawaiian genealogies, and because elders and *akua* are revered and looked to for spiritual guidance in Hawaiian culture, Mauna Kea is considered a sacred place (McCoy and Nees 2009).

Mauna Kea is thought of as a *lananu‘u mamao* or “sacred tower located within a *heiau* at or upon which worship takes place and offerings to the gods are made” (University of Hawai‘i 2009, p. 1-3). Three *kahua* or levels comprise the *lananu‘u mamao* ocated between approximately 11,000 and the summit. The *lana* is the first level between the 11,000 and 12,000 ft (3,353 and 3,658 m) elevation and is the least restricted *kahua.* This is an area of mundane resource procurement Documented archaeological sites here include ancient offering shrines. The *nu‘u*is the second level between 12,000 and 13,000 ft (3,658 and 3,962 m). Pre-contact archaeological features diminish in this area, but it was traditionally known to have been visited by *maka‘ainana* (commoners) to erect 4their shrines and make offerings to their gods. Viewed as more sacred than the *lana*, *nu‘u* was reserved for priests and their attendants. The most sacred and restricted *kahua* is the *mamao*. Located above 13,000 ft (3,962 m) where only ranking chiefs and high priests with their attendants were allowed to ascend. The relatively few

archaeological features that exist within the *mamao*, including burials, are likely associated with the upper echelons of Hawaiian society (University of Hawai‘i 2009, pp. 1-3, 1-4).

The only known uses of the alpine and subalpine zones on Mauna Kea are a few accounts of adze making and burials. Most of this information regarding traditional land uses is a result of archeological investigations that have taken place since the mid 1970s.

There is also evidence to indicate that the area above the limits of agriculture and permanent settlement was a wilderness, probably only accessed by a small number of Hawaiians engaged in special activities such as ceremonial practices, bird catching, canoe making, adze making, and burial of the dead. Bird catching and canoe making were likely concentrated in the upland forests, except for the capture of ‘ua‘u as these birds nested in the alpine and subalpine regions.

Archeological research indicated that the adze quarry, known as Keanakako‘i, on the south slope of Mauna Kea (concentrated between 11,500 and 12,400 ft [3,500 and 3,780 m]) was exploited over a period as long as 700 years between the years of 1100 and 1800. The date of the abandonment of the quarry is unknown, but it may have occurred as late as Captain Cook’s arrival in 1778 or soon thereafter, and the subsequent introduction of metal knives and tools. More recent archaeological research has documented the remains of ritual activity in the summit region of Mauna Kea (McCoy and Nees 2009). Archaeological work at Pōhakuloa Training Area to the southwest has documented temporary habitation sites, trails, ritual sites, stone resource procurement sites and other archaeological sites spanning the same chronological period as the adze quarry. These archaeological sites demonstrate the use of the mountain lands by Hawaiians throughout their residence in the islands. Historic maps also indicate trails on Mauna Kea, many of which are still known and used today.

Traditional Native Hawaiian beliefs include the concept that Mauna Kea represents the past, the present, and the future (University of Hawai‘i 2009, pp. 1-4, 5-7, and 5-8) and was the setting for early Hawaiian traditions. In addition, religious practices, tool making at Keanakako‘i quarry, and the study of the heavens took place on the upper elevations of Mauna Kea. Astronomical research continues today at Mauna Kea’s numerous observatories, as do some religious practices that have been categorized broadly as (1) traditional and customary and (2) contemporary. As described in the *Final Environmental Impact Statement, Thirty Meter Telescope Project Island of Hawai‘i, Hilo, Hawai‘i* (University of Hawai‘i 2010), traditional and customary practices include the following:

- Performance of prayer and ritual observances important for the reinforcement of an individual’s Hawaiian spirituality, including the erections of *ahu* or shrines
- Collection of water from Lake Waiau for a variety of healing and other ritual uses
- Deposition of *piko* (umbilical cords) at Lake Waiau and the summit peaks of Mauna Kea
- Use of the summit region as a repository for human burial remains, by means of interment, particularly on various pu‘u, during early times, and more recently by means of releasing ashes from cremations
- Burial blessings to honor ancestors
- Belief that the upper mountain region of Mauna Kea, from the saddle area up to the summit, is a sacred landscape – as a personification of the spiritual and physical connection between one’s ancestors, history, and the heavens

- Association of unspecified traditional navigation practices and customs with the summit area

- Annual solstice and equinox observations that take place at the summit of Kukahauʻula (University of Hawaiʻi 2010 p. 3-21).

Established on modern beliefs, contemporary practices include the following:

- Prayer and ritual observances

- Construction of new alters

- Subsistence and recreational hunting (University of Hawaiʻi, p. 3-21), although evidence exists to suggest that hunting in the summit region was not a traditional cultural practice and did not begin until the late 19th century (McCoy and Nees 2009).

Existing roads and trails are used to access these culturally important areas (University of Hawaiʻi 2009, pp. 1, 5-6). Several trails traverse the Mauna Kea summit region. Traditional accounts suggest that some ancient trails were present in the summit regions. These trails are known to cultural practitioners and are not necessarily signed and marked. In some cases, it is unknown whether the current trails follow the same routes as the ancient trails, and, in some cases, it is known that current trails are on different alignments from ancient trails. Trails in the summit region include the following:

- The Humuʻula Trail is probably the best know trail, and, in ancient times, it apparently began in the Kalaieha area where the Humuʻula Sheep Station is located and extended past Hale Pōhaku to Lake Waiau. The trail initially appears on maps made in 1892. Today, the trail begins just above Hale Pōhaku, passes near Lake Waiau, and ends near the Batch Plant Staging Area. The trail originally went around the east side of Puʻu Keonehehe‘e, but, in the 1930s, the Civilian Conservation Corps (CCC) gave the trail a straighter course around the west side of the puʻu.

- The Umikoa Trail is not mentioned in early accounts, and it first appears in maps in the 1920s. The trail may well be an ancient trail, but the name appears to be modern and likely derived from the Umikoa Ranch. Horseback trips to Mauna Kea from the ranch took place in the early 1900s and perhaps earlier. The trail enters the Mauna Kea Science Reserve between Puʻu Makanaka and Puʻu Hoaka on the northeast slope, passes below and west of Puʻu Lilinoe, and intersects the Humuʻula Trail near Lake Waiau.

- A trail less well known to modern people, Waikiʻi-Puʻu Lāʻau-Waiau Trail, probably passed up the west slope of Mauna Kea and possibly through the vicinity of the LZs (Puʻu Lāʻau is on the western flank of Muana Kea, and Waikiʻi is farther west downslope toward Waikoloa and Waimea) (University of Hawaiʻi 2000b).

- The Makahalau Kemolo Waiau Trail led to Waiau from the northwest in ancient times.

With the construction of modern roads providing ready access to the summit area, trails are not believed to play a significant role in ongoing cultural practices. They are retained as historic properties, and remain important to modern cultural practitioners. Trails and corridors traversed significant portions of Hawaiʻi Island, connecting communities with each other and with physical and spiritual resource areas.

3.7.2.2 Mauna Kea Archaeological/Historic Resources. Several archaeological surveys and fieldwork have been conducted on Mauna Kea. The Mauna Kea CMP (University of Hawaiʻi 2009) summarizes investigations undertaken in the University of Hawaiʻi Management Area (see

Subsection 3.9.2 for a description of the University of Hawai‘i area). Between 1975 and 2006, 223 historic properties were identified in the University of Hawai‘i Management Area within 11 distinct site types. Site types include traditional cultural properties, shrines, burials, possible burials, stone tool quarry/workshop complexes, the adze quarry ritual center, isolated adze manufacturing workshops, isolated artifacts, stone marker/memorials, temporary shelters, historic campsites, and those of unknown function (University of Hawai‘i 2009, pp. 5-19, 5-20).

To date, three TCPs have been designated on Mauna Kea and include the summit (Kukahau‘ula) and Pu‘u Lilinoe in the Mauna Kea Science Reserve and Lake Waiau in the Mauna Kea Ice Age NAR. In addition, a vast area on the summit is eligible for listing on the NRHP as a historic district. The Keanakako‘i adze quarry is listed as a National Historic Landmark (University of Hawai‘i 2009, p. 1), and it has been recommended that “the traditions, sites, practices, and continuing significance of Mauna Kea, both historically and today, make it eligible for nomination as a traditional cultural property under federal law and policies (USACE and COE 2009, p. 3-328). In addition, the State Historic Preservation Division (SHPD) has recommended that the entire region of Mauna Kea from 6000 feet to the summit be nominated to the State Register of Historic Places as a Traditional Cultural Property (Simonson & Hammatt 2010).

Results of field surveys undertaken at the three LZ locations on Mauna Kea are discussed below:

- LZ-4: A reconnaissance-level survey was conducted at LZ-4 on October 22, 2003. The results of this survey were negative. No archaeological sites were found in the area. However, a potential historic property (State of Hawai‘i Site #50-10-22-24004) is located approximately 0.5 mile (1 kilometer) southwest of LZ-4. The site consists of a large basalt rock wall enclosure measuring 836 ft (255 m) N/S by 1,115 ft (340 m) E/W and 19.7 to 4.6 ft (0.60 to 1.40 m) high. It is believed to be a historic feature associated with steer or goat roundups (Godby and Head 2003).

  One small, single-course, diamond-shaped rock alignment feature was identified near LZ-4 and was termed Rock Alignment 1 during a survey conducted in February 2011. Rock Alignment 1 is located approximately 318 ft (97 m) south of LZ-4. This location is within the area of potential effect (APE), which is defined as 328-ft (100-m) from center point of each LZ. The feature is constructed of small and medium pieces of locally available rock with some cobble infilling. Rock Alignment 1 does not display formal construction characteristics, with the rocks simply sitting on top of the ground without being tightly placed or imbedded in the soil. Rock Alignment 1 is 5.35 by 3.64 by 0.69 ft (1.63 by 1.11 by 0.021 m) and is oriented roughly northwest-southeast (Crowell 2011a). This feature was not observed during the previous visits to LZ-4 by PTA Cultural Resources staff and therefore is probably of recent construction.

- LZ-5: A reconnaissance-level survey was conducted at LZ-5 on December 4, 2003. LZ-5 is located between LZ-4 and the large rock enclosure (Site #50-10-22-24004) described above. A thorough examination of the LZ area was conducted for archaeological resources with negative results (Godby and Head 2003).

  On February 24, 2011, a survey identified two stacked rock formations near LZ-5. These formations have been identified as Rock Mound 1 and Rock Mound 2 (Crowell 2011a).

  Rock Mound 1 is located between the southern edge of a large crater and the southern crest of the pu‘u and overlooks the Saddle Region of Hawai‘i Island. Rock Mound 1 is located approximately 472 ft (144 m) south-southwest of LZ-5 and is just outside of the APE. Rock Mound 1 is a pyramidal-shaped, stacked-rock mound constructed in five to seven courses of large- and medium-sized pieces of locally available rock, with smaller rock and cobble infill. The area around the

feature appears to have been cleared, apparently for the construction of Rock Mound 1.The feature measures 8.7 by 5.74 by 4.1 ft (2.65 by 1.75 by 1.25 m) and is oriented roughly east-west. The feature is somewhat formally constructed with the rocks tightly placed and infilling with smaller rocks. Some of the rocks have tumbled from the top and sides of the feature and lie immediately adjacent at the base (Crowell 2011a).

Rock Mound 2 is located between the northern edge of a large crater and the northern crest of the pu‘u. T-022411-02 is located within the APE, approximately 270 ft (82 m) east-southeast of LZ-5 and 594 ft (181 m) northeast of Rock Mound 1 at 235099E, 2194029N. The feature is a pyramidal-shaped, stacked-rock mound constructed in five to seven courses of large- and medium-sized pieces of locally available rock with some smaller rock infill but with less infilling than is present at Rock Mound 1. Additionally, Rock Mound 2 has a more rectangular and less pyramidal shape than Rock Mound 1 but is wider at the base than at the top. The feature displays somewhat formal construction characteristics, with tightly placed rocks and some evidence of a faced profile on the north side of the feature. The area around the feature shows evidence of clearing due to the construction of the mound. Rock Mound 2 measures approximately 8.4 by 5.48 by 3.67 ft (2.55 by 1.67 by 1.12 m) and is oriented roughly east-west. A few of the rocks have tumbled from the sides and top of the feature and lie immediately adjacent to the base (Crowell 2011a).

- LZ-6: A reconnaissance-level survey was conducted at LZ-6 on December 4, 2003. LZ-6 is located approximately 3,281 ft (1,000 m) east of LZ-5. A thorough examination was made of the proposed landing area with negative results (Godby and Head 2003).

  One stacked rock feature was identified during a February 2011 survey near LZ-6 and was termed Rock Mound 3. This feature was previously identified in the Godby and Head (2003) survey and described as a rock mound constructed with local cobbles and boulders with faced sides on the north and the east. The current survey identified Rock Mound 3 located within the APE, approximately 184 ft (56 m) east-southeast of LZ-6. The feature is a pyramidal-shaped, stacked-rock mound constructed in six to eight courses of large- and medium-sized pieces of locally available rock with smaller rock and cobble infill. Rock Mound 3 is fairly formally constructed with tightly placed rocks and infilling. The area around the feature was cleared during the construction of the mound. Rock Mound 3 is approximately 7 by 4.5 by 4.4 ft (2.13 by 1.37 by 1.35 m) and is oriented roughly north-south. Rock Mound 1 and Rock Mound 2 are clearly visible from Rock Mound 3 (Crowell 2011a).

Figure 3-15 shows the traditional cultural properties on Mauna Kea in relation to the three LZ locations and the flight corridor.

3.7.3 Saddle Region Cultural Aspects

Because of the spiritual and physical interconnectivity of Mauna Kea and Mauna Loa, a discussion of these areas would be incomplete without a brief description of the area between them, the Saddle Region.

The Saddle Region, home to PTA, connects Mauna Kea to Mauna Loa. Various trails connecting population and resource centers run through the area and have small rock structures associated with them, including rest shelters and cairns to mark the trails. This area is often over flown by civilian helicopters.

Nineteenth century documents reveal the presence of the ‘ua‘u (Hawaiian petrel), a nocturnal, pelagic seabird that nests on the ground, in the plateau region between Mauna Kea and Mauna Loa. Although recent studies at PTA have not been able to document ‘ua‘u, they have been found on the slopes

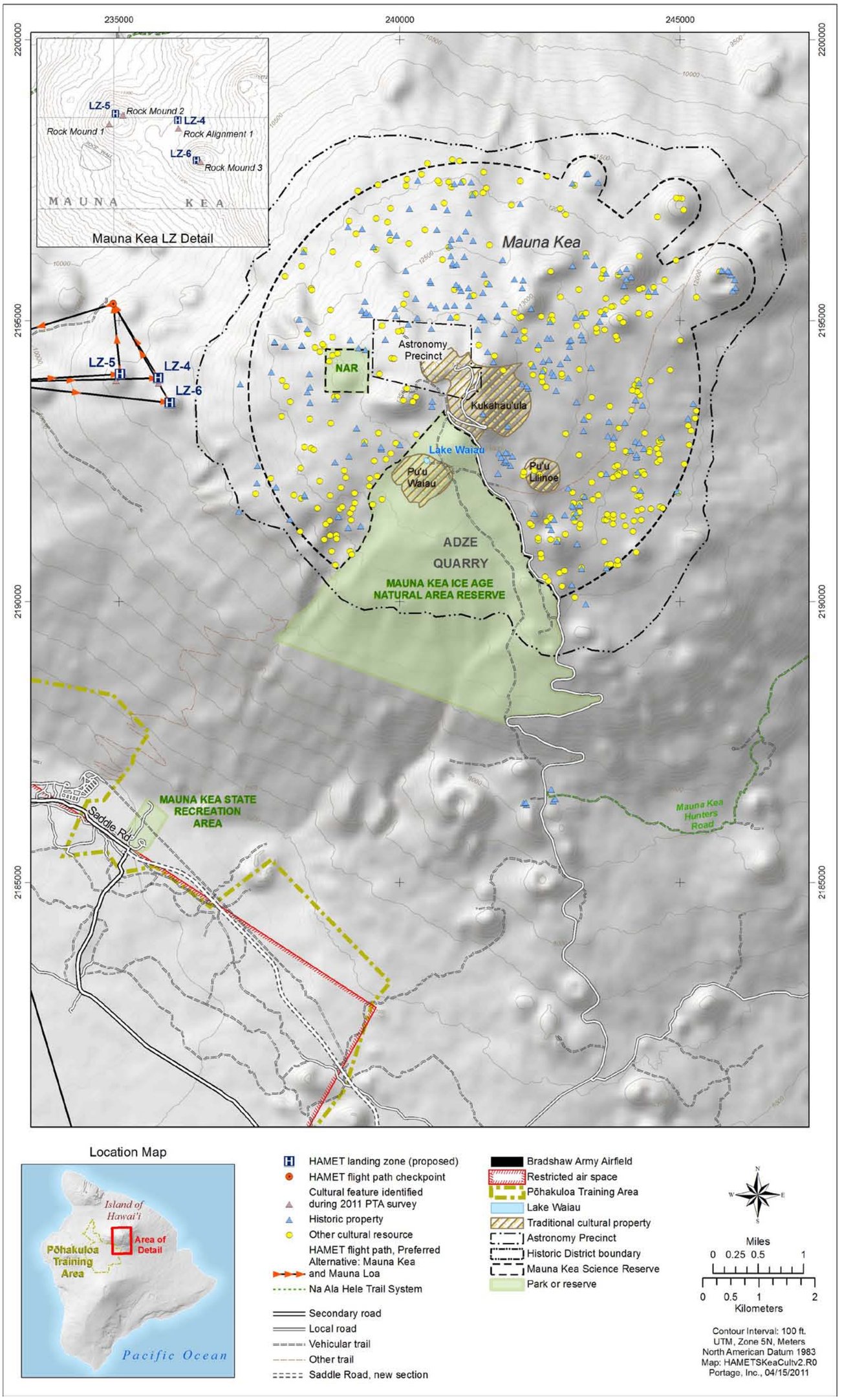

Figure 3-15. Map depicting the relationship between Mauna Kea LZs and flight paths to known traditional cultural properties.

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of Mauna Loa. Historically, the ʻuaʻu chicks were considered a delicacy, were hunted, and, with few exceptions, were consumed only by chiefs. It appears that adult ʻuaʻu were hunted and eaten by travelers in the Saddle Region who were perhaps on their way to Mauna Kea or Mauna Loa (U.S. Army 2004b, p. 3-26). Hunting for ʻuaʻu and other birds continued from prehistoric times into the early 20th century (U.S. Army 2004b, p. 3-27).

Numerous cultural-resource management investigations, including oral histories, archaeological field surveys, and historic building surveys, have been conducted in the Saddle Region, most for compliance purposes related to PTA. The Army manages more than 350 archaeological sites at PTA, including temporary habitation sites in lava tubes and on the surface of lava flows, trails, shrines, platforms, cairns, historic era ranching walls and fence lines, and other site types. Oral histories were gathered in 2002 by Social Research Pacific, and a field visit was made to *Ahu aʻUmi heiau*, which is located west of PTA between Hualālai and Mauna Loa and served as a ritual site and possibly a locus of tribute collection. Recorded as early as 1853, *Ahu a ʻUmi heiau* has been described as one of the most prominent of Hawaiian archaeological sites (Dye 2005, p. 16). Informants were also asked about possible burials, and the informants indicated some burials may exist in the vicinity of springs upslope from Bradshaw Army Airfield and Mauna Kea State Park (DOT 2010b).

Oral history subjects did report the continuation of bird hunting using old trails and modified lava blisters to encourage nesting in the region. Several major trails also linked population centers, and others likely led to procurement areas. In addition to prehistoric remnants, historic building surveys identified 138 PTA structures that are old enough to be considered for eligibility on the NRHP (U.S. Army 2004b, pp. 3-25, 3-28).

3.7.4 Mauna Loa Cultural Aspects

The following subsections describe the cultural aspects of Mauna Loa.

3.7.4.1 Mauna Loa Cultural Beliefs and Practices. Perhaps because there have been fewer actions triggering the need for impact analysis, literature searches reveal much less cultural information about Mauna Loa than either Mauna Kea or the Saddle Region (Donham 2010). However, information that was discovered makes it apparent that Mauna Loa's prehistoric and historic resources are similar in type and density to those found on PTA and that Mauna Loa holds a place of cultural importance to Native Hawaiians that is no less significant than that of Mauna Kea. One oral history informant described the importance this way:

"Mauna Kea was always kūpuna [an elder, ancestor] to us. Mauna Kea and Mauna Loa, the tips, they were always kūpuna [elders, ancestors]. And there was no wanting to go on top. You know, just to know that they were there was just satisfying to us. And so it was kind of a hallowed place that you know is there, and you don't need to go there. You don't need to bother it. But it is there, and it exists. And it was always reassuring because it was the foundation for our island" (University of Hawaiʻi 2000b).

Hawaiian legends also describe Mauna Loa's importance in Native Hawaiian culture. They explain that the volcano goddess Pele was driven from her home by her angry older sister, Na-maka-o-kahaʻi, because Pele had seduced her husband. Every time Pele would thrust her digging stick into the earth to dig a pit for a new home, Na-maka-o-kahaʻi, goddess of water and the sea, would flood the pits. Pele eventually landed on the Big Island of Hawaiʻi, where she made Mauna Loa her new home. Literally meaning "long mountain" in the Hawaiian language, Mauna Loa was so tall that even Pele's sister could not send the ocean's waves high enough on Mauna Loa to drown Pele's fires. So Pele established her home on its slopes.

3.7.4.2 Mauna Loa Archaeological/Historic Resources. A 2005 historic-sites review and feasibility study conducted for a proposed Mauna Loa trail system revealed resources that are similar in association and nature to those found on Mauna Kea and within the Saddle Region. These resources include those related to canoe building and bird catching (such as caves, lava blisters, and overhangs), human burials, possible human burials, a vast network of trails, and several sites and structures associated with historic settlement, ranching, and other agricultural activities (Dye 2005, pp. 4–8). As with Mauna Kea, Mauna Loa's elevation and location made it an important spot for atmospheric and other scientific observations. The Mauna Loa Solar Observatory has long been prominent in observations of the sun, and the nearby National Oceanic and Atmospheric Administration (NOAA) MLO monitors the global atmosphere.

Results of field surveys undertaken at the three LZ locations on Mauna Loa are discussed below:

- LZ-1: A reconnaissance-level survey was conducted at LZ-1 (called LZ-3 in the survey clearance report) on May 20, 2009. LZ-1 is located to the east of LZ-2. A thorough examination of the LZ area was conducted for archaeological resources with negative results (Rumsey 2009). LZ-1 is a leveled area in ʻaʻā lava along another finger of the 1899 Mauna Loa lava flow. Pāhoehoe lava is present around the edges of the LZ. Several cavities were identified in this pāhoehoe during a February 2011 survey; these were investigated, but no cultural resources were identified. An area 328 ft (100 m) from the center of the LZ was surveyed, and no historic properties were identified within this area (Taomia 2011).

- LZ-2: A reconnaissance-level survey was conducted at LZ-2 on May 20, 2009. LZ-2 is located adjacent to a rough quarry road. A thorough examination of the LZ area was conducted for archaeological resources with negative results (Rumsey 2009). An additional survey was conducted in February 2011, and no historic properties were identified within 328 ft (100 m) of LZ-2 (Taomia 2011).

- LZ-3: A reconnaissance-level survey was conducted at LZ-3 (called LZ-1 in the survey clearance report) on May 20, 2009. LZ-3 is located directly adjacent to the north side of the Mauna Loa access road. A thorough examination of the LZ area was conducted for archaeological resources, and the results were negative. LZ-3 was again surveyed in February 2011. The LZ is in ʻaʻā from the 1899 Mauna Loa lava flow, and the remnants of a wind sock are present across the road from the LZ. No historic properties were identified within the 328-ft (100-m) survey area at this LZ (Taomia 2011).

Figure 3-16 shows the relationship between the Mauna Loa LZs and flight paths to known traditional cultural properties associated with Mauna Loa (i.e., those near to the proposed Mauna Loa trail system).

3.8 Socioeconomics and Environmental Justice

The socioeconomic indicators used to describe the affected environment for socioeconomic resources include population, economy, employment, and income. The population data include the number of residents in the area and recent changes in population growth. Data on employment, labor force, unemployment trends, income, and industrial earnings describe the economic health of a region. Income information is provided as an annual total by county and per capita. The ROI for socioeconomic impacts includes the county of Hawai‘i, which is where the project is proposed to occur.

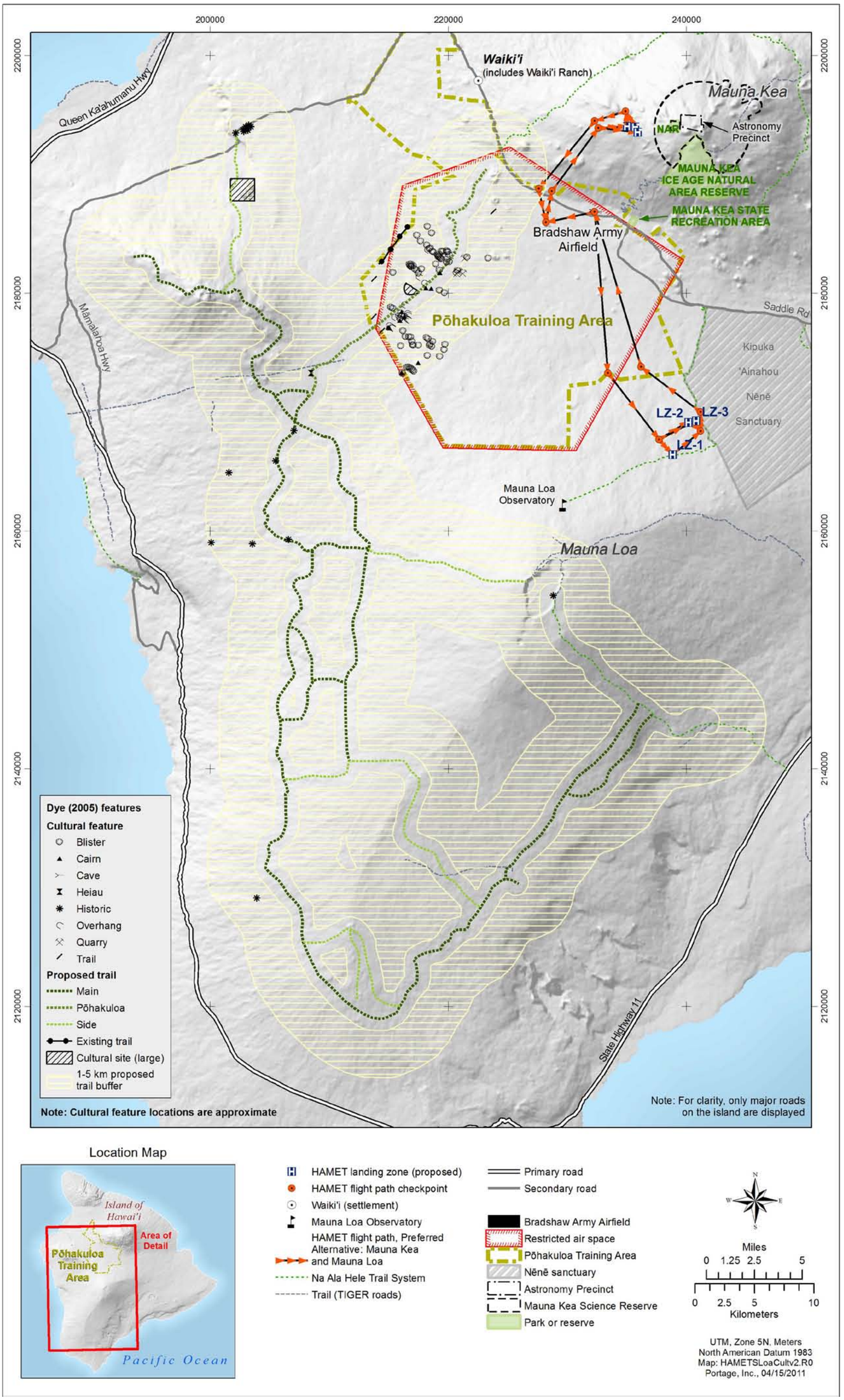

Figure 3-16. Map depicting the relationship between Mauna Loa LZs and flight paths to known cultural resources associated with Mauna Loa.

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3.8.1 Socioeconomics

The County of Hawai‘i is composed of nine districts with a total population of 148,677, as reported in the 2000 census. The three LZs located on Mauna Kea (LZs 4–6) are located within the District of Hamakua, and the three LZs located on Mauna Loa (LZs 1–3) are located within the District of North Hilo. Both of these districts are sparsely populated, with the 2000 census reporting populations of 6,108 (4%) and 1,720 (1%) and a population density of 10.5 and 4.6 persons per square mile (4.05 and 1.78 persons per square kilometer) for the Hamakua and North Hilo districts, respectively (County of Hawai‘i 2010). The county of Hawai‘i has seen growth of 2.4% annually for the period between 1990 and 2000 (County of Hawai‘i 2010). During this same period, each of the districts of Hamakua and North Hilo grew by 1%. The growth rate for the county from 2000 to 2008 remained at approximately 2.3% and is projected to remain steady through 2020. Growth for Hamakua and North Hilo counties is projected to remain at approximately 1% (County of Hawai‘i 2005).

The state government is the single largest employer in Hawai‘i County, accounting for 8,240 (12%) jobs in 2008 followed by Hawai‘i County itself with 2,705 (4%) and the federal government with 1,332 (2%) jobs (County of Hawai‘i 2010). The next largest employer is the Hilton Waikoloa Village with 984 jobs, highlighting the importance of tourism to the county. Tourism accounts directly for approximately 12,500 (18.6%) jobs. Most of these jobs are centered primarily on the leeward (Kona) or western coast of the island in the North Kona and South Kohala districts. The county of Hawai‘i had an unemployment rate of 10.1% in July 2010, lagging the overall state rate of 6.8% (Hawai‘i Department of Labor 2010).

Within the Hamakua District, the main sources of income and employment are cattle, macadamia nuts, and various other crops. There are numerous cattle ranches and several different varieties of crops in the district. Of these, macadamia nuts are expected to continue to play an important role in the future of agricultural development. Other crops grown in this area are taro, watermelons, tomatoes, ginger, kava, coffee, and vegetables. Manufacturing within the district is limited to the processing of macadamia nuts and other agricultural products (County of Hawai‘i 2010).

The astronomical facilities located atop Mauna Kea are also part of the Hamakua District. The facilities are located within the 11,228-acre (4,543-hectare) Mauna Kea Science Reserve, which includes those lands situated above the 12,000-ft (3,658-m) elevation, with the exception of areas within the Mauna Kea Ice Age NAR.

Mauna Kea is considered the world’s premier site for ground-based astronomical observatories. Mauna Kea is home to 13 observatories and includes 12 of the world’s most state-of-the-art telescopes. More major telescopes are located on Mauna Kea than on any other single mountain peak in the world. Mauna Kea is widely recognized as offering optimum conditions for optical, infrared, and millimeter/submillimeter measurements. In addition, the local availability of support technicians and personnel contribute to making Mauna Kea one of the finest astronomical sites in the world. These facilities have contributed more than $619 million in capital investments to the State of Hawai‘i, contributed $72.4 million in annual operating costs (University of Hawai‘i 2010), and generated approximately 270 permanent jobs (County of Hawai‘i 2010). The newest planned addition is the Next Generation Large Telescope, which is currently planned for construction starting in 2011, with operations starting in 2018 at a capital cost that may exceed $1 billion. Its annual operating budget is estimated at $25.8 million, which includes $13 million in labor.

The North Hilo District is agriculturally oriented. On the arable lands of the lower elevations from Honohina-Ninole to ‘Ō‘ōkala, former sugarcane lands are being cultivated in smaller acreages with a diverse range of crops and are also planted in eucalyptus trees. Large tracts of land within the district are

used for cattle grazing and logging of native and planted forests. Macadamia nuts, ginger, bananas, tropical foliage, orchids, tropical fruits, cacao, kava, assorted leafy vegetables, papaya, and taro are some of the other agricultural products grown in North Hilo.

There are no visitor accommodations in North Hilo. NOAA operates the MLO, a premier atmospheric research facility that has been continuously monitoring and collecting data related to atmospheric change since the 1950s.

Military presence within the county is represented by the U.S. Army, which operates a field training facility at PTA. With an area of 132,000 acres (52,800 hectares), PTA is the largest DoD installation anywhere in the Pacific.

3.8.2 Environmental Justice

On February 11, 1994, President Clinton issued "Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority and Low-Income Populations" (59 FR 32). It was designed to focus the attention of federal agencies on the human health and environmental conditions in minority and low-income communities. Environmental justice is analyzed to identify and address disproportionately high and adverse human health or environmental effects of federal agency programs, policies, and activities on minority and low-income populations and to identify alternatives that might mitigate these impacts. Data from the U.S. Department of Commerce 2000 Census of Population and Housing were used for this environmental justice analysis (U.S. Census Bureau 2010).

Minority populations included in the census are identified as Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and other Pacific Islander; Hispanic; of two or more races; and other. The majority of residents in the State of Hawai‘i are of Native Hawaiian, Asian, and other Pacific Islander descent. These groups accounted for 51% of the total population of Hawai‘i.

Poverty status, used to define low-income status, is reported as the number of persons with income below the poverty level. The Census Bureau bases the poverty status of families and individuals on 48 threshold variables, including income, family size, number of family members under the age of 18 and over 65 years of age, and amount of money spent on food.

For 2008, the Census Bureau defines the poverty level as an annual income of $10,991 or less for an individual, and an annual income of $21,834 or less for a family of four. The U.S. Census Bureau estimates indicate that nearly 13.3% of the population of Hawai‘i County was below the poverty level of families in 2008 (U.S. Census Bureau 2010).

3.8.3 Protection of Children

"Executive Order 13045 – Protection of Children from Environmental Health Risks and Safety Risks" (62 FR 78) requires federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that might disproportionately affect children and ensure that the policies, programs, activities, and standards of federal agencies address disproportionate risks to children that result from environmental health or safety risks. Environmental health and safety risks primarily entail risks that are attributable to products or substances that the child is likely to come into contact with or to ingest. In 2000, 25.6% of the state's population was made up of children (under 18 years old), which is an increase of 10.9% from 1990. In 2008, 25% of the population of Hawai‘i County was under the age of 18 (U.S. Census Bureau 2010).

3.9 Land Use

The total area of the island of Hawai‘i is approximately 2.5 million acres or 4,028 square miles: 4,023 square miles of land and 4.4 square miles of inland water. All of these lands are divided into approximately 125,000 parcels (County of Hawai‘i 2005).

The Proposed Action activities would be conducted on/over state lands and within the Hamakua and North Hilo land planning districts. Land use within these districts and around the area is described in this subsection.

3.9.1 Land Use and Zoning Districts

Hawai‘i was the first of the 50 United States to have a state land use law and a state general plan. Hawai‘i remains unique among the 50 states with respect to the extent of control that the state exercises in land use regulation. The *County of Hawai‘i General Plan* (County of Hawai‘i 2005), as amended, details the history and specifics of land use on the island. The County of Hawai‘i has no land use control over federal property.

Figure 3-17 shows the overall land ownership in, and immediately surrounding, the Proposed Action area. Table 3-6 shows the breakdown of land (other than federal) within the Hamakua and North Hilo land planning districts.

Table 3-6. Land use by planning district.[a]

District	Agricultural (acre)	Conservation (acre)	Rural (acre)	Urban (acre)	Total (acre)
Hamakua	162,729	235,805	13	1,041	399,588
North Hilo	53,587	120,110	71	608	174,376
a. Table data from *County of Hawai‘i General Plan* (County of Hawai‘i 2005) for the year 2000.					

The County of Hawai‘i zoning code is the legal method of land use designation and regulation. The zoning code is the county’s main land use control and implements the *County of Hawai‘i General Plan*. The code identifies the various types of zoning districts and the allowable uses for each district. Zoning maps establish the zoning for the island on a parcel-by-parcel basis. Rezoning is the primary method for changing the allowed uses of land. Rezoning must be consistent with the *County of Hawai‘i General Plan*. Table 3-7 shows the zoning of nonfederal land in the Hamakua and North Hilo districts.

Table 3-7. Acres zoned by planning district.[a]

Zoning	North Hilo District (acre)	Hamakua District (acre)
Single Family	391	631
Multi-Family	0	4
Resort	0	42
Commercial	10	38
Industrial	38	15
Industrial Commercial	0	0

Table 3-7. (continued.)

Zoning	North Hilo District (acre)	Hamakua District (acre)
Mixed		
Family Agriculture	0	0
Residential Agriculture	55	0
Agriculture	61,954	165,076
Open	38	963
Unplanned	0	185

a. Table data from *County of Hawai‘i General Plan* (County of Hawai‘i 2005) for the year 2000.

3.9.2 University of Hawai‘i Management Areas on Mauna Kea

This subsection provides an overview of the land use within University of Hawai‘i Management Areas, as taken from the Mauna Kea CMP (University of Hawai‘i 2009).

University of Hawai‘i Management Areas begin at approximately 9,200 ft (2,804 m) amsl on Mauna Kea and extend to the summit. There are three district areas within the University of Hawai‘i Management Area (Figure 3-18): the Mauna Kea Science Reserve (Science Reserve), the mid-level facilities at Hale Pōhaku, and the Summit Access Road. The University of Hawai‘i Management Areas are classified in the resource subzone of the state conservation district lands.

The Science Reserve is the largest of the three district areas (Figure 3-18). It was established in 1968 and originally encompassed approximately 13,321 acres (5,390 hectares). In 1998, 2,033 acres (823 hectares) were withdrawn from the Science Reserve as part of the Mauna Kea Ice Age NAR. Therefore, the Science Reserve now contains 11,288 acres (4,568 hectares) of state land above the 11,500-ft (3,505-m) elevation. Five hundred twenty-five of these acres (212 hectares) were designated in 2000 as an Astronomy Precinct, roads, and support infrastructure. The remaining 10,763 acres (4,356 hectares) in the Science Reserve are designated as a Natural/Cultural Preservation Area.

The Astronomy Precinct hosts the world’s largest astronomical observatory, with telescopes operated by astronomers from 11 countries. There are currently 13 working telescopes: nine of them are for optical and infrared astronomy, three of them are for submillimeter wavelength astronomy, and one is for radio astronomy. They include the largest optical/infrared telescopes in the world (the Keck telescopes), the largest dedicated infrared telescope (the United Kingdom Infrared Telescope), and the largest submillimeter telescope in the world (the James Kirk Maxwell Telescope). The westernmost antenna of the Very Long Baseline Array is situated at a lower altitude 2 miles (3.2 kilometers) from the summit.

The mid-level facilities at Hale Pōhaku encompass 19.3 acres (7.8 hectares) on the south slope of Mauna Kea. This area contains the Onizuka Center for International Astronomy, the Visitor Information Station, and the construction laborer camp, which has two old buildings and four modern cabins.

The Summit Access Road (John A. Burns Way) extends from Hale Pōhaku to the boundary of the University of Hawai‘i Management Areas at an elevation of approximately 11,500 ft (3,505 m). This area includes the road and a strip approximately 400 yd (366 m) wide on either side of the road but excludes the NAR.

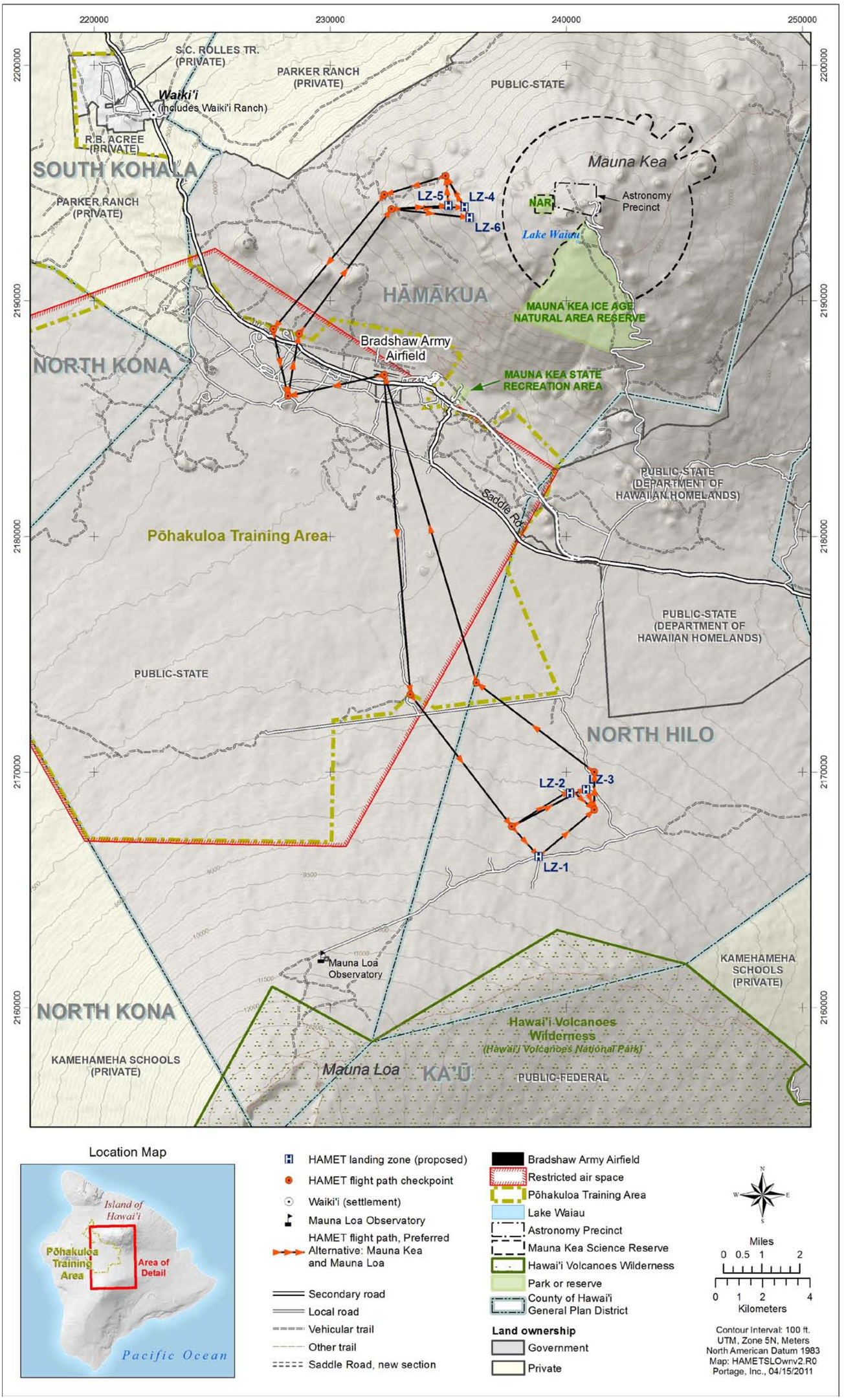

Figure 3-17. Land ownership.

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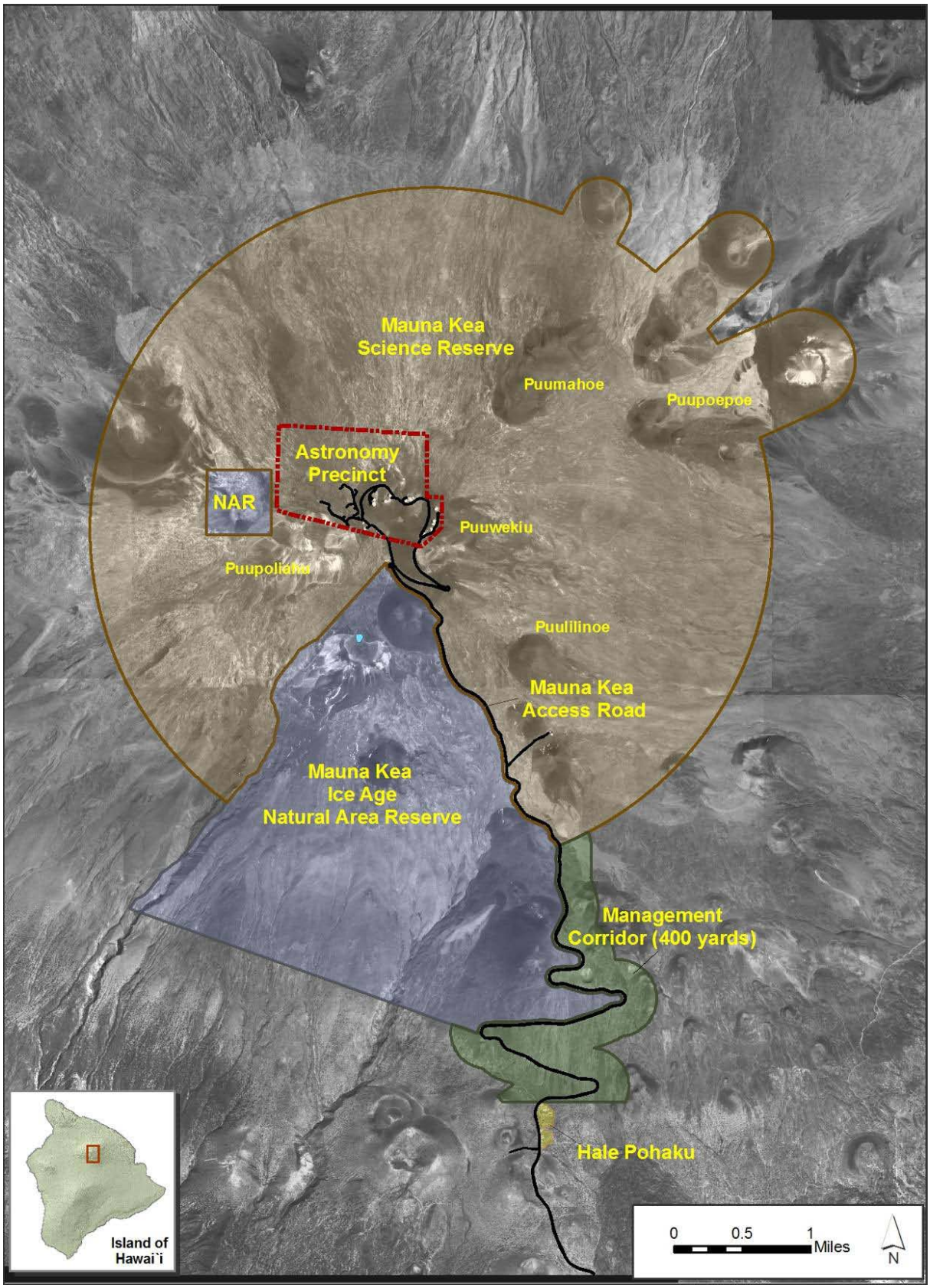

Figure 3-18. University of Hawai‘i Management Areas from University of Hawai‘i (2009).

3.9.3 Pōhakuloa Training Area

With 132,000 acres (52,800 hectares), PTA is the largest military training area in Hawai‘i, extending up the lower slopes of Mauna Kea to approximately 6,800 ft (2,073 m) amsl (Figure 3-19) (USAEC 2008). This area is within the general, limited, and resource subzones of the state-designated conservation district. A portion of the area is leased to the U.S. Army.

Land uses at PTA include the cantonment area, Bradshaw Army Airfield, maneuver training areas, drop zones, live-fire training ranges, artillery firing points, an ordnance impact area, and areas unsuitable for maneuver (USAEC and COE 2009). The cantonment area consists of 566 acres (229 hectares) with 154 buildings. The Bradshaw Army Airfield has a 3,969-ft (1,210-m) runway and offers helicopter access and, until recently, limited C-130 access. Approximately 56,661 acres (22,930 hectares) of land are suitable for field maneuvers. The ordnance area is approximately 51,000 acres (20,639 hectares).

Lands surrounding PTA are generally within the state-designated conservation district. Land uses in the areas include cattle grazing, game management, forest reserves, and undeveloped land (USAEC and COE 2009). Land to the northwest of PTA is agricultural, primarily for cattle grazing, and also provides limited hunting opportunities for big game species and game birds. Land to the north of PTA includes the Kaohe Game Management Area (GMA), Mauna Kea State Park, Mauna Kea Forest Reserve, and the Mauna Kea National Natural Landmark. Land to the east and south is included in the Mauna Loa Forest Reserve.

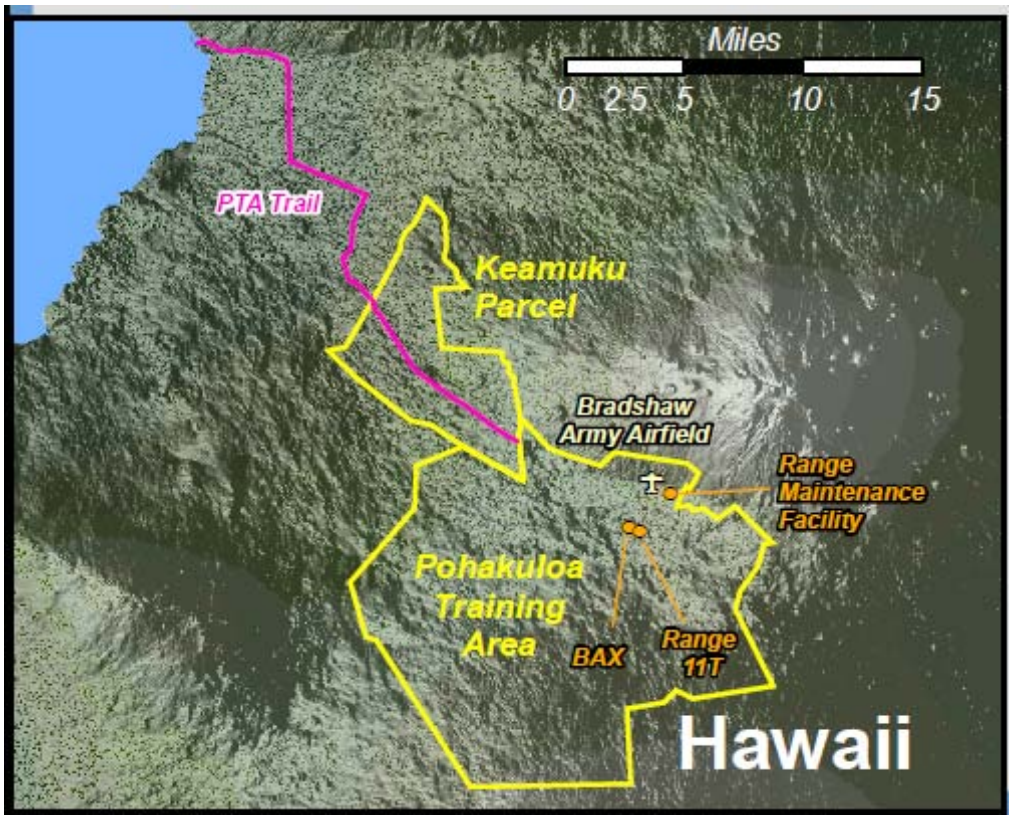

Figure 3-19. PTA and Keamuku Parcel from USAEC (2008).

3.9.4 The Keamuku Parcel

The Keamuku Parcel (referred to as the West PTA Acquisition Area in the *Final Environmental Impact Statement, Permanent Stationing of the 2/25th Stryker Brigade Combat Team* [USAEC 2008]) was acquired in July 2006, lies at the western foot of Mauna Kea (Figure 3-19), consists of approximately 23,000 acres (9,300 hectares), and is currently used for military maneuver training, a quarry, and occasional grazing.

Land uses surrounding the Keamuku Parcel include cattle grazing, military training, agriculture, residential lots, and open space. The remaining surrounding lands are used for recreation and ranching or are undeveloped (USAEC and COE 2009).

3.9.5 Mauna Loa

Mauna Loa volcano covers approximately 2,035 square miles (5,270 square kilometers). The land around Mauna Loa is owned and managed by the NPS and the State of Hawai‘i. Hawai‘i Volcanoes National Park covers the summit and southeast flank of the volcano. The Mauna Loa Forest Reserve is located on the northeast slope. The Kapapala Forest Reserve is located on the southeast slope. There is an observatory complex near the summit of Mauna Loa. This complex includes the Mauna Loa Solar Observatory and the MLO. In addition to the forest reserve areas, the area around Mauna Loa is primarily used for scientific research, public education, and outdoor recreational activity.

3.9.6 Regional Land Use

Areas outside the University of Hawai‘i Management Areas include the Mauna Kea Ice Age NAR and the Mauna Kea Forest Reserve; both properties are managed by the DLNR. Other state- and federal-managed areas include Hakalau Forest National Wildlife Refuge and Hawaiian Home Lands.

The Mauna Kea Ice Age NAR was established in 1981 and has two parcels that are surrounded by the University of Hawai‘i Management Areas. The NAR is under the jurisdiction of the DLNR Natural Area Resources Commission. A 143.5-acre (58.1-hectare) square parcel is located west of the summit area, around Pu‘u Pohaku. The larger 3,750-acre (1,518-hectare), triangular-shaped parcel extends from an elevation of approximately 10,070–13,230 ft (3,069–4,032 m) at the upper tip of the parcel. There are several features within this parcel: The Mauna Kea adze quarry, Lake Waiau, and geomorphic features created by glaciers (moraines and glacial till).

The Mauna Kea Forest Reserve has 52,500 acres (21,246 hectares) that sit above 7,000 ft (2,134 m) amsl surrounding the University of Hawai‘i Management Areas, Hale Pōhaku, and the Mauna Kea Ice Age NAR. The forest reserve is under the jurisdiction of the DLNR Division of Forestry and Wildlife.

The Hakalau Forest National Wildlife Refuge has two units: the 33,000-acre (13,355-hectare) Hakalau Forest Unit and the 5,300-acre (2,145-hectare) Kona Forest Unit. The Hakalua Forest Unit is on Mauna Kea, and the Kona Forest Unit is on Mauna Loa. The wildlife refuge was established to conserve endangered forest birds and their habitat.

The Hawaiian Home Lands area has 53,000 acres (21,448 hectares) at the lower elevations of Mauna Kea around Humu‘ula Saddle that were designated by the Hawaiian Homes Commission Act of 1920 (42 Stat 108) to be made available for homesteads. Today, there is limited cattle ranching under a permit issued by the Department of Hawaiian Home Lands.

3.9.7 Administrative/Special Designations

The U.S. National Park Service National Landmarks Program designated Mauna Kea as a National Natural Landmark (NNL) in 1972 (NPS 2011). Established in 1962, the program aims to encourage and support voluntary preservation of sites that illustrate the geological and ecological history of the United States and to strengthen the public's appreciation of America's natural heritage. An NNL is a significant natural area that has been designated by the Secretary of the U.S. Department of the Interior. To be nationally significant, a site must be one of the best examples of a type of biotic community or geologic feature in its biophysiographic providence. The primary criteria for designation are that the area is of illustrative value and condition of the specific feature; secondary criteria include rarity, diversity, and value for science and education. Mauna Kea is listed as an NNL, because it is the highest insular mountain (rising to an elevation of 13,796 ft [4,200 m] above sea level) in the United States, containing the highest lake (Lake Waiau at 13,030 ft [3,972 m] above sea level) in the country and evidence of glaciations above 11,000 ft (3,353 m). Mauna Kea is also recognized as the "most majestic expression of shield volcanism in the Hawaiian Archipelago, if not the world" (NPS 2011).

3.10 Recreation

In general, most of the proposed project activities would be conducted on/over state lands. This subsection describes recreational land use.

Dispersed recreational activities may occur within the area. Data are limited to quantifiably describe which activities occur and the frequency of their occurrence; however, recreational activities generally include hiking, hunting, camping, and sightseeing. The LZs lie within areas used for recreation but are not destinations for recreational activities.

Hunting is a popular activity on the island of Hawai‘i and near to the area where HAMET is proposed. Public hunting areas are those lands where the public may take game birds and mammals, including areas such as GMAs; forest reserves and surrendered lands; natural area reserves; restricted watersheds; cooperative GMAs; military training areas; unencumbered state lands; designated sanctuaries; and other lands designated by the DLNR (State of Hawai‘i 1999a, 1999b). The area defined by the extent of the Preferred Alternative (i.e., HAMET flights) is over or near locations within the following DOFAW GMAs: Mauna Kea Forest Reserve and GMA; Mauna Loa Forest Reserve and GMA, including portions of the Kipuka ‘Ainahou; PTA Cooperative GMA; Kaohe Horse Pasture GMA; PTA 21; and the Redleg portion of the PTA (State of Hawai‘i 1999a, 1999b).

Hunted species in these areas include feral pig (*Sus scrofa*); axis deer (*Axis axis*); Columbian black-tailed deer (*Odocoileus hemionus columbianus*); feral goat (*Capra hircus*); wild sheep, including mouflon sheep (*Ovis musimon*), feral sheep (*Ovis aries*), and mouflon-feral hybrid sheep (*Ovis musimon* x *Ovis aries*); ring-necked pheasant (*Phasianus colchicus*); white-winged pheasant (*Phasianus colchicus principalis*); green pheasant (*Phasianus versicolor*); Kalij pheasant (*Lophura leucomelanos*); California quail (*Callipepla californica*); Gambel's quail (*Callipepla gambelii*); Japanese quail (*Coturnix japonica*); spotted dove (*Spilopelia chinensis*); barred dove (*Geopelia maugei*); mourning dove (*Zenaida macroura*); chestnut-bellied sandgrouse (*Pterocles exustus*); chukar (*Alectoris chukar*); gray francolin (*Francolinus pondicerianus*); black francolin (*Francolinus francolinus*); Erckel's francolin (*Francolinus erckelii*); wild turkey (*Meleagris gallopavo*); and other game mammals and birds as may be designated by the DOFAW (State of Hawai‘i 1999a, 1999b).

Birds, as transient species on the island, are closely followed by hunters to the specific habitat in which they are plentiful, while game mammals tend to be less transient. All hunters are required to report their hunting results on standard field forms located at hunter check-in stations at the end of every hunt.

Each individual hunter is responsible for obtaining and completing the required forms. These forms are indicative of successful hunts by hunters but not necessarily of total hunter numbers within a hunting area. Additionally, numbers may be higher in certain GMAs than others, seasonally or annually, based on movements of transient species and habitat conditions at the time of the hunt. Regardless, the number of forms collected at a hunter check-in station can give an indication of an area's overall usage, particularly if the data are routinely collected over an extended period.

3.10.1 Mauna Kea Recreation

Tourism and private recreational activities on Mauna Kea include hiking, biking, hunting, snow play, and sightseeing (University of Hawai'i 2009). These activities have increased over the past several decades due to better access and a greater number of organized commercial and educational tours. The Visitor Information Station of the Onizuka Center for International Astronomy (VIS), established in 1986 at Hale Pōhaku, serves to increase visitor knowledge. The VIS provides information on safety and hazards, astronomy, the observatories, and the natural and cultural resources of Mauna Kea, as well as providing restrooms, a gift shop, and an evening stargazing program.

While there is no official registration system to track users, in recent years OMKM has been keeping detailed records on the number of people visiting the VIS and the summit (University of Hawai'i 2009). In 2002, it was estimated that 105,000 visitors stopped at the VIS (University of Hawai'i 2009). The recorded total for all types of summit visitations by vehicles was 32,066 in 2006 and 32,017 in 2007 (University of Hawai'i 2009). Observatory vehicles and visiting four-wheel drive vehicles represent, by far, the largest percentage of total vehicles on the mountain, with just over 13,000 of the former and over 10,500 of the latter in 2007 (University of Hawai'i 2009). Ranger estimates indicate an average of about 30 noncommercial visitors a day to the summit, most of them staying less than 30 minutes (University of Hawai'i 2009). The majority of non-observatory traffic occurs in the afternoon.

Hiking is currently a popular day-use activity for visitors to Mauna Kea. The Mauna Kea Trail is 6 miles (9.6 kilometers) long, starting from the VIS, which is at 9,200 ft (2,804 m), and well marked. The trail loosely parallels a partially paved summit road and, from the Mauna Kea Ice Age NAR boundary at 13,200 ft (4,023 m) to the summit road's high point of 13,700 ft (4,176 m), actually follows the road. There are also several established (but unmarked) trails in the summit region and other trails at lower elevations. Rangers monitor the trails that lead to the most popular places of interest and work to curtail unwanted new trails by directing visitors to the established ones and covering over evidence of unwanted trails. New trails are mainly created when visitors or researchers opt to explore new terrain. Due to lack of signage and a maintained trail network, a faint trail used infrequently may be discovered by others and become more established and impacted. Trail maps are available at the VIS, and hikers are requested to register there and inform rangers of their travel plans. Ranger reports between 2001 and 2007 suggest that approximately 5,000 to 6,000 hikers visit the summit region every year (University of Hawai'i 2009). Figure 3-20 shows the Mauna Kea trail system and regional recreation areas.

Hunting occurs in many areas on Mauna Kea. Although hunters are known to start looking for animals at elevations as high as 12,000 ft (3,660 m), mammal hunting typically takes place at lower elevations on Mauna Kea in the DLNR Mauna Kea Forest Reserve, where the animals are more numerous (University of Hawai'i 2009). In 1979, a federal court ordered the eradication of sheep and goats from Mauna Kea as a result of a lawsuit filed to protect designated PCH, the māmane-naio forest. This goal was nearly achieved in 1981, but the animals are still present on the slopes of Mauna Kea, and hunting continues to be a popular recreational and subsistence activity with local residents. DLNR maintains an active control program for sheep, goats, and mouflon from the lower boundaries of the Mauna Kea Forest Reserve up into the Mauna Kea Science Reserve.

Skiing and snow play are a common winter pastimes on the Big Island when the conditions are conducive for these activities (University of Hawai‘i 2009). Other than for plowing the roads (conducted by Mauna Kea Support Services) and directing parking, there is no logistical support for snow operations on the summit, and it is difficult to control use and access. During periods of heavy snow, rangers keep the road closed at Hale Pōhaku until they receive confirmation that conditions are safe for visitors to proceed up the mountain. Sometimes people wait overnight in their cars for the opportunity to drive up and see/collect snow (University of Hawai‘i 2009). Located directly east of the Caltech Submillimeter Observatory, Poi Bowl is the primary area used for snow play—in part because it is accessible by road at both the top and bottom of the run. Because there are no designated trails or ski lifts, visitors often hike off-trail to reach the ski runs, sometimes traveling across open cinder between the snow-covered areas. Vehicle and visitor traffic to the summit may be particularly high on snow days, especially when they fall on weekends. Many people (especially locals) visit the mountain only when there is snow. As many as 600 vehicles were recorded traveling to the summit on one heavy snow day, and each of these was likely carrying several passengers (University of Hawai‘i 2009). On New Year’s Day 2004, after a period of particularly heavy snowfall, rangers estimated there were 1,400 vehicles on the summit (University of Hawai‘i 2009), and during the 19 days documented by OMKM rangers as snow days in 2007, a total of 2,547 vehicles were recorded on the mountain (University of Hawai‘i 2009).

3.10.2 Mauna Loa Recreation

A proposed trail system would encircle Mauna Loa at its mid-elevations and would be accessible from the Māmalahoa Highway and Saddle Road at several locations. The total length of the trail system would exceed 350 miles (563 kilometers). The Mauna Loa Trail System is proposed to cross or pass adjacent to both public and private lands. The corridor within which the Mauna Kea Trail System is proposed includes only lands within agricultural and conservation zones (Nature Conservancy of Hawai‘i 2005).

The Mauna Loa Trail System, as proposed, would incorporate four well-known Hawai‘i trails (‘Ainapō Road, ‘Ainapō Trail, Mauna Loa Observatory Road, and Pu‘u ‘Ō‘ō Trail) and would link directly with two others (Pu‘u Lā‘au and Pu‘u Huluhulu) (Nature Conservancy of Hawai‘i 2005). Figure 3-20 shows the Mauna Loa proposed trail system and regional recreation areas. Key regional areas near the Proposed Action are discussed in the following subsection.

3.10.3 Regional Recreation

Recreation at PTA includes archery, and hunting on designated training areas, which the Army coordinates with the state (USAEC and COE 2009). Recreation opportunities exist in areas surrounding the Keamuku Parcel as well (USAEC and COE 2009).

Hawai‘i Volcanoes National Park encompasses a large area of the Big Island (see Figure 3-20). The northern border of Volcanoes National Park lies approximately 2 miles (3,200 m) from Mauna Loa LZ-1. The park displays the results of 70 million years of volcanism, migration, and evolution (NPS 2011). The park highlights two of the world’s most active volcanoes and offers insights on the birth of the Hawaiian Islands and views of dramatic volcanic landscapes. Recreation within the park includes biking, camping, hiking, lava viewing, lodging, and drivable tours (NPS 2011). Statistics from the NPS show 1,304,667 visitors used the Hawai‘i Volcanoes National Park in 2010 (NPS 2011).

The U.S. Congress designated the Hawai‘i Volcanoes Wilderness in 1978, and it now has a total of 130,790 acres (University of Montana 2011). The northwestern extension of the park includes Mauna Loa and is designated wilderness (Figure 3-20). In the southwestern portion of the park, a large chunk of

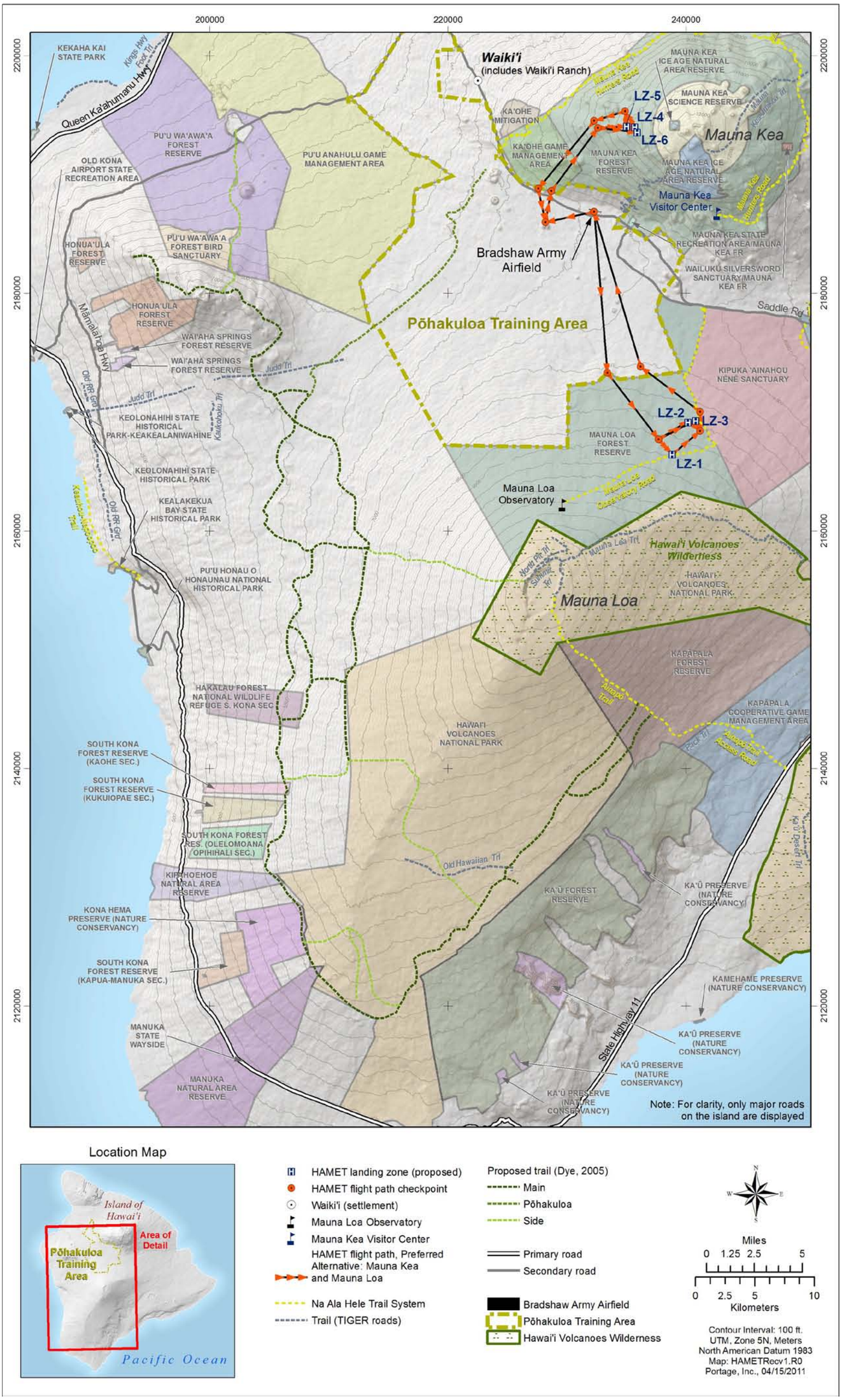

Figure 3-20. Mauna Kea trail system and regional recreation areas.

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wilderness includes several miles of coastline, and a small portion southeast of the visitor center is the ʻOlaʻa Forest, which is separate from and just north of the park.

The wilderness trail system within Hawaiʻi Volcanoes National Park provides the backcountry hiker with a diverse array of experiences, from barren lava to dense forest and steep alpine slopes (Nature Conservancy of Hawaiʻi 2005). Several trails run from 4–16 miles (6–26 kilometers). The longest, at 19 miles (31 kilometers), is the Mauna Loa Summit trail. It is, by far, the most challenging trail as a result of elevation gain (more than 7,000 ft [2,134 m]) and rapidly changing weather. Two cabins near the summit of Mauna Loa provide shelter on a first-come basis. The summit can also be reached by the Mauna Loa Weather Observatory road. The 2004 visitors report indicated that 2.6 million visitors entered the park, and 5,070 overnight backcountry permits were issued (Nature Conservancy of Hawaiʻi 2005).

3.11 Noise

Noise is generally unwanted sound. It can interfere with communications or other human activity, may be intense enough to cause hearing damage, or may be otherwise annoying. Human responses to noise vary, depending on the type and characteristics of the noise, distance between the source and receptor, receptor sensitivity, and time of day.

The typical human response to noise is annoyance, a response that is complex and displays wide variability for any given noise level. Although individual annoyance is sometimes measured in the laboratory, field evaluations of community annoyance are most useful for predicting the consequences of actions involving various noise sources, including various aircraft. A person's expectation of appropriate sound levels associated with an activity has a direct bearing on the level of annoyance. Effects from noise may include communication interference, sleep disturbance, disruption of one's peace of mind, enjoyment of one's property, and the enjoyment of solitude. The consequences of noise-induced annoyance are personal irritation that is often expressed as complaints to the installation or authorities. The five factors identified as indicators for estimating community-complaint reaction to noise are the following:

- Type of noise
- Amount of repetition
- Type of neighborhood
- Time of day
- Amount of previous exposure (USAEC and COE 2009).

3.11.1 Noise Standards and Guidelines

Noise is regulated under various federal and state guidelines. The federal government is required to set and enforce uniform noise-control standards for aircraft and airports, interstate motor carriers and railroads, workplace activities, trucks, motorcycles, and portable air compressors as well as for federally assisted housing projects located in noise-exposed areas. Among the laws governing these requirements are the Noise Control Act of 1972 (42 USC 65 § 4901), the Aviation Safety and Noise Abatement Act of 1979 (49 USC 475 § 47501), and the Control and Abatement of Aircraft Noise and Sonic Boom Act of 1968 (49 USC 447 § 44715). According to the FAA's 2000 Aviation Noise Abatement Policy (49 USC 401 § 40101), "[N]oise relief continues to be a shared responsibility… The FAA and the aviation industry have the primary responsibility to address aircraft source noise… Airport proprietors,

state and local governments, and citizens have the primary responsibility to address airport noise compatibility planning and local land use planning and zone."

The EPA is the agency in charge of enforcing the Noise Control Act. The EPA recommends using the day-night average sound level (DNL) for environmental noise to quantify the intrusiveness of nighttime noise.

The DoD began developing noise evaluation programs in the early 1970s. Initial program development involved the Air Installation Compatible Use Zone program for military airfields. Early application of that program emphasized Air Force and Navy airfields. The Army implemented the program by addressing both airfield noise issues and other major noise sources, such as weapons testing programs and firing ranges. Joint Air Force, Army, and Navy planning guidelines use annual average DNL values to categorize noise exposure conditions on military installations.

The Army uses three noise zones referred to as Land Use Planning Zones (LUPZs). These LUPZs are outlined in Army Regulation 200-1 (U.S. Army 2007a) and are intended to minimize the impact of environmental noise on the public without impairing the mission of the installation. Under Army policy:

- Zone I is compatible with noise-sensitive land use (residences, schools, medical facilities, cultural activities)
- Zone II should generally be limited to industrial activities (such as manufacturing, transportation, and resource protection)
- Zone III is incompatible with noise-sensitive land use.

In addition to federal regulations, the State of Hawai‘i has adopted statewide noise regulations. The standards outlined in Title 11 of Chapter 46 of the Hawai‘i Administrative Rules (State of Hawai‘i 1996) apply to fixed stationary noise sources, agricultural equipment, and construction equipment. However, the alternatives under proposed training activities being assessed in this report do not involve introduction of, or modifications to, stationary sources; therefore, the State of Hawai‘i Administrative Rules noise standards do not apply to these activities. The State of Hawai’i Department of Transportation Airports Division outlines noise abatement areas for each island in the *Hawai’i Airports and Flying Safety Guide 2010–2011* (DOT 2010a). These guidelines apply to all aviation activities in Hawai‘i, including proposed HAMET activities. Figure 3-21 shows designated noise abatement areas on the island of Hawai‘i. Proposed HAMET flight paths do not infringe on any voluntary noise abatement areas or recommended avoidance areas.

The U.S. Army Public Health Command has developed the *U.S. Army Hawai‘i Statewide Operational Noise Management Plan* (SONMP) (U.S. Army 2010c) to provide guidelines to foster positive relations between the Army and the public. The SONMP uses the LUPZs to provide more detailed information to surrounding communities on potential effects of increased noise resulting from Army operations. In addition to the three zones listed in Table 3-8, the Hawai‘i SONMP includes an informal land use planning zone, which is at the lower boundary of Zone I. This additional zone is intended to account for seasonable variability in increased operations that may dilute noise impacts averaged over a 1-year period.

3.11.2 Existing Conditions

Bradshaw Army Airfield and PTA lie in the saddle between Mauna Kea and Mauna Loa. The existing noise conditions and noise abatement procedures for Bradshaw Army Airfield and PTA are

outlined in the U.S. Army Hawaiian SONMP. The current number of military aircraft using established flight corridors near Bradshaw Army Airfield and PTA do not generate ground noise contours, because both are limited use with regard to aircraft (U.S. Army 2010c).

Noise conditions at PTA vary depending on location and time of day. The main source of noise at PTA is small-arms and large-caliber weapons firing, which occurs throughout the year, as well as aircraft and vehicles (USAEC and COE 2009). Currently, existing noise contours as a result of small-arms and large-caliber weapons firing are shown in Subsection 11.4 of the Hawai‘i SONMP (U.S. Army 2010c). Zone III noise contours extend slightly north of the PTA boundary approximately 650 ft (200 m) onto forest reserve land. Zone II noise contours also extent onto forest reserve land north of PTA, but all land uses within the contour are compatible with Zone II land uses. These noise contours represent a cumulative effect of all firing activities at PTA and therefore represent worst-case noise levels. When firing activities are not occurring, ambient noise levels may vary from 40 A-weighted decibels (dBA) during quiet nighttime hours to 70 dBA during windy daytime hours or when traffic is present on Saddle Road (U.S. Army 2010c).

The main source of noise at Bradshaw Army Airfield is aircraft, although the airfield only averages one flight per day for each of the aircraft utilizing it. These aircraft include rotary wing AH-64, CH-47, OH-58, UH-60, and Dauphin as well as fixed-wing C-12 and C-130 (U.S. Army 2010c). As previously stated, the low number of flights at Bradshaw Army Airfield does not generate DNL noise contours.

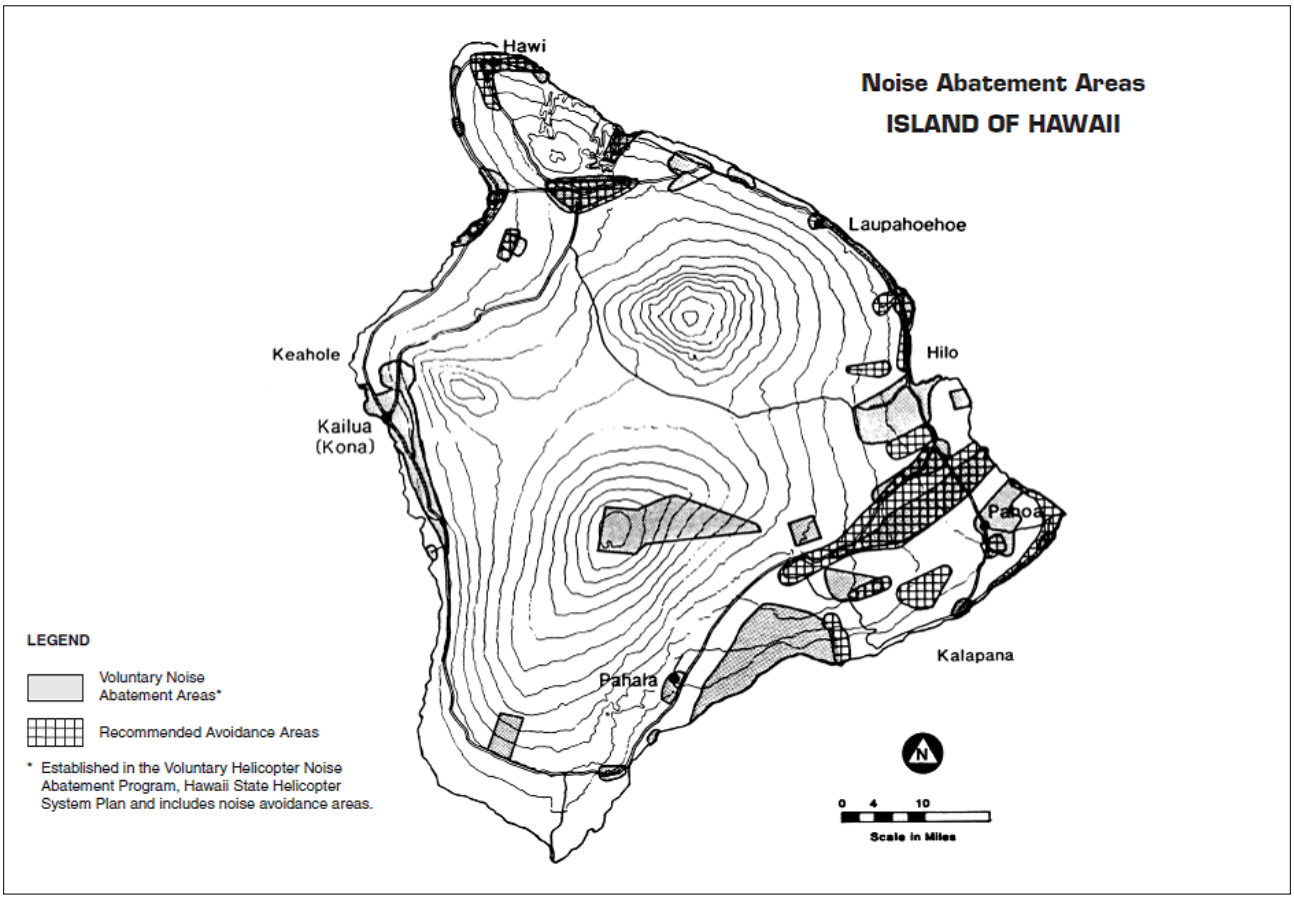

Figure 3-21. Island of Hawai‘i Noise Abatement Areas from DOT (2010a).

Table 3-8. Army land use planning guidelines.[a]

Noise Zone	Aviation ADNL (dBA)	Impulsive CDNL (dBC)	Small Arms PK 15 (met)
Land Use Planning	60–65	57–62	Not applicable
I	Less than 65	Less than 62	Less than 87
II	65–75	62–70	87–104
III	Greater than 75	Greater than 70	Greater than 104

a. Source: U.S. Army (2010c).

ADNL = A-weighted day-night average sound level.

CDNL = C-weighted day-night level.

dBA = A-weighted decibel.

dBC = C-weighted decibel.

3.11.2.1 Mauna Kea. The three high-altitude LZs on Mauna Kea are located within in the Mauna Kea Forest Reserve. Therefore, existing noise levels at the LZs are relatively low. Ambient noise sources consist of birds, insects, and wind. Noise sources that generate noise above background levels are generally associated with recreational use of the Mauna Kea State Recreation Area, Mauna Kea Ice Age NAR, and Mauna Kea summit region. These sources include tourists, vehicular traffic, observatory operations and users, and cultural practitioners. In addition, commercial helicopter flights operate in the area at lower elevations as part of scenic tours, which may also contribute to noise levels above background.

3.11.2.2 Mauna Loa. Similar to the Mauna Kea LZs, the three high-altitude LZs on Mauna Loa are located within the Mauna Loa Forest Reserve, and existing noise levels at the LZs are low. Ambient noise sources consist of birds, insects, and wind. Noise sources that generate noise above background levels are generally associated with recreational use of the Hawai‘i Volcanoes National Park. These sources include tourists and vehicular traffic.

3.12 Visual and Aesthetic Resources

The visual character of an area is defined in terms of four primary components: water, landform, vegetation, and cultural modifications. These components are characterized or perceived in terms of the design elements' form, line, color, texture, and scale. Visual components also may be described as being distinct (unique or special), average (common or not unique), or minimal (a liability) elements of the visual field and in terms of the degree to which they are visible to surrounding viewers (e.g., foreground, middle ground, and background) (USAEC 2008).

The visual quality of an area is defined in terms of the visual character and the degree to which these features combine to create a landscape that has the following qualities: vividness (memorable quality), intactness (visual integrity of environment), and unity (compositional quality). An area of high visual quality usually possesses all three of these characteristics.

The visual quality of an area also is defined in terms of the visual sensitivity within the view shed of the Proposed Action. Locations of visual sensitivity are defined in general terms as areas where high

concentrations of people may be present or areas that are readily accessible to large numbers of people. They are further defined in terms of several site-specific factors, including the following:

- Areas of high scenic quality (i.e., designated scenic corridors or locations)
- Recreation areas characterized by high numbers of users with sensitivity to visual features
- Quality (i.e., parks, preserves, and private recreation areas)
- Important historic or archaeological locations.

The natural beauty of the island of Hawai‘i includes not just lush tropical forests, waterfalls, and sandy beaches framed by turquoise waters but also active and dormant volcanoes and towering mountains.

3.12.1 Region of Influence

The *County of Hawai‘i General Plan* (County of Hawai‘i 2005) is a statement of development objectives, standards, and principles with respect to the most desirable use of land within the county (County of Hawai‘i 2005). The long-range goals with respect to the natural beauty of the island of Hawai‘i include the following:

- Protect, preserve, and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources
- Protect scenic vistas and view planes from becoming obstructed
- Maximize opportunities for current and future generations to appreciate and enjoy natural and scenic beauty.

The proposed HAMET LZs and PTA lie within the Hamakua and North Hilo planning districts described in the *County of Hawai‘i General Plan* (County of Hawai‘i 2005). Specific standards provide guidelines for designating sites and vistas of extraordinary natural beauty that must be protected, including the following types of features:

- Distinctive and identifiable landforms distinguished as landmarks, such as Mauna Kea
- Coastline areas of striking contrast
- Vistas of distinctive features
- Natural or native vegetation that makes a particular area attractive (USAEC and COE 2009).

3.12.2 Landscape Description

The landscape of the region from PTA to the proposed LZs is characterized by panoramic views of the broad open area between Mauna Kea and Mauna Loa. The gently sloping form and smooth line of Mauna Kea to the north and Mauna Loa to the south are dominant background features of the visual landscape. Terrain in the PTA area is gently sloping and open, periodically interrupted by remnant volcanic cones (pu‘u). Lava flows create dark, visually receding areas throughout PTA.

Vegetation generally consists of grasses and shrubs that tend to be sparse and low in height. Observatories are on Mauna Loa and Mauna Kea to the south and northeast of PTA. There are few human-made features in the area except roads and support facilities within the training area and structures, roads, and an airfield within the cantonment area of PTA. The cantonment area is a visually distinct element of the landscape. Visible cultural features include walls, platforms, and many rock shelters.

The extremely uniform vegetation and topography result in middle-ground and background views of PTA and the proposed LZs that lack visual complexity but that are dramatic in their expansiveness. The panoramic views, the integrated visual space, and the unity of the natural features give this area a high overall visual quality, despite the uniformity of the landscape.

The *County of Hawai‘i General Plan* identifies areas of unique natural beauty that are a principle asset of the island, and the plan encourages programs for their conservation, preservation, and integration with other elements. Within the Hamakua and North Hilo planning districts in which the Proposed Action would take place, the general plan lists the Mauna Kea State Park (and area) as an example of natural beauty sites the plan protects (County of Hawai‘i 2005).

Within this visual landscape, aviation training currently occurs within PTA, and commercial and private aircraft operate outside of PTA. The latter topics are discussed in Subsection 3.14, Traffic and Circulation. A view plane analysis is presented in Subsection 4.12, Visual and Aesthetic Resources.

3.13 Human Health and Safety Hazards

The six LZs proposed for HAMET have similar environmental features and would have similar operations conducted on them under all alternatives. There is no distinction between LZs from a human-health and safety-hazards perspective.

Existing hazards that could threaten human health and safety within the proposed LZs range from limited to nonexistent and are based on human presence within an LZ. In other words, there are no human health and safety hazards unless a human is present at the LZ. As presented in Subsection 2.7.2, Features Common to Alternatives 1, 2, and 3, the LZs have been used for previous HAMETs (U.S. Army 2003a; U.S. Army 2004a; U.S. Army 2005a). No incidents involving human health and safety occurred during previous uses, and no structures or other features that would pose a human health and safety hazard were placed during previous operations (U.S. Army 2003b; U.S. Army 2004a; U.S. Army 2005a). The primary human health and safety concerns of HAMET and human presence include LZ safety, hazardous material, and wildfire.

The Army has procedures in place to investigate and plan for possible hazards. As part of flight operations, a risk assessment is completed by a commanding officer and addresses general and specific hazards for each flight mission. Pilots are briefed on the risk assessment, hazards, mitigative actions, and emergency procedures during preflight briefings prior to the start of each training mission (Mansoor 2011a).

3.13.1 Landing Zone Safety

Health and safety hazards associated with the LZs proposed for high-altitude training activities are based on human activities proposed at each location. These hazards include the following:

- High elevation

- Risk of wildfire
- High wind
- Extreme temperature
- Night/low visibility.

3.13.2 Hazardous Material

The U.S. Department of Transportation defines a hazardous material as a substance or material that the Secretary of Transportation has designated as capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and that has been designated as hazardous under Section 5103 of the Federal Hazardous Materials Transportation Law (49 USC 51 § 5101 et seq.). The term "hazardous material" includes hazardous substances, hazardous wastes, marine pollutants, elevated-temperature materials, materials designated as hazardous in the Hazardous Materials Table, and materials that meet the defining criteria for hazard classes and divisions in 49 USC 51 § 5101 et seq. Hazardous-material and waste management continues to follow Army, federal, and state regulations to prevent impacts on human health or the environment.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 103 § 9601 et seq.) defines as hazardous any substance that, due to its quantity, concentration, or physical and chemical characteristics, poses a potential hazard to human health and safety or to the environment. CERCLA has created national policies and procedures to identify and remediate sites contaminated by hazardous substances. There have been no hazardous substances identified at the proposed LZ locations.

3.13.3 Wildfires

Fire in the area of PTA has been limited to volcanically started fires, occasional lightning ignitions, and human error such as catalytic converters (i.e., vehicle exhaust systems) and discarded cigarettes (USAEC and COE 2009).

Tracer ammunition (which is not used in HAMET) is by far the largest cause of fires within PTA. Based on fire records, the number of fires per month peaks from March to July. However, PTA has a mosaic of dry habitats that is relatively dry throughout the year. Additionally, the amount of precipitation received during the winter is not sufficient to change the probability of fire by any significant amount. Also, based on the fire history of PTA, the data show that the western and the northern sections of PTA potentially face the greatest threat of wildfire (USAEC and COE 2009). Therefore, the main cause of monthly variation in the data is probably the frequency and intensity of use by the military and not due to environmental or climatic conditions.

Since July 1990, more than 8,000 acres (3,237 hectares) at PTA have been recorded as burned. Of these, more than 7,700 acres (3,116 hectares) or 91% of all acres burned were from fires caused by lightning, arson, or carelessly discarded cigarettes, and the largest of these started off Army lands and later burned onto PTA (USACE and COE 2009). In 1994, for example, a wildfire that began off-post destroyed 118 individuals of *Tetramolopium arenarium* ssp. *Arenarium*, eliminating approximately one-third of the total population. In addition to the 8,000 acres (3,237 hectares) of previous burns, a fire of unknown ignition origin occurred immediately adjacent to PTA within the PCH during August 2010 and burned 1,387 acres (561 hectares) of habitat (see Figure 3-12).

Invading nonnative species can pose a threat to native plant communities in burned areas. Many invasive plant species (e.g., fountain grass) are fire tolerant and can rapidly spread, outcompeting the native vegetation and threatening the ecosystem functionality as well as creating the potential to impede training activities. Once a fire has occurred and the native habitat has been burned, there is the potential for subsequent invasion of nonnative plant species (particularly fountain grass). These species may increase competition with native plants and, depending on the species, may result in an increased or decreased fire-prone landscape.

All six LZs are either devoid of plant life or so sparsely vegetated that the risk of fire is minimal. In the unlikely event of a fire, wildland fire crews from the 25th CAB and PTA would respond in accordance with current agreements between the Army and local emergency management agencies. The response plans would be conducted using current, approved emergency response procedures.

3.13.4 Wildfire Management

The integrated wildland fire management plan (IWFMP) for PTA was developed to establish specific guidance, procedures, and protocols for managing wildfires on PTA (CEMML and U.S. Army 2003). The IWFMP addresses environmental conditions and fire effects in Hawai‘i, fire prevention, pre-fire suppression, fire suppression, post-fire actions, and fire management areas. Fire prevention includes planning, managing fuels, using prescribed fire, planning water resources, and conducting firefighter training.

Records and reports, reviews and formal investigations, and analysis make up post-fire actions. These require the Wildland Fire Program manager to maintain a wildland fire incident report for all wildland fires on Army lands. The IWFMP discusses fire management areas and describes baseline site characteristics, wildland fire fuel types, previous fires, biological and cultural resources protection, and the firebreak system. The locations of water storage resources and other firefighting resources are described in the IWFMP. The appendices to the IWFMP address standard operating procedures.

Vegetation management is a tool used to prevent the spread of a fire by creating firebreaks and to control the abundance of highly flammable plants so that fires cannot easily ignite. Conducting prescribed burns is one form of vegetation management; mowing and applying herbicides are others. The Army uses vegetation management techniques at PTA. In the event of a fire at PTA, affected activities (e.g., training) are stopped immediately, and appropriate actions are undertaken to control/extinguish the fire (USAEC and COE 2009).

Standard operating procedures provide specific requirements that delineate the responsibilities of the Army, Federal Fire Department, Range Control personnel, and military training units in preventing and suppressing fires on Army lands (CEMML and U.S. Army 2003). In addition to addressing the environmental setting in the standing operating procedures, site-specific guidance is provided for fire prevention (including drought management), fire-suppression actions, and post-fire actions.

According to the IWFMP, in the recent past, the entire Hawaiian ecosystem has experienced an increase in wildfire frequency. Causes for the increase in fire frequency include the spread and intensification of alien grasses. In 1991, the Army began to reduce the frequency of fires on Army land with the application of a fire-prevention and prescribed-burn program. During a typical training exercise, unit leaders receive briefings from Range Division staff on the locations of fire hazards and fire-prevention measures and procedures. Unit leaders brief every soldier in the unit on the importance of preventing wildland fires. In the event of fire at any location, the unit takes all appropriate actions to put out the fire (USAEC and COE 2009).

3.14 Traffic and Circulation

3.14.1 Land-Based Traffic

Traffic and circulation refers to the movement of vehicles and pedestrians along and adjacent to roadways. Major roads are under the jurisdiction of the state through the Hawai‘i Department of Transportation; other streets and roads are under the jurisdiction of the counties. Roadways range from multi-lane road networks with asphalt surfaces to unpaved plantation roads. Roads and paths leading to the LZs are non-maintained, single-lane roads built on crushed lava. These roads are accessible only with high-clearance, four-wheel-drive vehicles due to the remote location, extreme elevation changes, and harsh operating conditions. While these roads are open to the public, they are not used heavily. The following types of land-based activities may take place:

- Hiking
- Camping
- Mountain bike riding
- All-terrain vehicle riding
- Horseback riding
- Dog training.

These activities are unlikely to be conducted near the proposed LZs as a result of high elevation and undesirable terrain.

3.14.2 Aerial Traffic

Approximately 60 commercial helicopter flights per day (approximately 22,200 flights per year) fly over the PCH just to the north of PTA (Munger 2010b). Commercial vendors include, but are not limited to, Paradise/Tropical Helicopter, Sunshine Helicopters, and Blue Hawaiian Helicopters, all of which are based out of Hilo. Flights usually originate from the west side of Hawai‘i and fly along the south slope of Mauna Kea directly above the PCH to reach various parts of the island as part of scenic tours.

3.15 Public Services and Utilities

The LZs are proposed in remote locations on Mauna Kea and Mauna Loa. The LZs on Mauna Kea are only accessible by a four-wheel-drive vehicle trail. The LZs on Mauna Loa are accessible by an access road that is open to the public. There are no public services or utilities in the general area. In the event that police, fire, or emergency-medical services are needed, they are available from PTA. HAMET flights would be based from Bradshaw Army Airfield at PTA. Public services and utilities at, and affecting, PTA are presented in this subsection.

3.15.1 Police

Army staff provides all police services on PTA. Units that come to PTA for training may bring military police of their own, depending on the size of the unit and other circumstances. The PTA police facility is located in the cantonment and is open 24 hours per day, 7 days per week. Saddle Road, a public highway, is patrolled by Hawai‘i County police, but PTA military police are available for support when

necessary. Lands leased by the Army are not patrolled on a regular basis, but military police respond to calls in coordination with county police. PTA military police coordinate extensively with county police on a regular basis (USAEC and COE 2009).

3.15.2 Fire

Fire-response services are provided by Army staff based at PTA. There is one fire station located at Bradshaw Army Airfield, with a staff of six (including two emergency medical technicians sharing duty around the clock). Available equipment includes two brush trucks (wildland rigs), a tanker, a crash rig, and an ambulance (USAEC and COE 2009). The Army is required to follow established standard operating procedures for wildfire situations (CEMML and U.S. Army 2003).

3.15.3 Emergency Medical Services

Emergency-medical services are provided by Army staff based at PTA. Serious medical emergencies rely on medical helicopter transport to Hilo, which is about 10 minutes away by air. PTA emergency staff respond to accidents on the roughly 25 miles (40.2 kilometers) of Saddle Road that pass through PTA, and, at the border of the installation, the injured are transferred to the care of the City of Hilo and County of Hawai‘i (USAEC and COE 2009).

3.15.4 Potable Water

The water supply to PTA is now hauled by tanker trucks from the town of Waimea, where it is purchased. Excess demand can be met by the City of Hilo. Each truck has a capacity of 5,000 gal (18,927 L), and up to 14 truckloads per day were required when the camp was at full capacity. Two pump stations transport the hauled water to two 670,000-gal (2,553,226-L) storage reservoirs, where it is treated with powdered chlorine and sent to three 10,000-gal (37,854-L) distribution reservoirs. Water from these reservoirs supplies PTA, Bradshaw Army Airfield, and fire reserves. Water consumption on PTA ranges from 10,000 gal (37,854 L) per day to 250,000 gal (946,353 L) per day, depending on camp occupancy; average consumption is 100,000 gal (378,541 L) per day (USAEC and COE 2009).

Hōkūpani Spring, Waihū Spring, and Liloe Spring previously supplied water to PTA. Spring water is captured by two 2-in. (5-cm) pipes running from the springs, through water catchments, and down to the base camp. The annual production of water supplied by the springs ranges from 20,000 gal (75,708 L) to 40,000 gal (151,417 L) per day. Historically, however, the spring produces a range of 0 to 80,000 gal (302,833 L) per day. This water was stored in a 670,000-gal (2,553,226-L) tank and treated in a slow sand filter treatment plant installed in 1996. The treated water was then conveyed to the two storage reservoirs for chlorination. The slow sand filter ceased to function, and use of spring water was discontinued. The state ranger facility has the rights to the first 8,000 gal (30,283 L) of water from the springs. The Army has the rights to the next 6,000 gal (22,712 L), and the remainder of the water is divided equally between the two agencies (USAEC and COE 2009).

3.15.5 Wastewater

Wastewater discharges at PTA derive from domestic wastewater generated by mess halls, latrines, and other administrative operations. Most of the flows from each of these facilities are disposed of in adjacent cesspools. Some facilities are grouped to one cesspool, and wastewater from grouped facilities is collected and transported through 4-in. (10-cm) sewer lines to a cesspool for disposal. Three latrine/shower facilities (T-87, T- 290, and T-121) recycle water used in the showers and sinks for use in the latrines. The wastewater from the latrines is then discharged to a septic tank and is finally disposed of in a seepage pit or leach field (USAEC and COE 2009).

3.15.6 Solid Waste Management

PTA generates an estimated 296 tons (269 metric tons) of industrial solid waste annually based on the waste and recycling streams generated during the third quarter of 2002 (USAEC and COE 2009).

3.15.7 Telephone

Telecommunications from the area between Mauna Kea and Mauna Loa are transmitted to Hilo through the Humu‘ula microwave station. Overhead trunk lines extend from this station to PTA, and distribution lines are located in the base camp, cantonment area, and Bradshaw Army Airfield. The trunk and distribution lines are owned by GTE Hawaiian Telephone, Inc. (USAEC and COE 2009).

3.15.8 Electricity

HELCO supplies electric power to PTA through a single 12.47-kV delivery point from a HELCO-owned substation located outside the northeast fence of the cantonment area. The components of this system include metering equipment, 29 transformers, 20 miles (32.2 kilometers) of overhead lines, and 755 poles. Demand for electric power varies throughout the year, depending on troop population in the base camp. Usage varies from about 1,600 kilowatt hours per day (kWh/day) to 7,100 kWh/day; average consumption is approximately 4,553 kWh/day (USAEC and COE 2009).

3.15.9 Wildfire Response at PTA

As part of its stated objectives, the IWFMP provides the necessary firefighting capabilities for firefighter and public safety (CEMML and U.S. Army 2003). The IWFMP incorporates public health and environmental quality considerations into its fire management planning and execution and, where practical, provides protection for the natural and cultural resources. By following the guidelines set forth in the IWFMP and associated standard operating procedures, the Army can reduce wildfires and provide for the protection of public services and utilities. In the event of a fire, wildland fire management on Army-controlled lands is conducted in accordance with the NHPA and the ESA (U.S. Army 2004a).

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4. ENVIRONMENTAL CONSEQUENCES

This section presents a summary of the potential environmental impacts from the Action Alternatives and the No Action Alternative. The methodology and assumptions used for impact analysis and a discussion of factors used to determine the significance of direct and/or indirect impacts are also provided. Direct impacts are those impacts that are caused by the Action Alternatives and occur at the same time and place as the action. Indirect impacts are those impacts that occur later in time or are farther removed in distance from the action itself. The terms "impact" and "effect" are used synonymously throughout this section.

To determine whether an impact is significant, CEQ regulations require the consideration of context and intensity of potential impacts. Context normally refers to the setting, whether local or regional, and intensity describes the severity of the impact.

Summary tables provide an overview of impacts by resource and by alternative. These tables show the highest level of impact for each resource by issue area. Text supporting these conclusions is presented, and mitigation measures are listed for significant impacts and less-than-significant impacts, where mitigation is possible.

For this analysis, impacts are defined in the following categories: significant (S), significant but can be mitigated to less than significant (S/MI), less than significant (<SI), and no impact (NI). The results of the impact analysis of the Action Alternatives are included within each VEC discussion, and a summary table of overall impacts is presented in Table 6-1 of Section 6, Conclusions.

Mitigation is the reduction or elimination of the severity of an impact. The intention of mitigation is to reduce the effects of an action on the environment. CEQ defines mitigation as (1) avoiding an impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of an action; (3) rectifying the impact by repairing, rehabilitating, or restoring the environment; (4) reducing or eliminating an impact over time by using preservation and maintenance operations; and (5) compensating for an impact by replacing or providing substitute resources or environments (40 CFR 1508.20). Therefore, as with alternatives, mitigation measures would only be proposed if they would be technically feasible and if they would allow the proposed project to meet the purpose and need.

Unless otherwise indicated, data used in developing the impact analysis for the Action Alternatives relied on, and reference, existing environmental documents, field surveys, and other studies developed as part of past or concurrent projects associated with HAMET, PTA, and the lands and resources in the affected environment area.

An initial evaluation of the potential impacts associated with the Action Alternatives indicated that several of the VECs described in Section 3 were found to have few or no impacts resulting from implementing the Proposed Action. Those VECs include climate; air quality; geology and topography; soils; water resources; biological resources; cultural resources; socioeconomics and environmental justice; land use; recreation; noise; visual and aesthetic resources; human health and safety; traffic and circulation; and public services and utilities. The impacts are discussed in detail in the following subsections.

4.1 Impacts from No Action Alternative

The impact analysis of the No Action Alternative for all VECs resulted in the following findings:

- Impacts to climate and air quality are not anticipated under the No Action Alternative. The alternative does not change current climate or air quality conditions.

- Impacts to geology, soils, and water resources are not anticipated under the No Action Alternative. The alternative does not alter the current physical state of the environment.

- Impacts to biological or cultural resources are not anticipated under the No Action Alternative. The alternative does not alter the current state of these resources, which are described in Section 3.

- Impacts to sociological resources, economic resources, environmental justice, and environmental health effects on children are not anticipated under the No Action Alternative. The alternative does not alter the current state of the current conditions described in Section 3.

- Impacts to land use are not anticipated under the No Action Alternative. The alternative does not curtail the range of beneficial uses of the environment or conflict with existing or planned land uses. The alternative does not result in any substantial secondary impacts, such as population changes or effects on public facilities. The alternative also does not affect any special land use designations.

- Impacts to recreation are not anticipated under the No Action Alternative. The alternative does not curtail the range of recreational uses of the environment, affect scenic vistas or view planes, disrupt recreational use of land-based resources, interfere with the public's right of access, prevent a peak season, or discourage existing recreational activities.

- Impacts to noise or to visual and aesthetic resources are not anticipated under the No Action Alternative. Noise levels, visual character, visual quality, and sensitivity levels would remain as described in Section 3.

- Impacts to human health and safety, traffic and circulation, public services, and utilities are not anticipated under the No Action Alternative. These VECs would remain as described in Section 3.

The No Action Alternative would result in no changes in the existing environment. The No Action Alternative would leave the DoD stationed in Hawai‘i at a disadvantage with few ways to mimic the type of environment the unit will experience in Afghanistan.

4.2 Climate

4.2.1 Impact Methodology

Climate impacts from the Action Alternatives have been evaluated. The identification of project impacts relied on the use of available observations and professional judgment to make reasonable inferences about the potential impacts of the project, given the interpretation of the local and regional climates provided in Section 3.

4.2.2 Factors Considered for Impact Analysis

An action would be considered to have a significant impact on climate if it would alter a local or regional climatological condition (i.e., average temperature, rainfall, or wind pattern).

4.2.3 Summary of Impacts

No impacts to local or regional climate are expected as a result of Alternatives 1–3 (Table 4-1). The climate at the proposed LZs, and the island of Hawai‘i overall, would remain cool and tropical (upper montane to alpine), with no impacts on average temperatures, rainfall, or wind patterns.

Table 4-1. Summary of potential impacts to climate.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Climate change (temperature, winds, precipitation)	NI	NI	NI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

4.3 Air Quality

Evaluating impacts on air quality, as well as other VECs, required an understanding of a mechanism of physical disturbance associated with helicopter rotor wash. Rotor wash is a term used to define a “wave” of air created by the rotor disc of a helicopter. As shown in Figure 4-1, this wave is created by the downward thrust of air that produces lift. The wave extends out in a 360-degree pattern from the center of mass of the helicopter, which is usually the rotor mast (DOT 2000). High-speed rotor wash can be produced up to approximately three times the diameter of the rotor disc (U.S. Army 2007b).

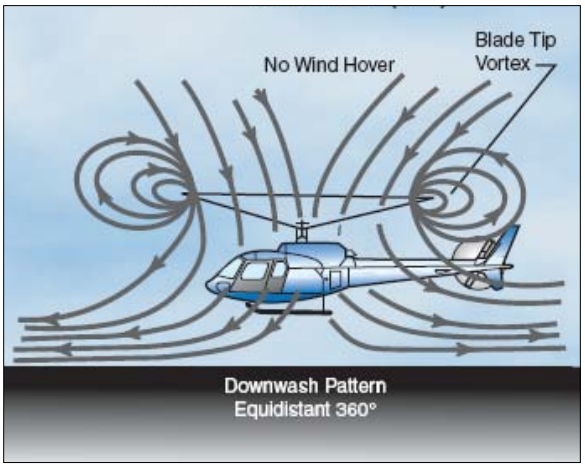

Figure 4-1. Rotor wash shown as “downwash” from DOT 2000.

Within a specific height from the ground, related to the helicopter's rotor blade diameter, rotor wash intensity may be sufficient to displace dust, dirt, rocks, or other loose materials. Rotor wash intensity tends to decrease as the distance from the helicopter increases. The intensity of rotor wash on the localized area is directly related to many factors, including helicopter weight, disc area of the helicopter being used, and the height of the helicopter from the ground. For example, a heavier helicopter, such as the Chinook, requires more lift than a Black Hawk and produces rotor wash across a wider area than the lighter Black Hawk would generate in the same area. Similarly, the Chinook's rotor wash, generated by a 60-ft (18-m) diameter rotor, begins to affect a localized environment when the pilot lowers the helicopter to approximately 90 ft (27 m) AGL (Figure 4-2). The Black Hawk, which is lighter and has a smaller rotor diameter at 53 ft (16 m), begins to affect a localized environment when the pilot lowers it to 79 ft (24 m) AGL.

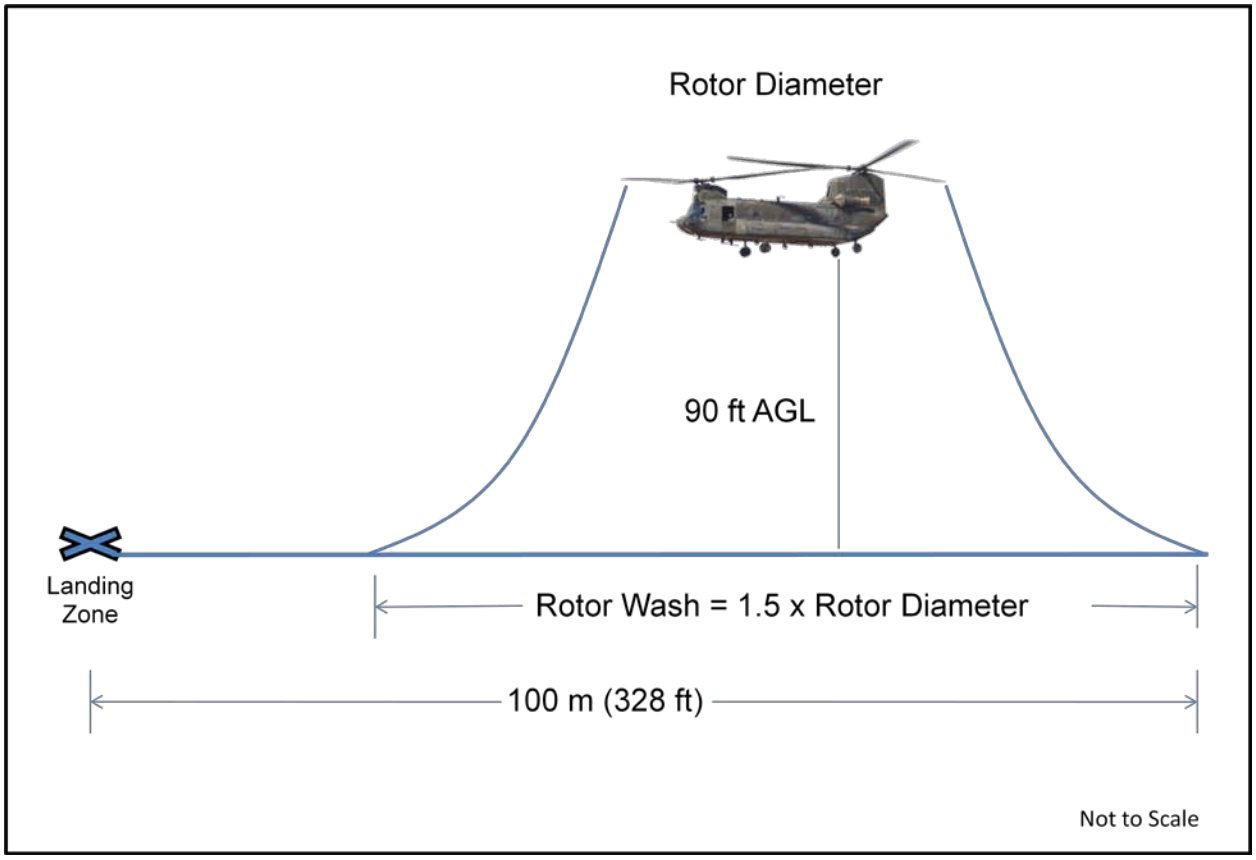

Figure 4-2. Rotor wash impact area.

For the air quality analysis, it was determined that the rotor wash from the Chinook and Black Hawk, at 90 ft (27 m) AGL, impact an area of 180 ft (55 m) and 159 ft (48 m), respectively. For purposes of a conservative analysis, the area of impact analyzed was 100 m (328 ft) from the center point of the LZ, or roughly twice as large as the typical rotor-wash area. Figure 4-3 is a photo of a Black Hawk that is hovering 12 in. (30 cm) from the ground on LZ-5 during the March 2011 data-collection training period. The photo shows no dust visible.

Figure 4-3. A Black Hawk helicopter (photographed from a separate helicopter at an angle) hovers above LZ-5 during the March 2011 data collection training period.

4.3.1 Impact Methodology

Air quality impacts from the Action Alternatives have been evaluated. Emission sources associated with Alternatives 1–3 include military helicopter engines and fugitive dust from helicopter landings and take-offs. The analysis was performed assuming a conservative flight frequency of 60 flights per day.

Particulate matter emissions analyses prepared for this EA are presented as PM_{10} estimates, because that is the most appropriate size fraction to address fugitive dust issues. PM_{10} estimates presented for military helicopter engine emissions can be interpreted as also being a conservative estimate of $PM_{2.5}$ emissions. Visible dust is a clear indication of airborne PM_{10} concentrations that are typically in the range of several micrograms per cubic meter. PM_{10} emissions are important, because the PM_{10} size fraction represents airborne particles small enough to be inhaled into the lower respiratory tract, where they can have adverse health effects. PM_{10} modeling was performed to better evaluate the potential for violations of the federal PM_{10} standards due to fugitive dust emissions associated with helicopter use. The modeling analyses used the EPA AP-42 emission calculation (EPA 1995) and *Fugitive Dust Handbook* from the Western Regional Air Partnership (WRAP 2004). The particle size category used was for undisturbed soils to determine particle settling and deposition. Meteorological conditions assumed in the modeling analysis included Class B (stable) and C (slightly unstable) for daytime operation with an average speed of 15.4 ft (4.7 m) per second from the NNW and D (neutral) and Class E (mild temperature inversion) for nighttime operations with an average wind speed of 16.7 ft (5.1 m) per second from the SSE. The dispersion modeling results obtained for evaluating helicopter maneuver exercises on a 1.2-acre

(5,046 m^2) section of undisturbed soil were used to extrapolate potential PM_{10} concentrations from wind erosion due to landings and take-offs from the LZ's conditions.

4.3.2 Factors Considered for Impact Analysis

Major factors considered in determining whether a project alternative would have a significant impact on air quality include the following:

- The amount of net increase in annual emissions of criteria pollutants on a given island. The 100 tons (90.7 metric tons) per year Clean Air Act conformity de minimums threshold does not apply to Hawai'i, because it is an attainment area, but the threshold was used nonetheless as a basis of comparison in analyzing air quality impacts.

- Whether or not dispersion modeling analyses indicated a potential for violation of federal and state PM_{10} or $PM_{2.5}$ standards at off-post locations.

- Whether or not dispersion modeling analyses indicated a potential for violation of federal and state carbon monoxide, nitrogen oxide, and sulfur dioxide standards at off-post locations.

4.3.3 Summary of Impacts

Potential impacts to air quality are discussed in following subsections and summarized in Table 4-2.

4.3.3.1 PM_{10} Emissions. Because each LZ was considered a separate point source and the soil characteristics at both Mauna Loa and Mauna Kea are similar, fugitive dust emissions would have the same relative impacts for all three of the Action Alternatives. Based on modeling, the impact of fugitive dust from helicopter activity on either Mauna Loa or Mauna Kea LZ areas would be less than significant. This is based on each LZ being treated as a separate area source and assuming one landing per episode. Using these assumptions, the maximum concentration at 1,093 yd (1,000 m) away from the center of the LZ(s) is less than 17.98 $\mu g/m^3$, which is below the state and EPA emission standard of 150 $\mu g/m^3$ per 24 hours of exposure to the general public (see Table 3-1). Consequently, PM_{10} emissions would be a less-than-significant impact for all Action Alternatives.

4.3.3.2 Pollutant Emissions from Helicopter Engine Use. Because the number of missions would be the same for Alternatives 1, 2, and 3, pollutant emissions would be the same for each option. The total tons per year for regulated pollutants are based on the average emissions from the proposed helicopters in use. Using emissions presented in Table 4.4.2 of the *Final Environmental Impact Statement, Military Training Activities at Mākua Military Reservation, Hawai'i* provides a realistic estimate of the regulated pollutants released from HAMET (USAEC and COE 2009).

The pollutant with the highest estimated annual net increase in emissions would be carbon monoxide followed by nitrogen oxides, which would increase by 3.85 tons (3.45 metric tons) per year for all missions combined.

Table 4-2. Summary of potential impacts to air quality.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
PM_{10} emissions	<SI	<SI	<SI	NI
Pollutant emissions	<SI	<SI	<SI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

4.4 Geology, Soils, and Topography

4.4.1 Impact Methodology

Geologic impacts include all of the effects that result from the interaction between the project and the geologic environment. For example, project impacts may include changes in erosion rates or changes in the level of exposure of people and structures to earthquakes or unstable slopes.

The identification of project impacts relied heavily on the use of available geologic studies, reports, observations, and professional judgment to make reasonable inferences about the potential impacts of the project, given the interpretation of the geologic setting provided in Section 3.

4.4.2 Factors Considered for Determining Significance of Impacts

Factors considered in determining whether an alternative would have a significant geologic impact include the extent or degree to which its implementation would:

- Result in substantial soil loss (e.g., through increased erosion) or terrain modification (e.g., altering drainage patterns through large-scale excavation, filling, or leveling)
- Result in soil or sediment contamination exceeding regulatory standards or other applicable or relevant human health or environmental effects thresholds
- Increase the exposure of people or structures to geologic hazards (e.g., ground shaking, liquefaction, volcanism, slope failure, expansive soils, hazardous constituents of soils) that could result in injury, acute or chronic health problems, loss of life, or major economic loss
- Adversely alter existing geologic conditions or processes such that the existing or potential benefits of the geologic resources are reduced (e.g., construction of a jetty that would interfere with sand-transport processes and beach formation or would increase shore erosion)
- Permanently damage or alter a unique or recognized geologic feature or landmark.

4.4.3 Summary of Impacts

The impacts on geology, soils, and topography from implementing each of the Action Alternatives are discussed in following subsections and summarized in Table 4-3.

Table 4-3. Summary of potential impacts to geology, soils, and topography.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Results in substantial soil loss (e.g., through increased erosion) or terrain modification (e.g., altering drainage patterns through large-scale excavation, filling, or leveling)	NI	NI	NI	NI
Results in soil or sediment contamination exceeding regulatory standards or other applicable or relevant human health or environmental effects thresholds	NI	NI	NI	NI
Adversely alters existing geologic conditions or processes such that the existing or potential benefits of the geologic resource are reduced	NI	NI	NI	NI
Soil dispersion from helicopter-generated winds; soil compaction from helicopters landing on the soil	<SI	<SI	<SI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

4.4.3.1 Alternative 1 – Mauna Kea and Mauna Loa. The three LZs (4, 5, and 6) on Mauna Kea exist on soils composed of cinder (Figure 3-7). LZ-4 lies in the vicinity of neighboring very stony soil. One potential for impact to these LZs would be from the helicopters disturbing the soil (i.e., blowing the soil). However, both of these soil types are very resilient to wind forces, because their larger grain sizes make it difficult to disturb by wind. Subsection 4.3.3.1 quantifies the amount of soil that would be dispersed is less than 17.98 µg/m^3 at 1,093 yd (1,000 m) away from the center of the LZ(s). Therefore, this impact is considered less than significant.

Another potential for impact would be the helicopter landing on the soil. The weight of the helicopter may compact or crush any soil or gravel underneath, but the potential impact is considered less than significant.

The three LZs (1, 2, and 3) on Mauna Loa exist on soils composed of ʻaʻā lava flows (see Figure 3-7). Nearby soils are composed of cinder. The potential impacts are the same as those listed for Mauna Kea above.

The LZs to be used by each alternative already exist; no further major ground-disturbing activities or alterations are planned. There would be no impact to geology or topography, because no further construction to the LZs is required. This also means there would be no impact to any geologic landmarks. The impact to soils from this alternative is considered less than significant.

4.4.3.2 Alternative 2 – Mauna Kea. As described in Subsection 4.4.3.1, there would be no impact to geology or topography for Alternative 2; the impact to soils from this alternative is considered less than significant.

4.4.3.3 Alternative 3 – Mauna Loa. As described in Subsection 4.4.3.1, there would be no impact to geology or topography for Alternative 3; the impact to soils from this alternative is considered less than significant.

4.5 Water Resources

This subsection evaluates impacts on water resources, as described in Section 3.

4.5.1 Impact Methodology

The impact analysis in this subsection is a discussion of the effects of No Action and the Action Alternatives. The nature of existing conditions on the island of Hawai‘i is interpreted from available literature.

4.5.2 Factors Considered for Determining Significance of Impacts

An Action Alternative’s impact on water resources is considered to be significant if the alternative would do any of the following:

- Degrade water quality in a manner that would reduce the existing or future beneficial uses of the water
- Substantially increase risks associated with human health or environmental hazards
- Reduce the availability of, or accessibility to, one or more of the beneficial uses of a water resource
- Alter water movement patterns in a manner that would adversely affect the uses of the water within or outside the ROI
- Be out of compliance with existing or proposed water quality standards or require an exemption from permit requirements in order for the project to proceed.

The regulatory standards against which impacts to water resources are evaluated include, but are not limited to, the following:

- Federal and state primary and secondary drinking water standards
- EPA Region 9 tap water preliminary remediation goals
- Point and nonpoint source discharge permit requirements under the Clean Water Act
- State and local plans and policies protecting surface water and groundwater resources.

4.5.3 Summary of Impacts

The potential impacts to water quality are discussed in following subsections and summarized in Table 4-4.

No impacts to surface water are expected as a result of the Alternative Actions, because there are no perennial streams or other surface water resources that could potentially be affected.

The only potential impact to groundwater would be through the contamination of an aquifer. If an emergency (i.e., mechanical failure resulting in a crash) were to result in a spill, it would likely be uncontainable due to the high permeability and percolation rates through the porous lava rock. Therefore, it would be likely for a spill to percolate through the lava rock and possibly contaminate an aquifer below. However, the groundwater level is near sea level and is, therefore, very far below the ground surface where high-altitude training would occur. Additionally, Army helicopters have self-sealing primary and auxiliary fuel systems for rotary winged aircraft to reduce the possibility of leakage, fire and explosion during impact. Therefore, the potential for the Action Alternatives to degrade water quality is less than significant.

Table 4-4. Summary of potential impacts to water quality.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Degrades water quality in a manner that would reduce the existing or future beneficial uses of the water	<SI	<SI	<SI	NI
Substantially increases risks associated with human health or environmental hazards	NI	NI	NI	NI
Reduces the availability of, or accessibility to, one or more of the beneficial uses of a water resource	NI	NI	NI	NI
Alters water movement patterns in a manner that would adversely affect the uses of the water within or outside the ROI	NI	NI	NI	NI
Is out of compliance with existing or proposed water quality standards or requires an exemption from permit requirements in order for the project to proceed	NI	NI	NI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

Implementation of any of the Action Alternatives requires no earth moving or land disturbance. Therefore, there is no potential to reduce the availability of, or accessibility to, any water resources, nor are any water movement patterns impacted.

Water quality would not be disturbed by implementing the Action Alternatives, because there are no discharges of wastewater required. Therefore, no permitting is required for point-source or nonpoint-source discharging under the Clean Water Act.

4.6 Biological Resources

Potential impacts to endangered and threatened species, sensitive species, and other vegetation and wildlife species, and to their respective habitats within and near the proposed alternative flight paths and LZs (i.e., the species' region of influence - ROI), were assessed by examining the planned activities in conjunction with past and present Section 7 ESA consultations, biological surveys, and relevant literature. All actions that could affect biological resources will be determined to be significant if that action substantially affects rare, threatened, or endangered species or their habitat.

4.6.1 Impact Methodology

Generally speaking, the impacts to the biological resources may be short or long term, direct, or indirect. Direct impacts on biological resources result when those resources are altered, destroyed, or removed during the project (USAEC and COE 2009). Examples of direct impacts include injury or mortality from aircraft collisions. Indirect impacts occur when project-related activities result in environmental changes that can influence the survival, distribution, or abundance of a species (USAEC and COE 2009). Examples of indirect impacts include the long-term effects of noise.

4.6.2 Factors Considered for Impact Analysis

The significance of all potential impacts, as defined by NEPA, to biological species (vegetation and wildlife) is based on the following:

- Importance or value of the resource affected
- Occurrence of a resource in the region
- Sensitivity of a resource to the potential impact
- Anticipated severity of the potential impact
- Anticipated duration of the potential impact.

When evaluating the potential impacts to biological resources, the sensitivity of the vegetation or wildlife is taken into account. Sensitive species are considered significant, while common species are considered significant if they are sensitive to modification. The determination of a potential impact's significance on common species depends on habitat quality, population size, and the extent of the anticipated impact.

Evaluating the significant environmental consequences for each alternative includes examining how the degree of the potential impact would affect the vegetation and wildlife. For each alternative, the impact on the vegetation and wildlife resources is considered using the following factors:

- Whether or not the impact would cause the injury or mortality that would result in a "take" under the ESA for an identified threatened or endangered species.

- Whether or not the impact would reduce the population of a sensitive species. A reduced population is defined as a reduction in numbers; alteration in behavior, reproduction, or survival; introductions of new species; or loss or disturbance of habitat.

- Whether or not the impact would have an adverse effect on the species habitat, such as a critical habitat.

Information on sensitive species is based on existing data from biological assessments, surveys, and previous EAs. A list of sensitive species that potentially occur is provided in Table 3-5. There are sensitive species that have been known to occur and that can potentially be affected by the HAMET operations: four federal- and state-listed endangered plant species and seven federal- and state-listed wildlife species. Detailed descriptions of the potentially impacted species are found in Subsection 3.6.

Section 7 of the ESA calls for interagency cooperation to conserve federally listed species and designated critical habitat. A Section 7 consultation requires that cooperating federal agencies determine whether or not a proposed action may affect listed species or critical habitat. Critical habitats are designated for sensitive species and require specific management practices. As previously discussed, the PCH has been designated for the listed palila bird, as described in Subsection 3.6. The critical habitat consists of māmane and naio forest with native shrubs and grasses and some invasive weed species. The military has established conservation measures to lessen the impacts to the palila and its habitat while operating over the PCH, and these conservation measures are in compliance with the *Revised Recovery Plan for Hawaiian Forest Birds* in that the measures limit impacts that alter bird behavior (Peshut 2011; USFWS 2006).

4.6.3 Summary of Impacts

The following subsections summarize the potential impacts to endangered and threatened species, sensitive species, and other vegetation and wildlife species.

4.6.3.1 Endangered and Threatened Species. Potential impacts to endangered and threatened species from Alternatives 1–3 are described below.

4.6.3.1.1 Alternative 1 – Mauna Kea and Mauna Loa. Alternative 1 consists of using the LZs on Mauna Kea and Mauna Loa and the designated flight paths from Bradshaw Army Airfield with a 2,000-ft (610-m) AGL flying elevation.

Impacts to Endangered and Threatened Species. In general, wildland fire is a devastating threat to endangered and threatened species, because it can cause mortality and habitat loss (USAEC and COE 2009). However, measures have been established at PTA to reduce the potential for fires and to respond to those that do occur. Not only is a potential wildland fire remote because there is sparse vegetation but also because of the unlikely event of a crash with fire (Lugo 2010). Therefore, the impact on endangered and threatened species experiencing habitat loss and mortality from a wildland fire is less than significant (Peshut 2011).

The introduction of nonnative vegetation and wildlife species can have a direct and indirect impact on biological species and their habitats, because nonnative species may remove nutrient sources, prey on native species, and carry disease (USAEC and COE 2009). Potential impacts of nonnative species from planned operations include the transportation of nonnative species to the LZs from the PTA and O'ahu.

The transportation of nonnative species was determined to be a less-than-significant impact because of a mitigation measure that calls for inspecting and cleaning the aircraft as required, if invasive species are identified. This measure is intended to limit the probability of transport of nonnative species to the LZs (USAEC and COE 2009; Mansoor 2011b).

Noise in the form of rotor wash from helicopter operations could potentially impact endangered and threatened wildlife species. The noise from helicopter training is a potential distraction to wildlife and may cause them to flee the area, interrupting life-cycle activities and modifying behavior. However, in most cases of disturbance from noise, wildlife will avoid the disturbance and then return to normal when the disturbance is over, and, after repeated disturbances, wildlife become habituated to frequent noise (Whittaker and Knight 1998). It is unlikely that wildlife species will be attracted to the noise. According to the DoD operational noise manual (U.S. Army 2005b), the specific reaction to noise is dependent on the species, and the reaction of a specific species can only be known after subsequent studies. Although results from studies cannot be applied across species, studies have demonstrated that birds can become habituated and can co-exist with loud noises (U.S. Army 2011; Delaney et al. 2000; Pater et al. 2009). Furthermore, published scientific literature on the effects of noise on bird species has indicated that they are more affected by ground-based noise, such as hiking and hunting, than air-based noise (Delaney et al. 2000). Surveys in March 2011 to identify potential wildlife species that could be impacted by noise from helicopters were conducted within the area formed by a 2,000-ft (610-m) radius from the center of the LZ based on the 80-dBA buffer. Detailed results and methods can be found in the memorandum for record (Peshut and Schnell 2011a, 2011b). The potential impacts of noise to the endangered and threatened wildlife species were determined to be insignificant because the noise generated by HAMET operations at LZs will be intermittent and of short duration (generally less than 10 minutes), because noise > 100 dB is expected to occur within approximately 150 feet of the aircraft, and because the presence of species within the ROI during HAMET operations is expected to be extremely rare (Peshut and Doratt 2011a; Peshut and Schnell 2011a, 2011b).

Collisions of endangered and threatened species with the helicopters constitute a potential impact that could cause injury or mortality to those species. Bird strikes are a possibility. Scientific literature has indicated that most bird strikes happen near runways where birds tend to migrate to avoid predators and because airports present roosting and feeding areas (Burger 1983). The military records have indicated that there has only been one strike with a helicopter since 2002 (Peshut and Schnell 2011a). On Mauna Kea and Mauna Loa. many of the wildlife species' ranges are not located within the helicopter flight paths, but bird and bat species have been known to cross into the specified areas. In addition, the 2,000-ft (610-m) AGL is outside of the flight paths of many birds and bats. It has been noted from viewing birds from helicopters in flight that birds will change their flight paths to avoid the helicopters (Peshut 2011). Within the proposed flight paths and LZs, the potential impact of collisions between helicopters and endangered and threatened bird species is considered to be extremely low and thus considered a less-than-significant impact. This is because of the locations of known bird habitats, behavior of bird species in response to noise, the planned flying altitudes of the helicopters over habitats, and established flight procedures to prevent collisions (USAEC and COE 2009).

The impact of wind and dust on threatened and endangered species is insignificant because of the scattered nature of the vegetation over barren rock and the small amount of available particulate matter at LZs.

Hawaiian Hoary Bat: During these surveys, potential Hawaiian hoary bat habitat (roosting and foraging) sites were not observed (Peshut and Doratt 2011a). Noise from the helicopters could potentially disturb the Hawaiian hoary bat. However, studies on bats have indicated that bat physiology provides several mechanisms to protect their auditory systems from environmental sounds, therefore reducing the impact of noise (Delaney 2002). In addition, noise is anticipated to have no impact on the life-cycle

activities of the Hawaiian hoary bat, because roosting and rearing of their young occurs within forested areas, and all LZs are essentially devoid of vegetation that would attract bats as suitable habitat (Peshut and Doratt 2011a).

Hawaiian Petrel. There are no identified active petrel breeding colonies within 2000 feet of the Mauna Kea and Mauna Loa LZs (Peshut and Schnell 2011a, 2011b). There are several conservation actions in place to manage current populations. These actions include protecting suitable habitat, controlling nonnative predatory species, determining the distribution of the populations, controlling direct mortalities, and minimizing the effects of artificial lighting (USFWS 1983). Surveys for petrels were conducted at all LZs in March and June 2011. No nesting colonies were identified, and no petrel presence was observed.(Peshut and Schnell 2011a, 2011b). Although petrels are known to transit the saddle region between the sea and nesting colonies in Hawaii Volcanoes National Park,the density of petrels in the saddle region is expected to be extremely low, based on earlier surveys. It is highly improbable that peterels would transit the summit region of Mauna Kea in favor of the lower elevations of the saddle region. The Hawaiian petrel is not expected to be affected by the Proposed Action, because birds, if disturbed, tend to temporarily leave an area when a noise event is experienced and return after the noise dissipates.

Palila. The potential impacts on the palila from planned operations include the impact of the noise from engines and rotor wash. No other direct or indirect impacts are likely to affect the palila due to the birds' range and habitat. Mitigation measures are in place to lessen the impact of the noise by maintaining an altitude of at least 2,000 ft (610 m) AGL while flying outside of the PTA and at locations near the designated LZs, as described in Subsection 2.7.

Mitigation. To reduce the impact of invasive species, measures are in place to inspect and clean equipment and helicopters if necessary to avoid the transportation of nonnative species (USAEC and COE 2009). Conservation measures to minimize the impacts of noise on endangered and threatened species include having an established flying altitude of at least 2,000 ft (610 m) AGL outside the PTA and at locations near the designated LZs. The military has an ongoing bird/aircraft strike hazard program to reduce bird/aircraft collisions, and this program would minimize the potential of collisions with endangered and threatened species (USAEC and COE 2009).

4.6.3.1.2 Alternative 2 – Mauna Kea. Alternative 2 consists of using the three LZs (4, 5, and 6) and the designated flight paths from Bradshaw Army Airfield with a 2,000-ft (610-m) AGL flying elevation. Potential impacts to endangered and threatened species are the same as those listed under Alternative 1.

Mitigation efforts for Alternative 2 should be the same conservation practices as discussed for Alternative 1.

4.6.3.1.3 Alternative 3 – Mauna Loa. Alternative 3 consists of using the three LZs (1, 2, and 3) and the designated flight paths from Bradshaw Army Airfield with a 2,000-ft (610-m) AGL flying elevation. Potential impacts to endangered and threatened species are the same as those listed under Alternative 1.

Mitigation efforts for Alternative 3 should be the same conservation practices as discussed above.

4.6.3.1.4 Conclusion. As determined by the individual analyses of fire, invasive species, noise, and collisions, the overall impact of Alternatives 1–3 to endangered and threatened species would be less than significant. Conservation measures previously described would lessen the impacts of

invasive species, noise, and collisions. Impacts to endangered and threatened species are summarized in Table 4-5.

4.6.3.2 Sensitive Species. Potential impacts to sensitive species from Alternatives 1–3 are described below.

4.6.3.2.1 Alternative 1 – Mauna Kea and Mauna Loa. Alternative 1 consists of using the LZs on Mauna Kea and Mauna Loa and the designated flight paths from Bradshaw Army Airfield with a 2,000-ft (610-m) AGL flying elevation.

Table 4-5. Summary of potential impacts to threatened and endangered species.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Impacts to endangered and threatened species from helicopter-caused fire	<SI	<SI	<SI	NI
Impacts to endangered and threatened species from nonnative species	<SI	<SI	<SI	NI
Impacts to endangered and threatened species from noise	<SI	<SI	<SI	NI
Impacts of endangered and threatened species from aircraft collisions	<SI	<SI	<SI	NI
Impacts to endangered and threatened species from wind from helicopters	NI	NI	NI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

Impacts to Sensitive Species. In general, wildland fire is a devastating threat to sensitive species, because fire can cause mortality and habitat loss (USAEC and COE 2009). However, not only is a potential wildland fire remote because there is sparse vegetation but also because of the unlikely event of a crash and/or the remoteness of a crash with fire (Lugo 2010). Therefore, the potential impact of sensitive species experiencing habitat loss and mortality from a wildland fire is low and thus insignificant (Peshut 2011).

The introduction of nonnative vegetation and wildlife species can have a direct and indirect impact on biological species and their habitats, because nonnative species may remove nutrient sources, prey on native species, and carry disease (USAEC and COE 2009). Potential impacts of nonnative species from planned operations include the transportation of nonnative species to the LZs from the PTA and O‘ahu. The potential for transportation of nonnative species is low and a less-than-significant impact, because of

a mitigation measure that requires cleaning the aircraft. This measure would minimize the transport of nonnative species to the LZs (USAEC and COE 2009; Mansoor 2011b).

Noise in the form of rotor wash from helicopter operations potentially could impact sensitive species. The noise from helicopter training is a potential distraction to wildlife and may cause them to flee the area, interrupting life-cycle activities and modifying behavior. However, in most cases of disturbance from noise, wildlife will avoid the disturbance and then return to normal when it is over, and after repeated disturbances, wildlife become habituated to frequent noise (Whittaker and Knight 1998). It is unlikely that wildlife species will be attracted to the noise. According to the DoD operational noise manual (U.S. Army 2005b), the specific reaction to noise is dependent on the species, and the reaction of a specific species can only be known after subsequent studies. Although results from studies cannot be applied across species, studies have demonstrated that birds can become habituated and can co-exist with loud noises (Peshut and Schnell 2011a; Delaney et al. 2000; Pater et al. 2009). Furthermore, published academic literature on the effects of noise on bird species has indicated that they are more affected by ground-based noise, such as hiking and hunting, than air-based noise (Delaney et al. 2000). Noise has no impact on vegetation species. Surveys in March 2011 to identify potential wildlife species that could be impacted by noise from helicopters were conducted within the area formed by a 2,000-ft (610-m) radius from the center of the LZ based on the 80-dBA buffer. Detailed results and methods can be found in the memorandum for record (Peshut and Schnell 2011a). The potential impacts of noise to the sensitive wildlife species within the area were determined to be insignificant due to established measures to minimize the effects of noise and due to the nature of the species habitat and range (Peshut 2011).

Collisions of sensitive bird species with the helicopters constitute a potential impact that could cause injury or mortality to those species. Bird strikes are a possibility. Academic literature has indicated that most bird strikes happen near runways where birds tend to migrate to avoid predators and because airports present roosting and feeding areas (Burger 1983). The military records have indicated that there has only been one strike with a helicopter since 2002 (U.S Army 2011a). Many of the wildlife species' ranges are not located within the helicopter flight paths, but bird and bat species have been known to cross into the specified areas. In addition, the 2,000-ft (610-m) AGL is outside of the flight paths of many birds. In addition, it has been noted from viewing birds from helicopters in flight that birds will change their flight paths to avoid the helicopters (Peshut 2011). Within the proposed flight paths and LZs, the potential impact of collisions between helicopters and sensitive species is low and thus considered a less-than-significant impact. This is because of the locations of known bird habitats, behavior of bird species in response to noise, the planned flying altitudes of the helicopters over habitats, and established flight procedures to prevent collisions (USAEC and COE 2009).

The impact of wind and dust on sensitive species is insignificant because of the scattered nature of the vegetation over barren rock and the small amount of available particulate matter.

Nēnē. The March 2011 presence surveys did not detect any nēnē or evidence of the nēnē, but it is not unreasonable to assume that the nēnē would use suitable habitat near the Mauna Loa LZs (Peshut and Schnell 2011a). The nēnē is not expected to be affected by the planned operations because of the known response of the nēnē to noise and aircraft. In addition, helicopters are permitted to fly under 500 ft (152 m) AGL while doing maneuvers on PTA (at PTA Range 1) when nēnē are in proximity (Peshut and Schnell 2011a).

Mitigation. To reduce the impact of invasive species, measures are in place to clean equipment and helicopters to avoid the transportation of nonnative species (USAEC and COE 2009). This will include inspecting the exterior of the aircraft and then cleaning and applying pesticides and herbicides as required.

4.6.3.2.2 Alternative 2 – Mauna Kea. Alternative 2 consists of using the three LZs (4, 5, and 6) and the designated flight paths from Bradshaw Army Airfield with a 2,000-ft (610-m) AGL flying elevation. Potential impacts to sensitive species are the same as those listed under Alternative 1.

Mitigation efforts for Alternative 2 should be the same conservation practices as discussed for Alternative 1.

4.6.3.2.3 Alternative 3 – Mauna Loa. Alternative 3 consists of using the three LZs (1, 2, and 3) and the designated flight paths from Bradshaw Army Airfield with a 2,000-ft (610-m) AGL flying elevation. Potential impacts to sensitive species are the same as those listed under Alternative 1.

Mitigation efforts for Alternative 3 should be the same conservation practices as discussed for Alternative 1.

4.6.3.2.4 Conclusion. As determined by the individual analyses of fire, invasive species, noise, and collisions, the overall impact of Alternatives 1–3 to sensitive species would be less than significant. Conservation measures described previously would lessen the impacts of invasive species and noise. Impacts to sensitive species are summarized in Table 4-6.

Table 4-6. Summary of potential impacts to sensitive species.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Impacts to sensitive species from helicopter-caused fire	NI	NI	NI	NI
Impacts to sensitive species from nonnative species	<SI	<SI	<SI	NI
Impacts to sensitive species from noise	<SI	<SI	<SI	NI
Impacts of sensitive species from aircraft collisions	<SI	<SI	<SI	NI
Impacts to sensitive species from wind from helicopters	NI	NI	NI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

4.6.3.3 Other Vegetation and Wildlife Species. The potential impacts to other vegetation and wildlife species from Alternatives 1–3 are described below.

4.6.3.3.1 Alternative 1 – Mauna Kea and Mauna Loa. Alternative 1 consists of using the LZs on Mauna Kea and Mauna Loa and the designated flight paths from Bradshaw Army Airfield with a 2,000-ft (610-m) AGL flying elevation.

Impacts to Vegetation and Wildlife Species. In general, wildland fire is a devastating threat to vegetation and wildlife species, because fire can cause mortality and habitat loss (USAEC and COE

2009). However, not only is a potential wildland fire remote because there is sparse vegetation but also because of the unlikely event of a crash and/or the remoteness of a crash with fire (Lugo 2010). Therefore, the potential impact on vegetation and wildlife species experiencing habitat loss and mortality from a wildland fire is less than significant (Peshut 2011).

The introduction of nonnative vegetation and wildlife species can have a direct and indirect impact on biological species and their habitats because nonnative species may remove nutrient sources, prey on native species, and carry disease (USAEC and COE 2009). Potential impacts of nonnative species from planned operations include the transportation of nonnative species to the LZs from the PTA and O‘ahu. The potential for transportation of nonnative species is low, and a less-than-significant impact, because of a mitigation measure that requires cleaning the aircraft. This measure would minimize the transport of nonnative species to the LZs (USAEC and COE 2009; Mansoor 2011b).

Noise from the helicopter operations potentially could impact wildlife species. The noise from helicopter training is a potential distraction to wildlife and may cause wildlife to flee the area, interrupting life-cycle activities and modifying behavior. However, in most cases of disturbance from noise, wildlife activities return to normal when the disturbance is over, and wildlife often adapt to the frequent noise. According to the DoD operational noise manual (U.S. Army 2005b), the specific reaction to noise is dependent on the species, and the reaction of a specific species can only be known after subsequent studies. Noise has no impact on vegetation species.

Surveys in March 2011 to identify potential wildlife species that could be impacted by noise from helicopters were conducted within the area formed by a 2,000-ft (610-m) radius from the center of the LZ based on the 80-dBA buffer. Detailed results and methods can be found in the memorandum for record (Peshut and Schnell 2011a). The potential impacts of noise to wildlife species within the area were determined to be insignificant due to established measures to minimize the effects of noise and due to the nature of the species habitat and range (Peshut 2011).

Collisions of bird species and helicopters constitute a potential impact that could cause injury or mortality to those species. Within the proposed flight paths and LZs, the potential impact of collisions between helicopters and birds is low and thus considered a less-than-significant impact. This is because of the known habitats and responses of bird species, the planned flying altitudes of the helicopters over habitats, and established procedures to prevent collisions (USAEC and COE 2009). In addition, it has been noted from viewing birds from helicopters in flight that birds will change their flight paths to avoid the helicopters (Peshut 2011).

The impact of wind and dust on vegetation and wildlife species is insignificant because of the scattered nature of the vegetation over barren rock and the small amount of available particulate matter.

Mitigation. To reduce the impact of invasive species, measures are in place to clean equipment and helicopters to avoid the transportation of nonnative species (USAEC and COE 2009). The military has an ongoing bird/aircraft strike hazard program to reduce bird/aircraft collisions, and this program would minimize the impact of collisions with wildlife species (USAEC and COE 2009).

4.6.3.3.2 Alternative 2 – Mauna Kea.

Alternative 2 consists of using the three LZs (4, 5, and 6) and the designated flight paths from Bradshaw Army Airfield with a 2,000-ft (610-m) AGL flying elevation. Potential impacts to vegetation and wildlife species are the same as those listed under Alternative 1.

Mitigation efforts for Alternative 2 should be the same conservation practices as previously discussed.

4.6.3.3.3 Alternative 3 – Mauna Loa.

Alternative 3 consists of using the three LZs (1, 2, and 3) and the designated flight paths from Bradshaw Army Airfield with a 2,000-ft (610-m) AGL flying elevation. Potential impacts to vegetation and wildlife species are the same as those listed under Alternative 1.

Mitigation efforts for Alternative 2 should be the same conservation practices as discussed for Alternative 1.

4.6.3.3.4 Conclusion.

As determined by the individual analyses of fire, invasive species, noise, and collisions, the overall impact of Alternatives 1–3 to would be less than significant. Conservation measures previously described would lessen the impacts of invasive species, noise, and collisions. Impacts to vegetation and wildlife species are summarized in Table 4-7.

Table 4-7. Summary of potential impacts to other vegetation and wildlife species.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Impacts to other vegetation and wildlife species from helicopter-caused fire	<SI	<SI	<SI	NI
Impacts to other vegetation and wildlife species from nonnative species	<SI	<SI	<SI	NI
Impacts to other vegetation and wildlife species from noise	<SI	<SI	<SI	NI
Impacts of other vegetation and wildlife species from aircraft collisions	<SI	<SI	<SI	NI
Impacts to other vegetation and wildlife species from wind from helicopters	NI	NI	NI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

4.6.4 Section 7 Consultation

Based on field surveys, a survey of the relevant scientific literature, supporting documents, and the conclusions presented in this EA, the Army has determined that the HAMET operations would have no effect on federally listed species or federally designated critical habitat. This determination is documented in Appendix C. This EA and supporting documents satisfy Army responsibilities under Section 7(c) of the ESA (16 USC 35 § 1531 et seq.) at this time. The Army will continue to remain aware of any change in the status of these species or critical habitat and will be prepared to reevaluate potential project impacts if necessary.

4.7 Cultural Resources / Cultural Impact Assessment

The U.S. Army is committed to the management of Hawaiian cultural resources through an active cultural resource management program. Through this program, the Army has identified, evaluated, monitored, and protected more than 350 cultural resources on Army lands in Hawai‘i (U.S. Army 2004b, p. 3-70). Cultural resources within the ROI include cultural beliefs and practices and properties that are listed on, or are eligible for, the NRHP. The conclusions in this subsection are based on the information presented in Section 3 and on the existence, extent, and type of cultural resources within the 328-ft (100-m) APE of each LZ.

4.7.1 Impact Methodology

A literature search was conducted to gather information on cultural resources in the APE, namely the three LZs on Mauna Kea, the three LZs on Mauna Loa and 100 m from the center of each LZ. The search was conducted to determine direct, indirect, and cumulative impacts on cultural resources within the APE.

Maps, cultural resource reports, resource management plans, and past environmental documents have been examined to identify cultural resources in the APE. In addition, the Hawai‘i State Historic Preservation Division was contacted to provide cultural resource surveys and survey results within the APE. The latter contact resulted in the identification of no new resources. In February 2011, a survey was conducted of the LZs and the area within 328 ft (100 m) of the center of each zone. However, given the large number and various types of cultural resources in University of Hawai‘i Management Areas on Mauna Kea that are located near the LZs and on Mauna Loa, and the mountains’ sacredness to Native Hawaiians, it is assumed that cultural resources, both tangible and intangible, are similar in type, importance, quantity, and variety to those that have already been identified near and within the APE. See Subsection 3.7 for more details on known and assumed cultural resources.

4.7.2 Factors Considered for Impact Analysis

Several federal laws and regulations guide the protection of cultural resources, primary among them is the NHPA (16 USC 1A § 470 et seq.), specifically Section 106. Section 106 of the NHPA requires that all federal agencies consider the impact of their actions on properties that are on, or eligible for listing on, the NRHP. Called historic properties, they would potentially include some of those that are significant for their importance to Native Hawaiian groups. An undertaking would have an effect on a historic property when that undertaking may alter the characteristics that make the property eligible for inclusion on the NRHP. Two determinations of effect can be made: (1) no historic properties affected, meaning there are either no historic properties within the ROI or there are historic properties but they would not be affected by the undertaking, or (2) historic properties affected, meaning that historic properties exist within the ROI and may be affected by the undertaking. If the latter determination is made, it is then required to determine whether the effect would be adverse. Adverse impacts include the following:

- Physical destruction, damage, or alteration of all or part of the property
- Isolation of the property or alteration of the character of the property’s setting when that character contributes to the property’s qualifications for the NRHP
- Introduction of visual, audible, or atmospheric elements that are out of character with the property, or changes that may alter its setting

- Neglect of a property, resulting in its deterioration or destruction

- Transfer, lease, or sale of a property without adequate provisions to protect its historic integrity.

Native Hawaiian cultural resources include cultural practices and beliefs, sacred sites, burials, and cultural items. Although they may not be eligible under NRHP criteria, they may be protected under the American Indian Religious Freedom Act (42 USC §§ 1996a, 1996b), ARPA (16 USC 1B § 470aa et seq.), or Native American Graves Protection and Repatriation Act (25 USC 32 § 3001 et seq.). Factors considered in determining whether an alternative would have a significant impact on cultural resources include the extent or degree that its implementation would result in the following:

- An adverse effect on a historic property, as defined under Section 106 of the NHPA and its implementing regulations, 36 CFR § 800

- A violation of provisions in the American Indian Religious Freedom Act, ARPA, or Native American Graves Protection and Repatriation Act.

NHPA and NEPA compliance differences, public concerns must also be considered. Opinions differ on the use of Mauna Kea for nontraditional activities such as the Proposed Action. Broadly, the public is divided into two groups, those who believe traditional and contemporary activities can co-exist and those who believe that "any disturbance of Mauna Kea by someone other than a Native Hawaiian is significant and unmitigatible…" (University of Hawai'i 2010, p. S-12). Additionally, Native Hawaiians have expressed concern over access to traditional and religious sites for ceremonial purposes, access for hunting and gathering, access to trails and known travel corridors, protection and preservation of archaeological and traditional sites, interpretation of significance based on Native Hawaiian tradition and the knowledge of community elders, community involvement in managing cultural resources on Army land, and compliance with federal and state laws and regulations concerning cultural-resources protection (USAEC 2008) and religious practices (University of Hawai'i 2009, p. 1-1). Some Native Hawaiians have also expressed concern with the cumulative impacts associated with various and multiple activities from a wide range of groups (University of Hawai'i 2009).

4.7.3 Consultation

In compliance with the NHPA, the Department of the Army consulted the Hawai'i SHPD on the Proposed Action. A letter initiating Section 106 consultation, dated October 20, 2010, was sent on October 25 to the SHPO at the Kapolei Office to request concurrence with a no-historic-properties-affected determination (Appendix D). This initiated the 30-day consult period. The Army also sent letters requesting review and comments to other consulting parties, including the NPS, Office of Hawaiian Affairs, Hawai'i Island Council of Hawaiian Civic Clubs, Hui Malama I Na Kupuna O Hawa'i Nei, and the Hawaii Island Burial Council. NPS responded by expressing concern regarding traditional practitioner access and disturbance from HAMET activities (Appendix D). These latter concerns are addressed in Subsection 4.7.6.

The Proposed Action was also presented to the PTA Cultural Advisory Committee at the November 2010 meeting. No serious concerns were raised at that time. In January 2011, SHPD provided a memo in response to the EA that also covered Section 106 concerns. The Army responded with a letter dated April 15, 2011.

The Office of Mauna Kea Management and its advisory council, Kahu Ku Mauna, expressed concerns about the Proposed Action and its impacts on cultural resources and cultural practices. On February 25, 2011, Kahu Ku Mauna joined the PTA Cultural Advisory Committee for a meeting. The

meeting provided a good opportunity for discussion. Lieutenant Colonel Robinson of the CAB attended and provided an overview of the training. The entire group was then invited to view a static display of helicopters and talk with crew members and instructors. Members of the PTA CAC requested a special meeting on March 11, 2011, to discuss the concerns raised particularly by OMKM and Kahu Ku Mauna, to be followed by another meeting with Kahu Ku Mauna. Lieutenant Colonel Niles assured members of Kahu Ku Mauna that their concerns would be addressed in the revised EA. Lieutenant Colonel Niles provided a digital copy of the EA comments to members of the PTA CAC. The meeting was held on March 11, 2011, at which steps being taken to address the concerns that had been raised were discussed. A follow-up meeting was held with Kahu Ku Mauna on May 11, 2011. In addition, PTA representatives met with Kealoha Pisciotta, representing Mauna Kea Anaina Hou on May 25, 2011 to discuss the proposed project and concerns regarding Mauna Kea.

4.7.4 Summary of Impacts

Potential impacts to cultural resources are summarized in Table 4-8 beginning with those related to cultural resources and followed by those related to cultural beliefs and practices.

4.7.5 Summary of Direct Impacts to Cultural Resources

A survey conducted in February 2011 of the LZs and the area within 328 ft (100 m) of the center of each zone did not discover any cultural resources directly within the LZs. Under the Action Alternatives, no landings would be planned or permitted outside of existing LZs. HAMET personnel would be provided with exact locations of all LZs to avoid the possibility of inadvertent landings that could alter or destroy known cultural resources or areas of cultural importance. No direct impacts would occur from project activities.

The February 2011 survey identified three potential cultural resources within the 328-ft (100-m) APE at the LZs. One potentially historic rock formation was located within the APE of LZ-5, and one within the APE of LZ-6. These rock formations could potentially see increased wind as a result of rotor wash from a landing helicopter. It should be noted that a rock outline located within the APE of LZ-4 was not observed during previous surveys, was constructed between 2003 and 2011, and is therefore not an historic property.

To assess the potential impact to the rock mounds near the LZs, a monitoring study was conducted between March 24, 2011, and April 4, 2011 (Crowell 2001b and c). The purpose of the monitoring was to ascertain whether HAMET has the potential to affect the rock mounds. An initial assessment of the state of the rock mounds was performed on March 24, 2011, with follow-up monitoring of the rock mounds on April 2, 2011, at the conclusion of the CAB training. The initial and the final monitoring included visual inspection of each rock mound and the immediate vicinity around each mound. Locations of photographs from the February survey were identified, and new photographs were taken from those locations to document any potential effects to the mounds. Additional photographs were taken of the remaining profiles of each rock mound in order to more fully document the mounds and to provide additional baseline data from which monitoring of potential effects may be performed. Each of the mounds was again monitored on April 2, 2011, when no additional tumbled rocks or collapse of the mounds were observed and the mounds appeared to be intact with no adverse effects from HAMET (Crowell 20011c).

Table 4-8. Summary of potential impacts to cultural resources.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Cultural resources – inadvertent landings resulting in the physical destruction, damage, or alteration of all or part of the property	NI	NI	NI	NI
Beliefs/practices – access restrictions that could isolate the property or alter the character of the property's setting when that character contributes to the property's qualifications for the NRHP	<SI	<SI	<SI	NI
Beliefs/practices – introduction of visual, audible, or atmospheric elements due to the presence of military aircraft that could impact the quality or frequency of cultural practices and beliefs. For some Native Hawaiians, any flights in the vicinity of Mauna Kea or Mauna Loa will be perceived as causing significant impacts. However, alternative design features and mitigations lessen the level of significance.	<SI	<SI	<SI	NI

Table 4-8. (continued).

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Beliefs/practices – introduction of visual, audible, or atmospheric elements due to the presence of military aircraft that could impact the quality or frequency of cultural practices and beliefs. Native Hawaiians who believe that cultural practices can exist along side secular activities will see that compliance with regulations and careful planning and implementation can ensure less-than-significant impacts to the culturally significant lands.	<SI	<SI	<SI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

4.7.5.1 Alternative 1 – Mauna Kea and Mauna Loa. Alternative 1 proposes using the LZs on Mauna Kea and Mauna Loa, the flight corridor over the PCH, and the projected flight path from Bradshaw Army Airfield to the LZs for helicopter training. The following determinations are made with a general knowledge that cultural resources and culturally important areas exist outside of the LZs and within the ROI, and the assumption that flight paths may cross over all or part of them:

- Mauna Loa LZ-1: Field survey determined that no cultural resources would be directly affected within the LZ.

- Mauna Loa LZ-2: Field survey determined that no cultural resources would be directly affected within the LZ.

- Mauna Loa LZ-3: Field survey determined that no cultural resources would be directly affected within the LZ (Appendix D).

- Mauna Kea LZ-4: Field survey determined that no cultural resources would be directly affected within the LZ (Appendix D). A potential historic property (State of Hawai‘i Site #50-10-22-24004) located approximately 0.5 mile (1 kilometer) southwest of LZ-4 would be avoided and, therefore, would not be directly affected (Godby and Head 2003).

- Mauna Kea LZ-5: Field survey determined that no cultural resources would be directly affected within the LZ (Appendix D). The rock enclosure (Site #50-10-22-24004) described above that lies just to the southwest of LZ-5 would be avoided and, therefore, would not be directly affected (Godby and Head 2003). Of the two rock mounds identified during the February 2011 PTA survey, one is located within the 328-ft (100-m) APE. As stated in Subsection 4.7.5, these rock mounds will not be impacted by increased winds due to rotor wash from landing HAMET helicopters.

- Mauna Kea LZ-6: Archaeological survey determined that no cultural resources would be directly affected within the LZ (Appendix D). A potential historic property (State of Hawai‘i Site #50-10-22-24004) located approximately 0.5 mile (1 kilometer) west of LZ-6 would be avoided and, therefore, would not be directly affected (Godby and Head 2003). One rock mound has been identified within the 328-ft (100-m) APE. As stated in Subsection 4.7.5, these rock mounds will not be impacted by increased winds due to rotor wash from landing HAMET helicopters.

- Flight paths: The Mauna Kea LZs are located in the *lana* or least restricted and sacred area of the mountain. Additionally, flight paths would be planned to avoid the majority of known cultural resources. No direct impacts to cultural resources or culturally important areas would result from the use of flight paths over this area (see Subsection 4.7.6 for indirect impact discussion). The training would be infrequent and temporary.

4.7.5.2 Alternative 2 – Mauna Kea. See Subsection 4.7.5.1 for LZs 4–6 and the flight corridor. No historic properties were identified at any of the three Mauna Kea LZs. The flight corridor is a consideration under this alternative; however, the LZs are located in the *lana* or least restricted and sacred area on the mountain. Additionally, flight paths would be planned to avoid the majority of cultural resources and areas identified as culturally significant.

4.7.5.3 Alternative 3 – Mauna Loa. See Subsection 4.7.5.1 for LZs 1–3. No archaeological resources were identified at any of the three Mauna Loa LZs. The flight path would not be a consideration under this alternative.

4.7.6 Summary of Indirect Impacts

Indirect and cumulative impacts may occur for all alternatives except the No Action Alternative. Indirect and cumulative impacts to the quality and frequency of cultural beliefs and practices could occur from access restrictions by practitioners to culturally important resources. However, access would not be restricted in areas that are flown over and would only be restricted near LZs where and when training activities would be planned. In addition, indirect and cumulative impacts may occur from the introduction of audible and visual elements by military aircraft. Introduction of such elements could result in the alteration of the character of all or part of historic properties and/or culturally important properties, including the potentially NRHP-eligible Mauna Kea TCP.

Indirect and cumulative impacts are rendered less than significant through the following:

- Flights would avoid known cultural resources. Air routes have been adjusted to approach from the west and to remain 2 miles (3.2 kilometers) away from the National Historic Landmark and the traditional cultural properties. Noise modeling showed insignificant impacts. Modeling results are presented in Subsection 4.11. Modeling results indicate that areas surrounding the flight path will be at or below Zone I levels (less than 65dB). As defined by the Army 220-1 Regulations (U.S. Army 2007a), Zone I levels are compatible with activities such as residences, schools, medical facilities, and cultural activities.

- As detailed in Subsection 4.11, cultural practitioners may experience and perceive noise as a distraction/annoyance under all Action Alternatives. However, the extent and magnitude of the distraction would be dependent on the distance the practitioner is from the noise source (HAMET flight) at any point in time during HAMET flights. Modeled average noise levels were compatible with current recreational land uses, as outlined in Army Regulation 200-1 (U.S. Army 2007a). In addition to modeled noise levels, a noise level study was conducted during training activities in March and April 2011. The results are discussed further in Subsection 4.11. In keeping with these

results, noise from HAMET flights would be expected to be of short duration and should not obstruct or curtail practitioner activities Potential impacts to practitioners would be mitigated through public notification of the HAMET schedule. With mitigation, the potential impacts to practitioners would be minimized to levels that are less than significant.

- Surveys of LZs revealed no historic properties to alter or destroy

- Cultural awareness training will be completed by all HAMET personnel, with particular emphasis on intangible resources and their importance to Native Hawaiians.

- The training will be of short duration and sporadic and temporary by its nature. There is no modification to the existing landscape of Mauna Kea or Mauna Loa. Therefore the project will not change the inherent qualities of the mountains that make them significant cultural places for Native Hawaiians.

As discussed in Section 4.12, cultural practitioners at Lake Waiau and the Mauna Kea summit would not be impacted visually under any of the Action Alternatives. At other locations, practitioners may see helicopters in the area depending on the alternative chosen and where the cultural practitioner is located at the time. However, HAMET flights would be of short duration and would not result in obstructing the cultural practitioners' views or practices.

For some Native Hawaiians, any flights in the vicinity of Mauna Kea or Mauna Loa will be perceived as causing significant impacts; however, those Native Hawaiians who believe that cultural practices can exist along side with secular activities will see that compliance with regulations and careful planning and implementation can ensure less-than-significant impacts to the culturally significant lands. Alternative design features have been developed to ensure that the cultural impacts will be less than significant. The project has been designed such that access to culturally significant areas will not be restricted at any point during the project, and no flights will occur during cultural holidays, as defined in Section 2. Mitigation efforts to ensure that impacts are less than significant include providing cultural awareness training for all HAMET personnel, with particular emphasis on intangible resources and their importance to Native Hawaiians.

4.8 Socioeconomics and Environmental Justice

4.8.1 Methodology

Socioeconomics includes sociological and economic conditions such as demographics, regional employment and economic activity, housing, schools, medical facilities, shops and services, and recreation facilities. The project would result in a significant impact if it substantially affects the economic or social welfare of the community or state. Therefore, a significant socioeconomic impact would occur if the project adversely affected the revenue, employment, or overall economic conditions of the island community or the state as a whole.

Environmental justice focuses on the distribution of race and poverty status in areas potentially affected by implementation of a Proposed Action. "Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (59 FR 32) directs each federal agency to identify and address any disproportionately adverse environmental effects of its activities on minority and low-income populations. The impact analysis presents projected conditions under the Action Alternatives, including the No Action Alternative. Potential disproportionate effects on low-income or minority populations and the potential for increased adverse health effects on children are also assessed to identify environmental justice effects. "Executive Order 13045 – Protection of Children

from Environmental Health Risks and Safety Risks" (62 FR 78) requires federal agencies to assess activities that have disproportionate environmental health effects on children.

4.8.2 Factors Considered for Impact Analysis

Factors considered in determining whether an alternative would have a significant impact on socioeconomics and environmental justice include the extent or degree to which its implementation would:

- Affect the unemployment rate for the county
- Change total income
- Change business volume
- Affect the local housing market and vacancy rates, particularly with respect to the availability of affordable housing
- Change any social, economic, physical, environmental, or health conditions in such a way as to disproportionately affect any particular low-income or minority group; or disproportionately endanger children.

4.8.3 Summary of Impacts

The impact analysis presents projected conditions under the Action Alternatives, including the No Action Alternative. Potential disproportionate effects on low-income or minority populations and the potential for increased adverse health effects on children are also assessed to identify environmental justice effects.

The impact analysis identifies and describes the potential project impacts on the ROI population, employment, income, business volume, and schools. The potential socioeconomics and environmental justice impacts are presented in the following subsections and summarized in Table 4-9.

4.8.4 Alternative 1 – Mauna Kea and Mauna Loa

Implementation of Alternative 1 would not affect any of the sociological and economic conditions. Implementation of Alternative 1 would also not affect children, because there are no schools or permanent family housing facilities in the area. Implementation of Alternative 1 would not change conditions associated with environmental justice.

4.8.5 Alternative 2 – Mauna Kea

The conditions associated with Alternative 2 are the same as stated above; there would be no impact to sociological, economic, environmental justice, or environmental health effects on children for this alternative.

4.8.6 Alternative 3 – Mauna Loa

The conditions associated with Alternative 3 are the same as stated above; there would be no impact to sociological, economic, environmental justice, or environmental health effects on children for this alternative.

Table 4-9. Summary of potential impacts to socioeconomics and environmental justice.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Economic development	NI	NI	NI	NI
Protection of children	NI	NI	NI	NI
Environmental justice	NI	NI	NI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

4.9 Land Use

4.9.1 Impact Methodology

This subsection evaluates impacts on land use, as described in Section 3. Land use includes activities that are being carried out on the land in and around the ROI and the designation of land as determined in local, state, and federal land use policies. This subsection also describes the methods and significance criteria used to assess the level of impact and then describes the impacts from the Action Alternatives.

Impacts on land use were assessed based on the consistency of project activities with state and local plans and on compatibility with land uses in and near to the ROI.

4.9.2 Factors Considered for Determining Significance of Impacts

An action would be considered to have a significant impact on land use if it would do any of the following:

- Curtails the range of beneficial uses of the environment
- Involves substantial secondary impacts, such as population changes or effects on public facilities
- Conflicts with existing or planned land uses on or around the site
- Conflicts, or is incompatible, with the objectives, policies, or guidance of state and local land use plans
- Conflicts, or is incompatible, with administrative or special designations.

4.9.3 Summary of Impacts

The Proposed Action does not involve acquiring land or rezoning land for use, and, as such, the Proposed Action and the use of the LZs would not result in any changes of current or planned land uses or zonings as delineated by the *County of Hawai'i General Plan* (County of Hawai'i 2005). For the same reasons, HAMET use of the LZs would not curtail the range of beneficial uses of the environment; would not result in substantial secondary impacts, such as increases or decreases in population changes or

effects upon public facilities; and would not be in conflict with the objectives, policies, or guidance of state and local land use plans.

As discussed in Section 3, general features for which an NNL designation is considered for an area include rarity, diversity, and value for science and education. The specific features for which Mauna Kea was designated as an NNL include:

- Being the highest insular mountain (rising to an elevation of 13,796 ft [4,200 m] above sea level) in the United States
- Having the highest lake (Lake Waiau at 13,030 ft [3,971 m] above sea level) in the country
- Possessing evidence of glaciations above the 11,000-ft (3,353-m) level.

Mauna Kea is one of the best examples of a type of biotic community or geologic feature in its biophysiographic providence. HAMET activities would not compromise or disturb the illustrative value or condition of the features for which Mauna Kea was designated NNL status. Thus, the Proposed Action does not impact any of the criteria with regard to Mauna Kea's NNL designation, and implementing HAMET would have no impact on NNL designation. The potential impacts to land use are shown in Table 4-10.

Table 4-10. Summary of potential impacts to land use

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Curtails the range of beneficial uses of the environment	NI	NI	NI	NI
Involves substantial secondary impacts, such as population changes or effects on public facilities	NI	NI	NI	NI
Conflicts with existing or planned land uses on or around the site	NI	NI	NI	NI
Conflicts, or is incompatible, with the objectives, policies, or guidance of state and local land use plans	NI	NI	NI	NI
Conflicts, or is incompatible with, special land use designations (i.e., NNL status for Mauna Kea)	NI	NI	NI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

4.10 Recreation

This subsection evaluates impacts on recreational use, as described in Section 3. Recreational use includes activities that are being carried out on the land in the Proposed Action area. This subsection also describes the methods and significance criteria used to assess the level of impact on recreational use and then describes the impacts from the Action Alternatives.

4.10.1 Impact Methodology

Impacts on recreational resources were assessed by determining the types of recreational uses in and around the ROI and then determining the sensitivity of those uses to the short- and long-term project effects, such as noise and visual disturbance and access and recreational restrictions.

4.10.2 Factors Considered for Determining Significance of Impacts

An action would be considered to have a significant impact on recreation if it would do any of the following:

- Curtails the range of recreational uses of the environment
- Substantially affects scenic vistas and view planes
- Disrupts recreational use of land-based resources, such as parks or recreational paths, or interferes with the public's right of access
- Prevents long-term recreational use or use during a peak season or impedes or discourages existing recreational activities.

4.10.3 Summary of Impacts

Recreational activities occur in the areas described in Section 3. Dispersed recreational activities may occur near or at the LZs; however, the LZs are not normally destinations for recreational activities. While HAMET use of LZs would not be compatible with concurrent recreational uses of an LZ, HAMET use of the LZs would not curtail the range of recreational uses of the surrounding areas that currently occur. As detailed in Section 3.11, Noise, recreationists may experience and perceive noise as a distraction/annoyance under all Action Alternatives. However, the extent and magnitude of the distraction would be dependent on the distance the recreationist is from the noise source (HAMET flight) at any point in time during HAMET flights. Modeled average noise levels were found to be compatible with current recreational land uses as outlined in Army Regulation 200-1 (U.S. Army 2007a). In addition to modeled noise levels, a noise level study was conducted during training activities in March and April 2011 and is discussed further in Subsection 4.11. In keeping with these results, noise from HAMET flights would be expected to be of short duration and should not obstruct or curtail recreation activities. Recreational trails or activities in the ROI would not be closed or modified as a result of noise introduced through implementation of any of the Action Alternatives. Additionally, the public right of access to any recreation areas would not be modified. Thus, it is not anticipated that any of the Action Alternatives would significantly impact or result in the cessation of any recreational activities or access to them, including Mauna Loa Observatory Access Road, Saddle Road, and Mauna Kea Summit Access Road. The helicopter overflights may also introduce aesthetic disturbances that may be perceived as a distraction by people in the immediate area. As discussed in the view plane analysis in Section 4.12, Visual and Aesthetic Resources, recreationists at Lake Waiau and the Mauna Kea summit would not be impacted visually under any of the Action Alternatives. At other locations, recreationists may see

helicopters in the area depending on the alternative chosen and where the recreationist is located at the time. However, HAMET flights would be of short duration and would not result in obstructing recreationists' views.

Potential impacts to recreation would be mitigated through public notification of the HAMET training schedule. With mitigation, the potential impacts to recreation, shown in Table 4-11, would be minimized to levels that are less than significant.

Table 4-11. Summary of potential impacts to recreational use.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Curtails the range of recreational uses of the environment	NI	NI	NI	NI
Substantially affects scenic vistas and view planes	<SI	<SI	<SI	NI
Disrupts recreational use of land-based resources, such as parks or recreational paths, or interferes with the public's right of access	<SI	<SI	<SI	NI
Prevents long-term recreational use or use during a peak season or impedes or discourages existing recreational activities	<SI	<SI	<SI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

4.11 Noise

Noise associated with proposed training operations has the potential to impact various land uses and wildlife in the ROI. Modeled average noise levels (DNLs) and maximum noise levels were used in accordance with Army Regulation 200-1 (U.S. Army 2007a) to assess effects of helicopter noise on land uses and wildlife in the area. The conclusions in this subsection are based on the information presented in Section 3, noise modeling results, and maximum noise levels.

4.11.1 Impact Methodology

Noise emissions from helicopter training operations associated with the Action Alternatives on current land uses have been evaluated using the DoD's NoiseMap noise model. NoiseMap uses aircraft-specific sound hemispheres generated from flyover measurement studies in conjunction with acoustical research conducted by the Air Force Research Laboratory's Aural Displays and Bioacoustics Branch to model noise due to helicopter operations (U.S. Army 2010d).

Modeling was performed assuming a conservative flight frequency of 60 flights per day during both daytime (0700 to 2200 hours) and nighttime hours (2200 to 0700 hours), 45 days per year, by the CH-47 Chinook. The CH-47 Chinook was used for both modeling purposes and maximum noise levels, because it is the loudest helicopter in terms of maximum decibel levels of the helicopters to be used for training activities and therefore represents a worst-case scenario.

Noise monitoring was performed during the March 2011 data collection and training period conducted at the three Mauna Kea LZs in March and April 2011. Noise measurements were collected at areas of concern to assess baseline noise levels associated HAMET activities. Sound-level meters were placed at each of the following locations:

1. Under the flight path in the PCH

2. Under the flight path in the PCH farther northeast and upslope on Mauna Kea

3. Near the Na Ala Hele trails within the PCH and northwest of the LZs

4. Near the summit of Pu‘u Poli‘ahu (Mauna Kea)

5. Near the boundary of the Ice Age NAR

6. Near Lake Waiau.

These sample locations are shown on Figure 4-4. The sound-level meters at each location collected average, maximum, and minimum noise levels continuously during the 2-week training period. Results of this sampling effort are discussed in the following subsections.

4.11.1.1 Noise Measurements and Effects.

Noise is expressed and analyzed as follows:

- Units of measurement. The unit of measurement used in sound measurement is the decibel (dB), which is usually reported on an A-weighted (dBA), a C-weighted (dBC), or a linear (dBL) scale. The A-weighted scale most closely represents the response of the human ear to sound. The term “noise level” is used interchangeably with “sound level.”

- Common metrics. Two noise metrics commonly used to assess impacts of noise are the day-night average sound level (DNL) and the maximum sound level (L_{max}).

  – *DNL.* Most federal community noise guidelines in the United States are based on the DNL (Berger et al. 2003). The DNL represents energy-averaged sound levels measured by summation and averaging of sound exposure level values during a 24-hour period. A penalty of 10 dB is assigned to noise events occurring between 10 p.m. and 7 a.m. to compensate for generally lower background noise levels and increased annoyance associated with events occurring at night. For this assessment, modeling parameters included a daytime flight frequency of 42 flights and a nighttime flight frequency of 18 flights. The DoD, FAA, and Department of Housing and Urban Development use a DNL of 65 dBA as their regulatory goal in assessing acceptable noise levels in and near residential areas (Berger et al. 2003). For assessing long-term average sound levels near airports with frequently occurring sound events, the DNL is usually calculated using a 365-day year averaging period. However, use of the 365-day averaging period in areas where sound events are intermittent may dilute the DNL (Berger et al. 2003). To account for seasonal variation in noise levels resulting from intermittent training operations, the

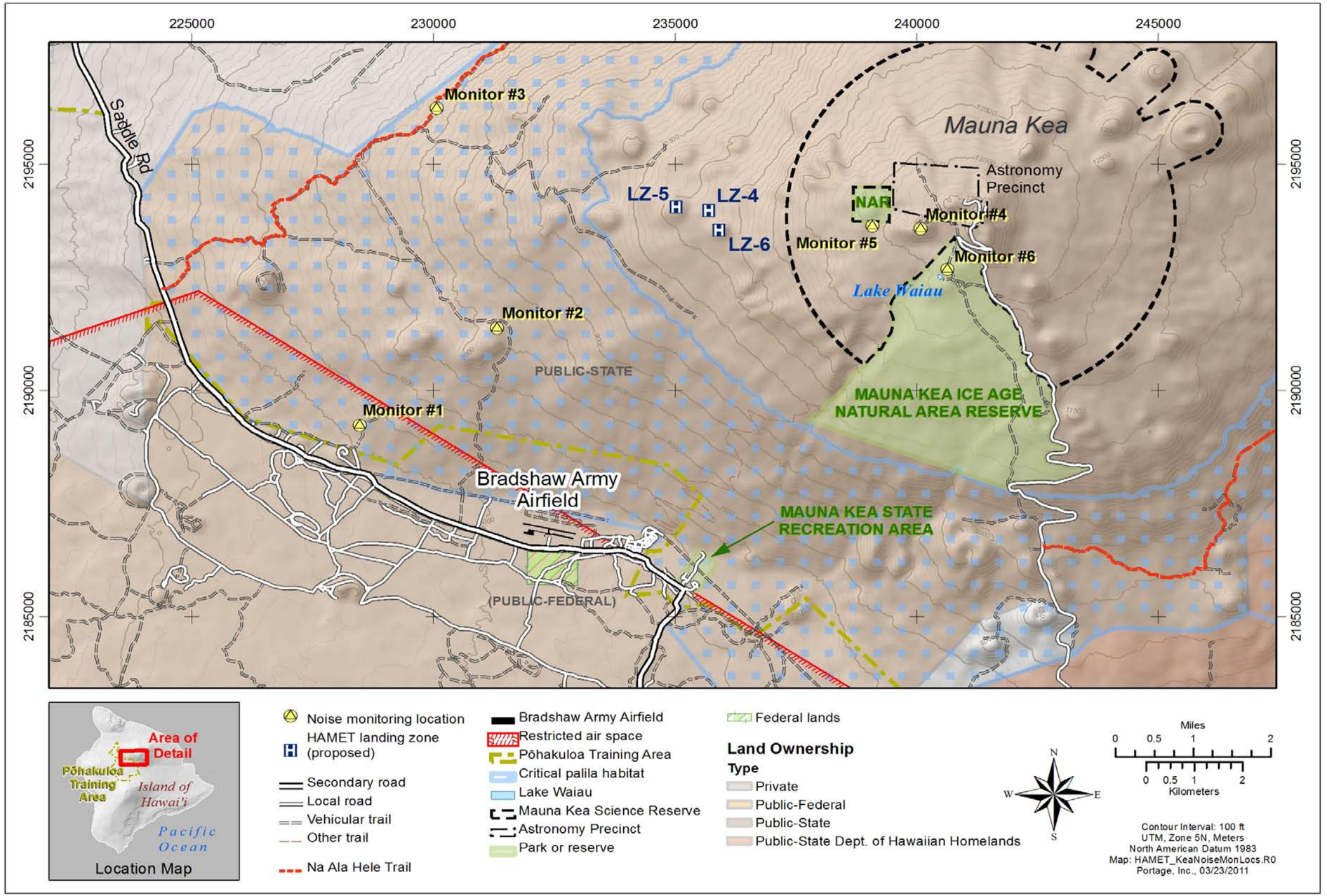

Figure 4-4. Noise monitoring sample locations for March – April 2011 sampling effort.

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Army may use shorter averaging periods to more accurately represent average noise levels (U.S. Army 2005b). An averaging period of 45 days was used in this EA to calculate DNLs resulting from HAMET operations and corresponds to the actual proposed number of flying days per year.

– L_{max}. The maximum sound level of a noise source is useful in anticipating impacts on wildlife. Maximum sound levels are used in conjunction with the proximity and duration of the noise source to examine potential effects on wildlife (NoiseQuest 2011).

- Metric noise from transportation sources. Noise from transportation sources, such as vehicles and aircraft, and from continuous sources, such as generators, is assessed using the A-weighted DNL (ADNL). The ADNL significantly reduces the measured pressure level for low-frequency sounds while slightly increasing the measured pressure level for some high-frequency sounds.

The maximum noise levels for military helicopters to be used for HAMET are listed in Table 4-12. The CH-47 Chinook is the loudest of these helicopters.

Table 4-12. Maximum sound level by aircraft (dBA).[a]

Slant Distance (ft)[b]	CH-47 (Chinook)	UH-60 (Black Hawk)
200 (60 m)	98	91
500 (152.4 m)	89	83
1,000 (304.8 m)	83	76
2,000 (609.6 m)	77	69

a. Source: U.S. Army (2010c).

b. The slant distance is the distance between the helicopter and a lateral point on the ground.

These levels can be compared to the percentage of the population likely to be annoyed by particular noise levels to determine potential annoyance due to helicopter operations (Table 4-13). Annoyance associated with transient noise sources such as helicopters is dependent on both the noise level and duration. The annoyance levels in Table 4-13 were developed using respondents exposed to more than 50 flights per day; therefore, annoyance levels due to HAMET operations may vary based on the actual number of flights per day (U.S. Army 2010c).

Table 4-13. Population annoyance percentages due to aircraft noise.

Maximum Noise Level (dBA)	Percentage Highly Annoyed
70	5
75	13
80	20
85	28
90	35

a. Source: U.S. Army (2010c).

Chapter 14 of Army Regulation 200-1 (U.S. Army 2007a) states the primary means of assessing military noise should be to use DoD noise assessment software and the primary metric should be the DNL. In accordance with this regulation, NoiseMap noise modeling software was used in assessing noise impacts from proposed HAMET activities. NoiseMap is the official DoD computer model for assessing fixed-wing and rotorcraft noise. The program uses aircraft-specific acoustical data in conjunction with topography, atmospheric data, flight frequency, time of day, flight track, and flight profile information to develop DNL ground noise contours. The farthest extent for each ground noise contour represents an accurate picture of the potential noise impact on current land uses in the ROI.

Army Regulation 200-1 (U.S. Army 2007a) also specifies that potential impacts of noise on wildlife shall be assessed through studies "…on individual species' response or a surrogate response to noise." In accordance with this approach, published studies on wildlife responses to helicopter noise were utilized in assessing potential effects on wildlife due to training operations.

4.11.1.2 Additional Parameters. In addition, the parameters listed below were used in each flight path during noise modeling.

- The minimum flight altitude for all HAMET helicopter operations is 2,000 ft (610 m) AGL when departing from PTA and enroute to the release point (RP). At the RP, aircrews begin descending directly to one of the three LZs on either Mauna Kea or Mauna Loa. Flights around the LZ area will be conducted at 500 ft (152 m) AGL, and, once a final approach is established, a controlled descent will be made to the designated LZ.

- Upon departure from each LZ, the aircrew will climb to a minimum altitude of 2,000 ft (610 m) AGL prior to reaching the outbound checkpoint and will remain at or above this altitude until back inside the PTA property line.

- Inside the PTA property line, helicopter aircrews will maintain altitudes of 500 ft (152 m) AGL or less unless otherwise approved in accordance with PTA standard operating procedures (U.S. Army 2008).

Modeled DNL noise contours were aligned with current recreational and cultural land use locations. The resulting land use and associated DNL were then compared to the LUPZs discussed in Subsection 3.11.1 to determine the impact of training operations on current land uses. Figures 4-5 and 4-6 show modeled noise contours in relation to recreational areas, and Figures 4-7 through 4-9 show contours in relation to cultural areas.

Maximum noise levels were compared to current wildlife habitat locations to determine noise levels wildlife may be exposed to during training activities. Figure 4-9 shows flight path locations in relation to PCH, the Kipuka ʻAinahou Nēnē Sanctuary, and ʻakiapolaʻau and ʻio habitats. The duration of maximum noise levels was also considered, because this affects wildlife responses (NoiseQuest 2011).

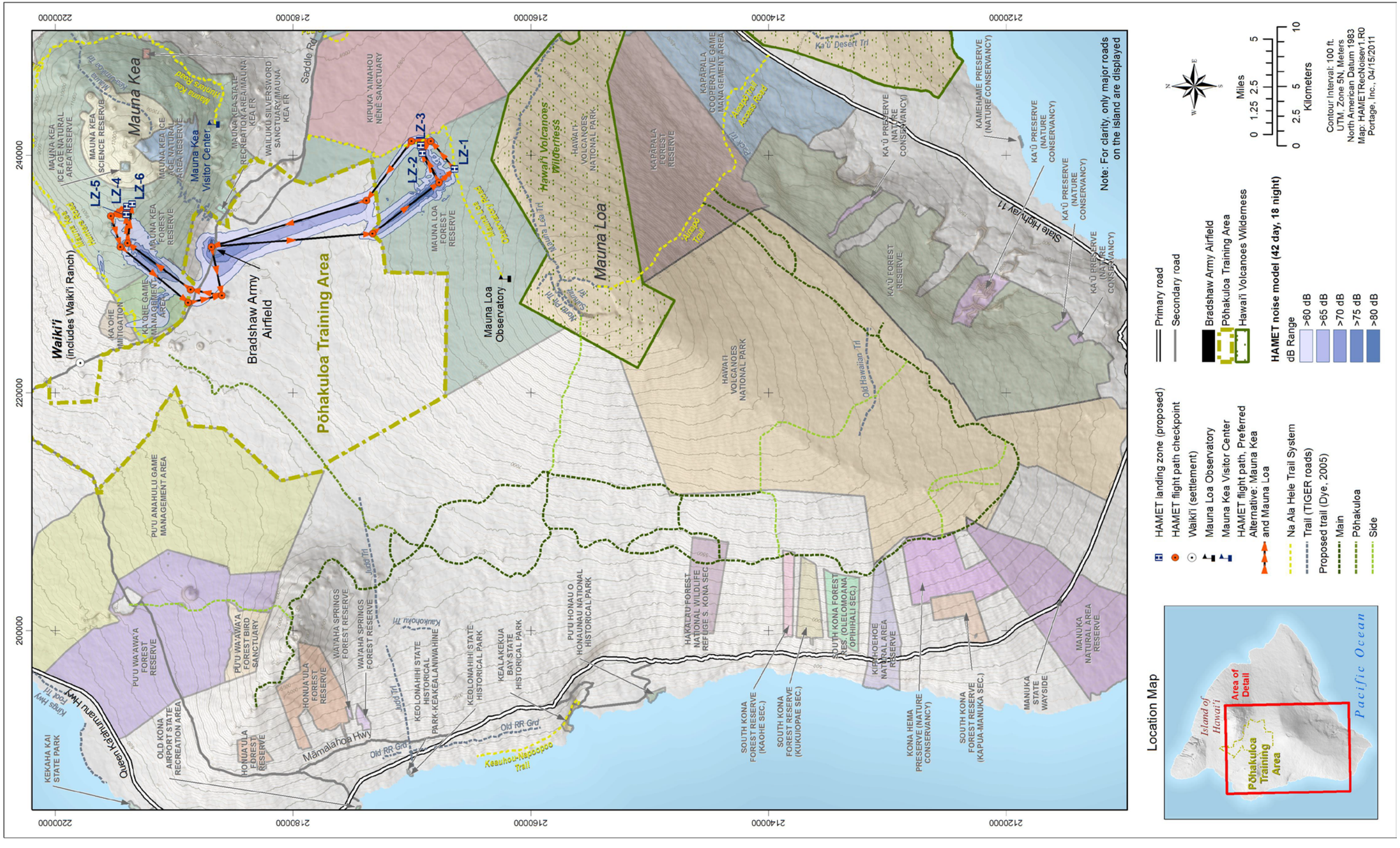

Figure 4-5. Modeled DNL noise contours in relation to recreational resources within and surrounding the Proposed Action/Alternatives area.

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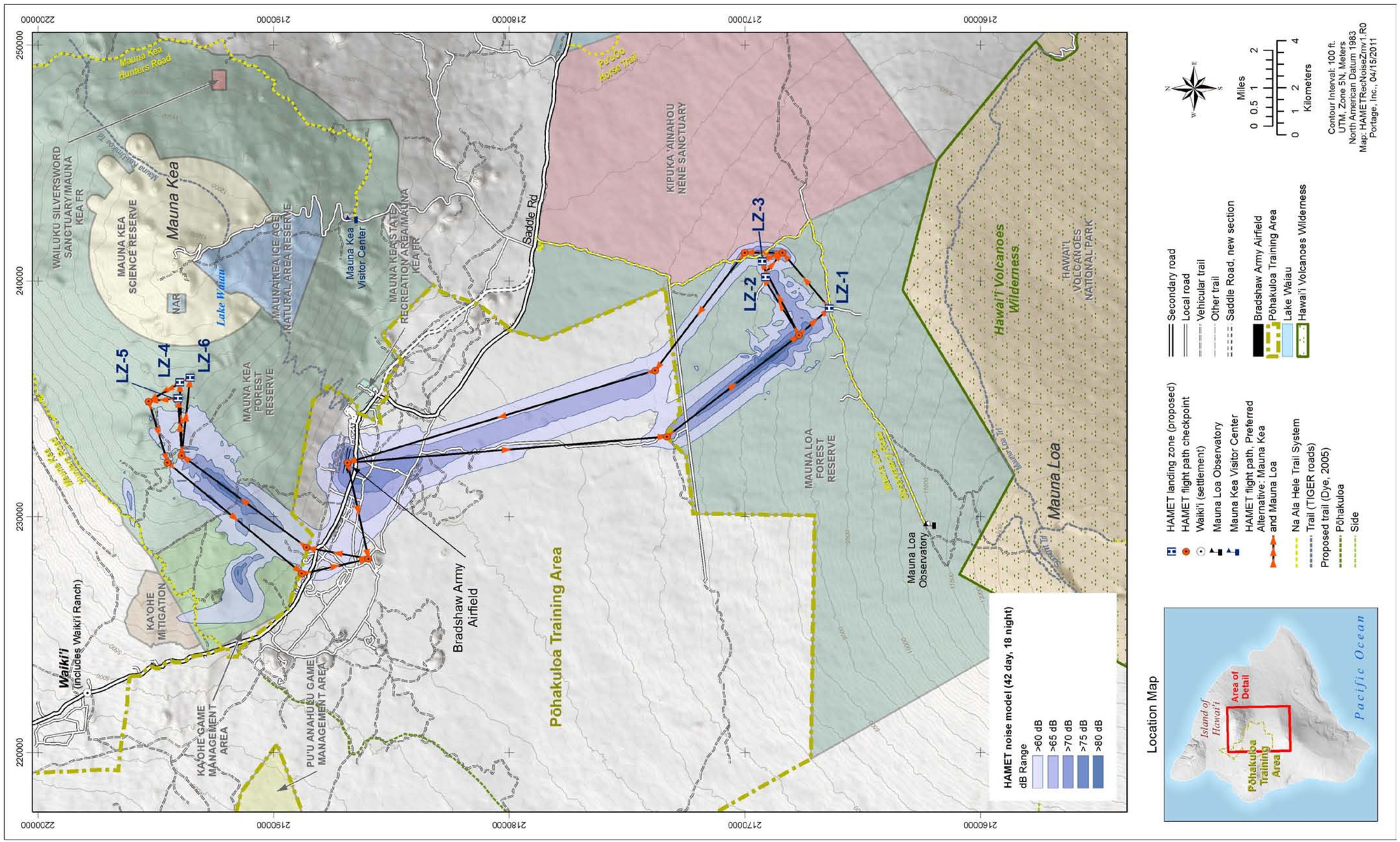

Figure 4-6. Closer view of modeled DNL noise contours in relation to recreational resources within and surrounding the Proposed Action/Alternatives area.

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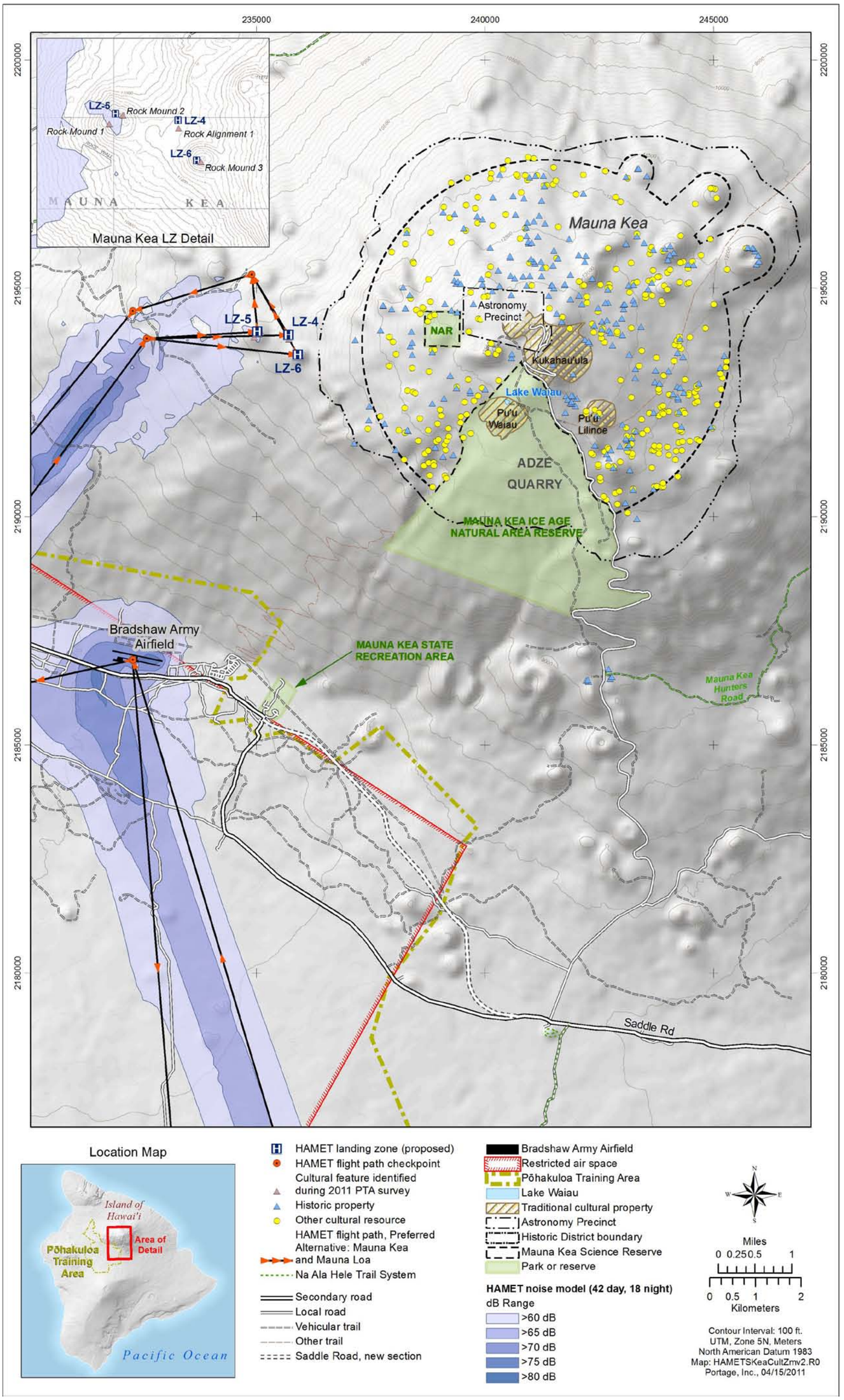

Figure 4-7. Modeled DNL noise contours in relation to Mauna Kea.

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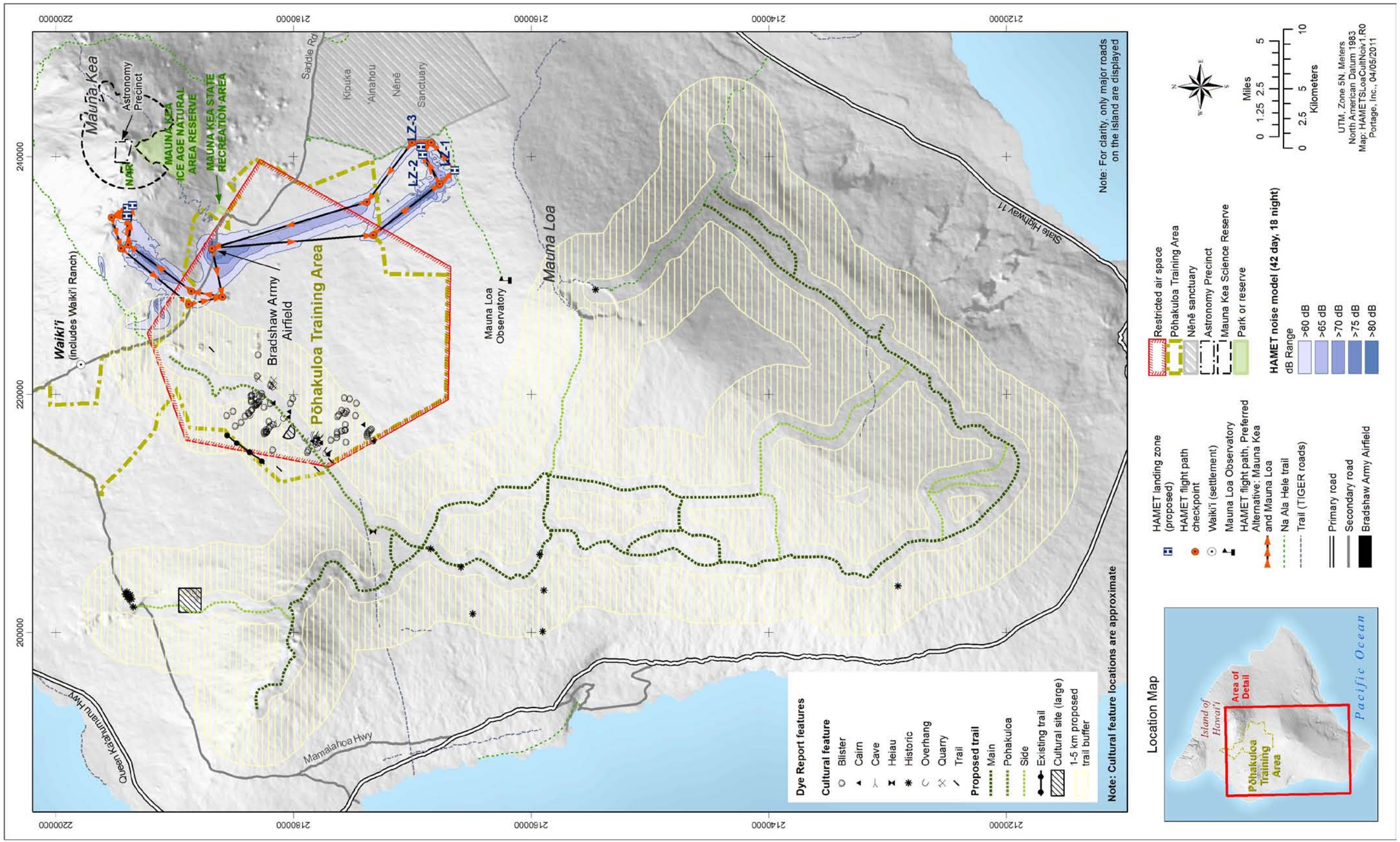

Figure 4-8. Modeled DNL noise contours in relation to cultural resources of the Proposed Action/Alternatives area with emphasis on the Mauna Loa LZs.

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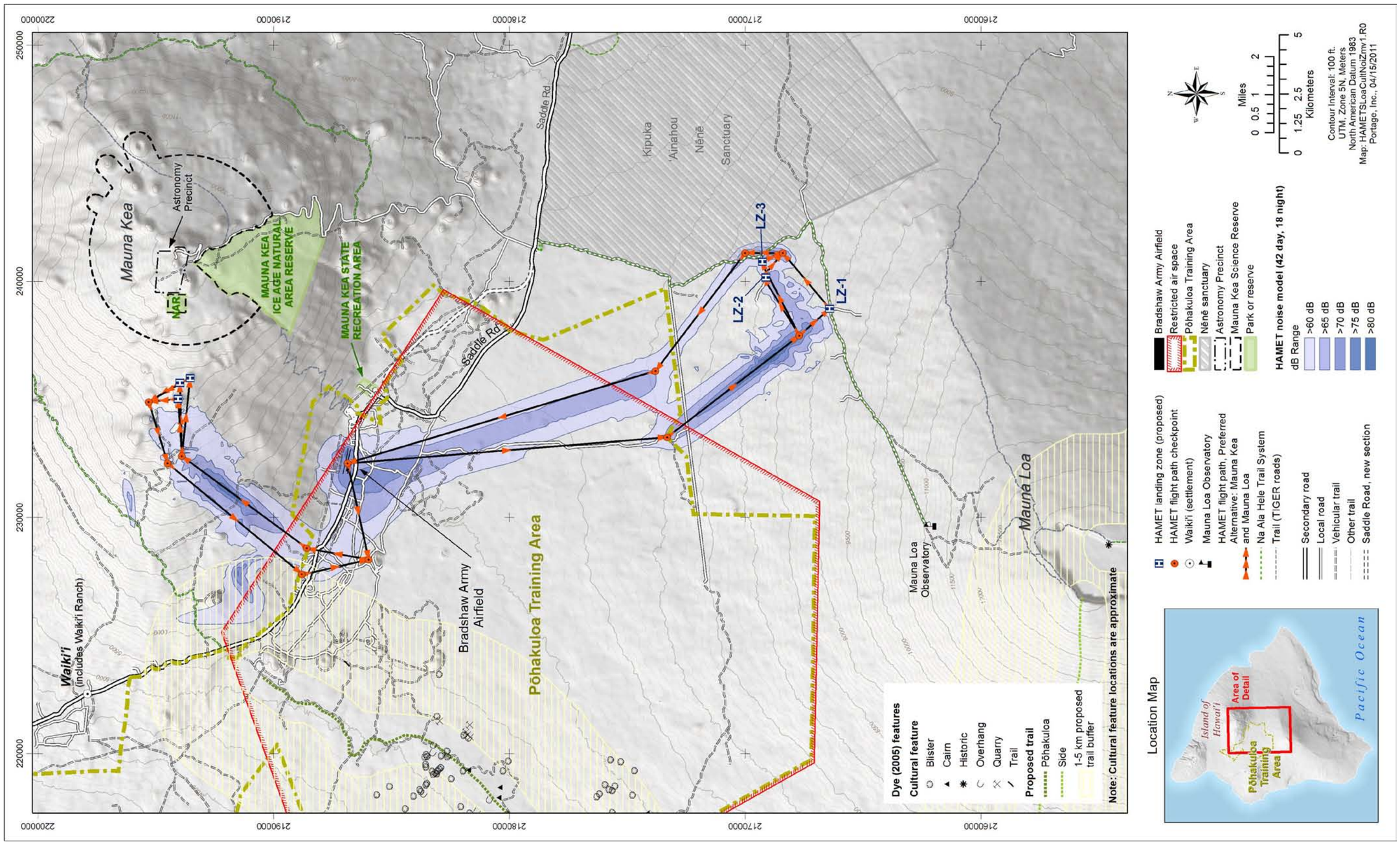

Figure 4-9. Closer view of modeled DNL noise contours in relation to cultural resources surrounding Mauna Loa LZs.

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4.11.2 Factors Considered for Impact Analysis

Factors considered in determining whether an alternative would have a significant impact on noise include the extent or degree to which its implementation would do the following:

- Exceed noise zone thresholds listed in the SONMP (U.S. Army 2010c) for current land uses in the ROI
- Affect wildlife in the ROI as outlined in Subsection 4.6 based on existing information on effects of helicopter noise on birds.

4.11.3 Summary of Impacts

Modeled noise levels resulting from the Proposed Action are compatible with existing land uses in the ROI; therefore, the impact on humans is considered less than significant. Potential impacts of noise on wildlife within the ROI, including threatened and endangered species, are considered less than significant due to the nature of the species habitat and range as well as established conservation measures (Peshut 2011). The potential impacts are discussed in the following subsections and summarized in Table 4-14.

Table 4-14. Summary of potential impacts from noise.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Rotary wing aircraft noise to humans	<SI	<SI	<SI	NI
Rotary wing aircraft noise to wildlife	<SI	<SI	<SI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

As previously mentioned, in addition to using modeled noise contours and maximum noise levels to assess impacts from noise associated with helicopter flights for Army training activities, a noise level study was conducted in March and April 2011 to provide additional information on the baseline noise conditions and noise associated with Army helicopter training activities. Preliminary results from this study showed that maximum noise levels observed on days when training was conducted were similar to those observed on days when training was not conducted.

Noise data were collected from March 19, 2011, through April 2, 2011. During this period, HAMET activities were conducted with the UH-60 Black Hawk on March 21 through 24 and March 28 through 31, 2011. One CH-47 Chinook flight also occurred on March 29, 2011. Flight paths followed the proposed HAMET flight paths to the three Mauna Kea LZs. Maximum noise levels on days when HAMET training activities were conducted (herein referred to as "flying days") ranged from 82 to 104 dBA. Maximum noise levels on days when HAMET training activities did not occur (herein referred to as "non-flying days") ranged from 82.3 to 102.1 dBA. Figure 4-10 shows the maximum noise level at each sample location for flying days and non-flying days. As the figure shows, maximum noise levels on

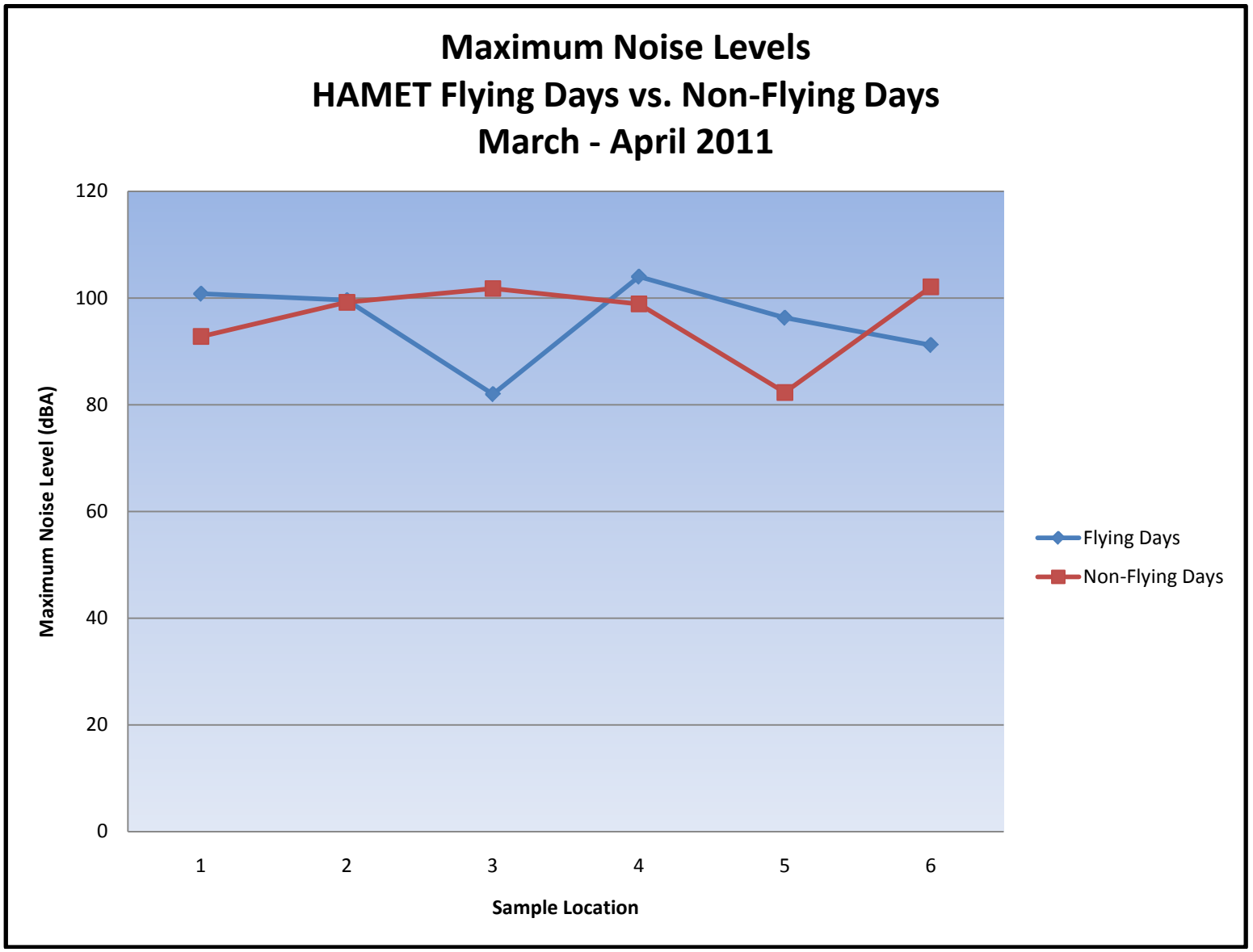

Figure 4-10. Maximum noise levels for HAMET flying days versus non-flying days.

flying days are similar to non-flying days; therefore, this preliminary assessment indicates HAMET activities do not significantly alter the existing maximum noise levels at each sample location.

4.11.3.1 Land Use Compatibility. Impacts on land use from noise associated with the Proposed Action are discussed below.

4.11.3.1.1 Alternative 1 – Mauna Kea and Mauna Loa. Modeled average noise levels (DNLs) in training areas leading to and including the Mauna Kea and Mauna Loa LZs due to helicopter training operations would likely result in noise contours above 65 dBA covering approximately 13 square miles (33.7 square kilometers) of land within the PTA property boundary, the Mauna Kea Forest Reserve, and the Mauna Loa Forest Reserve. As shown in the noise contour in Figures 4-5 through 4-9, and particularly on Figure 4-6, LUPZ/Zone I noise contours (60–65 dBA) generally lie within areas less than 1 mile (1.6 kilometers) from the training flight paths. Zone II (65–75 dBA) and Zone III (>75 dBA) noise contours exist directly under proposed flight paths; the cumulative area covered by Zone III noise contours is less than one-half square mile (less than 1.3 square kilometers). There is also one area with Zone I, II, and III noise contours approximately 2 miles (3.2 kilometers) west of the Mauna Kea outbound flight corridor. These contours lie within the Kaohe GMA as well as the 0.6–3.1 mile (1–5 kilometer) trail buffer for the proposed Pōhakuloa Trail. DNL noise contours above 60 dBA do not extend into other areas.

As shown on Figures 4-5 through 4-9, noise contours do not surround the Mauna Kea LZs. This likely results from a combination of the topography on Mauna Kea as well as the use of average noise levels to develop noise contours. Average noise levels are higher in areas common to all flight paths to each mountain, such as the portion of the flight path between PTA and the RP for each mountain. Once the flight paths diverge at the RP to travel to individual LZs, average noise levels decrease. This results in lower noise contours surrounding the individual LZs; in the case of the Mauna Kea LZs, average noise levels in the vicinity of the LZs are below the LUPZ/Zone I noise levels.

As discussed in Subsection 3.11 of this EA, Zone I noise levels are compatible with noise-sensitive uses such as residences and cultural activities, Zone II noise levels are compatible with activities such as resource protection, and Zone III noise levels are compatible with forestry-related activities, provided there are no residential buildings in the area (U.S. Army 2010c). Based on these land use planning guidelines, projected noise levels from proposed training exercises are compatible with current land uses in these areas. Therefore, impacts on humans due to training operations are considered less than significant.

4.11.3.1.2 Alternative 2 – Mauna Kea. As discussed previously, the impact of using LZs on Mauna Kea is considered less than significant for humans.

4.11.3.1.3 Alternative 3 – Mauna Loa. As discussed previously, the impact of using LZs on Mauna Loa is considered less than significant for humans.

4.11.3.2 Wildlife. Impacts on wildlife from noise associated with the Proposed Action are discussed below.

4.11.3.2.1 Alternative 1 – Mauna Kea and Mauna Loa. Maximum noise levels for the CH-47 Chinook and the UH-60 Black Hawk are listed in Table 4-12. As previously discussed, the CH-47 Chinook was used to assess maximum noise levels, because it is the loudest of the helicopters to be used for training purposes.

Flight paths to the LZs on Mauna Kea travel directly over PCH and ʻakiapolaʻau habitat (Figures 3-12 and 3-13, respectively). The LZs on Mauna Loa lie within ʻio habitat, and the flight path for the Mauna Loa LZs extends approximately 1,640 ft (500 m) into the Kipuka ʻAinahou Nēnē Sanctuary (Figures 3-11 and 3-14, respectively). The impact of noise on the listed endangered and threatened species, sensitive species, and other wildlife species is a concern throughout the ROI. The noise from helicopter training is a distraction to wildlife and may cause them to flee the area, which would interrupt life-cycle activities and result in behavior modification. Results from surveys conducted in March 2011 (Army 2011a) to identify potential wildlife species that may be impacted near the LZs are discussed further in Subsection 4.6. Research performed by the USFWS determined that some territorial songbirds exhibited reduced reproduction after exposure to low-altitude overflights (NoiseQuest 2011). However, conservation measures include maintaining a minimum altitude of 2,000 ft (610 m) AGL while enroute to all LZs, which includes those areas over the PCH and ʻakiapolaʻau habitat, as described in Subsection 2.7.

At a slant distance of 2,000 ft (610 m), the maximum noise level of the CH-47 Chinook is 77 dBA; this noise level is comparable to a garbage disposal at a distance of 3 ft (1 m) (Berger et al. 2003). The duration maximum noise levels would be in the range of seconds, depending on the speed of the aircraft, with noise levels rising above background, peaking at approximately 77 dBA when the aircraft is directly overhead, and fading back to background levels. A study performed by Delaney et al. (2000) examined the responses of the red-cockaded woodpecker to military training events, including helicopters. Sound exposure levels for helicopter flights included in the study ranged from 72 to 88 dBA. The study showed that the proximity of the noise source and the noise level affected the frequency of flushing from nesting cavities. However, in all cases, the woodpeckers returned to their nests relatively quickly and a decline in reproduction was not noted (Delaney et al. 2000). Although results from studies cannot be applied across species, studies have demonstrated that birds can become habituated and co-exist with loud noises (Peshut and Schnell 2011a; Delaney et al. 2000; Pater et al. 2009). In addition, academic literature on the effects of noise on bird species has indicated they are more affected by ground-based noise, such as hiking and hunting, than air-based noise (Delaney et al. 2000). Therefore, the impact of noise on wildlife, including threatened and endangered species, is less than significant due to the nature of the species habitat and range as well as established conservation measures (Peshut 2011).

4.11.3.3 Alternative 2 – Mauna Kea. As discussed previously, the impact of using LZs on Mauna Kea is considered less than significant for wildlife.

4.11.3.4 Alternative 3 – Mauna Loa. As discussed previously, the impact of using LZs on Mauna Loa is considered less than significant for wildlife.

4.12 Visual and Aesthetic Resources

4.12.1 Impact Methodology

A literature search was conducted to gather information on visual and aesthetic resources in the ROI, inclusive of the entire island of Hawaiʻi. The search determined that the people that view the island of Hawaiʻi can be described as residents, sightseers, and cultural practitioners, each with a different expectation of their visual experience. Sixteen representative view points were identified for Mauna Loa and Mauna Kea and were considered visually significant to the three viewer groups. Table 4-15 provides a listing of theses viewpoints.

Table 4-15. Representative view points.

Viewpoint	Location	Description	Viewer Group
1	Lake Waiau	Small lake near the summit of Mauna Kea that is accessible by trail and used for healing and worship practices.	Cultural practitioners
2	Puʻu Poliʻahu	Cinder cone on west side of Mauna Kea summit, home to Poliʻahu, the Hawaiian snow goddess of Mauna Kea.	Cultural practitioners Sightseers
3	Mauna Kea summit	Highest point on Mauna Kea. Recognized as a sacred place to Native Hawaiians.	Cultural practitioners
4	Ice Age NAR	State reserve on the south summit flank of Mauna Kea and includes two rare communities: an aeolian desert and the state's only alpine lake.	Cultural practitioners
5	Puʻu Waʻawaʻa	Summit of cinder cone that is of cultural importance to Native Hawaiians.	Cultural practitioners
6	Mauna Loa summit	Highest point on Mauna Loa and recognized as a sacred place to Native Hawaiians.	Cultural practitioners Sightseers
7	North Ridge of Mauna Kea Summit	Ridge north of the observatories on near the summit of Mauna Kea.	Sightseers
8	Mauna Kea Access Road	Road from Saddle Road to the Mauna Kea observatories.	Sightseers
9	Mauna Loa Trail	Trail from near Kilauea crater to the summit of Mauna Loa.	Sightseers
10	Mauna Loa Observatory	NOAA atmospheric research facility.	Sightseers
11	Saddle Road, State Highway 200	Road that traverses the island from Hilo to its junction with Hawaiʻi Route 190.	Sightseers Residents
12	Kawaihae Harbor	Harbor northwest of Mauna Kea.	Cultural practitioners Sightseers

Table 4-15. (continued).

Viewpoint	Location	Description	Viewer Group
13	Department of Hawaiian Home Lands Waikoloa-Waialeale	Along old Manalahoa Highway through ranchlands.	Residents
14	Mauna Loa Observatory Road	Road from Highway 200 to the Mauna Loa Observatory.	Sightseers
15	Waikiʻi Ranch	3,000-acre ranch consisting of 10-, 20-, and 40-acre residential lots.	Residents
16	Mauna Kea State Recreation Area	20-acre state park used for picnicking, camping, lodging, and viewing.	Sightseers

With these points, viewsheds were calculated using the Spatial Analyst Observer Points tool in ESRI ArcMap 10 SP1. To define the existing conditions, a flight path around the perimeter of PTA and on a grid across PTA was used with helicopters flying at 2,000 ft (610 m) AGL. This provides a map of where current helicopter activities at PTA potentially could be seen from across the island. For the alternatives, the conditions used for the analyses were based on the alternative description, including the flight path (+/- 500 m) at 2,000 ft (610 m) AGL, an area inclusive of 3,280 ft (1,000 m) from the center point of the LZs and a 6-ft tall viewer. The viewsheds were then mapped and the maps analyzed.

4.12.2 Factors Considered for Determining Significance of Impacts

Factors considered in determining whether an alternative would have a significant impact on visual resources include the extent or degree to which its implementation would do the following:

- Introduce physical features that are substantially out of character with adjacent developed areas
- Alter a site so that a sensitive viewing point or vista is obstructed or adversely affected, or if the scale or degree of change appears as a substantial, obvious, or disharmonious modification of the overall view
- Be inconsistent with the visual resource policies of the *County of Hawaiʻi General Plan* (County of Hawaiʻi 2005).

4.12.3 Summary of Impacts

To evaluate the potential that an aircraft could be seen during its HAMET flight, viewsheds were calculated as previously described. Figure 4-11 illustrates the results of the analysis for the baseline conditions, i.e., the current potential visibility of training flights within the PTA boundary. Figures 4-12 through 4-14 illustrate the results of the analysis for Alternatives 1, 2, and 3, respectively. The areas highlighted in yellow are the locations where unobstructed views exist when near-ideal atmospheric

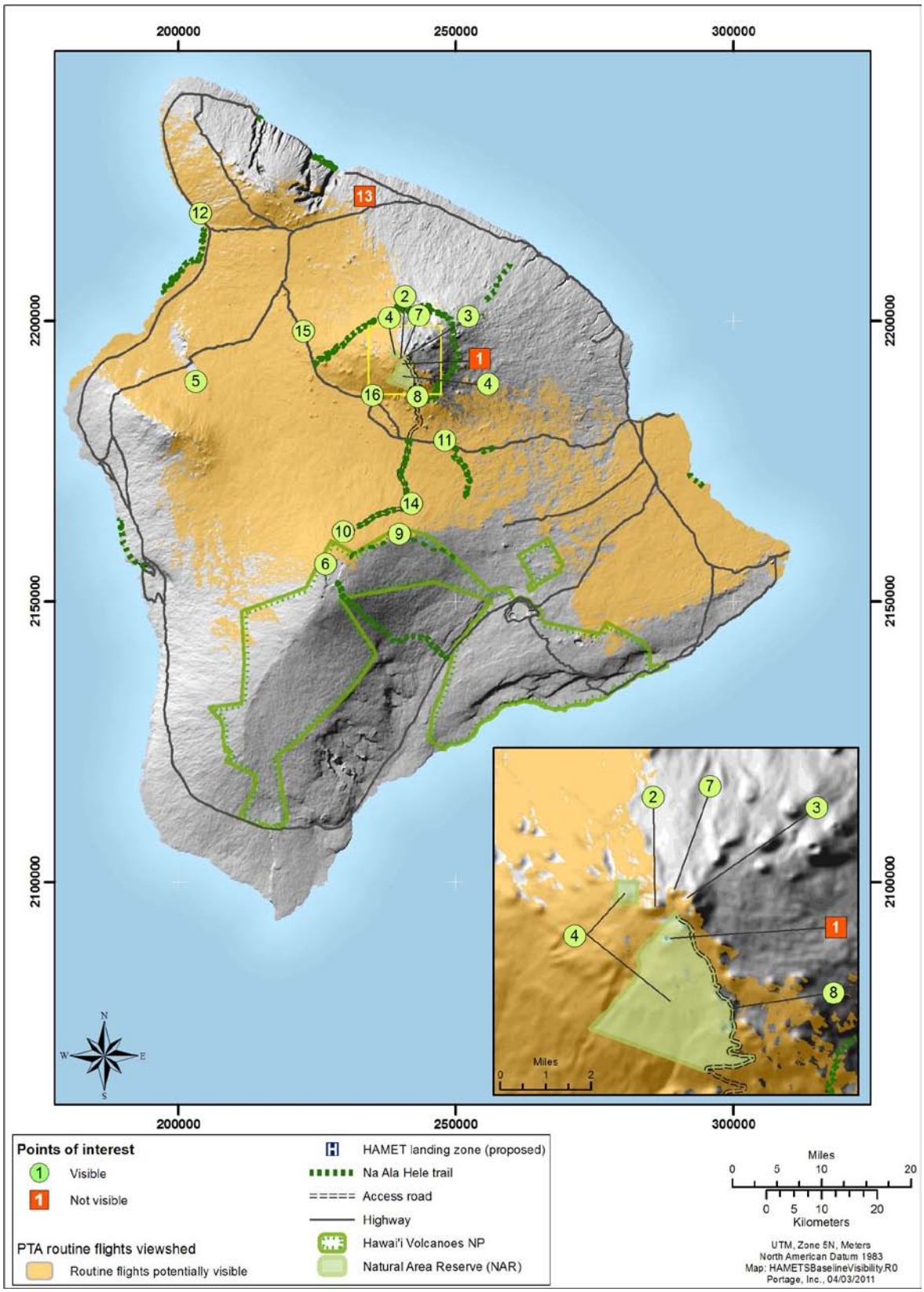

Figure 4-11. View plane analysis of the existing conditions.

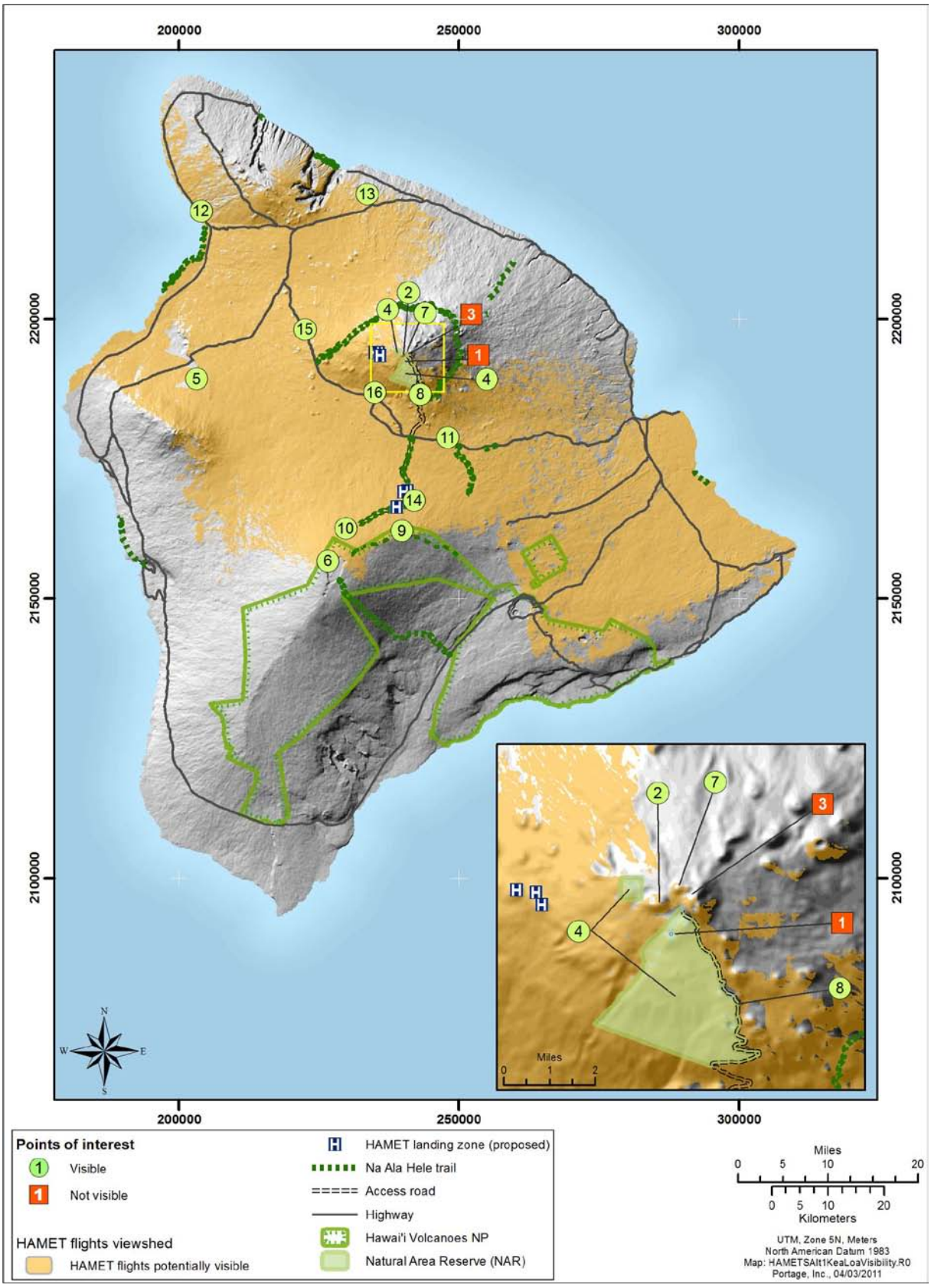

Figure 4-12. View plane analysis of Alternative 1 (Preferred Alternative) – Mauna Kea/Mauna Loa.

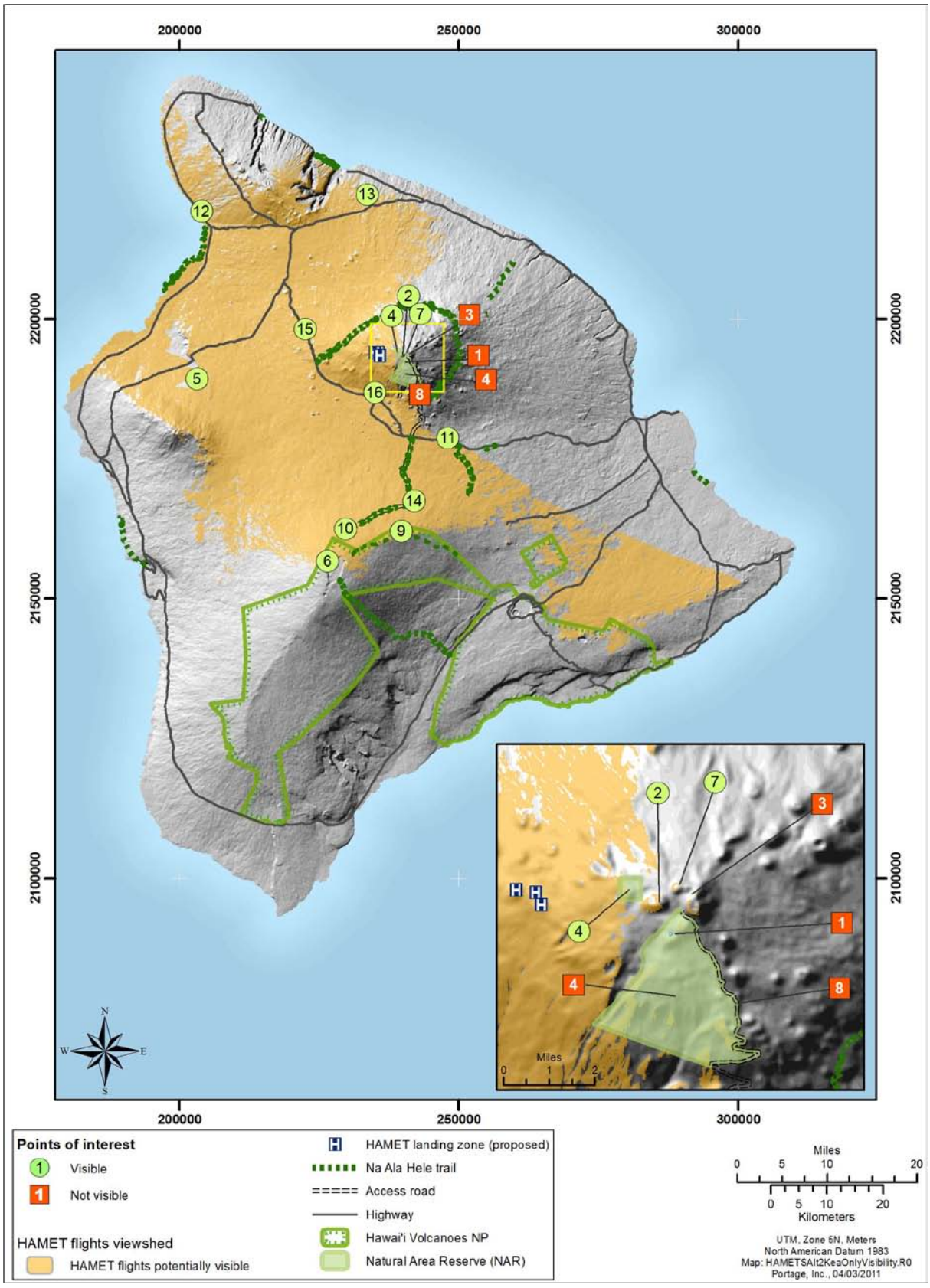

Figure 4-13. View plane analysis of Alternative 2 – Mauna Kea.

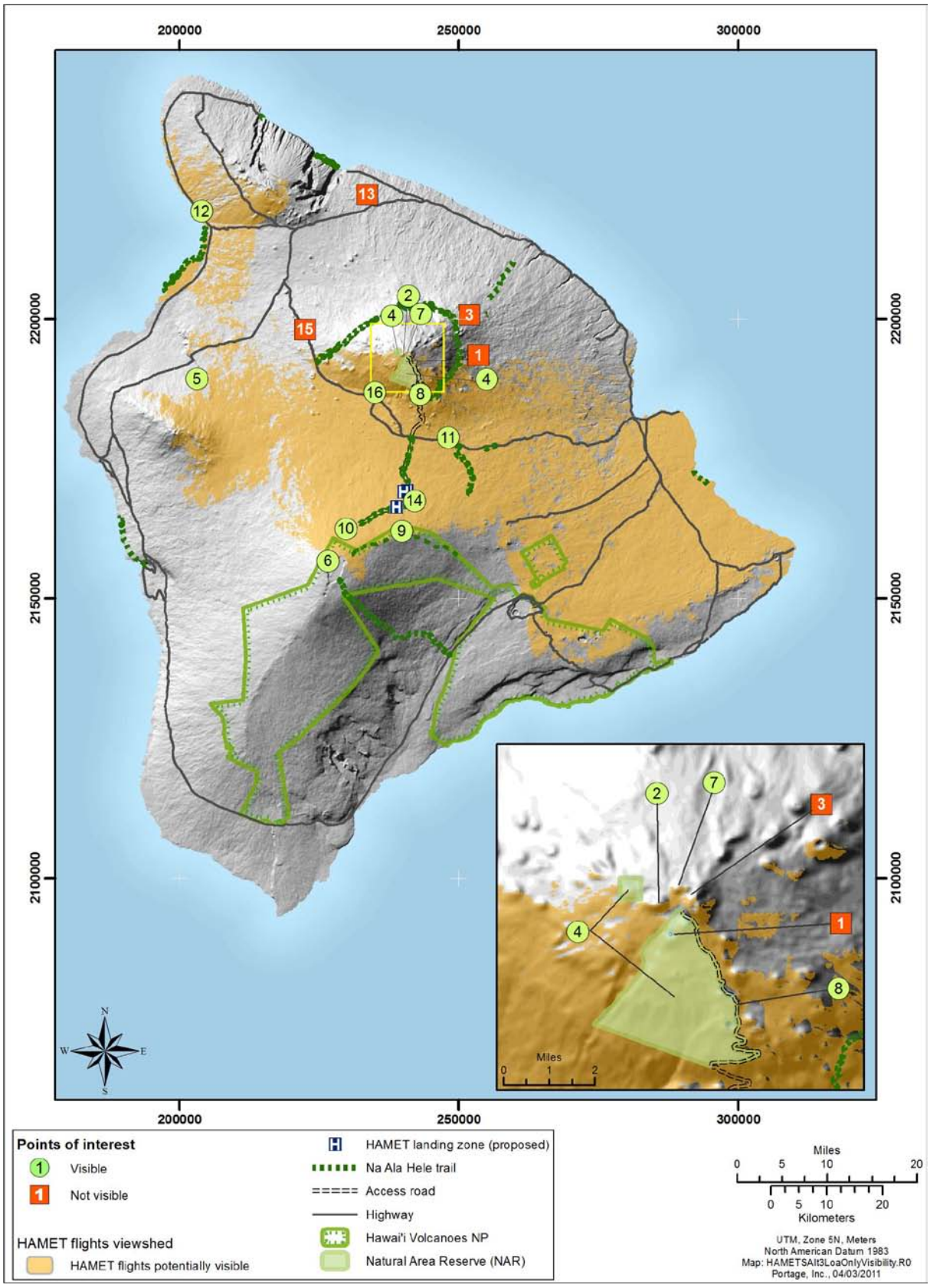

Figure 4-14. View plane analysis of Alternative 3 – Mauna Loa.

conditions occur. The numbers show the locations of the viewpoints identified in Table 4-15. For example, from Lake Waiau (Location 1), helicopters conducting HAMET would not be visible for any of the alternatives. However, a viewer from the Waikiʻi Ranch at Location 15 would not be able to see an aircraft conducting HAMET in Alternative 3 but would be able to see HAMET aircraft under Alternatives 1 and 2. Clouds, haze, trees, etc., would limit the ability to see an aircraft from many of the distant locations.

In addition to conducting a view plain analysis, photographs were taken from a vantage point on Puʻu Poliʻahu during the March 2011 HAMET. Figure 4-15 is a photograph of a Black Hawk helicopter as it approaches LZ-4. As can be seen in the photograph, the helicopter, at its nearest location to the viewer, is barely visible and only for a short time as it passes out of view.

Figure 4-15. Black Hawk helicopter flying to LZ and viewed from Puʻu Poliʻahu.

The view plain analysis shows that under ideal conditions, the potential this of a viewer to see a helicopter during HAMET from most locations is possible. However, as seen in the example photograph from the March 2011 data collection training period (Figure 4-15), it is highly unlikely that a viewer would be able to see an aircraft, unless the viewer was very near vicinity of the flight path. In addition, those sightings would be short term. For all alternatives, aircraft are not visible for the highly sensitive areas of Lake Waiau and the summit of Mauna Kea. Additionally, based on photographs, HAMET flights would be unlikely to obstruct the view of natural beauty sites within the Hamakua and North Hilo planning districts.

The visual character and quality of the areas defined by the Action Alternatives, including the proposed LZs, would not be impacted, because the Action Alternatives would not change basic land use or require any alterations to the LZs. The visual sensitivity of these areas would have less-than-significant impacts, because the areas are not identified as areas of high scenic quality (i.e., designated scenic corridors or locations) and are not readily accessible to, or used by, large numbers of people. In addition, air-quality impacts to visibility are less than significant, intermittent, and of short duration. Therefore, any impacts to visual and aesthetic resources are less than significant. The potential impacts are summarized in Table 4-16.

Table 4-16. Summary of potential impacts to visual resources.

Impact Issue	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Disturbance to visual sensitivity from rotary-wing aircraft	<SI	<SI	<SI	NI
Disturbance to landscape from rotary-wing aircraft	<SI	<SI	<SI	NI
Obstruct views of natural beauty sites	NI	NI	NI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

4.13 Human Health and Safety Hazards

Numerous federal, state, and local laws regulate the storage, use, recycling, disposal, and transportation of hazardous materials and waste. There are similar laws to prevent and abate wildfires, and the primary goal of these laws is to protect human health and safety.

Multiple LZ areas have been identified to use for high-altitude landing training activities. The environmental features and operation activities for each LZ are similar to each other, and there is no distinction between one LZ and the others for the human-health and safety-hazards discussion. Potential impacts are discussed in following subsections and summarized in Table 4-17.

There is a potential increase in human hazards to any people in the immediate vicinity of the LZ only during actual approach and landing maneuvers as part of HAMET operations.

4.13.1 Landing Zone Safety

This subsection identifies potential LZ safety impacts that may result from implementing the Action Alternatives. The pilots requiring HAMET are trained on the aircraft type being flown.

4.13.1.1 Impact Methodology. An impact is identified when the proposed training maneuvers increase the risk to human health and safety. Numerous procedures and training requirements are in place to prevent interaction of the public with military personnel during training. The primary goal of these procedures and training requirements is to protect human health and safety.

Table 4-17. Summary of potential human health and safety hazards impacts.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
LZ safety	<SI	<SI	<SI	NI
Hazardous material	NI	NI	NI	NI
Wildfires	< SI	<SI	<SI	NI
Accident/incident investigation and recovery	< SI	< SI	< SI	NI

S = Significant.
S/MI = Significant but can be mitigated to less than significant.
<SI = Less than significant.
NI = No impact.

4.13.1.2 Factors Considered for Determining Significance of Impacts. Factors considered in determining whether an alternative would have a significant impact on human health or are similar across all LZs and thus all Action Alternatives. The only hazards of consideration are when HAMET flights are being conducted. The general experience of the pilots as well as their qualifications as a proficient pilot of each aircraft type being flown are factors in determining the significance of impacts. The identified hazards during high-altitude training activities include the following:

- Noise
- Flying debris
- High elevation
- Risk of wildfire
- Operations in high wind
- Operations in extreme temperatures
- Operations at night or during low visibility
- Mechanical/moving parts.

During periods of training activities, military personnel follow standard safety procedures and practices that minimize the risks for the public. Standard procedures and practices include the following:

- Public notification of PTA training activities
- Specified mission objectives
- Mission-specific training
- Pilot and crew briefings

- Standard military safety protocol
- Equipment inspections
- GPS tracking systems
- Aircraft equipped with ABC fire extinguishers
- Mechanical shielding and operator training
- Hearing and eye protection
- Fall protection measures
- Go-around authority.

The Army's Public Affairs Office would notify the public about dates, times, and areas (possibly to include maps) that would be affected by training activities. For HAMET flights, the 25th CAB prepares the actual press release, which would be released to media outlets such as, but not limited to, newspapers, radio stations, and television stations. Press releases would possibly be re-posted by recipients to other locations, such as hunter check stations.

Regardless, it is possible that nonmilitary personnel or wildlife could be in the general area of HAMET flights. The hazards to nonmilitary personnel or wildlife in the vicinity of LZs during HAMET flights would be mitigated by the pilot conducting a reconnaissance flyover prior to conducting any HAMET maneuvers. During the reconnaissance flyover, pilots would visually inspect the LZ to ensure landing would not create an unreasonable risk to human health or safety. This procedural step would ensure that unauthorized personnel or wildlife are not exposed to the hazards associated with the training exercises.

The LZs are located such that obstructions and hazards to human health and safety and to biological species are minimized. Due to the geography and elevation of the proposed LZs, little vegetation exists in the immediate area, and wildlife is expected to be minimal. LZs for all alternatives are not located in areas where the public would be expected. Any obstructions that exist within the LZ would be associated with the LZ surface itself, such as a hole or depression, and would be clearly identified in mission plans such that pilots would be made aware of the obstructions before HAMET flights commence. Based on the methodology and factors considered, there is a less-than-significant impact to LZ safety for all Action Alternatives.

4.13.1.3 Summary of Impacts. Based on the methodology and factors considered, there is a less-than-significant impact to LZ safety for all Action Alternatives. The Action Alternatives will not be conducted if interaction with persons or wildlife in an LZ while HAMET maneuvers are being performed is suspected. Army training procedures as well as standard operational and emergency procedures minimize any impact to human health and safety in the LZ during HAMET.

4.13.2 Hazardous Material

This subsection identifies potential hazardous material and waste impacts that may result from implementing the proposed alternatives. Depleted uranium or other radiological materials will not be transported onboard aircraft participating in HAMET. In addition, aircraft are not allowed to land or conduct ground disturbance in any radiological-controlled area. Therefore, there will be no transport of

radiological particulates to the LZs. The impact analysis compares projected conditions to the affected environment and ROI described in Subsection 3.13.

4.13.2.1 Impact Methodology. Numerous federal, state, and local laws regulate the storage, use, recycling, disposal, and transportation of hazardous materials and waste. The primary goal of these laws is to protect human health and the environment. The methods for assessing potential hazardous material and waste impacts generally include the following:

- Reviewing and evaluating each of the alternatives to identify the action's potential to use hazardous or toxic substances or to generate hazardous waste, based on the activities proposed
- Comparing the location of proposed training activities with baseline data on known or potentially contaminated areas (e.g., land contaminated with unexploded ordnance)
- Assessing the compliance of each alternative with applicable site-specific hazardous material and waste management plans
- Assessing the compliance of each alternative with applicable site-specific standard operating procedures and with health and safety plans in order to avoid potential hazards
- Using professional judgment to determine whether any additional known or suspected potential hazardous material and waste impacts or concerns relate to each alternative.

4.13.2.2 Factors Considered for Determining Significance of Impacts. Regulatory standards and guidelines have been applied to determine the significance of each alternative's potential impact related to hazardous materials and waste. Factors considered in determining whether an alternative would have a significant safety hazard or hazardous-material and waste impact include the extent or degree to which its implementation would result in the following:

- Cause a spill or release of a hazardous substance, as defined by 40 CFR § 302 (CERCLA) or 40 CFR §§ 110, 112, 116, and 117 (Clean Water Act)
- Expose the environment or public to any hazardous substance through release or disposal (i.e., open-burn/open-detonation disposal of unused ordnance)
- Generate either hazardous waste or acutely hazardous waste, resulting in increased regulatory requirements over the long term or violating the standards established for the conditionally exempt small-quantity generators and the small-quantity generators
- Endanger the public or environment during the storage, transport, or use of ammunition
- Expose military personnel or the public to areas potentially containing unexploded ordnance
- Increase the risk of an accident or a release from existing or proposed vehicles, equipment, procedures, or training practices
- Contaminate soils, groundwater, or surface water with lead from ammunition (i.e., migration due to vehicle, equipment, and foot traffic on ranges, thereby increasing potential exposure to military personnel and the public)
- Cause a release of pesticides or potentially expose military personnel or the public to pesticides

- Expose military personnel or the public to polychlorinated biphenyls
- Expose the public to electromagnetic fields with cycle frequencies greater than 300 hertz
- Cause a spill or release of petroleum-based products
- Require the removal or upgrade of an underground storage tank.

4.13.2.3 Summary of Impacts. Based on the methodology and factors considered, the expulsion or release of hazardous substances is not anticipated as part of HAMET flights. Should a spill occur, defensive actions would be implemented as necessary and appropriate in accordance Army, federal, and state notification and cleanup regulations to prevent impacts on human health and the environment. The Army has determined there would be no impact from hazardous materials resulting from the Proposed Action.

4.13.3 Wildfires

No fires were reported during previous iterations of HAMET flights (U.S. Army, 2003a; U.S. Army 2004b; U.S. Army 2005a).

4.13.3.1 Impact Methodology. Potential direct impacts from wildfires include possible damage to biological and cultural resources and impairment of air quality. Examples of potential indirect impacts from wildfires include increased soil erosion due to removal of vegetation from the land and diminished water quality from water running over land cleared by fire (USAEC and COE 2009).

The potential for wildfire ignition is used as the criterion for assessing wildfire impacts, because it is possible for many fires to affect a relatively limited area, resulting in limited impacts. It is also possible for one fire to affect a large area, resulting in many impacts. Therefore, the frequency of wildfires is not used as a means for assessing the impacts of wildfires. The scenario associated with potential wildfire ignition and HAMET activities would be a helicopter crash in a vegetated area with fuel loads sufficient to carry a fire.

4.13.3.2 Factors Considered for Determining Significance of Impacts. Factors considered in determining whether an alternative would have a significant wildfire ignition potential include the extent or degree to which implementing the alternative would involve the following wildfire ignition issues:

- Historical safety record (See Section 2.5, Previous HAMET Activities and the 25th CAB)
- Operation of aircraft at high altitudes
- Occurrence of nighttime training.

The aircraft proposed for HAMET would be unarmed for HAMET flights. Onboard HAMET aircraft are two 5-lb ABC fire extinguishers to extinguish fires manually. The CH-47 and UH-60 have an on-board fire-suppression system to control engine fires. The CAB reported safe operations during previous HAMET flights (see Subsection 2.5).

4.13.3.3 Summary of Impacts. The potential ignition of a wildfire within the ROI was analyzed. Based on the methodology and factors considered, there would be less-than-significant impacts under Alternatives 1–3, because the only credible risk of a wildfire would be as the result of a crash within a

vegetated area with fuel loads sufficient to carry fire. HAMET flights are considered low risk, according to the 25th CAB Risk Assessment Worksheet (Lugo 2010), and the possibility of a wildfire as a result of a crash was determined remote. This conclusion is based on the CAB's historical safety record (see Subsection 2.5), the fact that training would be conducted outside of vegetated areas (i.e., at LZs), and the minimal flight time that would be spent over vegetated areas.

4.13.4 Hazards Associated with Incident/Accident Investigations or Recovery Activities

4.13.4.1 Impact Methodology. An impact is identified when the requirements of the Action Alternatives increase the risk to human health and safety. The risk to human health and safety is estimated and compared to the existing risk. These estimates are compared to the baseline risk to human health and safety.

4.13.4.2 Factors Considered for Determining Significance of Impacts. Factors were considered in determining whether an alternative would have a significant impact on human health and safety. These factors include the following:

- Historical safety record
- Emergency operational procedures
- Location of the alternatives.

The investigation into the history of high-altitude training at PTA indicated no accidents have taken place either at PTA or at any LZs.

The CAB has an excellent safety record, including during past HAMET flights (see Subsection 2.5). The 25th CAB has had two Class A accidents involving rotary-wing aircraft on the island of O'ahu in February 2001 and May 2009. The 2001 incident was during an air-assault training operation in the Kahuku training area, and the 2009 incident was during a general maintenance test flight on Wheeler Army Airfield. HAMET does not involve air-assault or test-flight maneuvers and is considered a low-risk mission according to the 25th CAB Risk Assessment Worksheet (IAW FM 5-19 & AR 95-1) (Lugo 2010). In the event of an incident/accident or recovery activity, military procedures for conducting these activities would be followed.

4.13.4.3 Summary of Impacts. Based on the methodology and factors considered, the Army determined there are less-than-significant impacts associated with Alternatives 1–3 because of the CAB's safety record and the low potential for future accidents.

4.14 Traffic and Circulation

Multiple LZ areas have been identified for use during high-altitude landing training activities. The environmental features and operation activities for each LZ are similar to each other, and there is no distinction between one LZ and the others for the traffic and circulation discussion. The potential impacts to traffic and circulation are shown in Table 4-18 and discussed in following subsections.

Table 4-18. Summary of potential impacts to traffic and circulation.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Land-based traffic	<SI	<SI	<SI	NI
Aerial traffic	<SI	<SI	<SI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

4.14.1 Land-Based Traffic

4.14.1.1 Impact Methodology. An impact is identified when the requirements of the proposed alternatives increase the amount of land-based traffic. There may be an increase in traffic and circulation around Bradshaw Army Airfield during HAMET flights. Additional fuel is anticipated to be needed for HAMET missions. The additional fuel would be brought in via Saddle Road. The transport of the additional fuel may increase traffic volume from the available vendor to Bradshaw Army Airfield.

4.14.1.2 Factors Considered for Determining Significance of Impacts. Factors were considered in determining whether an alternative would have a significant impact on land-based traffic. These factors include the following:

- The potential increase of personnel traffic
- The potential increase of support traffic (i.e., fuel trucks)
- Capacity of existing infrastructure (Saddle Road).

4.14.1.3 Summary of Impacts. Based on the methodology and factors considered, the Army determined there are less-than-significant impacts associated with Alternatives 1–3. There may be an increase in traffic and circulation around Bradshaw Army Airfield during HAMET flights. Additional fuel is anticipated to be needed for HAMET missions. The additional fuel would be brought in on Saddle Road. The transport of the additional fuel may increase traffic volume from the available vendor to Bradshaw Army Airfield. However, the increase is expected to be less than significant, in part due to ongoing fuel supply activities for Bradshaw Army Airfield and the surrounding areas. In addition, the Saddle Road realignment project was undertaken to handle an increase in traffic. Saddle Road is being developed to rural arterial design standards of the Hawai‘i Department of Transportation and American Association of State Highway and Transportation Officials, with a design speed of 60 mph (97 km/h). Uphill passing lanes, truck escape ramps, scenic pullouts, and military-vehicle crossings would be incorporated into the project design, as needed, to enhance safety and improve the projected level of service (DOT 2010b).

4.14.2 Aerial Traffic

4.14.2.1 Impact Methodology. An impact is identified when the requirements of the Action Alternatives increase the amount of aerial traffic in the area. The movement of aircraft to and from PTA in support of annual training would not be significantly increased by the addition of HAMET missions.

4.14.2.2 Factors Considered for Determining Significance of Impacts.

Factors were considered in determining whether an alternative would have a significant impact on aerial traffic. These factors include the following:

- The increase of aerial traffic
- Already existing traffic levels for Army operations
- Already existing civilian traffic levels (commercial and recreational flights)
- Capability of existing procedures (standard FAA flight procedures).

4.14.2.3 Summary of Impacts.

Originating from the Hilo International Airport and Kona International Airport, there are approximately 60 commercial sightseeing flights each day that may fly in or near the airspace proposed for all Action Alternatives (Munger 2010b). An unknown number of recreational pilots may also fly in or around the area. HAMET flights would increase air traffic 3% over current activity.

The pilots conducting HAMET flights follow standard FAA procedures for flights conducted in and out of controlled airspace. Airspace Mauna Kea and Mauna Loa is Class G uncontrolled airspace from surface to 1,200 ft (366 m) AGL. Pilots also use the Island Traffic Advisory Frequencies Northwest 127.05 and Southeast 122.85 to provide traffic advisories and perform airspace deconfliction with nonparticipating aircraft (DOT 2010a, p. 14). The Common Traffic Advisory Frequency (CTAF) is used for air-to-air communications for pilots flying in uncontrolled airspace. Pilots use the common frequency to coordinate their arrivals and departures safely, give position reports, and acknowledge other aircraft in the area. Use of the CTAF also provides commercial and recreational pilots information and allows them to stay clear of HAMET operations. The use of CTAF would help resolve conflicts associated with an increase in air traffic resulting from the Action Alternatives.

Based on the methodology and factors considered, the Army concluded that impacts to air traffic would be less than significant, because the overall volume of flights that HAMET would contribute (3%) would be small compared to current commercial and recreational air traffic, pilots could be redirected temporarily through FAA air traffic control, and the CTAF could be used to resolve potential conflicts in response to HAMET missions.

4.15 Utilities and Public Services

This subsection is an analysis of the potential impacts on public services and public utilities. Public services include police, fire, and emergency medical services. Public utilities include potable water, stormwater, wastewater, solid waste management, telephone, and electricity.

4.15.1 Impact Methodology

An impact is identified when the requirements of an Action Alternative increase demand on an existing public service or public utility. Analyzing a project alternative and its anticipated need for utilities and public services identifies potential impacts. When a project alternative requires additional resources of a public service or utility, the increase in demand is estimated. These estimates are compared to the capacity of the public utility to determine whether the capacity would be exceeded.

4.15.2 Factors Considered for Determining Significance of Impacts

Factors considered in determining whether an alternative would have a significant impact on public services or utilities include the extent or degree to which its implementation would do the following:

- Disrupt a public service as a result of a programmatic demand beyond the capacity of the provider
- Require a public utility service beyond the capacity of the provider to the point that substantial expansion, additional facilities, or increased staffing levels would be necessary
- Generate additional quantities of stormwater runoff that could not be disposed of by the existing drainage system.

4.15.3 Summary of Impacts for Alternatives 1–3

Impacts to utilities and public services are presented below and summarized in Table 4-19. Less-than-significant adverse impacts on law enforcement, fire protection, and emergency medical services would be expected. The increase in training activities could increase the demand for these services, but current services are adequate to accommodate such an increase. There would be no change in jurisdiction for any law enforcement agencies or fire departments (USAEC and COE 2009).

Increased training maneuvers could increase the demand for potable water at PTA, but this should not have a significant adverse impact on the potable water supply system. Water supplied to the Twin Pu‘u range location would be brought in by truck, and no wells or distribution lines would be required (USAEC and COE 2009).

The wastewater and stormwater collection and treatment systems at PTA are anticipated to have adequate capacity to handle increases in volume that could result from Alternatives 1–3 (USAEC and COE 2009).

The increased training maneuvers could result in an increase in the solid waste generated at PTA. These changes should be within the capacity of the existing waste-collection and disposal system.

The telephone systems at PTA are anticipated to have adequate capacity to handle increases in volume that could result from Alternatives 1–3.

The HELCO substation and distribution system are estimated to be adequate to supply the anticipated energy demands of the range facility. No upgrades to the existing system are anticipated.

Table 4-19. Summary of potential impacts to utilities and public services.

Impact Issues	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Police, fire, and emergency medical services	<SI	<SI	<SI	NI
Potable water	<SI	<SI	<SI	NI
Wastewater	<SI	<SI	<SI	NI
Solid waste management	<SI	<SI	<SI	NI
Telephone	<SI	<SI	<SI	NI
Electricity	<SI	<SI	<SI	NI

S = Significant.

S/MI = Significant but can be mitigated to less than significant.

<SI = Less than significant.

NI = No impact.

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5. CUMULATIVE IMPACTS

Federal and State regulations require that the cumulative impacts of a proposed action be assessed (40 CFR V §§ 1500-1508; HAR §11-200-5, -12). Cumulative impact is defined by CEQ as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions." (40 CFR V §1508.7). Cumulative impact is defined by the State of Hawaii as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (HAR §11-200-2). Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. Effects and impacts are used synonymously throughout this discussion.

In general, guidance for considering cumulative effects should compare the cumulative effects of numerous actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant. This section discusses other projects on the island of Hawai'i that may have cumulative effects when combined with impacts from the alternatives discussed in this EA. To be considered cumulative impacts, the effects must meet the following criteria: the effects would occur in a common locale or region; the effects would not be localized (i.e., they would contribute to effects of other actions); the effects would impact a particular resource in a similar manner; and the effects would be long term.

For this EA, cumulative impacts are described across the larger area of the preferred alternative, which is the maximum area proposed under the Proposed Action. Implementing HAMET is an activity that primarily occurs in the air, is of short duration, and, when in direct contact with the environment, has direct and indirect impacts that are less than significant. Additionally, the need for HAMET is a direct result of a specific military conflict (the war in Afghanistan) occurring within an environment requiring specialized high-altitude flight skills. Thus, cumulative impacts were considered throughout this area and in the time span of the identified reasonably foreseeable future actions. It was found that the incremental impacts from this action within other past, present, and foreseeable actions do not rise to the level of significant impact.

5.1 Past, Other Present, and Reasonable Foreseeable Future Actions

Past actions are described in Table 5-1. The results of past actions are reflected in the discussions of the VECs in Section 3, Affected Environment.

The projects listed in Table 5-2 are currently occurring or anticipated to occur in the reasonably foreseeable future on the island of Hawai'i. These activities largely involve Army activities at PTA and activities occurring within/involving the observatory campus. Within and around the ROI, about 36 current and reasonably foreseeable future actions were identified (Table 5-2). The results of the Army's evaluation of cumulative impacts for affected VECs are presented in the following subsections.

Table 5-1. Summary of past activities.

Activity	Location	Sponsor	Description	Dates
Adze quarry activity	Southern slopes of Mauna Kea		Radiocarbon dates from adze quarry sites document Native Hawaiian use of quarries.	1100–1800
Cattle and other ungulates graze	Mauna Kea		First cattle introduced through a gift from Captain Vancouver to Kamahameha I. Continues with cattle and sheep ranches and feral ungulates for hunting.	1793–1936 (some feral ungulates still present)
Hawai‘i Forest Reserve System established	Mauna Kea	Territory of Hawai‘i	System established to protect forests against fire and grazing – inspired by fires in Hamakua.	Established in 1903
Civilian Conservation Corps (CCC) activities	Mauna Kea	CCC	CCC plants trees and constructs horse and truck trails; trail around Mauna Kea at 7,000-ft (2133-m) elevation completed in 1935; stone cabins built at Hale Pōhaku.	1930s
Mauna Kea Forest Reserve fenced	Mauna Kea	Territory of Hawai‘i	Fence erected around the Mauna Kea Forest Reserve to keep sheep and goats out; more than 40,000 sheep and goats were exterminated within the forest reserve.	1935–1936
Mauna Kea access Jeep trail established	Mauna Kea southern slope	State of Hawai‘i	First road is bulldozed to facilitate astronomy development: originally built to support astronomical testing on Mauna Kea.	1964
University of Arizona 0.3-m Site Test Telescope	Pu‘u Poli‘ahu	University of Arizona	0.3-m site telescope; erected on Pu‘u Poli‘ahu and used intensively for a 6-month test program; all equipment was removed upon completion of testing.	1964–1964

Table 5-1. (continued).

Activity	Location	Sponsor	Description	Dates
Site testing for University of Hawai‘i 2.2-m Observatory	13N (Area E) Pu‘u Poli‘ahu and Pu‘u Kea (Area A)	University of Hawai‘i	Site testing was performed at the 13N location (the location for the Thirty Meter Telescope Observatory), Pu‘u Poli‘ahu (former location of Arizona Test Telescope), and on Pu‘u Kea (the current location of the University of Hawai‘i 2.2-m observatory). Jeep trails were built to access the test sites.	1965–1967
University of Hawai‘i 0.9-m Observatory	Astronomy Precinct, Area A	University of Hawai‘i	Observatory consisted of a 0.6-m optical telescope; was built by the U.S. Air Force and transferred to University of Hawai‘i; upgraded with a 0.9-m telescope in 2008; and is now used primarily for teaching and research by University of Hawai‘i at Hilo.	1968–present
Planetary Patrol 0.6-m Observatory	Astronomy Precinct, Area A	Lowell Observatory	Observatory consisted of a 0.6-m optical telescope; was used for long-term monitoring of the planets in the solar system until facility was removed to make way for Gemini North.	1968–1990s
University of Hawai‘i 2.2-m Observatory	Astronomy Precinct, Area A	University of Hawai‘i	Observatory consists of a 2.2-m optical/infrared telescope; was funded by National Aeronautics and Space Administration (NASA), now entirely funded and operated by the University of Hawai‘i.	1970–present
Mauna Kea access road improved	Mauna Kea southern slope		Original Jeep trail realigned to remove some sharp corners and improve access.	1975
United Kingdom Infrared Telescope	Astronomy Precinct, Area A	United Kingdom	Observatory consists of a 3.8-m infrared telescope operated by the Joint Astronomy Center with headquarters in Hilo.	1979–present
NASA Infrared Telescope Facility	Astronomy Precinct, Area B	NASA	Observatory consists of a 3.0-m infrared telescope; operated and managed by NASA.	1979–present

Table 5-1. (continued).

Activity	Location	Sponsor	Description	Dates
Canada-France-Hawai‘i Telescope	Astronomy Precinct, Area A	Canada/ France/ University of Hawai‘i	Observatory consists of a 3.6-m optical/infrared telescope; jointly funded by Canada, France, and the State of Hawai‘i through the University of Hawai‘i; headquarters located in Waimea.	1979–present
Hale Pōhaku expansion	Hale Pōhaku	University of Hawai‘i	The original construction camp, including stone cabins and temporary buildings, has been progressively upgraded and expanded to include dormitory and support facilities to accommodate astronomers and visitors to the summit of Mauna Kea.	1983–present
Mauna Kea Access road improved	Mauna Kea southern slope	State of Hawai‘i and Mauna Kea Observatories Support Services	Access road improved to allow for safer access to the summit. Portions paved and the alignment further straightened.	1985
Caltech Submillimeter Observatory (CSO)	Astronomy Precinct, Area C	Caltech/ National Science Foundation (NSF)	Observatory consists of 10.4-m millimeter/submillimeter telescope; operated by Caltech under an NSF contract and managed from CSO headquarters in Hilo.	1986–present
Installation of power and communica-tions utilities	Saddle Road to the Astronomy Precinct	University of Hawai‘i, with individual observatories	University of Hawai‘i funded the design and installation of the power and communication lines connecting the HELCO system at Saddle Road to the summit distribution loop. Lines are overhead from Saddle Road to near Hale Pōhaku and then underground from there to the summit area.	mid-1980s
Very long baseline array	Mauna Kea Science Reserve, outside Astronomy Precinct	National Radio Astronomy Observatory/ Associated Universities, Inc./NSF	25-m, centimeter-wavelength antenna; is an aperture-synthesis radio telescope consisting of 10 remotely operated antennas, funded by the NSF and managed from New Mexico.	1992–present

Table 5-1. (continued).

Activity	Location	Sponsor	Description	Dates
W. M. Keck Observatory	Astronomy Precinct, Area B	Caltech/ University of California/ California Association for Research in Astronomy (CARA)	Observatory consists of two 10-m optical/infrared telescopes, which are used individually most of the time. About 10 % of the time, they are used together as an interferometer, managed by nonprofit CARA and headquartered in Waimea.	1992 (Keck I)/ 1996 – present (Keck II)
GTE fiber optic cable installation	Saddle Road to Hale Pōhaku	Institute for Astronomy	A fiber optic telecommunications line was installed connecting the Mauna Kea observatories to the GTE Hawaiian Telephone Company fiber optic system.	1998
Subaru Observatory	Astronomy Precinct, Area B	Japan	Observatory consists of an 8.2-m optical/infrared telescope; formerly known as the Japan National Large Telescope, operated by the National Astronomical Observatory of Japan and headquartered in Hilo.	1999 – present
Gemini North Observatory	Astronomy Precinct, Area A	United States/United Kingdom/ Canada/ Argentina/ Australia/ Brazil/Chile	Observatory consists of an 8.1-m optical/infrared telescope; is the twin to the Gemini South Observatory located in Chile. NSF was the federal agency for the project and is headquartered in Hilo.	1999 – present
Jeep trail closure	Puʻu Poliʻahu	Office of Mauna Kea Management	A 300- to 400-yd (274- to 365-m) trail that extended up to Puʻu Poliʻahu was closed to vehicles to minimize disturbance of cultural sites.	2001
Submillimeter array	Astronomy Precinct, Area C	Smithsonian Astrophysical Observatory/ Taiwan	Observatory consists of eight 6-m submillimeter antennas; operated from a base facility in Hilo.	2002 – present
Proposed critical habitat	PTA	U.S. Fish and Wildlife Service	Proposal to formally designate critical habitat on the island of Hawaiʻi.	May 2003
Outrigger Telescopes Project	Mauna Kea	NASA	NASA proposes to construct, install, and operate six outrigger telescopes in the W. M. Keck Observatory at the Mauna Kea summit area.	2004–2007

Table 5-1. (continued).

Activity	Location	Sponsor	Description	Dates
Saddle Road improved	Saddle Road	Hawai‘i Department of Transport-ation	Saddle road is being realigned and improved, increasing access to Mauna Kea.	2005
High-altitude training	State of Hawai‘i land north of PTA	2-25th Aviation Regiment	2-25th Aviation Regiment established LZs to conduct high-altitude training.	2003–2006
West PTA Maneuver Training Area land acquisition	Land adjacent to PTA	U.S. Army	Proposal to acquire between 15,000 acres (6,070 hectares) and 23,000 acres (9,308 hectares) of land adjacent to PTA from Parker Ranch to be used for maneuver training.	Completed
Fixed Tactical Internet	PTA	U.S. Army	Construct vertical whip antennas at eight strategic locations, each with four antennas, on existing tower sites.	Completed
Installation Information Infrastructure Architecture (I3A)	PTA	U.S. Army	Install fiber optic cable from cantonment area to ranges, motor pool, and other facilities.	Completed
PTA improvements	PTA	25th CAB	Improvements include the construction of a four-point forward-arming and refueling point, construction of an aviation large-area maintenance shelter, and emplaced 28 “EOD-T” targets.	Completed
PTA 1010 land acquisition	PTA	U.S. Army	Land acquisition for ongoing training use.	Completed
Consolidated Command and Range Control Building	PTA	U.S. Army	Construct a consolidated command center for ongoing training.	Completed

Table 5-2. Summary of current and anticipated activities.

Project	Location	Sponsor	Project Description	Projected Completion Date
Saddle Road Realignment	Across island of Hawai‘i, near PTA	Federal Highways Administration, State of Hawai‘i	Improving and modifying (realignment of) Saddle Road from Hilo to Kona.	2010–2015 (Phased in over many years)
Kawaihae/ Waimea Road	Waimea Park to Merriman’s (near Kawaihae Harbor)	State of Hawai‘i	Conduct minor resurfacing and improvements on existing roadway and potentially provide right-of-way for roadway replacement.	Unknown
Waimea to Kawaihae Highway	South Kohala	Federal Highways Administration	Conduct highway improvements along 14 miles (23 kilometers) of existing roadway.	2009–2010
Former Waikoloa Maneuver Area and Nansay Unexploded Ordnance Cleanup	Hawai‘i, Former Waikoloa Maneuver Area and Nansay Combat Range	U.S. Army Corps of Engineers	Unexploded ordnance cleanup on lands used by Navy and Marine Corps for artillery and Navy gun fire, troop maneuvers, and weapons practice.	2015
Battle Area Complex	PTA	U.S. Army	Proposal to construct the Battle Area Complex at existing Range 12 for company gunnery training and qualification requirements of selected weapons systems and to support mounted and dismounted infantry platoon tactical live-fire operations.	2012
Military Vehicle Trail with Easement	PTA-Kawaihae	U.S. Army	Acquire easement and construct a new 27-mile (43-kilometer) roadway from Kawaihae Harbor and PTA for use by military vehicles.	Suspended

Table 5-2. (continued).

Project	Location	Sponsor	Project Description	Projected Completion Date
Ammunition Storage	PTA	U.S. Army	Proposal to construct three new earth-covered ammunition bunkers (igloos), totaling 6,750 ft^2 (627 m^2), within the existing ammunition storage facility.	2012
Tactical Vehicle Wash Facility	PTA	U.S. Army	Proposal to construct a tactical vehicle wash facility with four wash stations.	2012
Range Maintenance Facility	PTA	U.S. Army	Proposed construction of a 15,145-ft^2 (1,407-m^2) consolidated range maintenance complex on a previously developed site in a PTA cantonment.	2015
Runway Upgrade/ Extension, Bradshaw Army Airfield	PTA	U.S. Army	Proposed construction of an 18,667-ft (5,700-m) long, paved runway with 1,000-ft (300-m) long paved runway overrun areas on each end, plus an operations complex to support runway activity.	Speculative
Implementation of the Integrated Wildfire Management Plan	PTA	U.S. Army	Implement specific guidance, procedures, strategies, and protocols to prevent and suppress wildfires and manage fuel loads.	Ongoing
Thirty-Meter Telescope Observatory	13N site in Area E		Thirty-Meter Telescope Observatory will be built and operated at the 13N site in Area E. It will be decommissioned at the end of its life.	Unknown
Accessway to the Thirty-Meter Telescope Observatory	Between 13N site in Area E and the Mauna Kea Access Road Loop		An accessway will be built to allow access to the Thirty-Meter Telescope Observatory. It will be decommissioned at the end of its life.	Unknown

Table 5-2. (continued).

Project	Location	Sponsor	Project Description	Projected Completion Date
Panoramic Survey Telescope and Rapid Response System (Pan-STARRS)	Area A		Pan-STARRS would replace the existing University of Hawai‘i 2.2-m telescope in Area A. It would consist of four 1.8-m telescopes within a single enclosure. Pan-STARRS would be able to observe the entire available sky several times during the dark portion of each lunar cycle. It would enable remote and/or robotic operation.	Unknown
Smithsonian Astrophysical Observatory	Areas C and/or D		Smithsonian Astrophysical Observatory is considering adding two antenna pads and one antenna to the existing 24-pad, eight-antenna submillimeter array system.	Unknown
Caltech Submillimeter Observatory Decommission	Area C		Decommissioning and removal of the Caltech Submillimeter Observatory.	Unknown
Paving Mauna Kea Access Road	Hale Pōhaku		Paving of the remaining dirt portions of the Mauna Kea access road.	Unknown
Infantry Platoon Battle Area and PTA Modernization	PTA	USAG-HI and U.S. Army Pacific	Construct and use an infantry platoon battle course and a military-operations-in-urban terrain and shoot house, and modernize range and cantonment facilities.	2013–2022
U.S. Marine Corps MV-22 and Cobra Attack Squadron Training at PTA	PTA	U.S. Marine Corps	Conduct periodic U.S. Marine Corps training requirements.	Ongoing from 2013

Table 5-2. (continued).

Project	Location	Sponsor	Project Description	Projected Completion Date
Implementation of the Pōhakuloa Training Area Implementation Plan	PTA	U.S. Army	Implement specific guidance, procedures, strategies, and protocols to protect and enhance endangered species habitat and populations.	Ongoing

5.2 Climate and Air Quality

Air quality around PTA is generally good. Federal ozone standards have not been exceeded in Hawai‘i during the past decade despite the cumulative emissions from highway traffic, commercial and military aircraft operations, commercial and industrial facility operations, agricultural operations, and construction projects in both urban and rural areas (USAEC 2008). The Action Alternatives would do little to alter overall vehicle traffic or air traffic activity on Hawai‘i; therefore, air quality impacts are not expected to increase. Given historical air quality conditions, the cumulative impact of emissions associated with the Action Alternatives, in combination with other construction projects and continuing emissions from highway traffic and other sources, is not expected to violate state or federal ozone or PM_{10} standards (USAEC 2008). Consequently, the Army concludes that the cumulative air quality impacts on ozone or other secondary pollutants would be less than significant under the Action Alternatives, and that these Action Alternatives, when considered in combination with other past, present, and reasonably foreseeable future actions, would not be cumulatively significant.

5.3 Geology, Soils, and Topography

Within the Mauna Kea Summit Region, most of the changes associated with local geology are due to wind; movement of ice, snow, and water; and human activity (University of Hawai‘i 2010). The main human activities that disturb cinder and other geologic features include road grading and travel by vehicles, hiking, off-road vehicle use (now prohibited), and activities associated with infrastructure improvements. Most of these disturbances have taken place at or near the observatory areas. Following the construction of the Mauna Kea Access Road, erosion of materials next to the roadway has been an issue during heavy rainfall or rapid snowmelt.

Reasonably foreseeable future activities would involve construction of facilities, construction of roadways, and use of vehicles during operations. Large construction projects, including road construction projects listed in Table 5-2, are examples of potential slope stability-, geology-, and soil-disturbing projects that could contribute to cumulative impacts, primarily due to alteration of the cinder cone morphology. However, the Army concludes that the Action Alternatives do not contribute to slope-stability or geology-disturbing direct or cumulative impacts and contribute only negligibly to cumulative soil disturbance, because existing LZs would be used.

5.4 Water Resources

The drainage patterns have been minimally impacted by the past developments (University of Hawai‘i 2010). On the cinder cones, the introduction of impervious surfaces has not resulted in surface runoff, because the cinder is so porous it has the capacity to absorb water more quickly than the rate of

precipitation. Access roads and paved surfaces have slightly altered the path of natural surface runoff; the resulting erosion and deposition of materials are minor.

The lack of surface water combined with the permeability of the lava rocks reduces the potential for cumulative impacts to surface water resources. Because groundwater exists far below ground surface at the LZs, the potential for cumulative impacts is negligible. Because the Action Alternatives do not pose impacts to water resources directly or indirectly, the Army concludes that the Action Alternatives, when considered in combination with other past, present, and reasonably foreseeable future actions, would not result in cumulative impacts.

5.5 Biological Resources

Past actions within or near the ROI have had significant impacts on the biological resources. Agriculture, land use, military activities, and public works projects have all had some impact on biological resources in the past. The impacts include loss of native habitat from land clearing for agriculture and wildland fires that have caused declines in populations such as the palila and Hawaiian mint (*Haplostachys haplostachya*). The Mauna Kea silversword has experienced population declines due to grazing by introduced ungulates. The nēnē had experienced a population decline until the 1950s, from recreational activities and habitat loss. These past activities have contributed to these species being designated as threatened and endangered. The nēnē has since experienced recovery on Hawaii Island due to successful management efforts. The nēnē population on Hawaii Island now numbers approximately 500. The status of the Hawaiian Hoary Bat as a federally-listed endangered species is equivocal. Data from the Pohakuloa Natural Resources Office indicates that bats are ubiquitous in the saddle region. There are informal discussions amongst the conservation and regulatory communities that the status of the bat may require revision. These discussions are preliminary at this time.

Current and future actions may contribute to the impacts that are affecting the biological resources within the ROI. Current and future actions include road maintenance near the PCH, construction activities, and military activities in habitats that contain sensitive species. The Action Alternatives include existing conservation measures to mitigate the direct and indirect impacts to PCH and sensitive species habitats. Because of the measures in place, the Army concludes that the cumulative impacts on PCH or other sensitive species habitats would be either no impact or less than significant under the Action Alternatives, and that these Action Alternatives, when considered in combination with other past, present, and reasonably foreseeable future actions, would not be cumulatively significant.

5.6 Cultural Resources

In ancient times, human activities in the mountain lands of the island of Hawai‘i were mainly for religious or resource-procurement purposes. Hawaiians gathered tool-making materials at stone quarries, caught birds for sustenance and feathers, and buried the dead. Trees were harvested for canoes and *heiau* images, and other plants were gathered for medicine, ritual practice and personal adornment. Hawaiians took the umbilical cords and afterbirth of infants to Mauna Kea either for placement in Lake Waiau or for burial on the mountain. Oral traditions indicate that battles were fought in the area between the chiefs of different districts. Natural resources of importance to Native Hawaiians were impacted beginning in the late-1700s by feral sheep, goat, and cattle grazing. Development of astronomical observatories began at the mountains' summits in the mid-1900s. The associated infrastructure has had lasting impacts on the island's cultural resources. U.S. military use of the Hawaiian Islands began in the late 1800s and continues today. Currently, there are several military installations on the Big Island: Bradshaw Army Airfield, Kilauea Military Camp, Keaukaha Military Reserve, Kawaihae Military Reserve, and PTA.

Tourists and recreationists from around the world have traveled to the island of Hawai‘i to experience its scenic beauty and vistas from the ground, sea, and air (University of Hawai‘i 2009, p. 6-1).

Future activities include the possibility of construction of new astronomical observatories and modifications, including possible expansions, demolitions, and replacements of existing observatories and other scientific research structures. Possible construction activities related to visitation include expansion of visitors' centers, parking areas, rest areas, and scenic lookouts (University of Hawai‘i 2009, pp. 6-8 and 6-11). In addition, military training in the area may continue to accelerate and may result in construction of new, or modifications to existing, infrastructure. If practitioners perceive disruptions from increases in audio and visual impacts from these activities during practices or if practitioners have access increasingly restricted, adding to areas that are currently restricted or even made temporarily restricted, these restrictions and disturbances would be considered cumulative impacts.

Additionally, the cumulative impact of past and possible future activities that is related to direct alteration or destruction of archaeological sites and the character and setting of places of religious and cultural importance to Native Hawaiians would be considered adverse and significant. However, the Army has concluded that the cumulative impacts associated with the Action Alternatives would be less than significant, and that these Alternatives, when considered in combination with other past, present, and reasonably foreseeable future actions, would not be significant, because access would not be restricted, flights would avoid known cultural resources, noise modeling showed insignificant impacts, the LZs have no historic properties to alter or destroy and the training would be infrequent and sporadic and leave no lasting impression on the landscape.

5.7 Land Use and Recreation

Construction and operation of the observatories and access roads have been consistent with state and local land use policies and land use designations (University of Hawai‘i 2010). Each of the existing observatories underwent required permitting processes and reviews. Therefore, past development does not conflict with existing land use plans or policies.

Large construction projects, including road construction projects listed in Table 5-2, are examples of potential alterations to land use that could contribute to cumulative impacts and that could be cumulatively significant. However, the Army concludes that the Action Alternatives do not contribute to land use alterations and thus not to cumulative impacts, because no changes to existing land use would occur. The Action Alternatives also do not alter use of land for recreation and thus do not cumulatively impact recreation.

5.8 Noise

Noise effects from proposed helicopter training operations would be intermittently audible in areas near Bradshaw Army Airfield and PTA and in the vicinity of the Mauna Kea and Mauna Loa LZs. Worst-case noise levels were assessed using DoD's NoiseMap model (Subsection 4.11.1). Modeling results demonstrated average noise levels (DNLs) for training operations would be compatible with existing land uses near the LZs when PCH mitigation measures were followed. These noise levels are considered less than significant. While noise sensitivity is species specific and varies among individuals within each species, average noise levels for the combination of any of the Action Alternatives with existing and future noise sources are unlikely to cause excessive disruption or annoyance in noise-sensitive locations in or near the ROI. Thus, the Army concludes that the cumulative noise impacts associated with implementing any of the Action Alternatives would be negligible.

5.9 Visual and Aesthetic Resources

The visual character and quality of the areas encompassed by the LZs would not be impacted, because the Action Alternatives would not change basic land use or require any alterations to the LZs. The visual sensitivity of these areas would have less-than-significant impacts, because the areas are not identified as areas of high scenic quality (i.e., designated scenic corridors or locations), are not readily accessible, or are not used by large numbers of people, and air quality impacts to visibility are less than significant, intermittent, and of short duration. Therefore, the Army concludes that any cumulative impacts to visual and aesthetic resources as a result of implementing any of the Action Alternatives, in combination with other past, present, and reasonably foreseeable future actions, would not be cumulatively significant.

5.10 Utilities and Public Services

During periods of HAMET activity, the need and use of utilities and public services, such as wastewater and stormwater collection and treatment systems at PTA, telephone systems, water- and energy-distribution systems, and law-enforcement, fire-protection, and emergency-medical services, would be expected to increase; however, these increases are anticipated to be within the current capacity of all systems. As a result of implementing any of the Action Alternatives, in combination with other past, present, and reasonably foreseeable future actions, the increases would not be cumulatively significant.

5.11 Traffic and Circulation

During periods of HAMET activity, the incremental increase to air traffic by HAMET is 3% over current levels (Munger 2010b). This increase is not cumulatively significant. Vehicle ground traffic is not expected to increase as a result of the proposed action (because there is no land vehicle support) therefore cumulatively significant impacts are not anticipated.

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6. CONCLUSIONS

This section presents conclusions of the environmental consequences analysis (Section 4) of the Action Alternatives and the No Action Alternative (Table 6-1).

Table 6-1. Summary of overall impacts.

Resource Area/Impacts	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Climate	NI	NI	NI	NI
Air Quality				
PM_{10} emissions	<SI	<SI	<SI	NI
Pollutant emissions	<SI	<SI	<SI	NI
Geology and Topography	NI	NI	NI	NI
Soils				
Results in substantial soil loss (e.g., through increased erosion) or terrain modification (e.g., altering drainage patterns through large-scale excavation, filling, or leveling)	NI	NI	NI	NI
Results in soil or sediment contamination exceeding regulatory standards or other applicable or relevant human-health or environmental-effects thresholds	NI	NI	NI	NI
Adversely alters existing geologic conditions or processes such that the existing or potential benefits of the geologic resource are reduced	NI	NI	NI	NI
Results in soil dispersion from helicopter-generated winds; causes soil compaction from helicopters landing on the soil	<SI	<SI	<SI	NI
Water Resources				
Degrades water quality in a manner that would reduce the existing or future beneficial uses of the water	<SI	<SI	<SI	NI

Table 6-1. (continued).

Resource Area/Impacts	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Substantially increases risks associated with human health or environmental hazards	NI	NI	NI	NI
Reduces the availability of, or accessibility to, one or more of the beneficial uses of a water resource	NI	NI	NI	NI
Alters water movement patterns in a manner that would adversely affect the uses of the water within or outside the ROI	NI	NI	NI	NI
Is out of compliance with existing or proposed water quality standards or requires an exemption from permit requirements in order for the project to proceed	NI	NI	NI	NI
Biological Resources – Endangered and Threatened Species				
Impacts to endangered and threatened species from helicopter-caused fire	<SI	<SI	<SI	NI
Impacts to endangered and threatened species from nonnative species	<SI	<SI	<SI	NI
Impacts to endangered and threatened species from noise	<SI	<SI	<SI	NI
Impacts to endangered and threatened species from aircraft collisions	<SI	<SI	<SI	NI
Impacts to endangered and threatened species from wind from helicopters	NI	NI	NI	NI
Biological Resources – Sensitive Species				
Impacts to sensitive species from helicopter-caused fire	NI	NI	NI	NI
Impacts to sensitive species from nonnative species	<SI	<SI	<SI	NI
Impacts to sensitive species from noise	<SI	<SI	<SI	NI

Table 6-1. (continued).

Resource Area/Impacts	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Impacts of sensitive species from aircraft collisions	<SI	<SI	<SI	NI
Impacts to sensitive species from wind from helicopters	NI	NI	NI	NI
Biological Resources – Other Vegetation and Wildlife Species				
Impacts to other vegetation and wildlife species from helicopter-caused fire	<SI	<SI	<SI	NI
Impacts to other vegetation and wildlife species from nonnative species	<SI	<SI	<SI	NI
Impacts to other vegetation and wildlife species from noise	<SI	<SI	<SI	NI
Impacts to other vegetation and wildlife species from aircraft collisions	<SI	<SI	<SI	NI
Impacts to other vegetation and wildlife species from wind from helicopters	NI	NI	NI	NI
Cultural Resources				
Cultural resources – inadvertent landings resulting in the physical destruction, damage, or alteration of all or part of the property	NI	NI	NI	NI
Beliefs/practices – access restrictions that could isolate the property or alter the character of the property's setting when that character contributes to the property's qualifications for the NRHP	<SI	<SI	<SI	NI

Table 6-1. (continued).

Resource Area/Impacts	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Beliefs/practices – introduction of visual, audible, or atmospheric elements due to the presence of military aircraft that could impact the quality or frequency of cultural practices and beliefs. For some native Hawaiians, any flights in the vicinity of Mauna Kea or Mauna Loa will be perceived as causing significant impacts. However, alternative design features and mitigations lessen the level of significance.	<SI	<SI	<SI	NI
Beliefs/practices – introduction of visual, audible, or atmospheric elements due to the presence of military aircraft that could impact the quality or frequency of cultural practices and beliefs. Native Hawaiians who believe that cultural practices can exist along side with secular activities will see that compliance with regulations and careful planning and implementation can ensure less-than-significant impacts to the culturally significant lands.	<SI	<SI	<SI	NI
Socioeconomics and Environmental Justice	NI	NI	NI	NI
Economic development	NI	NI	NI	NI
Protection of children	NI	NI	NI	NI
Environmental justice	NI	NI	NI	NI
Land Use				
Curtails the range of beneficial uses of the environment	NI	NI	NI	NI
Involves substantial secondary impacts, such as population changes or effects on public facilities	NI	NI	NI	NI
Conflicts with existing or planned land uses on or around the site	NI	NI	NI	NI

Table 6-1. (continued).

Resource Area/Impacts	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Conflicts, or is incompatible, with the objectives, policies, or guidance of state and local land use plans	NI	NI	NI	NI
Conflicts, or is incompatible, with acceptable use governed by NNL status for Mauna Kea	NI	NI	NI	NI
Recreation				
Curtails the range of recreational uses of the environment	NI	NI	NI	NI
Substantially affects scenic vistas and view planes identified in county or state plans or studies	<SI	<SI	<SI	NI
Disrupts recreational use of land-based resources, such as parks or recreational paths, or interferes with the public's right of access	<SI	<SI	<SI	NI
Prevents long-term recreational use or use during a peak season or impedes or discourages existing recreational activities	<SI	<SI	<SI	NI
Noise				
Noise – wildlife	<SI	<SI	<SI	NI
Noise – humans	<SI	<SI	<SI	NI
Visual and Aesthetic Resources				
Disturbance to visual sensitivity from rotary-wing aircraft	<SI	<SI	<SI	NI
Disturbance to landscape from rotary-wing aircraft	<SI	<SI	<SI	NI
Obstruction of views of natural beauty sites	NI	NI	NI	NI
Human Health and Safety Hazards				
LZ safety	<SI	<SI	<SI	NI
Hazardous material	NI	NI	NI	NI
Wildfires	<SI	<SI	<SI	NI
Accident/incident investigation and recovery	<SI	<SI	<SI	NI

Table 6-1. (continued).

Resource Area/Impacts	Alternative 1 – Mauna Kea/ Mauna Loa	Alternative 2 – Mauna Kea	Alternative 3 – Mauna Loa	No Action Alternative
Traffic and Circulation				
Land-based traffic	<SI	<SI	<SI	NI
Aerial traffic	<SI	<SI	<SI	NI
Public Services and Utilities				
Police, fire, and emergency medical services	<SI	<SI	<SI	NI
Potable water	<SI	<SI	<SI	NI
Wastewater	<SI	<SI	<SI	NI
Solid waste management	<SI	<SI	<SI	NI
Telephone	<SI	<SI	<SI	NI
Electricity	<SI	<SI	<SI	NI

NI = No impact.

<SI = Less than significant.

S/MI = Significant but can be mitigated to less than significant.

S = Significant.

6.1 Conclusions from No Action Alternative

The impact analysis of the No Action Alternative resulted in the following findings:

- Impacts to climate and air quality are not anticipated under the No Action Alternative. The alternative would not change current climate or air quality conditions.
- Impacts to geology or soils are not anticipated under the No Action Alternative. The alternative would not alter the current physical state of the environment.
- Impacts to biological or cultural resources are not anticipated under the No Action Alternative. The alternative would not alter the current state of these resources.
- Impacts to sociological resources, economic resources, environmental justice, and environmental health effects on children are not anticipated under the No Action Alternative. The alternative would not alter the current state of the current conditions.
- Impacts on noise or visual and aesthetic resources are not anticipated under the No Action Alternative. Noise levels, visual character, visual quality, and sensitivity levels would remain as described in Section 3.
- Impacts to human health and safety, traffic and circulation, public services, and utilities are not anticipated under the No Action Alternative. These VECs would remain as described in Section 3.

The No Action Alternative would result in no changes in the existing environment. The No Action Alternative would be impracticable, undesirable and costly when trying to capture the training needs of new pilots assigned to the CAB during this time and those pilots who need to conduct additional training to meet the advanced requirement. The perstempo would create an additional 45 days away from Families prior to the upcoming year-long deployment and helicopters and maintenance crews will spend additional time on the mainland resulting in higher costs to the taxpayer. Furthermore, this would leave the DoD stationed in Hawai‘i at a disadvantage with no home station training similar to the type of environment the unit will experience in Afghanistan. Familiarity with this specialized high altitude environment is critical to save the lives of our 25th CAB aircrews and the Soldiers they transport when operating in support of Operation Enduring Freedom in Afghanistan.

6.2 Conclusions from Alternatives 1–3

The impact analysis of Alternatives 1–3 resulted in the following findings:

- Impacts to climate are not anticipated under Alternatives 1–3. The climate at the proposed LZs, and the island of Hawai‘i overall, would remain cool and tropical (upper montane to alpine), with no impacts on average temperatures, rainfall, or wind patterns.

- Impacts to air quality under Alternatives 1–3 are anticipated to be less than significant. Based on modeling, the impact of fugitive dust from helicopter activity on either Mauna Loa or Mauna Kea LZ areas would be less than significant. The maximum concentration at 1,093 yd (1,000 m) away from the center of the LZ(s) is less than 17.98 $\mu g/m^3$, which is below the state and EPA emission standards.

- Impacts to land use, geology, and topography are not anticipated under Alternatives 1–3. Basic land use would not change with the Alternative Actions. The Proposed Action does not involve acquiring land or rezoning land for use, and, as such, the Proposed Action and the use of the LZs would not result in any changes of current or planned land uses or zonings. There would be no impact to geology or topography, because no further construction to the LZs would be required.

- Impacts to recreation are not anticipated under Alternatives 1–3. Overflights may be perceived as a slight noise and visual distraction by people in the immediate area of any of the Action Alternatives, but HAMET would not significantly impact or result in the cessation of any recreational activities or access to them, including Mauna Loa Observatory Access Road, Saddle Road, and Mauna Kea Summit Access Road.

- Impacts to soils are anticipated to be less than significant under Alternatives 1–3. The soils present may be compacted or crushed by the weight of the helicopter. However, the soils are very resilient to wind forces, and fugitive dust has been modeled to be below state and EPA emission standards.

- Impacts to water resources are anticipated to be less than significant under Alternatives 1–3. No impacts to surface water are expected as a result of the Alternative Actions, because there are no perennial streams or other surface water resources that could potentially be affected. The only potential, but unlikely, impact to groundwater would be contamination of an aquifer through an unlikely spill.

- Impacts to biological resources are divided between endangered and threatened species, sensitive species, and other vegetation and wildlife species for Alternatives 1–3. The impacts to endangered and threatened species are anticipated to be less than significant. In February, March, May and

June 2011, presence surveys for vegetation, birds, bats, and arthropods were conducted at the proposed LZs on Mauna Kea and Mauna Loa. The surveys were conducted by the Army and the Center for Environmental Management of Military Lands (CEMML). Vegetation surveys were conducted to determine the presence of listed species near the LZs, and no listed species were located within a 328-ft (100-m) radius of the LZs (Peshut and Evans 2011). The nearest known population of silversword is located 2,500 meters (8,202 ft) west of Mauna Kea LZ-5. Surveys for birds occurred within a 2,000-ft (610-m) buffer around each LZ and generally observed limited resources for bird habitat near the LZs, which would limit bird occurrence near those areas (Peshut and Schnell 2011a). The survey for bats concluded that there is little vegetation near the LZs or in the general region of the LZs where the Hawaiian hoary bats can roost (Peshut and Doratt 2011a). Surveys for arthropods near the LZs on Mauna Kea found no wekiu bugs or invasive ants (Peshut and Doratt 2011b; Peshut and Doratt 2011c). There are no identified active dark-rumped petrel breeding colonies near (within the 2000-ft radius survey area) the Mauna Kea and Mauna Loa LZs (Peshut and Schnell 2011a; Peshut and Schnell 2011b). There are no identified active ***band-rumped storm petrel*** breeding colonies near (within the 2000-ft radius survey area) the Mauna Kea and Mauna Loa LZs (Peshut and Schnell 2011a; Peshut and Schnell 2011b). The impacts to sensitive species are anticipated to be less than significant due to the likelihood that sensitive species are not located near the proposed LZs. The impacts to other vegetation and wildlife species are expected to be less than significant because of the measures in place to reduce the impacts from invasive species, noise, and collisions. As a whole, impacts to biological resources would be less than significant.

- Impacts to cultural resources are divided between direct, indirect, and cumulative impacts for Alternatives 1–3. There are no direct impacts to cultural resources from HAMET activities, because the flight paths have been designed to avoid known cultural resources and there are no cultural resources in and directly around the LZ. Indirect and cumulative impacts relating to cultural beliefs and practices are determined to be less than significant, because access will not be restricted and flight paths have been designed to avoid cultural resources and ensure accuracy of landings. The training will be infrequent and the impacts temporary, with no lasting effects on the landscape.

- Impacts to sociological resources, economic resources, environmental justice, and environmental health effects on children are not anticipated under Alternatives 1–3. The alternatives would not alter the current state of the current conditions described in Section 3.

- Impacts from noise on humans are not anticipated under Alternatives 1–3. The anticipated noise levels are acceptable for current land uses in these areas. The noise sampling results did not measure the maximum decibel level discernable above background levels for areas of concern to cultural practitioners or recreationists. Impacts from noise on wildlife would be less than significant under Alternatives 1–3. While noise sensitivity is species specific and varies among individuals within each species, average noise levels for the combination of any of the Action Alternatives with existing and future noise sources are unlikely to cause excessive disruption or annoyance in noise-sensitive locations. The noise could impact sensitive species by causing the wildlife to flee the area and interrupting life-cycle events like breeding; however, wildlife activities return to normal when the disturbance is over, and wildlife often adapt to the frequent noise. Design features of the alternatives (e.g., flight-corridor and minimum-elevation requirements through the flight corridor) also result in a less-than-significant determination.

- Impacts to visual and aesthetic resources are anticipated to be less than significant under Alternatives 1–3. The visual sensitivity associated with HAMET would have less-than-significant

impacts, because the areas are not identified as areas of high scenic quality and are not readily accessible to, or used by, large numbers of people. HAMET flights would be unlikely to obstruct a one's view of natural beauty sites within the Hamakua and North Hilo planning districts. In addition, air-quality impacts to visibility are less than significant, intermittent, and of short duration.

- Impacts to human health and safety are anticipated to be of no impact for hazardous materials under Alternatives 1–3. A less-than-significant determination has been made for the remote possibility of a crash that results in wildfire in vegetation that could sustain a wildfire. There is no such habitat at the LZs. A less-than-significant determination was made for LZ safety, because it is possible, but highly unlikely, for the public to be in the vicinity of operations. A less-than-significant determination was made for accident/incident investigation and recovery because of the CAB's safety record and the low potential for future accidents.

- Impacts to traffic and circulation are anticipated to be less than significant under Alternatives 1–3. Impacts to air traffic would be less than significant because of the small volume of commercial and recreational air traffic involved and the ability for recreational pilots to be redirected temporarily through air traffic control and use of CTAF in response to HAMET missions.

- Impacts to public services and utilities are not anticipated under Alternatives 1–3. No activities at the LZs would require public services or utilities. While HAMET could marginally increase the demand for public services at PTA, current services are adequate to accommodate such an increase.

6.3 Conservation Recommendations

Conservation recommendations, such as mitigations and best management practices, for the Action Alternatives are shown in Table 6-2. The table shows the means by which the recommendations would be implemented.

Table 6-2. Conservation recommendations.

Recommendation Type	Action Alternative	Law or Policy	Standard Operating Procedure	Conservation Measure	Best Management Practice
General					
Non-permanent markings would be used to identify LZs during training. LZs would be cleared of all markings after completion of HAMET.	1, 2, 3		X		
Have firefighting resources on standby while training, and have transportation available for firefighting personnel.	1, 2, 3		X		
Notify Mauna Loa Observatory air-quality instrumentation personnel prior to conducting HAMET missions (requested by NOAA personnel).	1, 3				X
Notify the general public, through press releases, of training schedules.	1, 2, 3				

Table 6-2. (continued)

Recommendation Type	Action Alternative	Law or Policy	Standard Operating Procedure	Conservation Measure	Best Management Practice
Biological Resources					
Maintain a minimum altitude of 2,000 ft (610 m) in the flight corridor (when flying over the PCH).	1, 2		X		
Inspect the exterior of the aircraft and clean and apply pesticides and herbicides as required to reduce the potential for spread of invasive species.	1, 2, 3		X		
Inpsect the landing pads at Bradshaw Air Field and apply pesticide to eliminate the threat of invasive ants spreading to LZ areas.	1,2,3				
Cultural Resources					
Continue to participate in open communication with Native Hawaiians, other land use groups, and other interested parties to evaluate resources and reduce impacts.	1, 2, 3				X
Avoid close hovering over potential cultural features in the vicinity of the LZ's	1,2,3				
Conduct cultural awareness training for all HAMET personnel, with particular emphasis on intangible resources and their importance to Native Hawaiians.	1, 2, 3		X		

7. CONSULTATION AND COORDINATION

Table 7-1 lists persons who were contacted or consulted for information to develop this EA.

Table 7-1. Persons and agencies contacted or consulted.

Contact	Title/Role and/or Organization
Kahu Ku Mauna The Office of Mauna Kea Management, 640 N. Aohoku Place, Room 203, Hilo, HI 96720	Advises the Mauna Kea Management Board, Office of Mauna Kea Management (OMKM), and University of Hawai‘i, Hilo, Chancellor in Hawaiian cultural matters affecting the Mauna Kea Science Reserve
William J. Aila Jr., Kalanimoku Building 1151 Punchbowl Street, Room 227 Honolulu, HI 96813	Chairperson, Board of Land and Natural Resources State Historic Preservation Officer
David A. Conner NASA Langley Research Center, Mail Stop 461 2 North Dryden Street Hampton, VA 23681-2199	Flight Acoustics Group, Leader/Noise Modeling Subject Matter Expert, NASA
Paul J. Conry 1151 Punchbowl Street, Room 325 Honolulu, HI 96813	Administrator, Division of Forestry and Wildlife
Joseph Czech Wyle Laboratories 128 Maryland Street El Segundo, CA 90245	Principal Engineer/Noise Modeling Subject Matter Expert, Wyle Laboratories
Theresa Dunham Hawai‘i State Historic Preservation Division Kakuhihewa Building 601 Kamokila Blvd., Suite 555 Kapolei, HI 96707	Acting Archaeology Branch Chief, Hawai‘i State Historic Preservation Division
Frank Hays Pacific West Region 300 Ala Moana Blvd., Box 50165 Room 6-326 Honolulu, HI 96850-0053	Pacific Area Director, National Park Service
Jacqui Hoover Hawai‘i Innovation Center at Hilo 117 Keawe Street Hilo, HI 96720-2811	Hawai‘i Island Economic Development Board
Jacqui Hoover Hale Kea Office Building 65-1410 Kawaihae Road Kamuela, HI 96743	Hawai‘i Leeward Planning Conference

Table 7-1. (continued).

Contact	Title/Role and/or Organization
Roger Imoto Department of Land and Natural Resources 19 E. Kawili Street Hilo, HI 96820	Department of Forestry and Wildlife Hawai‘i Branch
Loyal Mehrhoff Pacific Islands Office 300 Ala Moana Boulevard Room 3-122, Box 50088 Honolulu, HI 96850	Field Supervisor, U.S. Department of Interior Fish and Wildlife Service
Bill Moore Civilian Aides to the Secretary of the Army, CASA 59 916 Kohala Ranch Road Kamuela, HI 96743	Liaison between the Army and the civilian community
Stephanie Nagata Office of Mauna Kea Management 640 N. Aohoku Place Hilo, HI 96720	Interim Director, Mauna Kea Management and Observatories
Rob Pacheco Board of Land and Natural Resources 74-5035 B. Queen Kaahumanu Highway Kailua-Kona, HI 96740	Department of Lands and Natural Resources
Dr. Russ Schnell NOAA Earth System Research Laboratory Global Monitoring Division 325 Broadway Boulder, CO 80303	Deputy Director, NOAA, MLO
Barry Taniguchi Office of Mauna Kea Management 640 N. Aohoku Place Hilo, HI 96720	Mauna Kea Management and Observatories
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Appendix A

Notices of Availability

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Ms. Cindy Orlando, Superintendent
Hawai`i Volcanoes National Park
P.O. Box 52
Hawaii National Park, HI 96718-0052

Dear Ms. Orlando:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

Name of Applicant:	United States Army Garrison, Hawaii (USAG-HI)
Contact Address	948 Santos Dumont Avenue, Wheeler Army Airfield, Building 105
City, State, Zip	Schofield Barracks, Hawaii 96857-5000
Contact and Phone	Mr. William Rogers (808) 656-3075
Approving Agency/ Accepting Authority:	Department of Land and Natural Resources (DLNR)
Address	Kalanimoku Building, 1151 Punchbowl Street.
City, State, Zip	Honolulu, HI 96813
Contact and Phone	William J. Aila Jr., Chairperson (808) 587-0400
Consultant	Portage
Address	1075 S. Utah Ave., Suite 200
City, State, Zip	Idaho Falls, ID 83402
Contact and Phone	(208) 419-4176

Please send written comments to the identified Consultant or Applicant. Comments must be received or postmarked by: August 22, 2011

Thank you for your participation in the EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Mr. Loyal Mehrhoff, Field Supervisor
U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

Dear Mr. Mehrhoff:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

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Thank you for your participation in the EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Ms. Deborah Ward
Sierra Club
P.O. Box 918
Kurtistown HI 96760

Dear Ms. Ward:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

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Approving Agency/ Accepting Authority:	Department of Land and Natural Resources (DLNR)
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Consultant	Portage
Address	1075 S. Utah Ave., Suite 200
City, State, Zip	Idaho Falls, ID 83402
Contact and Phone	(208) 419-4176

Please send written comments to the identified Consultant or Applicant. Comments must be received or postmarked by: August 22, 2011

Thank you for your participation in the EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Sierra Club, Moku Loa Group
PO Box 1137
Hilo, Hawai'i 96721

Dear Sierra Club Members:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

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Consultant	Portage
Address	1075 S. Utah Ave., Suite 200
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Contact and Phone	(208) 419-4176

Please send written comments to the identified Consultant or Applicant. Comments must be received or postmarked by: August 22, 2011

Thank you for your participation in the EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Ms. Stephanie Nagata, Interim Director
Office of Mauna Kea Management
200 W. Kawili Street
Hilo, HI 96720

Dear Ms. Nagata:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

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City, State, Zip	Schofield Barracks, Hawaii 96857-5000
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Approving Agency/ Accepting Authority:	Department of Land and Natural Resources (DLNR)
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Consultant	Portage
Address	1075 S. Utah Ave., Suite 200
City, State, Zip	Idaho Falls, ID 83402
Contact and Phone	(208) 419-4176

Please send written comments to the identified Consultant or Applicant. Comments must be received or postmarked by: August 22, 2011

Thank you for your participation in the EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Mr. Clyde W. Nāmuʻo, Chief Executive Officer
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, HI 96813

Dear Mr. Nāmuʻo:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawaiʻi in the Hamakua District.

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Contact and Phone	(208) 419-4176

Please send written comments to the identified Consultant or Applicant. Comments must be received or postmarked by: August 22, 2011

Thank you for your participation in the EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Ms. Cory Harden
PO Box 10265
Hilo, Hawai'i 96721

Dear Ms. Harden:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

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Please send written comments to the identified Consultant or Applicant. Comments must be received or postmarked by: August 22, 2011

Thank you for your participation in the EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Mr. Jose Martinez
R.R. 2, Box 4500
Pahoa, Hawaii 96778

Dear Mr. Martinez:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

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Consultant	Portage
Address	1075 S. Utah Ave., Suite 200
City, State, Zip	Idaho Falls, ID 83402
Contact and Phone	(208) 419-4176

Please send written comments to the identified Consultant or Applicant. Comments must be received or postmarked by: August 22, 2011

Thank you for your participation in the EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Kahu Ku Mauna
C/O Office of Mauna Kea Management
200 W. Kawili Street
Hilo, HI 96720

Dear Council Members:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

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Contact Address	948 Santos Dumont Avenue, Wheeler Army Airfield, Building 105
City, State, Zip	Schofield Barracks, Hawaii 96857-5000
Contact and Phone	Mr. William Rogers (808) 656-3075
Approving Agency/ Accepting Authority:	Department of Land and Natural Resources (DLNR)
Address	Kalanimoku Building, 1151 Punchbowl Street.
City, State, Zip	Honolulu, HI 96813
Contact and Phone	William J. Aila Jr., Chairperson (808) 587-0400
Consultant	Portage
Address	1075 S. Utah Ave., Suite 200
City, State, Zip	Idaho Falls, ID 83402
Contact and Phone	(208) 419-4176

Please send written comments to the identified Consultant or Applicant. Comments must be received or postmarked by: August 22, 2011

Thank you for your participation in the EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Ms. Miwa Tamanaha, Executive Director
KAHEA
P.O. Box 37368
Honolulu, HI 96837

Dear Ms. Tamanaha:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

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Contact Address	948 Santos Dumont Avenue, Wheeler Army Airfield, Building 105
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Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Mr. Joe Estores
59-206 Alapio Road
Haleiwa, HI 96712

Dear Mr. Estores:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

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Address	Kalanimoku Building, 1151 Punchbowl Street.
City, State, Zip	Honolulu, HI 96813
Contact and Phone	William J. Aila Jr., Chairperson (808) 587-0400
Consultant	Portage
Address	1075 S. Utah Ave., Suite 200
City, State, Zip	Idaho Falls, ID 83402
Contact and Phone	(208) 419-4176

Please send written comments to the identified Consultant or Applicant. Comments must be received or postmarked by: August 22, 2011

Thank you for your participation in the EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Mr. Hanalei Fergerstrom
Na Kapuna Moku O Keawe
P.O. Box 951
Kurtistown, HI 96760

Dear Mr. Fergerstrom:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

Name of Applicant:	United States Army Garrison, Hawaii (USAG-HI)
Contact Address	948 Santos Dumont Avenue, Wheeler Army Airfield, Building 105
City, State, Zip	Schofield Barracks, Hawaii 96857-5000
Contact and Phone	Mr. William Rogers (808) 656-3075
Approving Agency/ Accepting Authority:	Department of Land and Natural Resources (DLNR)
Address	Kalanimoku Building, 1151 Punchbowl Street.
City, State, Zip	Honolulu, HI 96813
Contact and Phone	William J. Aila Jr., Chairperson (808) 587-0400
Consultant	Portage
Address	1075 S. Utah Ave., Suite 200
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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Mr. Roger Imoto, Branch Chief
Division of Forestry & Wildlife
19 E. Kawili St.
Hilo, HI 96720

Dear Mr. Imoto:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

Name of Applicant:	United States Army Garrison, Hawaii (USAG-HI)
Contact Address	948 Santos Dumont Avenue, Wheeler Army Airfield, Building 105
City, State, Zip	Schofield Barracks, Hawaii 96857-5000
Contact and Phone	Mr. William Rogers (808) 656-3075
Approving Agency/ Accepting Authority:	Department of Land and Natural Resources (DLNR)
Address	Kalanimoku Building, 1151 Punchbowl Street.
City, State, Zip	Honolulu, HI 96813
Contact and Phone	William J. Aila Jr., Chairperson (808) 587-0400
Consultant	Portage
Address	1075 S. Utah Ave., Suite 200
City, State, Zip	Idaho Falls, ID 83402
Contact and Phone	(208) 419-4176

Please send written comments to the identified Consultant or Applicant. Comments must be received or postmarked by: August 22, 2011

Thank you for your participation in the EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Ms. Theresa K. Donham, Acting Archaeology Branch Chief
The State Historic Preservation Division
40 Po'okela Street
Hilo, Hawaii 96720

Dear Ms. Donham:

Attached for your review is a Draft Environmental Assessment (EA) / Draft Finding of No Significant Impact (FNSI) for High Altitude Mountainous Environment Training prepared pursuant the Army's NEPA implementing regulations 32 Code of Federal Regulation (CFR) 651 and the State of Hawaii Environmental Impact Statement (EIS) law (Ch. 343, HRS and 11-200, HAR). The Army's preffered alternative is located on the Island of Hawai'i in the Hamakua District.

Name of Applicant:	United States Army Garrison, Hawaii (USAG-HI)
Contact Address	948 Santos Dumont Avenue, Wheeler Army Airfield, Building 105
City, State, Zip	Schofield Barracks, Hawaii 96857-5000
Contact and Phone	Mr. William Rogers (808) 656-3075
Approving Agency/ Accepting Authority:	Department of Land and Natural Resources (DLNR)
Address	Kalanimoku Building, 1151 Punchbowl Street.
City, State, Zip	Honolulu, HI 96813
Contact and Phone	William J. Aila Jr., Chairperson (808) 587-0400
Consultant	Portage
Address	1075 S. Utah Ave., Suite 200
City, State, Zip	Idaho Falls, ID 83402
Contact and Phone	(208) 419-4176

Please send written comments to the identified Consultant or Applicant. Comments must be received or postmarked by: August 22, 2011

Thank you for your participation in the EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Hilo Public Library
300 Waianuenue Avenue
Hilo, Hawaii 96720

To Whom It May Concern:

Enclosed is a copy of the Draft Environmental Assessment (EA) for High Altitude Mountainous Environment Training (HAMET). We are providing this EA to you and request that it be made available for public review from July 23, 2011 through August 22, 2011.

If you should have any questions please contact Mr. William Rogers at (808) 656-3075. Thank you for your assistance.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Kailua-Kona Public Library
75-138 Hualalai Road
Kailua-Kona, Hawaii 96740

To Whom It May Concern:

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Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure

CLASSIFIED

INSIDE | PAGE 5 & 6
Business Service Directory

100 lb. cast iron weight set, includes plastic carry case, incldes 6 (10 lb), 4 (5lb), 4 (2.5lb) & weight bar with threaded collars, like new, $100. 345-4302

BEDROOM SET, night stand, dresser, mirror, rattan, $300. 2 (24" H) swivel counter stools, $75, Game tower, too cool! $25 329-2821

~~CAMPER Shell, fits truck bed 58" X 6' $30~~
22 Cu. ft. Kitchen-Aid refrigerator $100. 640-1534

COMPUTER DESK glass/ wood, 36"W X 19"D X 36"H with total of 48"H shelving, Sharper Image, Merido Collection, $90 at OFFICEMAX for $199 345-1832

BATHROOM/SINKS above counter, glass. $225-$250 each 326-7760

ELECTRIC dryer, 19 cycles, 5 temperature, warranty- 2014, glassdoor, $380, 315-8658

~~ELECTROLUX Vacuum cleaner, very good condition, includes all attachments, plus replacement bags $80~~, Brother electric Typewriter, good condition $20, 885-4119

BEAUTIFUL tile top metal patio table, 6 chairs, accomodate umbrella $250 772-812-7519

LARGE Blue gas grill with side burner/ tank, clean, $250. 772-812-7519

MISC: Steamer-$12 Child's SZ 5 Harley Davidson vinyl Jacket LIKE NEW- $15 (2) Delsy suitcases- $5 each. Infant car seat $8 7wave surf ski needs work- $15. 329-1738

Records - 50's & 60's Rock & Roll plus 70 Albums. $50.00 937-4992 leave message

STEEL dive tank, visual/ hydro good, $100. 640-4435

TOYOTA Camry 1991, good condition, powering steering pump & gear, new radiator, reconditioned alternator, transmission/ tires still good, engine runs, needs battery $300/ offer 333-8841

TRANSPORT Wheelchair $145, Comode with cushion $45, Cane 4 legs $25, v shaped cane $30, toilet seat $20, shower chair $25, GE electric water dispenser $75, tube feeding machine $110 896-0134

WHITE DRESSER $100 4 drawers, corner shelf stand $50, great condition 938-6149

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CLASSIFICATION INDEX

ADVERTISERS
Please check your ad on the first run date. You are responsible to know the RUN DATES, & CLASSIFICATION of your advertisement. Also please check for any TYPOGRAPHICAL ERRORS on your ad. We will make correction on the next available edition.
West Hawaii Today

ADVERTISING POLICY - Advertiser represents that all advertised copy is truthful and not misleading. Advertiser shall indemnify and hold Publisher harmless from any claim against Publisher arising out of or in connection with publication of advertising (except for modifications made by publisher without advertiser's approval) including, but no limited to, claims for libel, invasion of privacy, commercial appropriation of ones name or likeness, copyright infringement, trademark, trade name or patent infringement, commercial defamation, false advertising, or any other claim whether based in tort or contract, or on account of any state or federal statute, including state and federal deceptive trade practices acts. If Advertiser claims copyright ownership in any of the advertising published, Advertiser must include proper notice of its copyright claim in the body of the advertisement, otherwise copyright ownership shall remain in Publisher."

IT'S YOUR RESPONSIBILITY
Please Check Your Ad, Run Dates & Classification For Errors on the first run date!!!

$8,000 for single coin; $6,200/ painting; $3,500/ Jade pin. Talk is cheap, paying record local prices isn't. Wanted U.S. coins and Hawaiian coins & tokens! Don 938-8744

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ALL EMPLOYMENT ADVERTISED herein is subject to the Equal Opportunity Laws, which makes it illegal to advertise "any preference, limitation, or discrimination based on race, color, religion, sex, handicap, familial status, or national origin, or an intention to make any such preference, limitation or discrimination." We will not knowingly accept any advertising which is in violation of the law. All persons are hereby informed that all advertisements are available on an Equal Opportunity basis.

DEADLINES FOR CLASSIFIED ADS:
MONDAY PUBLICATION Friday, 2:00 PM
TUESDAY PUBLICATION Monday, 11:30 AM
WEDNESDAY PUBLICATION Tuesday, 11:30 AM
THURSDAY PUBLICATION Wednesday, 11:30 AM
FRIDAY PUBLICATION Thursday, 11:30 AM
SATURDAY PUBLICATION Friday, 11:30AM
SUNDAY PUBLICATION Friday, 2:00 PM

Legal Notices 20

Name of Applicant or Proposing Agency: U.S. Army Garrison Hawaii

Name of Project: High-Altitude Mountainous Environment Training, Island of Hawaii

Project Summary: The Army has prepared a draft Environmental Assessment (EA) and draft Finding of No Significant Impact (FNSI) / anticipated Negative Determination that assesses the potential impacts of High-Altitude Mountainous Environment Training (HAMET) on the Island of Hawaii. The draft EA has been prepared in accordance with the National Environmental Policy Act (NEPA), and is compliant with Hawaii Revised Statutes (HRS) Chapter 343.

The purpose of the Proposed Action is to provide 90 helicopter aviators a total of 180 hours of mandatory high-altitude flight operations training. The need for the Proposed Action is to ready helicopter air crews to be successful in the combat theater to support the operational and mission requirements of the 25th CAB, 25th Infantry Division, set forth by the Department of Army and Department of Defense (DoD). This training is critical to save the lives of our 25th CAB aircrews and the Soldiers they transport when operating in support of Operation Enduring Freedom in Afghanistan.

Based on the information analyzed, the draft EA concludes that the Proposed Action would not result in significant direct, indirect, or cumulative adverse impacts on the natural or human environment.

The draft EA and draft FNSI/ draft Notice of Determination are available for public review at the following public libraries: Hilo Public Library, Kailua-Kona Public Library, and Thelma Parker Memorial Public and School Library. Copies can also be obtained by e-mailing hamet_nepa@portageinc.com or by calling (208) 419-4176. In addition a copy will be posted at the State of Hawaii Office of Environmental Quality and Control (OEQC) website. The public comment period will run from July 23, 2011 to August 22, 2011. In order for comments to be considered they must be received by August 23, 2011. Comments should be directed to the email address above, or mailed to: Directorate of Public Works, Environmental Division (IMPC-HAW-PWE), Attn: Mr. William Rogers, 948 Santos Dument Avenue, Building 105, Wheeler Army Airfield, Schofield Barracks, 96857-5013.

(No. 45744-West Hawaii Today: July 21, 2011)

THE ENVIRONMENTAL NOTICE

A semi-monthly periodic bulletin published by the Office of Environmental Quality Control pursuant to Section 343-3, Hawai'i Revised Statutes

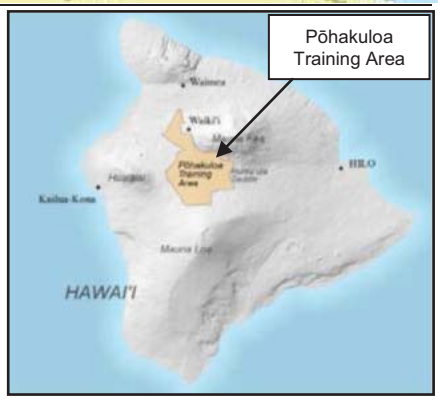
July 23, 2011

Note: If you get a message saying that the file is damaged when you click on the link, then the file is too big to open within your web browser. To view the file, download directly to your hard drive by going to File and select Save As in your web browser.

The Environmental Notice informs the public of environmental assessments and other documents that are available for review and comment per HRS 343-3 and is issued on the 8th and 23rd of each month on the Office of Environmental Quality Control's website. If you would like to be notified when it is issued, send us your email address and we'll put you on our mailing list.

Neil Abercrobmie, Governor · Gary Hooser, Director · Office of Environmental Quality Control · 235 South Beretania Street, Suite 702 · Honolulu, HI 96813
Tel: 586-4185 · Fax: 586-4186 · Email: oeqc@doh.hawaii.gov ·
Website: http://hawaii.gov/health/environmental/oeqc/index.html/
Toll Free: Kaua'i: 274-3141 ext. 64185 · Maui: 984-2400 ext. 64185 · Moloka'i/Lāna'i: 1-800-468-4644 ext. 64185
Hawai'i: 974-4000 ext. 64185

HAWAIʻI (HRS 343)



1. High Altitude Mountainous Environment Training Draft EA (Appendices)

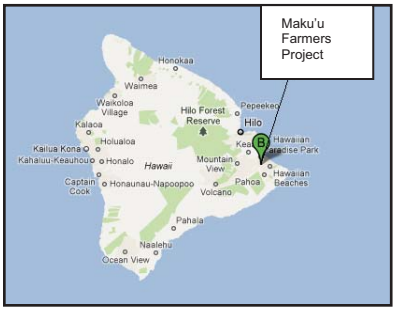
Island: Hawaiʻi
District: Hāmākua
TMK: Multiple
Permits: Right of Entry via Hawaiʻi Department of Land and Natural Resources, Division of Forestry and Wildlife Special Use Permit
Proposing Agency: United States Army Garrison, Hawaiʻi (USAG-HI), 851 Wright Avenue, Wheeler Army Airfield, Schofield Barracks, Hawaiʻi 96857-5000. Contact: Mr. William Rogers (808) 656-3075
Approving Agency: Department of Land and Natural Resources Kalanimoku Building, 1151 Punchbowl Street, Honolulu, Hawaiʻi 96813. Contact: William J. Aila, Jr., (808) 587-0400
Consultant: Portage, 1075 S. Utah Ave., Suite 200, Idaho Falls, ID 83402. (208) 419-4176
Status: Anticipated Finding of No Significant Impact. 30-day comment period begins; comments are due on August 21, 2011. Send comments to the Proposing Agency and the Consultant

The proposed action is to provide 90 helicopter pilots and crew 180 hours of high altitude training in October 2011 in preparation for deployment to Afghanistan to satisfy mandatory annual training requirements. The Army's preferred alternative consists of flying to, hovering, and touch and go landings at three (3) landing zones (LZs) located on the slopes of Mauna Kea and three (3) LZs located on the slopes of Mauna Loa. Aircraft landing in the LZs would not be picking up or dropping off troops or supplies. Aircraft will be spending a minimal amount of time in the LZ areas, and ground time should not exceed 10 minutes per landing.

Familiarity with this specialized high altitude environment is critical to save the lives of our 25th Combat Aviation Brigade aircrews and the Soldiers they transport when operating in support of Operation Enduring Freedom in Afghanistan.

Based on careful review of the analysis and conservation measures set forth in the EA and consideration of public comments received to date, implementing the Preferred Alternative would result in no significant direct, indirect, or cumulative impacts on natural resources, cultural resources, water resources, recreational resources and other resources assessed in the EA. Implementing the Preferred Alternative is not a major federal or state action that would significantly impact the quality of the environment.

2. Makuʻu Farmers Market and Community Center Final EA (FONSI) (Appendix B, Appendix C)



Island: Hawaiʻi
District: Puna
TMK: (3) 1-5-10: 17
Permits: Underground Injection Control/Approval of Drywells, Approval of Septic Systems, Approval of Driveway Connection, Plan Approval and Approval of Construction Plans
Applicant: Makuʻu Farmers Association, 15-2131 Keaʻau-Pahoa Highway, Pahoa, Hawaiʻi 96778. Contact: Paula Kekahuna, (808) 965-1441
Approving Agency: Department of Hawaiian Home Lands, P.O. Box 1879, Honolulu, Hawaiʻi 96805.

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Appendix B

Comments Received and Responses

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Contents

Comment Letters to HAMET

Response Letters from USAG-HI

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July 28, 2011

NEPA PROGRAM USAG-HI
Director of Public Works
Environmental Division [IMPC-HI-PWE]
948 Santos Dumont Ave., Bldg.105, Wheeler Army Airfield
Schofield Barracks, HI 96857-5013

Gentlemen,

I am appalled that anyone has any objection whatsoever to the Pohakuloa helicopters using sites on Mauna Kea and Mauna Loa. The army has made it clear that they will only use a small area which has been checked for archaeology sites and none have been found.

We are talking about our troops who put their lives on the line every day for America. We need them well trained to succeed and to be safe. This exercise involving high altitude landings is necessary because of the mountainous terrain in Afghanistan. We are asking for kokua on a matter of minor importance to our mountains but of huge importance to America's success and our troops safety. Please grant them these landing sites.

Aloha,

Leslie M. Agorastos

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Rogers, William Mr CIV US USA IMCOM

From: Valerie Amby [valleialoha@yahoo.com]
Sent: Tuesday, August 23, 2011 7:45 PM
To: HAMET_NEPA
Subject: Public Comment on Draft Environmental Assessment for Army Project at PTA and Mauna Kea and Mauna Loa

Dear Colonel Mulbury,

I am writing to you in regards to the Draft Environmental Assessment for the High-Altitude Mountainous Environment Training, dated July 2011(http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-High-Altitude-Mountanous-Environment-Training.pdf and http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-Hi-Alt-Mnt-Env-Trng-Appendices-A-to-D.pdf). These comments are provided to you in response to your request for comments, with the 30-day review beginning on July 23, 2011 and ending on August 23, 2011.

I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document. Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA. The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?" Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis. Why, if the army claims that "analyses did not indicate the need for an environmental impact statement" did you require this many attempts in reaching a FONSI? Even after three attempts at a FONSI, the analysis is still lacking.

The alternatives considered do not meet your stated purpose to recognize army environmental and social stewardship responsibilities within the affected region. Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii. The alternative 5 for other high-altitude training sites on the CONUS is prematurely eliminated and should have been carried forward for further analysis. This alternative should be fully considered in an EIS.

Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the army is not qualified to conduct a legitimate impact analysis. The army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture. Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the army catastrophically fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.

The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor has the community been properly consulted. Had the cultural impact assessment been completed properly, impacts to cultural resources would have been identified as significant and unmitigable.
Aside from photographs taken on a day outing to these LZs what efforts have been put into the interpretation of the sites identified? The identified sites are extremely close in proximity to each LZ and located on the tops of small pu'u. The cairns atop each pu'u are within 20 feet of the LZs. Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times. Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources. It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36CFR part 800, let alone meet the substantive portion of the law.

There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas. The substantive portion of Section 106 of the National Historic Preservation ACT of 1966 (as amended) mandates that the army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each pu'u in this project. For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawai'i.
The lack of information does not instill in me confidence that the army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ. It is difficult to comprehend how the army proposes to protect cultural resources without understanding what they are. More respect of the army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.
While the army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other non-army projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

While the army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii? Native Hawaiians have been unjustly targeted for the army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape. Has the army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

This EA lacks impact analysis on transportation between the islands of Oʻahu and Hawaiʻi.

Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable. I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Sincerely,

Valerie Amby-Kamakeeaina

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Rogers, William Mr CIV US USA IMCOM

From: Kananimae'ole Amina [kanani16@gmail.com]
Sent: Wednesday, August 24, 2011 12:56 AM
To: HAMET_NEPA
Subject: Draft Environmental Assessment for the High-Altitude Mountainous Environment Training

Dear Colonel Mulbury,

I am writing to you in regards to the Draft Environmental Assessment for the High-Altitude Mountainous Environment Training, dated July 2011(http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-High-Altitude-Mountanous-Environment-Training.pdf and http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-Hi-Alt-Mnt-Env-Trng-Appendices-A-to-D.pdf). These comments are provided to you in response to your request for comments, with the 30-day review beginning on July 23, 2011 and ending on August 23, 2011.

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The alternatives considered do not meet your stated purpose to recognize army environmental and social stewardship responsibilities within the affected region. Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii. The alternative 5 for other high-altitude training sites on the CONUS is prematurely eliminated and should have been carried forward for further analysis. This alternative should be fully considered in an EIS.

Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based

in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the army is not qualified to conduct a legitimate impact analysis. The army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture. Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the army catastrophically fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.

The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor has the community been properly consulted. Had the cultural impact assessment been completed properly, impacts to cultural resources would have been identified as significant and unmitigable.

Aside from photographs taken on a day outing to these LZs what efforts have been put into the interpretation of the sites identified? The identified sites are extremely close in proximity to each LZ and located on the tops of small puʻu. The cairns atop each puʻu are within 20 feet of the LZs. Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times. Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources. It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36CFR part 800, let alone meet the substantive portion of the law.

There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas. The substantive portion of Section 106 of the National Historic Preservation ACT of 1966 (as amended) mandates that the army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each puʻu in this project. For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawaiʻi.

The lack of information does not instill in me confidence that the army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ. It is difficult to comprehend how the army proposes to protect cultural resources without understanding what they are. More respect of the army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.

While the army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other non-army projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

While the army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii? Native Hawaiians have been unjustly targeted for the army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape. Has the army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

This EA lacks impact analysis on transportation between the islands of O'ahu and Hawai'i.

Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable. I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Sincerely,

Kananimae'ole P. Amina

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Mauna Kea
Recreational Users Group

Public Land for Public Use

447 Kalanianaole Avenue, Hilo, Hawaii 96720

contact@maunakearug.com

CHAIRMAN
Wayne Blyth

COMMITTEES

Bob Duerr
Fishing

Matt Hoeflinger
Hunting

Nani Pogline
Hiking

Chris Seymour
Bicycling

Dennis Vierra
OHV

Pat Reppun
Equestrian

MEMBER ORGANIZATIONS

Big Island Gun Dogs

Pig Hunters of Hawaii

Rock Island Riders

August 22, 2011

NEPA PROGRAM USAG-HI,
Directorate of Public Works
Environmental Division (IMPC-HI-PWE)
948 Santos Dumont Avenue, Bldg. 105, Wheeler Army Airfield
Schofield Barracks, HI 96857-5013

Dear Sirs:

As an invited observer of the proposed U.S. Army helicopter pad training sites I find no problems with the stated use as shown and described on my flight over Mauna Kea and Mauna Loa.

I will state that in reading the EA I did not find mention of Off Highway Vehicle (OHV) use. The OHV program in Hawaii is strong and funded by taxpayer dollars. It is the funding mechanism of many trails not only OHVs in Hawaii and must be included in the EA.

Lastly, I would strongly ask that the U.S. Army at its Pohakuloa Military Base not further restrict Hawaii's outdoors persons. In fact, I would ask that the U.S. Army make a dedicated effort to increase access to what is cherished hunting, bow hunting, hiking, off road vehicle, and general outdoor recreation.

Though for the Army the plains of Mauna Loa and Mauna Kea duplicate high desert areas of Afghanistan, Pakistan and all the other "stans," for Hawaii's Mauna Kea's recreational users this is our America the beautiful.

Mahalo,

Wayne Blyth
Chairman
Mauna Kea Recreational Users Group

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FROM: John Carse
R.R. 2, Box 4852
Pahoa, HI 96778

TO: NEPA PROGRAM USAG-HI
Directorate of Public Works
Environmental Division (IMPC-HI-PWE)
948 Santos Dumont Avenue, Bldg. 105, Wheeler Army Airfield
Schofield Barracks, HI 96857-5013

DATE: August 18, 2011

RE: Environmental Assessment and Finding of No Significant Impact for Training the 25th Infantry Division -25th Combat Aviation Brigade in High-Altitude Environmental Terrain Flight Operations

Aloha,

I am very concerned about the impact to the environment that will be caused the proposal to deploy more aircraft on the already overburdened and under-monitored air space of the Island of Hawaii.

First, what is the minimum height that these aircraft will be allowed to fly over our residential areas and national parks? And how much noise will that create? Although the Federal Aviation Administration requires all aircraft to maintain a standoff distance of 1500 feet for safety reasons, the Honolulu FAA Flight Standards District Office has voided this commonsense regulation on the Island of Hawaii. Currently, air tours are allowed to buzz our homes at 500 feet and vast swaths of our precious Hawai'i Volcanoes National Park at 200 feet. Will the military aircraft be operating at these ridiculously unsafe heights, too, despite the fact that these new regulations were created -- in violation of the FAA's own written policies -- without an Environmental Impact Statement?

And how will we report the inevitable barnstorming that pilots seem unable to suppress? Will there be someone to contact when immature pilots start strafing our communities? And will reporting unacceptable behavior achieve anything? Currently, the FAA claims to have the sole jurisdiction when it comes to enforcing aircraft regulations, despite the fact the inspectors have failed miserably at this task. In fact, although the Honolulu FAA FSDO has received literally thousands of complaints, there is no evidence that it has ever found a pilot guilty based on the details provided by concerned citizens. Will the military follow the FAA's example and completely ignore complaints from residents of the Island of Hawaii? Or will you help us to identify and prosecute pilots who violate laws, rules, regulations and ordinances?

Also, it wasn't that many years ago that a showboating military pilot strafed Spencer Beach Park so low that the prop wash collapsed tents and caused the injury of a Boy Scout so severe that he required hospitalization. Will the names of the offending pilots be made available to that we can seek financial restitution from them in our civil courts for damages caused?

And what method will be used to track these aircraft when they operate over our neighborhoods? The FAA currently has no way to identify any aircraft without a photograph clearly showing the N-number, despite the fact that these numbers are impossible to be seen when aircraft fly overhead. And they have absolutely no way to identify any aircraft operating at night. Will anything be done to rectify this travesty?

Also, according to Hawai`i Volcanoes National Park Superintendent Cynthia Orlando, the park is planning to use the entry fees provided by air tours to establish a monitoring program, even though they refuse to tell their neighbors what it will be or how it works. Will you be contacting the National Park Service to make sure that their monitoring efforts are synchronized with those created for this proposed program?

Because of the tremendous damage currently be done to the environment by irresponsible pilots and uncaring FAA officials, efforts are now being made to establish state and county monitoring systems that include specific route and height regulations as well as penalties for pilots who violate them. Will the military be joining us in our efforts to make aviators accountable?

Currently, pilots are destroying the Big Island citizens' right to privacy, land values, and quality of life. What will you be doing to prevent further increasing this mayhem?

Please include answers to these questions in your analysis of this proposed program. Thank you for your attention.

Sincerely,

John Carse

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY H. KAULUKUKUI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL ST., ROOM 325
HONOLULU, HAWAII 96813
TEL (808) 587-0166 FAX (808) 587-0160

August 30, 2011

NEPA PROGRAM
USAG-HI, Directorate of Public Works
Environmental Division (IMPC-HI-PWE)
948 Santos Dumont Avenue, Bldg. 105, Wheeler Army Airfield
Schofield Barracks, HI 96857-5013

Subject: **Draft Environmental Assessment (DEA) for High-Altitude Mountainous Environment Training (HAMET)**

To Whom It May Concern:

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has reviewed the HAMET DEA and found that all the items/issues that were identified and commented on in the previous federal Environmental Assessment were adequately addressed in the DEA. DOFAW has no further comments.

Thank you for allowing us to review your project.

Sincerely yours,

Paul J. Conry
Administrator

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Rogers, William Mr CIV US USA IMCOM

From: rashan c [rashanemail@gmail.com]
Sent: Tuesday, August 23, 2011 7:40 PM
To: HAMET_NEPA
Subject: EA for Mauna Kea & Mauna Loa

Dear Colonel Mulbury,

I am writing to you in regards to the Draft Environmental Assessment for the High-Altitude Mountainous Environment Training, dated July 2011(http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-High-Altitude-Mountanous-Environment-Training.pdf and http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-Hi-Alt-Mnt-Env-Trng-Appendices-A-to-D.pdf). These comments are provided to you in response to your request for comments, with the 30-day review beginning on July 23, 2011 and ending on August 23, 2011.

I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document. Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA. The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?" Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis. Why, if the army claims that "analyses did not indicate the need for an environmental impact statement" did you require this many attempts in reaching a FONSI? Even after three attempts at a FONSI, the analysis is still lacking.

The alternatives considered do not meet your stated purpose to recognize army environmental and social stewardship responsibilities within the affected region. Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii. The alternative 5 for other high-altitude training sites on the CONUS is prematurely eliminated and should have been carried forward for further analysis. This alternative should be fully considered in an EIS.

Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based

in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the army is not qualified to conduct a legitimate impact analysis. The army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture. Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the army catastrophically fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.

The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor has the community been properly consulted. Had the cultural impact assessment been completed properly, impacts to cultural resources would have been identified as significant and unmitigable.

Aside from photographs taken on a day outing to these LZs what efforts have been put into the interpretation of the sites identified? The identified sites are extremely close in proximity to each LZ and located on the tops of small puʻu. The cairns atop each puʻu are within 20 feet of the LZs. Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times. Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources. It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36CFR part 800, let alone meet the substantive portion of the law.

There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas. The substantive portion of Section 106 of the National Historic Preservation ACT of 1966 (as amended) mandates that the army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each puʻu in this project. For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawaiʻi.

The lack of information does not instill in me confidence that the army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ. It is difficult to comprehend how the army proposes to protect cultural resources without understanding what they are. More respect of the army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.

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While the army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii? Native Hawaiians have been unjustly targeted for the army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

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This EA lacks impact analysis on transportation between the islands of O'ahu and Hawai'i.

Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable. I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Sincerely,

Pua Corpuz

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HAMET DOCUMENT REVIEW COMMENTS

1. General Comments:

   a. There is excessive redundant information throughout the document.

   b. Numerous references throughout the document are irrelevant to the HAMET operations of two types of helicopters conducting repeat operations at isolated sites. References are made to incomplete studies, lack of data, and unclear "reconnaissance-level" surveys. The following samples of portions of statements indicate the lack of specifics directly related to helicopter operations:

      i. "...and it is anticipated that the population densities of...is zero."
      ii. "...should have no effect...."
      iii. "...could potentially occur...."
      iv. "There are no identified active petrel breeding colonies...."
      v. "...is not expected to...."
      vi. "...it is expected that...."
      vii. "...it is anticipated that birds would vacate the area while noise levels are high..."

   Irrelevant information include "Socio-economics & Environmental Justice", Land Use; the whole picture/diagram of Hiking Trails along the coastline; reference to selected previous UH and Stryker EIS findings which are not related to helicopter operations; a lot of propaganda information about PTA, military training and usage and management of the land and historic, cultural sites on the reservation, traffic densities, and the analysis of noise concentrated on humans rather than on the animals, birds and insects which is more appropriate to the resultant effects of these operations; the section on air quality and the lengthy coverage of "Geology and Topography" add pages of reading that are not necessary.

c. The gentle slopes of both Mauna Kea and Mauna Loa and the selected HAMET training sites do not have the flying effects and characteristics associated with mountain environments. They will only give pilots high altitude and slope conditions. The LZs are not configured to give pilots the full spectrum of conditions of mountain flying which include strong wind sheer, up and down drafts, considerable turbulence, and quick changing atmospheric conditions. The sites will not adequately prepare the pilots for the challenges of real mountain conditions. Denying pilots the true effects of mountain training elsewhere due to costs and time away from families put the crews at risks that are not acceptable.

d. The archaeological rock mound surveys and monitoring resulting in "no effects from HAMET training" are not proven. The fact that some rock was tumbled indicates some effects. Later checks do show that the same flight approaches or type of helicopter used in training were duplicated to cause more effects. Therefore, the surveys were useless and to incorporate these findings are inappropriate.

e. The noise monitor placement Memorandum FOR THE RECORD dated 22 March 2011 merely addresses placement of the devices and the outcomes or results are not included. Installation of the devices should have preceded the 25th CAB training in that time frame to ascertain the effects. The memo covers the installation and refers to "no archaeological sites were found within the (each) area. Noise is only one dimension of helicopter flying; there is the question of blade and jet engine noise/frequencies that are not addressed by these monitors. Use of this Memo for concluding there is no effect from HAMET operations is not deemed appropriate and, needs to be proven.

f. There should be an alternate that considers the War Fighting Center concept where CAB Units go through high altitude training and evaluation like all other combat units that must pass through NTC in predeployment processing. Upon completion of the training, they load up the helicopters for deployment directly into theater and the personnel return to home station to complete the rest of the mobilization processing to include home leave.

This alternative ensures pilots are trained and evaluated close to the time they will need to fly missions in high altitudes and mountainous conditions.

2. When referencing to "State and commercial helicopters are using the Helicopter LZ sites"- are you implying if they are using the sites then it is ok for the military to use them? The Blackhawk and the Chinook are considerably larger helicopters and will make a significantly more impact from dust and displacement of loose stones and pebbles from their downdraft during landings, hovering and takeoffs.

3. Use of terms "final EA" and "draft FONSI" in a document that is going out for review and comments gives the reader the impression that there is already a preconceived determination that there will be no need to perform an EIS with the required public reviews and hearings and that there are no significant impacts. Such wording tends to raise suspicion about the process and intentions of the US Army in such a serious matter of interest to the Native Hawaiian community on the Island of Hawaii.

4. The document does not fully support the finding of no significant impact from HAMET helicopter operations. A full Environmental Impact Statement is needed to ensure no short term and long lasting effects on the sacred mountains in respect for the Hawaiian culture.

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NA KUPUNA MOKU O KEAWE

Hanalei Fergerstrom, Spokesperson

P.O. Box 951

Kurtistown, Hawaii 96760

808 938-9994

NEPA PROGRAM USAG-HI

Directorate of Public Works

Environmental Division (IMPC-HI-PWE)

948 Santos Dumont Avenue, Bldg. 105, Wheeler Airfield

Schofield Barracks, Hi 96857-5013

Re: (HAMET) High Altitude Mountainous Environment Training)

Public Comment Period (July 23, 2011 to August 23, 2011

Na Kupuna Moku O Keawe is a gathering of traditional Kupuna representing all six districts of the island of Hawaii. We offer our comments to the third Environmental Assessment. Na Kupuna Moku O Keawe is very concerned that the USAG-HI has not followed the process described under section 1.7.4 second paragraph, where it states:

"The USAG-HI will review comments received during the public comment period to determine whether the Proposed Action has potentially significant impacts that could not be reduced to less than significant with the application of mitigation. If impacts are found to have the potential to be significant after the application of mitigation measures, **THE USAG-HI WOULD BE REQUIRED TO PUBLISH A NOTICE OF INTENT TO PREPARE AN ENVIRONMENTAL IMPACT STATEMENT IN THE *FEDERAL REGISTER*."**

Previously we brought to your attention the 'Critical Habitat "of the endangered species **PALILA,** which is protected by the National Endangered Species Act. The Palila bird has played an important part in the ecology of Mauna Kea. Since the Palila gained it's classification as an

endangered species, Mountain and Muflon sheep were forcefully removed from the slopes of Mauna Kea for the protection of Critical Habitat essential for the survival of the Palila Bird. The National Endangered Species Act and the protection of Critical Habitat reigns legally superior over the proposed HAMET program and the State of Hawaii is also bound to protect the critical habitat of the Palila as a recipient of federal funds specifically for that purpose.

Mauna Kea and Mauna Loa are very sacred to the Hawaiian People both religiously and culturally. They represent the embrace of the male and female energies and are symbolic of the continuum of life. The spiritual significance of these mountains is not limited to just the Hawaiian People but is shared with many who come to these islands. It is for these reasons that the very thought of training attack Helicopters is contrary to the belief in the sanctity of life and spiritual ambiance of the mountains.

Both Mauna Kea and Mauna Loa are in Conservation Use Districts and therefore are required to meet and satisfy conservation district use criteria. We are also concerned that the USAG-HI has tried to evade following State of Hawaii Administrating Rules regarding Conservation District Use Permits and instead is seeking a special use permit directly through the Chairperson of the Department of Land and Natural Resources.

Another point of serious concern is the military "taking" of public property. Such a taking is certainly illegal and would need to go through the proper legal procedures applied to any eminent domain project.

In conclusion, Na Kupuna Moku O Keawe, stands in opposition to the proposed HAMET program and urges the USAG-HI to immediately file with the Federal Register to complete full Environmental Impact Statement.

Thank you for your time and the opportunity to respond.

Dated this day August 22, 2011

Sincerely,

Hanalei Fergerstrom

From: Gary Sue Pekarsky [mailto:spgyyy@gmail.com]
Sent: Wednesday, July 27, 2011 9:35 PM
To: HAMET_NEPA
Subject: Blackhawk Training Big Island PTA

HEPA PROGRAM USAG-HI
Directorate of Public Works
Environmental Division (IMPC-HI-PWE)
948 Santos Dumont Avenue, Bldg.105, Wheeler Army Airfield
Schofield Barracks, HI 96857-5013

Dear Army People:

While we understand the need to train helicopter pilots in high altitude conditions similar to those they will encounter once deployed we feel this should be done in an unpopulated region away from sacred grounds and environmentally sensitive areas. Certainly not on a populated island--every part of which is connected to the whole.

So, our concerns relative to Kiowa Warrior, Black Hawk and Chinook helicopters training in the proposed expanded PTA on Big Island are several: We are concerned with the deleterious effects of more munitions being exploded on the land, flora and fauna of this island and also with the deleterious effects on the residents of this island and the island's tourist based economy.

It concerns us that attack helicopters transiting to and from the PTA would impact daily life and add to the sense of living in a war zone because of their high decibel level as well as the visual impact of military aircraft right in our backyards and faces.

It concerns us that the flora, fauna and land itself of the PTA continue to be destroyed.

It concerns us that on an earthquake prone island with an active volcano no consideration is given to the impact of the constant percussive nature of exploding armament on the ground.

It concerns us that, when tourism on Big Island is already severally impacted by the economic downturn, an increased visual, audible and vibrational military presence will deter potential tourists to this island. Because I/Sue work in a retail store at the Waikoloa Kings Shops I often hear negative comments from visitors to our island about their unwanted exposure to the sounds, sights and feel of the military training exercises at the PTA and the convoys between the PTA and Kawaihae Harbor. Adding more training to the mix will only exacerbate the situation.

It concerns us that to be subjected to even more visual, auditory and visceral impacts of being in a war zone, for all intents and purposes, can only lead to even more stress for the human mind, soul or body. Life is not good when the sounds of every day life are punctuated by the explosions at the PTA–at least 25 miles away. Life is not good when the house shakes repeatedly because of bombing or other armament explosions. Life is not good when we lie in bed at night and look out the window at explosive fireballs on the hills of the PTA. The July 2011 training maneuvers in the waters of Hawaii, specifically off the Big Island's North Kohala coast and at Kawaihae Harbor, were yet another stressful immersion into the impact of war on innocent civilians, residents here on this island in the American state of Hawaii, not enemies in distant countries.

It concerns us that the military acts with impunity and puts the life of the island, its core, its flora, its fauna and those poor mortals residing here within sight and sound of PTA activities at emotional, physical and financial risk with its training activities.

Thanks for your consideration of Big Island but we think we are full up here with military training and bombing.

Sue Pekarsky Gary
David R. Gary
59-566 Lokelani Place
Kohala Estates
PO Box 44362
Kamuela, Hi 96743-4362

TO hamet_nepa@portageinic.com
FROM Cory Harden, Sierra Club, Moku Loa group, PO Box 1137, Hilo, Hawai'i 96721
mh@interpac.net 808-968-8965

To whom it may concern,

Thank you for the opportunity to comment on the July 2011 Draft Environmental Assessment (EA) for Army High-Altitude Mountainous Environment Training (HAMET) at Pohakuloa.

There is a necessity for high-quality training. But it appears that the EA underestimates impacts, and that HAMET training could be done in a more appropriate setting, with fewer impacts, in Colorado or Afghanistan. Also, an Army investigation of last year's HAMET crash in Colorado said "There are few, foreseeable mission requirements in the theater of Afghanistan which would require Army reconnaissance and attack rotary wing aircraft to land to pinnacles and ridgelines at high altitudes—even in the event of an emergency." [see comments for 2.7-- Action Alternatives]

The Army is to be commended for relocating some training to Colorado and revising the draft EA twice to address community concerns and follow environmental law. But extensive comments on the April EA by SHPD (State Historic Preservation Division), USFWS (U.S. Fish and Wildlife Service), and Sierra Club re. biological, cultural, and visual resources, cumulative impacts, and safety, are not addressed in the July EA, and Sierra Club was not consulted. Review was hampered by no information re. specific text changes, no appendices in the online July EA, and no response to Sierra Club's Freedom of Information Act request for background memoranda.

The alternative now being used, Fort Carson, was not mentioned in the April EA. The time, expense, difficulty, and impacts of transport to Pohakuloa vs. Colorado is not disclosed. The alternative of doing HAMET after arrival in Afghanistan is not considered.

The EA lacks specifics re. how much time will be spent, at what altitudes, and where, for the maneuvers it describes: descent, reconnaissance from 100-500 feet up, short-stop approach, abort, go-around, climb-out, full-stop landing, multiple touch-and-go, landing on uneven surfaces and pinnacles, hovering at 3 feet, and flying at 200 feet in a 1 ¼ mile diameter circle centered on each LZ. The EA estimate of only 10 minutes of noise at each landing zone appears unrealistic.

Noise analysis remains inadequate. Noise maps contradict written information, and show levels at some LZs as quieter than locations farther away. Day-night and even annual averages, and a method that under-estimates low-frequency noise, are used. The only study quoted re. noise impacts on wildlife was done by the Army. Inadequate data is presented re. HAMET training-day noise levels. It is unclear whether noise analysis considers a likely scenario of more than one helicopter at a time flying on one mountain. Vibration is not evaluated.

Text and graphics re. flight paths are contradictory. It appears helicopters will start descending from 2,000 feet while still over palila critical habitat. One LZ is directly adjacent to a nene sanctuary and three LZs are inside 'io range. Helicopters will fly at 200 feet in a circle over a mile wide around landing zones, but some biological surveys only cover a square one-tenth that size. Several birds and a bat, all at risk, may occur below flight paths and breed in October, when training is proposed. Information on inspection and cleaning procedures for invasive species is contradictory.

Safety analysis is inadequate for aircraft maneuvers so difficult they require three weeks of specialized training. The EA does not mention two high-altitude helicopter crashes in Colorado (one fatal), nor two fatal helicopter crashes and one forced landing in Hawai'i. The safety of aging UH-60A Black Hawk helicopters is not evaluated. There is no analysis of causes or environmental impacts for the 2003 Hawai'i HAMET landing over three miles off the LZ. The EA does not does not say whether lights will used at night to avoid aircraft collisions. Information on rotor wash and vortices is contradicted by information from other sources.

Instead of analyzing cumulative aircraft visual and noise impacts with HAMET added, the EA uses existing aircraft impacts as a rationale for generating more. Cumulative impacts from future HAMET operations are not evaluated.

The EA does not evaluate impacts from restricting public access, saying BLNR (State Board of Land and Natural Resources), not the Army, may restrict access.

Detailed comments follow. Thank you for your attention to these concerns.

Comments on July 2011
Draft Environmental Assessment (EA), Army High-Altitude Mountainous Environment Training
by Cory Harden, Sierra Club, Moku Loa group, PO Box 1137, Hilo, Hawai'i 96721
mh@interpac.net 808-968-8965

GENERAL COMMENTS

For July 2011 EA content with no substantive changes compared to the April 2011 EA, please see Sierra Club comments on the April EA.

Impacts from transporting personnel and equipment between O'ahu and Pohakuloa should be evaluated.

SPECIFIC COMMENTS

1.4 Need for Proposed Action *[July EA p. 1-2]*
"...the proposed LZs are previously bulldozed, open, level areas that do not fit the requirements for landing on slopes, uneven surfaces, pinnacles or ridges, as indicated for this type of training..." [letter from Theresa Donham of SHPD to Charlene Uoki of DLNR re the December 2010 EA, July EA, p. B-76 to 81]

The alternative of doing HAMET after arrival in Afghanistan is not considered.

"To conduct HAMET at a CONUS location, the 25th CAB aircrews will spend up to an additional 45 days away from Families prior to the upcoming deployment." *[July EA p. 1-3]*
The EA should specify the minimum, as well as the maximum, time away from families, and compare that to time away if soldiers train at Pohakuloa, where families cannot come.

"Flight paths for the Proposed Action were redesigned to reduce the size of the over flight area and avoid the Mauna Kea State Recreation Area and proximity to the Mauna Kea Ice Age Natural Area Reserve. " *[July EA p. 1-5]*
Graphics seem to contradict this—all seem identical to the April EA, and are all dated April 2011. Text also appears to have no substantive changes re. flight paths.

1.7.1 Outreach *[July EA p. 1-5 to 1-6]*
Sierra Club was not consulted, despite bringing this up in comments on the December 2010 and Arpil 2011 EAs.

1.7.2 Cultural Consultation *[July Ea p. 1-6]*
"In January 2011, SHPD provided a memo in response to the EA that also covered Section 106 concerns. The Army responded with a letter dated April 15, 2011." [*July EA p. 1-6]*
The SHPD memo was unavailable for public review in the April EA.

1.7.4 Public Involvement *[July EA p. 1-7]*
Involvement by the public and regulatory agencies has been seriously hampered by

- *the time demanded to comment on three different versions of the EA released within six months, none indicating exactly how text and graphics were changed*
- *the omission of all appendices from the online July EA*
- *no response to a June 15 Freedom of Information Act request by Debbie Ward of Sierra Club requesting memoranda associated with biological studies conducted for the EA*
-

2.1 HAMET Training Overview *[July EA p. 2-2]*
"...tasks...VMC approach (typically 10 degrees) or to a 3-ft. hover...Abort and go-around...climb-out...100-500 ft...reconnaissance over high-altitude LZs..." *[July EA p. 2-2]*
The EA should have maps/ graphics showing

- *expected altitudes*
- *expected locations for each altitude*
- *expected amount and percentage of time spent at each altitude*

- *relation of all these to*
  - *critical habitat and range for wildlife at risk*
  - *cultural sites*

The EA should describe and evaluate cumulative impacts from future plans for HAME. It has been conducted intermittently for eight years, and a source with Army contacts told me there are plans to continue that at some point after October 2011.

2.6 25th CAB Safety Record *[July EA p. 2-7]*
Information from Sierra Club comments on safety for the April EA was not added.

How do 25th CAB procedures differ from those used in the HAMET crash in Colorado last year? Excerpts below are from the AR-15-6 Investigation Findings and Recommendations for Accident of Aircraft #09-05578 re. the June 30, 2010 crash. Page numbers refer to the enclosed PDF of the complete report.

> *"The ad hoc command and control of the HAMET training program contributed to the delay in discovering that a crash occurred, and recovering the crash victims in a timely manner" [PDF p. 6]*
>
> *One crash victim "attempted to transmit mayday calls on two separate frequencies. Since he did not get a response, he set it to 'beacon' and put the radio down to **pull out his cell phone**." [PDF p. 13, bold added]*
>
> *"...it...took nearly four and one-half hours to get the pilot off the crash site and into a position to transport him...the capabilities, locations, and contact information of local rescue services must not be a discovery learning process..." [PDF p. 14]*

Evaluate the safety of the UH-60A Black Hawk in light of the following (discussed with different emphases in the July EA p. C-4). Would Black Hawks used for HAMET be upgraded?

> *"The average age of the UH-60A fleet is approaching 25 years old. The increased operational tempo of the last six years is simply wearing out these older helicopters much faster than the Army had planned."*
> *[2-27-08 letter from National Guard Major General Francis Vavala to Congresspeople, enclosed]*
>
> *"Twenty two percent of the UH-60A helicopters within the fleet were over 20 years old at the end of FY00 and 66 percent had exceeded their service half life. Increased operational tempo and the technological age of the airframe, components, and systems are adversely impacting the UH-60 resulting in increased O&S costs and decreased reliability and maintainability. The UH-60 does not have the necessary digital avionics architecture to meet interoperability communication requirements... Current UH-60A/L navigation systems do not provide the precision required to insert troops and equipment during future combat (land and over-water) operations especially in darkness and adverse weather conditions... A Service Life Extension Program (SLEP) was planned for the UH-60 beginning in FY99... In March 2001 the Army received the go-ahead from the Defense Acquisition Board to upgrade its aging fleet of 1,500 UH-60 Black Hawk helicopters to the UH-60M (previously UH-60L+) configuration..."*
> *[http://www.globalsecurity.org/military/systems/aircraft/uh-60a.htm]*

Will the Fatcow Chinook be used? If so, analyze safety in light of this statement:

> *"The Fatcow is a CH-47D with the Extended Range Fuel System [ERFS] II system located in the cargo bay... The ERFS tanks are airworthy when installed, operated, and maintained as described in TM 55-1560-307- 13&P. With this configuration, however, fuel can leak into the cabin and a catastrophic incident can occur in the event of a hard landing or an accident. When the non-crashworthy ERFS tanks are installed, the potential for fires during a crash increases..."*
> *[http://www.globalsecurity.org/military/systems/aircraft/ch-47d.htm]*

2.7 Action Alternatives *[July EA p. 2-7]*
"...conducting HAMET entirely through simulation...was considered briefly but dismissed. Such an alternative would not address purpose and need, because it does not meet the mandatory in air training requirements." *[July EA p. 2-7]*
The EA should explain the apparent contradiction between this and the excerpt below, from AR 15-6 Investigation Findings and Recommendations for Accident of Aircraft #09-05578, August 10, 2010, Commander, 10th CAB, Fort Drum, New York. (PDF enclosed.)

> *"There are few, foreseeable mission requirements in the theater of Afghanistan which would require Army reconnaissance and attack rotary wing aircraft to land to pinnacles and ridgelines at high altitudes—even in the event of an emergency. Yet, the HAMET program (based on the successful and long established HAATS) focuses almost exclusively on landing helicopters, no matter their mission, type, design, or series, high up in the mountain. Yes, there certainly is a requirement for heavily-laden attack helicopters to take off and land to their normal bases of operations, but the very first page of the HAATS Student Book states:*
>
> > *'This is achieved by creating a four-torque reference system (to be described later in this chapter) used in three flight tasks involving the simulation of maximum gross weight.'*
>
> *Simulating a fully loaded Apache can be done with ease on one's home airfield and at moderate (5- to 8-thousand foot) altitudes by simulating a low maximum torque and preventing the pilot from exceeding that training limit.*
> *According to the unclassified FORSCOM Deployment Training Guidance For Follow-ON Forces Deploying ISO SWA, dated 01MAY10, P 15.B.7.A., HAMET is an opportunity, not a requirement."*

"HAMET is not an expansion of PTA or any of its facilities." *[July EA p. 2-8]*
There would be no change in maps or structures, but there would be a significant change in actions and impacts.

"Figure 2-5. Simulated vertical view of HAMET flight from an RP to an LZ." *[p. 2-10]*
The graphic lacks detail and clarity. See comment for 2.1 HAMET Training Overview p. 2-2.

2.7.2.3 HAMET Conduct *[July EA p. 2-10]*
Will helicopters use flares, tracers, lights, or (as reported by observers of Colroado HAMET) strobe lights?

" Conditions the Board *[of Land and Natural Resources]* adds could involve... the public (e.g., implementing temporary access restrictions or closure of areas)." *[July EA p. 2-12]*
This seems to suggest that BLNR, not the Army, will be to blame for any restrictions, and precludes EA analysis of impacts. As the party most familiar with the action, the Army should spell out recommended restrictions and evaluate the impacts.

"Pilots would execute multiple touch-and-go, hover, short-stop approach, full-stop landing, and elevated (100–500 ft [30–152 m]) reconnaissance over the high-altitude LZs." *[July EA p. 2-15]*
See comment for 2.1 HAMET Training Overview p. 2-2.

2.7.2.4 LZ Selection
"The proposed LZs...are approximately 150 by 150 ft (46 by 46 m)." *[July EA p. 2-11]*
"I have guidance from the military about Chinook landing sites. They recommend that a rectangular area measuring 100m x 100m, cleared to ground level and free from immovable objects that are more than 2 feet high should be provided for these aircraft."
[2-16-11 e-mail from Helicopter Adviser Peter Rover to Cory Harden, enclosed. Rover is cited as the author of a report on a helipad prepared in 2010 for Southampton University Hospital, U.K., http://www.southampton.gov.uk/moderngov/mgConvert2PDF.aspx?ID=2964]
See also comments for p. 4-3.

2.7.2.5 Use of LZs [*July EA p. 2-15]*
"Flight paths of this alternative *[Alternative 1]* avoid designated wilderness areas and are designed to avoid close proximity to Kipuka 'Ainahou Nene Sanctuary...and fly high enough over palila critical habitat as not to disturb palila..." *[July EA p. 2-16]*
But Figure 2-14 shows LZ-3 just outside the Nene Sanctuary.
Re. palila see comments for. 2.1 HAMET Training Overview p. 2-2, and for p. 2-10.

2.7.7 Other High-Altitude Training Sites *[July EA p. 2-18]*
"Another possible offsite location for HAMET that the 25th CAB considered is at Fort Carson in Colorado Springs, Colorado...most of the 25th CAB is going to conduct a majority of the HAMET requirement at Fort Carson..." *[July EA p. 2-18]*
Why was this alternative—now being used-- not mentioned in the April EA?

[with HAMET done at Fort Carson] "Aircrews will spend up to an additional 45 days away from Families prior to the upcoming deployment; and helicopters and maintenance crews will spend additional time on the mainland..." *[July EA p. 2-18]*
See comment for p. 1-3.

Figures 2-15 through 2-20
See comment for 2.1 HAMET Training Overview p. 2-2.

3.6 Biological Resources *[July EA p. 3-22 ff.]*
The EA should evaluate impacts from loss of potential habitat which might enhance survival of endangered species, even if they are not using the habitat now.

Below are listed several at-risk species that may occur below flight paths (per Table 3-5 on p. 3-24) and may breed/ nest in October, when the training is planned.
"HAMET Phase II...will be conducted during October 2011." *[July EA p. 2-10]*

'Ake 'ake or Band-rumped storm petrel (*Oceancodroma castro*)
candidate for Federal endangered species list
on State endangered species list
"In Hawai'i, eggs are laid between May and June, and nestlings fledge in October."
[http://www.state.hi.us/dlnr/dofaw/cwcs/files/NAAT%20final%20CWCS/Chapters/Terrestrial%20Fact%20Sheets/Seabirds/band-rumped%20storm%20petrel%20NAAT%20final%20!.pdf]

`Akiapola`au or Hammerhead bird (Hemignathus munroi)
On Federal and State endangered species lists
"Two nests of the `Akiapola`au have been found, one in October and one in February...
`Akiapola`au may have a prolonged breeding period."
*[http://www.state.hi.us/dlnr/consrvhi/*forestbirds]

'Amakihi bird (*Hemignathus virens virens*)
Federal species of special concern
State –no listing
"On the island of Hawai'i, their breeding season extends from late October through August."
[Kern, Michael and Charles van Riper, Altitudinal variations in the nests of the Hawaiian honeycreeper Hemignathus virens virens, The Condor 86:443-454, http://www.jstor.org/pss/1366825]

Hawai'i `Elepaio (*Chasiempis sandwichensis*)
Federal species of special concern
State –no listing
"Nesting dates range from January to August depending on the population, and even between years (perhaps in response to rainfall)."
[http://birds.audubon.org/species/elepai]

'Io or Hawaiian Hawk (*Buteo solitarus*)
on Federal and State endangered species lists
"Although the complete biology of this species is not known, the breeding season runs from February through August and possibly September, with pairs having their own schedule that may be dependent on locality."
[http://www.hilozoo.com/zoo_facts_animals_birds.php]

Nēnē or Hawaiian goose (*Branta sandvicensis*)
on Federal and State endangered species lists
"...breeding season, extending from October through February..."
[http://www.state.hi.us/dlnr/consrvhi/forestbirds]

`Ope`ape`a or Hawaiian Hoary Bat (*Lasiurus cinereus semotus*)
on Federal and State endangered species lists
"It is believed that mating occurs between September and December..."
[http://www.state.hi.us/dlnr/dofaw/cwcs/files/hawaiian_hoary_bat.pdf

Palila bird (*Loxioides bailleui*)
on Federal and State endangered species lists
"Breeding season begins in March and continues through August.... young...remain in the nest for up to 31 days before fledging." *[http://www.state.hi.us/dlnr/consrvhi/forestbirds]*

'Ua'u or Hawaiian petrel (Pterodroma sandwichensis)
on Federal and State endangered species lists
'Most eggs are laid in May and June and most birds fledge by December."
[http://www.state.hi.*us/dlnr/dofaw/cwcs/files/NAAT%20final%20CWCS/Chapters/Terrestrial%20Fact%20Sheets/Seabirds/Hawaiian%20petrel%20NAAT%20final%20!.pdf]*

"The flight path is also over a portion of palila critical habitat..." *[July EA p. 3-22]*
See comment for 2.1 HAMET Training Overview p. 2-2.

"In February, March, May and June 2011, presence surveys for vegetation, birds, bats, and arthropods were conducted at the proposed LZs..." *[July EA p. 3-23]*
It appears Cory Harden's comments for the April EA were not addressed --"Helicopters will fly 200 feet about ground level in a 6560-foot (1 ¼ mile) diameter circle around the LZs [EA p. 2-9]...But surveys conducted by the Pohakuloa Natural Resources Office were within a square only one-tenth that size for plants, bat habitat, and wekiu bugs. Surveys were within a circle only two-thirds that size for birds. [EA p. A-4 to A-5]"

"There are no identified active petrel breeding colonies near (within the 2000-ft radius survey area) the Mauna Kea and Mauna Loa LZs..." *[July EA p. 3-31 and 4-14]*
This information from the April EA should be included: " The March 2011 presence survey conducted at the Mauna Loa LZs found evidence of a potential colony within 350 ft...of the Mauna Loa LZ.. suspected Hawaiian petrel nesting sites are within the 2,000-ft... buffer of the Mauna Loa and Mauna Kea LZs." "
[April EA p. 3-32]

"In February, March, May and June 2011, surveys for birds, bats, arthropods, and vegetation within survey areas up to 2,000-ft (610-m) radius of LZs on Mauna Kea and Mauna Loa were conducted to determine whether significant resources were present, and no significant resources were found at those locations..." *[July EA p. 3-37]*
Were the species likely to be present at this time of year, in the same numbers as in October?

3.7.1 Cultural Overview *[July EA pp. 3-41 to 42]*
"Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain."
[July EA p. 3-42]

This and other additions to 3.7, the Cultural Resources section, are commendable.
Unfortunately, there is still no response to Cory Harden's comments on this section for the April 2011 and December 2010 EAs.

'Perhaps because it is an active volcano that erupted as recently as 1984, literature searches reveal much less cultural information about Mauna Loa than either Mauna Kea or the Saddle Region..." *[July EA p. 3-50]*
This was not corrected despite the January 31, 2011 letter by Theresa Donham of the State Historic Preservation Division. It says Donham is incorrectly cited as a reference and "Common sense would indicate that there is less information for Mauna Loa because there have been fewer actions triggering the need for impact assessments..." [July EA p. B-80]

4.3 Air Quality *[July EA p. 4-3]*
"Figure 4-3 is a photo of a Black Hawk that is hovering 12 in.(30 cm) from the ground on LZ-5...The photo shows no dust visible." *[July EA p. 4-4]*
Would no dust be visible for a Chinook?

The EA should include more specific information on rotor wash and vortices--windspeed, size and shape of affected area, and effects on different weights of objects on the ground—based on independent studies. That information, plus the following statements, should be analyzed in relation to biological resources, noise, and safety, as well as air quality.

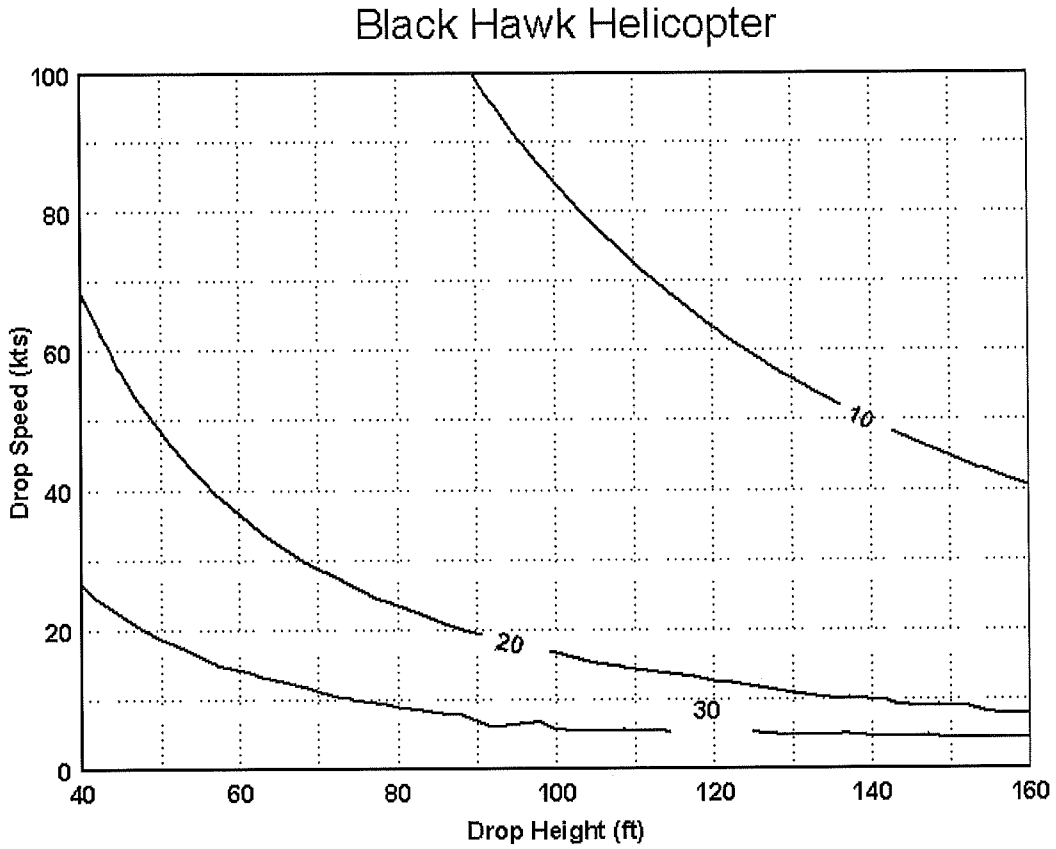
> *The rotor wash from the CH- 47 [Chinook] presents a safety hazard to smaller aircraft."*
> *[http://www.globalsecurity.org/military/systems/aircraft/ch-47d.htm]*
>
> *"...a DAILY analysis of the Army's aviation mishap database dating back to the 1970s shows that Chinooks and AH-1 Cobras are the two leading helicopters for downwash-related incidents. The review of about 100,000 records identified 65 mishaps involving rotorwash or downwash as a probable or possible cause, with the Chinook being the named culprit in about two dozen of them."*
> *[Rotor-wash concerns buffet Chinook, Michael Fabey/Aerospace Daily & Defense Report, Aviation Week, copyright 2011,*
> *[http://www.aviationweek.com/aw/jsp_includes/articlePrint.jsp?headLine=Rotor-wash%20concerns%20buffet%20Chinook&storyID=news/5CSAR060508.xml]*
>
> *"...a DAILY analysis of Army aviation incidents dating back to the late 1970s and into the first years of the current conflicts in Iraq and Afghanistan shows about two dozen cases of injury or damage were related to Chinook downwash...*
> ** July 24, 1993: "The rotor wash from the CH-47 pushed the OH-58 three feet to the right, then picked it up onto the right skid, it then pivoted 35 to 45 degrees to the left deflecting the tailboom a total of 7 to 8 feet."*
> *The entire left side of the OH-58 was blasted with dirt, dust and rocks. The damage to the aircraft included: sand and small rocks got into the transmission compartment, injector tubes, swirltubes, engine inlet and engine exhaust collector. The exposed tail rotor driveshaft hangar bearings required purging to clean out the dirt and dust. An engine mechanic determined that the engine requires disassembly and multiple inspections.*
> **March 25, 1996: "The rotor downwash from the CH-47 caused the door of the OH-58 to blow off."*
> **Jan. 8, 2000: "A heavily loaded CH-47 picked up to a hover upwind of a parked UH-60A. The blades of the UH-60A began to spin and flap up and down causing damage to the spindle."*
> *The downwash also damaged buildings:*
> ** June 4, 1990: "Aircraft flew over Bajio (Panama) and portion of roof collapsed. Four service members were reported to be struck by flying debris with one of four soldiers admitted to hospital for two days of observation. Other service members were treated with minor injuries."*
> ** March 25, 1996: CH-47D helicopter was on final approach to soccer field at Kankintu, Panama, carrying a 15,000-pound external load. Resulting rotorwash lifted a poorly secured roof from an*

adjacent shed despite every effort by aircrew to land as far away as possible avoiding overflight of the building."
And the rotor wash has been associated with injuries:
** July 5, 1992: "Soldier on ground was injured when he was hit on the head by the cross beam of the camouflage netting which was blown down by the CH-47D. The injury to the soldier required three stitches to close the wound."*
** Jan. 5, 1999: "The rotor wash from the CH-47D knocked the injured personnel down. The injured personnel tried to break his fall with his hand and injured his wrist."*
[Chinook Downwash Moved Other Helos, Blew Off Roofs, Michael Fabey/Aerospace Daily & Defense Report , Aviation Week, Jul 3, 2007, http://www.aviationweek.com/aw/generic/story_generic.jsp?channel=defense&id=news/CHIN070307.xml&headline=Chinook%20Downwash%20Moved%20Other%20Helos,%20Blew%20Off%20Roofs]

"I have guidance from the military about Chinook landing sites. They recommend that a rectangular area measuring 100m x 100m, cleared to ground level and free from immovable objects that are more than 2 feet high should be provided for these aircraft. The AUW of a Chinook is over 23 tonnes and its overall length, which being a twin rotor machine is equivalent to its effective rotor diameter, is just over 30m. In still air it is reckoned that down wash will dissipate into the ambient wind at a range of about 3 x the rotor diameter away from the edges of the rotor disk. This means that the down wash effect will be felt up to about 90m from the edges of the rotor. If there is any wind blowing, the effect will extend further down wind and be reduced up wind depending on the wind strength. The maximum velocity of the down wash is equivalent to hurricane force so, generally, the Chinook should not be allowed anywhere near civilisation!

The Black Hawk is a 10 tonne helicopter with a rotor diameter of about 16.5 m . It will generate a mass down wash equivalent to 10 tonnes which will dissipate into the ambient wind flow at a range of about 50m from the rotor edges. The design of the blade tips gives rise to a particularly vicious type of blade tip vortex which can displace light building cladding and any loose objects within this range of 50m at least. The duration of the effects will depend on how long the pilot holds a hover; if the pilot does not delay but gets on with the landing the effect will be felt for about a minute to a minute and a half."
[2-16-11 e-mail from Helicopter Adviser Peter Rover to Cory Harden, enclosed. Rover is cited as the author of a report on a helipad prepared in 2010 for Southampton University Hospital, U.K., http://www.southampton.gov.uk/moderngov/mgConvert2PDF.aspx?ID=2964]

"The Black Hawk, which...has a smaller rotor diameter at 53 ft (16 m), begins to affect a localized environment when the pilot lowers it to 79 ft (24 m) AGL." *[July EA p. 4-4]*
Explain the apparent contradiction with the statement and graph below, both from the same source:
"If the Black Hawk were hovering, it would have to be well over 160 feet to achieve a rotor wash less than 30 mph."
[Rotor Wash, U.S. Department of Agriculture Forest Service Aerial Delivery System User Information, revision date 1/26/05, http://www.fs.fed.us/outernet/rm/fire/pubs/pdfpubs/user_gd/ug-15.pdf]



4.6 Biological Resources *[July EA p. 4-11]*
"...a mitigation measure...calls for inspecting and cleaning the aircraft as required, if invasive species are identified." *[July EA p. 4-13]*
This should not have been watered down compared to April EA, which says "a mitigation measure...calls for cleaning the aircraft." [April EA p. 4-13]

"The potential impacts of noise to the endangered and threatened wildlife species were determined to be insignificant because the noise generated by HAMET operations at LZs will be intermittent and of short duration (generally less than 10 minutes)..." *[July EA p. 4-13]*
Surely there will be more than 10 minutes of noise from all maneuvers-- descent, reconnaissance from 100-500 feet up, short-stop approach, abort, go-around, climb-out, full-stop landing, multiple touch-and-go, landing on uneven surfaces and pinnacles, hovering 3 feet up, and flying at 200 feet in a 1 ¼ mile diameter circle centered on each LZ. [see July EA pp. 2-1 to 2, 2-9, and 2-15]

It appears Sierra Club comments on noise for the April EA were not considered.

"Surveys for petrels were conducted at all LZs in March and June 2011." *[July EA p. 4-14]*
See comments for p. 3-23.

"Palila...Mitigation measures are in place to lessen the impact of the noise by maintaining an altitude of at least 2,000 ft (610 m) AGL while flying outside of the PTA and at locations near the designated LZs..." *[July EA p. 4-14]*
But Figure 3-12 shows checkpoints, where helicopters would start descending, above palila critical habitat.

"...measures are in place to inspect and clean equipment and helicopters if necessary to avoid the transportation of nonnative species..." *[July EA p. 4-14]*
See comments on this topic for p.4-13.

4.11 Noise *[July EA p. 4-31]*
4.12 Visual and Aesthetic Resources *[July EA p. 4-50]*
4.13 Human Health and Safety Hazards *[July EA p. 4-58]*
These are major concerns for many citizens, and Sierra Club made extensive comments on these issues for the April EA, but apparently no changes were made.
Re. safety, see also comments for p. 2-7.

What are plans for helicopters "socked in" at landing zones by one of the sudden weather changes common on mountains?

Appendixes
Appendixes should include the 5-23-11 comments from U.S. Fish and Wildlife Service.

Memorandum by Peter Peshut, Program Manager, Natural Resources Office, PTA—Appendix A
"Botanical surveys were conducted 23 February 2011...and 24 February 2011..." *[July EA p. A-4]*
"Surveys to assess potential available treeland roosting habitat and potential foraging habitat for the federally-listed Hawaiian Hoary Bat were conducted 02 March 2011...and 03 March 2011..." *[July EA p. A-5]*
Would results have been different in June?

"Several bird species protected under the Migratory Bird Treaty Act were identified at the LZs...Overall densities of these birds within the survey areas were extremely low. These bird species are expected to vacate the immediate vicinities of the aircraft and LZs if present during HAMET operations." *[July EA p. A-6]*
This could be disruptive to feeding, raising young, and breeding.

"The spread of invasive species within the project area will be reduced by inspecting and cleaning the exterior of the HAMET aircraft at the Bradshaw Army Air Field prior to training flights...Helicopters will be inspected for invasive arthropod and plant species prior to each mission, and cleaning protocols will be followed if invasive species are identified." *[July EA p. A-7]*
This seems to contradict p. 4-13 and p. 4-14—see comments for those pages.

"HAMET operations will produce ~10 minutes of noise disturbance per LZ landing event..." *[July EA p. A-7]*
See comments on noise for p. 4-13.

Appendix B—4-15-11 letter from Douglas Mulbury of the Army to William Aila of DLNR *[July EA p. B-3 to 4]*
"Based upon discussions with the pilots, rotor wash begins to affect the ground once the helicopters have reached an altitude of 90 feet above ground level. This altitude will be reached at 100 meters from the center of the landing zone. In addition, most of the effects of rotor wash on the ground are felt on liftoff.... Thus, the overall acreage for the six discontinuous APEs is 14.8 acres."
No supporting evidence is cited except "discussions with the pilots".

Appendix B--1-31-11 letter from Theresa Donham of SHPD to Charlene Uoki of DLNR re the December 2010 EA *[July EA, p. B-76 to 81]*
Concerns raised by SHPD have not been adequately addressed.

ENCLOSURES

2-27-08 letter from National Guard Major General Francis Vavala to Congresspeople

2-16-11 e-mail from Helicopter Adviser Peter Rover to Cory Harden

AR-15-6 Investigation Findings and Recommendations for Accident of Aircraft #09-05578 re. June 30, 2010 Colorado HAMET crash

http://www.southampton.gov.uk/moderngov/mgConvert2PDF.aspx?ID=2964

report by Rover on helipad for Southampton General Hospital, U.K.

.....

From: Peter Rover [mailto:pbrover@blueyonder.co.uk]
Sent: Tuesday, August 16, 2011 11:05 PM
To: 'Cory (Martha) Harden'
Subject: RE: rotor wash

17 August 2011

Dear Cory,

I am no great expert on the technical details of down wash and vortices but have a fair amount of anecdotal information on the subject.

Dr John Leverton who now lives in the USA published useful information about down wash many years ago. I spoke to him just yesterday on Skype and I am sure he will help you as far as he is able to.

I get involved in a number of queries from civil authorities about the effects of down wash. I assume, since you distinguish between down wash (rotor wash) and vortices that you are aware of the different characteristics. Down wash is the mass displacement of air down through the rotors and is equivalent to the mass of the helicopter producing it. Vortices are generated at the blade tips and are particularly erratic in their behaviour, dispersal patterns and rates of decay.
I have guidance from the military about Chinook landing sites. They recommend that a rectangular area measuring 100m x 100m, cleared to ground level and free from immovable objects that are more than 2 feet high should be provided for these aircraft. The AUW of a Chinook is over 23 tonnes and its overall length, which being a twin rotor machine is equivalent to its effective rotor diameter, is just over 30m. In still air it is reckoned that down wash will dissipate into the ambient wind at a range of about 3 x the rotor diameter away from the edges of the rotor disk. This means that the down wash effect will be felt up to about 90m from the edges of the rotor. If there is any wind blowing, the effect will extend further down wind and be reduced up wind depending on the wind strength. The maximum velocity of the down wash is equivalent to hurricane force so, generally, the Chinook should not be allowed anywhere near civilisation!

The Black Hawk is a 10 tonne helicopter with a rotor diameter of about 16.5 m . It will generate a mass down wash equivalent to 10 tonnes which will dissipate into the ambient wind flow at a range of about 50m from the rotor edges. The design of the blade tips gives rise to a particularly vicious type of blade tip vortex which can displace light building cladding and any loose objects within this range of 50m at least.
The duration of the effects will depend on how long the pilot holds a hover; if the pilot does not delay but gets on with the landing the effect will be felt for about a minute to a minute and a half. You can see video footage on Chinook down wash on U tube (an approach to landing in the Afghanistan wilderness. Quite dramatic!

I hope that helps, and good luck with your project.

Regards

Peter Rover

REPORT OF PROCEEDINGS BY INVESTIGATING OFFICER/BOARD OF OFFICERS

For use of this form, see AR 15-6; the proponent agency is OTJAG.

IF MORE SPACE IS REQUIRED IN FILLING OUT ANY PORTION OF THIS FORM, ATTACH ADDITIONAL SHEETS

SECTION I - APPOINTMENT

Appointed by MG James L. Terry, Commander, 10th Mountain Division
(Appointing authority)

on 06JUL10 *(Attach inclosure 1: Letter of appointment or summary of oral appointment data.) (See para 3-15, AR 15-6.)*
(Date)

SECTION II - SESSIONS

The *(investigation) (board)* commenced at Butts Army Airfield, Fort Carson, CO *(Place)* at 0800 *(Time)*

on 07JUL10 *(Date)* *(If a formal board met for more than one session, check here* ☐ *. Indicate in an inclosure the time each session began and ended, the place, persons present and absent, and explanation of absences, if any.)* The following persons *(members, respondents, counsel)* were present: *(After each name, indicate capacity, e.g., President, Recorder, Member, Legal Advisor.)*

CW5 (b)(6) Investigating Officer.

The following persons *(members, respondents, counsel)* were absent: *(Include brief explanation of each absence.) (See paras 5-2 and 5-8a, AR 15-6.)*

The *(investigating officer) (board)* finished gathering/hearing evidence at _____ *(Time)* on _____ *(Date)*

and completed findings and recommendations at _____ *(Time)* on _____ *(Date)*

SECTION III - CHECKLIST FOR PROCEEDINGS

	A. COMPLETE IN ALL CASES	YES	NO 1/	NA 2/
1	Inclosures *(para 3-15, AR 15-6)*			
	Are the following inclosed and numbered consecutively with Roman numerals: *(Attached in order listed)*			
	a. The letter of appointment or a summary of oral appointment data?	☒	☐	
	b. Copy of notice to respondent, if any? *(See item 9, below)*	☐	☐	☒
	c. Other correspondence with respondent or counsel, if any?	☐	☐	☒
	d. All other written communications to or from the appointing authority?	☐	☐	☒
	e. Privacy Act Statements *(Certificate, if statement provided orally)?*	☒	☐	☐
	f. Explanation by the investigating officer or board of any unusual delays, difficulties, irregularities, or other problems encountered *(e.g., absence of material witnesses)?*	☐	☐	☒
	g. Information as to sessions of a formal board not included on page 1 of this report?	☐	☐	☒
	h. Any other significant papers *(other than evidence)* relating to administrative aspects of the investigation or board?	☐	☐	☒

FOOTNOTES: 1/ *Explain all negative answers on an attached sheet.*
2/ *Use of the N/A column constitutes a positive representation that the circumstances described in the question did not occur in this investigation or board.*

		YES	NO 1/	NA 2/
2	Exhibits *(para 3-16, AR 15-6)*			
	a. Are all items offered *(whether or not received)* or considered as evidence individually numbered or lettered as exhibits and attached to this report?	☒	☐	☐
	b. Is an index of all exhibits offered to or considered by investigating officer or board attached before the first exhibit?	☒	☐	☐
	c. Has the testimony/statement of each witness been recorded verbatim or been reduced to written form and attached as an exhibit?	☒	☐	☐
	d. Are copies, descriptions, or depictions *(if substituted for real or documentary evidence)* properly authenticated and is the location of the original evidence indicated?	☒	☐	☐
	e. Are descriptions or diagrams included of locations visited by the investigating officer or board *(para 3-6b, AR 15-6)?*	☒	☐	☐
	f. Is each written stipulation attached as an exhibit and is each oral stipulation either reduced to writing and made an exhibit or recorded in a verbatim record?	☐	☐	☒
	g. If official notice of any matter was taken over the objection of a respondent or counsel, is a statement of the matter of which official notice was taken attached as an exhibit *(para 3-16d, AR 15-6)?*	☐	☐	☒
3	Was a quorum present when the board voted on findings and recommendations *(paras 4-1 and 5-2b, AR 15-6)?*	☐	☐	☒
B. COMPLETE ONLY FOR FORMAL BOARD PROCEEDINGS *(Chapter 5, AR 15-6)*				
4	At the initial session, did the recorder read, or determine that all participants had read, the letter of appointment *(para 5-3b, AR 15-6)?*	☐	☐	
5	Was a quorum present at every session of the board *(para 5-2b, AR 15-6)?*	☐	☐	
6	Was each absence of any member properly excused *(para 5-2a, AR 15-6)?*	☐	☐	☐
7	Were members, witnesses, reporter, and interpreter sworn, if required *(para 3-1, AR 15-6)?*	☐	☐	☐
8	If any members who voted on findings or recommendations were not present when the board received some evidence, does the inclosure describe how they familiarized themselves with that evidence *(para 5-2d, AR 15-6)?*	☐	☐	☐
C. COMPLETE ONLY IF RESPONDENT WAS DESIGNATED *(Section II, Chapter 5, AR 15-6)*				
9	Notice to respondents *(para 5-5, AR 15-6):*			
	a. Is the method and date of delivery to the respondent indicated on each letter of notification?	☐	☐	
	b. Was the date of delivery at least five working days prior to the first session of the board?	☐	☐	
	c. Does each letter of notification indicate —	☐	☐	
	(1) the date, hour, and place of the first session of the board concerning that respondent?	☐	☐	
	(2) the matter to be investigated, including specific allegations against the respondent, if any?	☐	☐	
	(3) the respondent's rights with regard to counsel?	☐	☐	
	(4) the name and address of each witness expected to be called by the recorder?	☐	☐	
	(5) the respondent's rights to be present, present evidence, and call witnesses?	☐	☐	
	d. Was the respondent provided a copy of all unclassified documents in the case file?	☐	☐	
	e. If there were relevant classified materials, were the respondent and his counsel given access and an opportunity to examine them?	☐	☐	☐
10	If any respondent was designated after the proceedings began *(or otherwise was absent during part of the proceedings):*			
	a. Was he properly notified *(para 5-5, AR 15-6)?*	☐	☐	☐
	b. Was record of proceedings and evidence received in his absence made available for examination by him and his counsel *(para 5-4c, AR 15-6)?*	☐	☐	☐
11	Counsel *(para 5-6, AR 15-6):*			
	a. Was each respondent represented by counsel?	☐	☐	
	Name and business address of counsel:			
	(If counsel is a lawyer, check here ☐ *)*			
	b. Was respondent's counsel present at all open sessions of the board relating to that respondent?	☐	☐	☐
	c. If military counsel was requested but not made available, is a copy *(or, if oral, a summary)* of the request and the action taken on it included in the report *(para 5-6b, AR 15-6)?*	☐	☐	☐
12	If the respondent challenged the legal advisor or any voting member for lack of impartiality *(para 5-7, AR 15-6):*			
	a. Was the challenge properly denied and by the appropriate officer?	☐	☐	☐
	b. Did each member successfully challenged cease to participate in the proceedings?	☐	☐	☐
13	Was the respondent given an opportunity to *(para 5-8a, AR 15-6):*			
	a. Be present with his counsel at all open sessions of the board which deal with any matter which concerns that respondent?	☐	☐	
	b. Examine and object to the introduction of real and documentary evidence, including written statements?	☐	☐	☐
	c. Object to the testimony of witnesses and cross-examine witnesses other than his own?	☐	☐	☐
	d. Call witnesses and otherwise introduce evidence?	☐	☐	
	e. Testify as a witness?	☐	☐	
	f. Make or have his counsel make a final statement or argument *(para 5-9, AR 15-6)?*	☐	☐	
14	If requested, did the recorder assist the respondent in obtaining evidence in possession of the Government and in arranging for the presence of witnesses *(para 5-8b, AR 15-6)?*	☐	☐	☐
15	Are all of the respondent's requests and objections which were denied indicated in the report of proceedings or in an inclosure or exhibit to it *(para 5-11, AR 15-6)?*	☐	☐	☐

FOOTNOTES: 1/ *Explain all negative answers on an attached sheet.*
2/ *Use of the N/A column constitutes a positive representation that the circumstances described in the question did not occur in this investigation or board.*

SECTION IV - FINDINGS *(para 3-10, AR 15-6)*

The *(investigating officer) (board)* , having carefully considered the evidence, finds:

1. The pilots were properly briefed for the mission they were flying and they were flying that mission within the constraints of their briefing. However, the mission approval authority, the mission briefer, and the mission pilots did not properly interpret , nor comply with unit SOP requirements during the briefing and risk assessment process.

2. AH-64D #09-05578 crashed due to the negligence of its two-person aircrew because that crew:

a. Deliberately placed the aircraft in situation where there was little or no margin for error,

b. Did not adequately coordinate performance and contingency analysis,

c. Failed to recognize and properly react to warning signs that the aircraft was approaching and exceeding both its and the aircrew's limits,

d. Did not react in a timely, coordinated, and appropriate manner to execute an escape plan.

3. A present and contributing cause of this crash was the design and execution of the High Altitude Mountain Environment Training (HAMET) program because of its emphasis on performing unrealistic, non-mission-focused tasks for reconnaissance and attack aircraft.

4. The ad hoc command and control of the HAMET training program contributed to the delay in discovering that a crash occurred, and recovering the crash victims in a timely manner.

SECTION V - RECOMMENDATIONS *(para 3-11, AR 15-6)*

In view of the above findings, the *(investigating officer) (board)* recommends:

See attached memorandum for recommendations.

SECTION VI - AUTHENTICATION *(para 3-17, AR 15-6)*

THIS REPORT OF PROCEEDINGS IS COMPLETE AND ACCURATE. *(If any voting member or the recorder fails to sign here or in Section VII below, indicate the reason in the space where his signature should appear.)*

(b)(6)

~~(Recorder)~~ *(Investigating Officer)* ~~*(President)*~~

~~(Member)~~ ~~(Member)~~

~~(Member)~~ ~~(Member)~~

SECTION VII - MINORITY REPORT *(para 3-13, AR 15-6)*

To the extent indicated in Inclosure _____, the undersigned do(es) not concur in the findings and recommendations of the board.

(In the inclosure, identify by number each finding and/or recommendation in which the dissenting member(s) do(es) not concur. State the reasons for disagreement. Additional/substitute findings and/or recommendations may be included in the inclosure.)

(Member) (Member)

SECTION VIII - ACTION BY APPOINTING AUTHORITY *(para 2-3, AR 15-6)*

The findings and recommendations of the *(investigating officer)* ~~*(board)*~~ are *(approved)* ~~*(disapproved)*~~ ~~*(approved with following exceptions/ substitutions)*~~. *(If the appointing authority returns the proceedings to the investigating officer or board for further proceedings or corrective action, attach that correspondence (or a summary, if oral) as a numbered inclosure.)*

DEPARTMENT OF THE ARMY
Headquarters, 10th Combat Aviation Brigade
19815 Hangar Access Road
Fort Drum, New York 13603

AFDR-BDA-OP

10 AUG 10

MEMORANDUM THRU Commander, 10th Combat Aviation Brigade, Fort Drum, New York, 13602

FOR Commander, 10th Mountain Division, Fort Drum, New York, 13602

SUBJECT: AR 15-6 Investigation Findings and Recommendations for Accident of Aircraft #09-05578.

1. FINDINGS: After investigating the aviation accident on 30 June 2010, I conclude, based on the preponderance of the evidence, that:

a. The pilots were properly briefed for the mission they were flying and they were flying that mission within the constraints of their briefing. However, the mission approval authority, the mission briefer, and the mission pilots did not properly interpret, nor comply with unit SOP requirements during the briefing and risk assessment process.

b. AH-64D #09-05578 crashed due to the negligence of its two-person aircrew because that crew:

(1) Deliberately placed the aircraft in situation where there was little or no margin for error,

(2) Did not adequately coordinate performance and contingency analysis,

(3) Failed to recognize and properly react to warning signs that the aircraft was approaching and exceeding both its and the aircrew's limits,

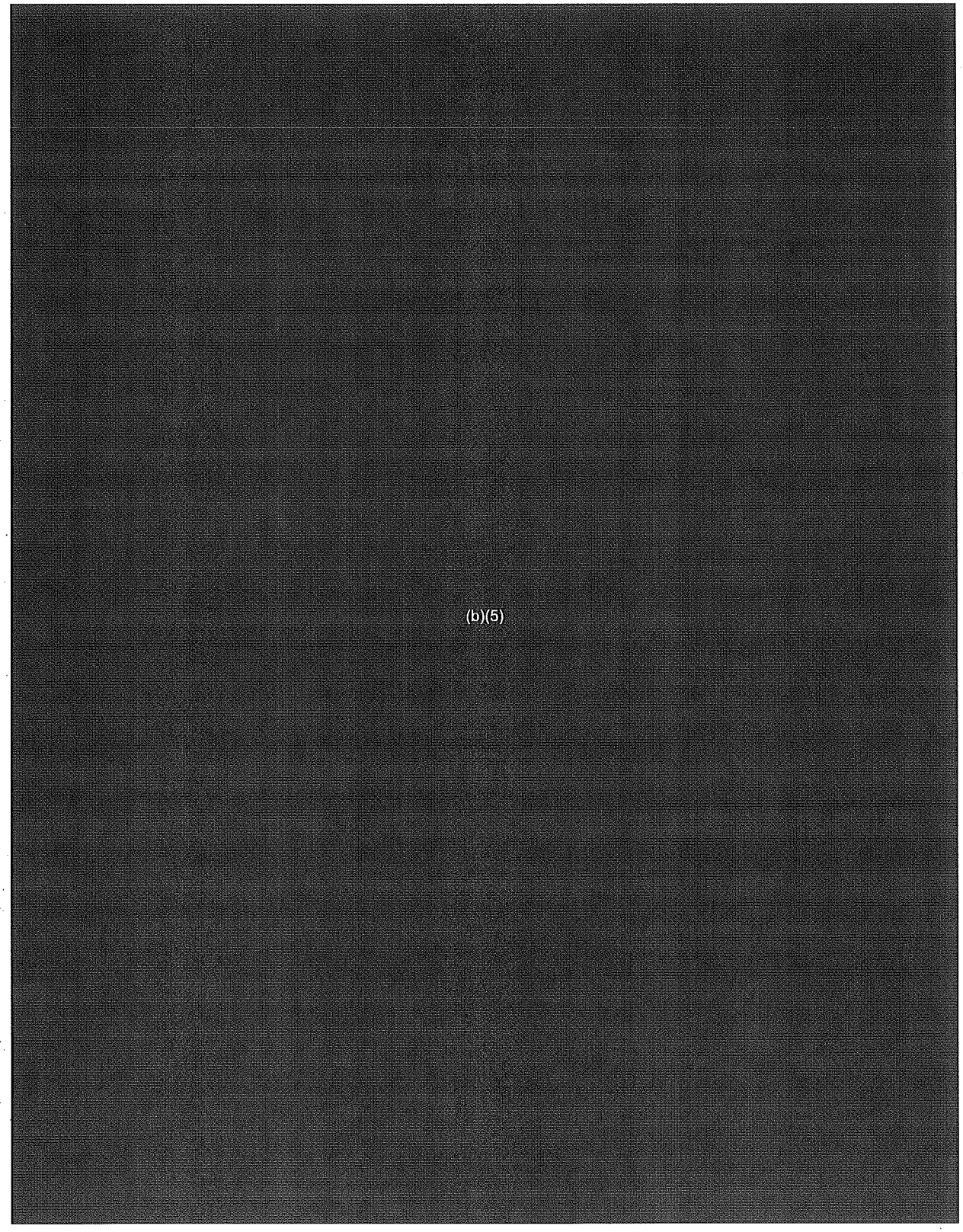
(4) Did not react in a timely, coordinated, and appropriate manner to execute an escape plan.

c. A present and contributing cause of this crash was the design and execution of the High Altitude Mountain Environment Training (HAMET) program because of its emphasis on performing unrealistic, non-mission-focused tasks for reconnaissance and attack aircraft.

d. The ad hoc command and control of the HAMET training program contributed to the delay in discovering that a crash occurred, and recovering the crash victims in a timely manner.

2. RECOMMENDATIONS: I recommend that:

(b)(5)


(b)(5)

[redacted]

3. BACKGROUND: The following section explains the rationale for reaching my findings and recommendations, and provides reference to the evidence I used to support my analysis.

a. The aircrew of AH-64D #09-05578 was briefed by CW3 [redacted] (2) and the mission was approved by CPT [redacted] (3). The risk assessment matrix form (4) was filled out with no addition errors for a total risk value of 44 and a total risk assessment of "Low." CW3 [redacted] the C/1-10 Standardization Instructor Pilot, was an authorized mission briefer. CPT [redacted] the C/1-10 Commander was an authorized approval authority. The signatures are valid. On the front side of the RAM, 10CAB has combined the DA Form 5484-R (Mission Schedule/Brief) with a CAB-generated Mission Approving Authority Verification Form (5).

On all three forms, there are references to this aircrew's intent to conduct multi-ship, multi-aircraft, and formation flight. In accordance with Chapter 18 *Multi-Ship Operations* of the 10CAB Tactical Air SOP ¶ 1.a. '[redacted]' (6) An AMC was not designated for this mission. CW3 [redacted] explained in his statement (2) the rational for why no AMC was designated for this mission; "*We briefed multi-ship operations in the event of a link up with other aircraft for opportunity training in the area in order to support our training objectives.*"

I asked other members of this unit (to include the Task Force Operations Officer) their views on the necessity of designating an AMC for this type of mission. Although I did not take written statements, I can characterize these conversations by relaying that all persons I talked to agreed that although the SOP requires an AMC, they believed it was not necessary for these types of training missions in which aircrews are generally conducting individual training and may only need to conduct "opportunity" training by coordinating in the air with another aircraft in the vicinity. None agreed on what level of multi-ship integration would require an AMC.

b. The aircrew did not find themselves in a situation wherein they were suddenly confronted with almost no power margin by chance. The instructor pilot had progressively increased the difficulty of the maneuver, Task 1058 *Perform Visual Meteorological Conditions Approach* (7) by changing the external conditions (e.g. increasing density altitude). CW4 [redacted] in his first sworn statement (8), relayed; "*The concept was to progressively increase the difficulty by changing the conditions in a step-by-step manner. If the pilot had trouble at any stage, we would not move on to areas with more difficult conditions until he could demonstrate capability to do so.*"

On the initial approach attempt at the Almagre landing site (approximately 12,200 feet above sea level), the aircrew was aware that they had possibly only a 2% to 4% power margin between their maximum torque available and what they determined it would take to make their first landing attempt. CW2 [redacted] remembers 2% to 3% in his statement (9), but the transcript of the cockpit voice record (10) has CW4 [redacted] predicting a 4% margin (time stamp 00:26:27.296). Several seconds later into that first approach attempt (time stamp 00:26:36.719) CW4 [redacted] states; "*Alright, so we have very little margin room...*"

Later in the approach, they actually encounter conditions which would indicate that they required more power to execute this approach than they planned for and, more importantly, than what the aircraft was able to produce. The transcript at time stamp 00:27:38.496 has CW4 (b)(6) stating; "*Watch your power, we have no more power to start ah, messing around with, we're 90 percent… you're starting to droop the rotor, so take just a little power out, push forward cyclic, let's go around.*" After initiating a go-around, the aircrew reacted to indications of possible performance issues on the failed approach attempt by talking about how to configure the cockpit displays (see time stamp 00:28:02.304 through 00:28:53.376). They did not follow the precepts of the HAATS Student Handbook (11). Specifically, Chapter 4, under The Reconnaissance section, the student handbook states;

> "In the Power Management Training System, pilots are held accountable for the amount of power they use in the execution of the approach and takeoff. This means that they have to ascertain *all* the issues that will affect the approach and departure with respect to power as well as the *amount* that those factors affect it. Because power is scrutinized to the closest percentile of torque, *everything* matters, down to the smallest detail. At the conclusion of each landing [attempt] and takeoff, the content and accuracy of the reconnaissance is reviewed."

This deliberate review of why the aircrew expended 7% to 10% more power than the crew predicted did not occur, even though that demonstrated excess requirement meant that the aircraft was incapable of producing it.

c. It is clear from the contrast between the sworn statements of both pilots and the transcript of the cockpit voice recording that both pilots recall the level and quality of crew coordination with respect to the analysis of the landing zone sequence with greater detail than had actually taken place. Below is a recreation of the landing zone sequence checklist from the HAATS Student Book.

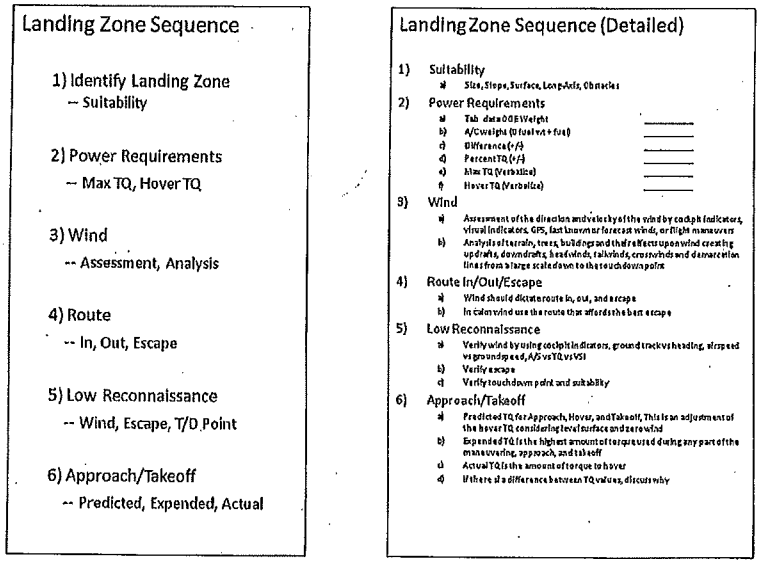


Figure 1 - Landing Zone Sequence

The instructions on page 4-1 of the HAATS Student Book say; "The following format, the Landing Zone Sequence (LZS), will be used during the HAATS training course and is recommended during all training." The HAMET POI for the AH-64D lists the only student training materials as the HAATS Student Book and a list of daily questions. This checklist only requires the aircrew to verbalize steps 2) d) and e) prior to the approach,

However, they were obligated by this checklist to figure out why the first approach torque expenditure was well outside of their prediction (see 6.d., where it states; "If there is a difference between TQ values, discuss why"). The cockpit voice transcript indicates this discussion never took place.

In fact, the crew's only alteration to their plan was to change their approach heading. Both pilots (CW2 (b)(6) in his sworn statement, and CW4 (b)(6) from the voice transcript) indicated the reason for changing the approach direction was to align the approach path with the long axis of the landing zone.

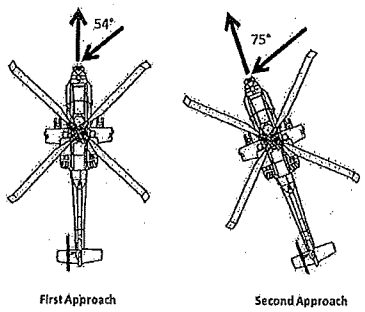


Figure 2 - Crosswind Component

However, this changed their relative wind component from a right quartering crosswind to a nearly full-on right crosswind[1]. Now, not only did the aircrew not discuss the reasons for why they used 7% to 10% more torque on their previous approach than they predicted, but they passively brushed over the implications of changing their technique without fully discussing them. According to the voice transcript, CW2 (b)(6) brings up the fact that there will be more of a crosswind component. CW4 (b)(6) seems to acknowledge this, but brings up the advantage of the ridgeline orientation:

00:29:46.368	(b)(6)	*Like traveling with more of a crosswind.*
00:29:48.544	(b)(6)	*There you go.*
00:29:51.488	(b)(6)	*Maybe just, that, there's probably a little better angle... I would come in where you got maybe more ah, lengthwise to the hill, if you would... so you're coming across, not across the ridge, but parallel to it.*

It is apparent from the next portion of the voice transcript that CW4 (b)(6) even without verbalizing the reason why, appeared to understand that the situation was serious enough that he did not trust CW2 (b)(6) to fly the approach himself and actually got on the controls with him:

00:30:22.208	(b)(6)	*Don't get too slow out here, we got to keep that speed up when we're right on the edge of power... let me help you on the cyclic just a little, now we can start slowing down... the power is good, speed's good, come on down were still, looking good, ready to start pulling power, don't get too slow, don't get too slow, we're right at our max power, we're in a thirty minute limit...*

[1] Data extrapolated from MDR data. Wind and heading for first approach from timestamp 06:48:10.550, and timestamp 06:51:37.570

00:30:54.240	(b)(6)	*OK... keep coming forward, forward, forward, Forward..... forward, God damn it.*
00:30:56.000	(b)(6)	*Eight seven* [percent torque].
00:30:57.536	Aircraft	*Rotor RPM Low* [synthesized voice]
00:30:59.774	(b)(6)	*Damn it.*
00:30:00.608	Aircraft	*Rotor RPM Low.*

d. The aircrew's only discussion of an escape route was on their initial reconnaissance, prior to the last two approach attempts:

00:24:37.5680	(b)(6)	*OK, escape route is down and to the right.*
00:24:39.215	(b)(6)	*OK.*

Unfortunately, because of their decision to change the approach direction, they were now flying almost parallel to the ridgeline (but with the mountain out the right door on short final). Their stale escape plan now had them flying into rising terrain in the event they were required to execute it near the terminal phase of the approach. According to CW2 (b)(6)'s sworn statement, he remembers the escape route as being "*...down and to the left.*" His impression was they didn't execute that plan due to the loss of tail rotor authority and, "[t]*he aircraft made the decision for us by turning to the right.*"

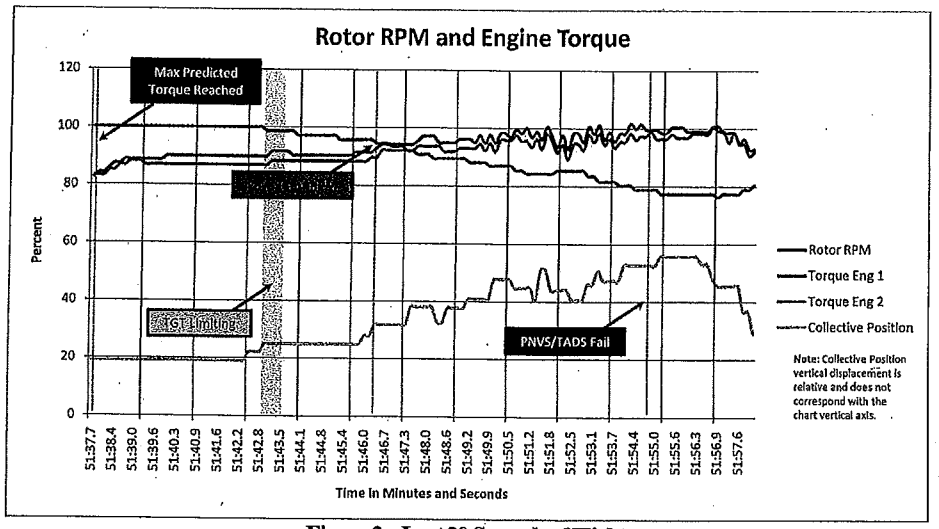


Figure 3 – Last 20 Seconds of Flight

The crew reached their predicted maximum torque of 84% (above on the left where the chart begins) and continued to demand more power. Six seconds after exceeding this with the crew not reacting, the engines entered a phase (TGT limiting) wherein they automatically started limiting fuel to prevent internal damage. The result of this was a leveling-out of the power produced by the engines. The crew, however, continued to increase the demand (observe the gray line showing relative collective position). This increase in demand in the face of engines which were limiting their output meant the rotor system RPM started to decay. Approximately nine seconds after reaching their predicted maximum, the rotor decayed to such a point that the aircraft synthesized voice announced a warning of the low rotor RPM condition. The crew continued to demand more and more power, exacerbating the situation until they crashed.

e. There are few, foreseeable mission requirements in the theater of Afghanistan which would require Army reconnaissance and attack rotary wing aircraft to land to pinnacles and ridgelines at high altitudes—even in the event of an emergency. Yet, the HAMET program (based on the successful and long established HAATS) focuses almost exclusively on landing helicopters, no matter their mission, type, design, or series, high up in the mountains. Yes, there certainly is a requirement for heavily-laden attack helicopters to take off and land to their normal bases of operations, but the very first page of the HAATS Student Book states:

> "This is achieved by creating a four-torque reference system (to be described later in these chapters) used in three flight tasks involving the *simulation* of maximum gross weight."

Simulating a fully loaded Apache can be done with ease on one's home airfield and at moderate (5- to 8-thousand foot) altitudes by simulating a low maximum torque and preventing the pilot from exceeding that training limit. High altitude combat maneuvering for attack aircraft can be simulated anywhere the aircraft can climb to altitude.

f. According to the unclassified *FORSCOM Deployment Training Guidance For Follow-On Forces Deploying ISO SWA* ,dated 01MAY10, ¶ 15.B.7.A, HAMET is an opportunity, not a requirement. This exportable training package concept requires units to plan for and conduct their training at a select few remote training areas. The training support consists of; a training facility, funding, aircrew trainers/evaluators, and a POI for aircrews. In this case, 10CAB deployed a CAB white cell for life support, and used successive Battalion Task Forces to command and control the training over a several month period. It is my impression (and that of several of the DES instructors who were supporting us) that TF Phoenix's effort was typical of all of the BN TF efforts. I conclude there were things overlooked during the planning and execution of this event which contributed to the delay in recognizing that a helicopter had crashed and in the time it took to recover the pilots.

The Army aircraft in 10CAB's inventory have up to three of the following long-range communications devices; High Frequency (HF) radio, Satellite Communications (SATCOM), and Blue Force Tracker (BFT) messaging. Of the three, only BFT was being used (partially). BFT was degraded due to problems related to the Unit Reference Number (URN), which resulted in messages being incorrectly routed. The communications architecture for this high-density, intense training event was extracted from the minimum requirements of Fort Carson regulation 95-1. The requirement for the accident aircraft, operating in Training Area 2 (where the accident site is located) was to monitor and flight follow with Butts Radio. This forced the TF operations center to rely on external, civilian communications nodes to track and relay communications to and from their aircraft. Referencing the unit's near-contemporaneous reconstructed timeline of events (13), I highlight the following facts:

(1) Butts Radio heard neither the accident aircraft ELT, the mayday call on UHF 243.0, nor the beacon from the pilot's PRC-90 survival radio. Since this aircraft was equipped with an ELT, it was authorized by FC 95-1 to operate single-ship in the mountain training area. If there were no other aircraft in the immediate vicinity that night, the accident would have gone unnoticed for significantly longer than it did.

(2) I interviewed the instructor pilot (IP) of the UH-60 (UH 590) who was first alerted to the accident. I did not take a statement, as I was only gaining situational awareness of the events that could not be discerned from the referenced memo. The IP told me he distinctly remembers hearing a 1.5 to 2 second sound from an aircraft ELT (an AH-64, AH 042 reported hearing a 2 second ELT "beep" as well). This was the only time an ELT was heard. UH-590 was the only aircraft to subsequently hear the truncated mayday call. He told me that it he heard a "Mayday, Mayday" call with no other information about one minute after hearing the short ELT signal. By cross-referencing the statement from CW4 (b)(6) where he estimates that it took about 10 minutes from the time they

crashed, he extracted CW2 (b)(6) from the cockpit, dragged him across the hill to a safe area, and then pulled out his PRC-90 survival radio, to when he transmitted the first mayday call, I was led to conclude the ELT did not activate and transmit at the time of the crash, but after a period of 5 to 10 minutes post-crash. CW4 (b)(6) told me he attempted to transmit mayday calls on two separate frequencies. Since he did not get a response, he set it to "beacon" and put the radio down to pull out his cell phone. No station reported hearing the distinctive sound the beacon should have been transmitting. This indicates to me that it was more probable that the battery of CW4 (b)(6) survival radio was so low on charge as to only be capable of a short voice transmission, than due to any operator error or equipment malfunction.

(3) Although TF Phoenix is equipped with Combat Survivor/Evader Locator (CSEL) survival radios, none of the training staff (e.g. DES instructor pilots) had them, nor were there enough for every crew member to have one of their own. The CSEL radio, when properly registered, programmed, initialized, and used, is a superbly capable piece of equipment. When any or all of these things are overlooked, it is a plastic brick.

TF Phoenix (like their predecessors) relied on a memorandum (13) which relieved them of the regulatory requirement for every crew member in each aircraft to carry an operating survival radio. Even though CW2 (b)(6) the previous period front seat pilot, passed the CSEL he was using to CW2 (b)(6) as he entered the cockpit, there were problems with how the unit was complying with the requirements of the waiver memo, how the unit was managing the radios, how the pilots were preparing and operating the radios, and how this pilot in particular, was securing the radio on this flight.

If a CSEL radio is properly registered with the rescue coordination center system, as was the case with 10CAB's previous deployments with this radio system, within two to five minutes of any of these radios being activated, I personally, as the CAB POC for survivability, would get a phone call telling me what radio (by registration information) was emitting, which subordinate unit owned it, and their POC information. This is a worldwide capability that units in CONUS habitually fail to take advantage of. In order for this amazingly short reaction time to occur, the unit with CSEL radios must:

(a) Keep the registration information for each radio current (such as when a unit deploys to Fort Carson for several weeks for HAMET).

(b) Properly key all CSEL radios.

(c) Centrally store and distribute CSEL radios for every flight[2].

(d) Ensure every crew member properly initializes their CSEL before each flight.

(f) Use the spot on the survival vest, designed for survival radios, to store the radio so that it is available after the pilot becomes separated from the aircraft[3].

[2] From reference (13): "When utilizing the provisions of this memorandum, units will centralize all operational survival radios and only distribute them to crewmembers prior to individual flights."

[3] From referencing CW2 (b)(6) s statement, he admits he left the CSEL on the instrument dash and did not have it available after he was cut out of the cockpit and moved.

Although Task Force Phoenix's response to the accident was commendable, it still took nearly four and one-half hours to get the pilot off the crash site and into a position to transport him. Even though a registered, initialized, available CSEL radio would have notified the Rescue Coordination Center (RCC) immediately, the missing long pole was hoist capability. Since we don't put hoists on the non-MEDEVAC UH-60s, or on the CH-47 D, we were unprepared to extract a litter patient directly from the side of this hill at over 11-thousand feet. What was needed was a deliberate, multi-layered extraction plan (e.g. MEDEVAC hoist below 8-thousand feet, CH-47 long-rope above 8-thousand feet). When confronted with an environment as challenging as this, the capabilities, locations, and contact information of local rescue services must not be a discovery learning process—just as not knowing the local echelons of care, putting injured soldiers in danger, would be unacceptable.

g. CW4 (b)(6) toxicology report came back positive for ethanol (alcohol) and two forms of opiates. I did not include it because it is unnecessarily prejudicial. My investigation of this report conclusively proved to me that CW4 (b)(6) did not have any of these substances in his system during the accident flight. I've include his second sworn statement (15) and the Armed Forces Institute of Pathology (AFIP) Form 1323 (16), which I obtained from the Forensic Toxicology Lab in MD. According to the timeline, CW4 (b)(6) crashed approximately 0100, Arrived at the civilian hospital by UH-60 at 0444, was treated and released (with a prescription for Oxycontin) around 1030, took Oxycontin and drank several drinks at his hotel room, was awoken and driven to a clinic on Fort Carson and his blood and urine samples taken at 1330 (12.5 hour after the accident). I have been unable to interview the TF Phoenix flight surgeon to have him explain to me why, in contravention to the unit's and regulatory post accident procedures, the samples were not properly draw at the civilian hospital where both pilots were first taken.

4. EXHIBITS: Exhibits are listed on the next page, and referenced by (#) number.

5. POC for this memorandum is CW5 (b)(6) 15-6 Investigating Officer, at (b)(6)

(b)(6)
CW5, AV

Exhibits

1. **Department of the Army, HQ Fort Carson.** Aviation Local Flying Rules and Procedures. *FC Reg 95-1.* February 01, 2010.

2. (b)(6), **CW3, AV.** *DA Form 2823, Sworn Statement.* [interv.] CW5, AV (b)(6) (b)(6) July 08, 2010.

3. (b)(6) **CPT, AV.** *DA From 2823, Sworn Statement.* [interv.] CW5, AV (b)(6) (b)(6) July 08, 2010.

4. (b)(6) **CW4, AV.** 10th Combat Aviation Brigade Risk Assesment Matrix AH-OH Version 7.4a, Feb 10. June 29, 2010.

5. (b)(6) **CPT, AV.** Mission Schedule/Brief, Mission Approving Authority Verification. June 29, 2010.

6. **10th Combat Aviation Brigade.** Tactical Air SOP. April 01, 2010.

7. **Headquarters, Department of the Army.** TC 1-251. *Aircrew Training Manual, Attack Helicopter, AH-64D.* September 2005.

8. (b)(6) **CW4, AV.** *DA Form 2823, Sworn Statement.* [interv.] CW5, AV (b)(6) July 09, 2010.

9. (b)(6) **CW2, AV.** *DA From 2823, Sworn Statement.* [interv.] CW5, AV (b)(6) (b)(6) July 14, 2010.

10. **United States Army Combat Readiness/Safety Center Digital Collection, Analysis, and Integration Lab.** Audio Transcript of AH-64D, 09-05578, Class A Mishap. June 30, 2010.

11. **Army National Guard High-Altitude Army Aviation Training Site.** *HAATS Student Book.* November 2009.

12. **Department of the Army, TF Phoenix.** Memorandum for Record. *Subject: Aircraft 09-05578 Hard Landing Timeline.* June 30, 2010.

13. **Department of the Army, DCoS G-3/5/7.** Memorandum for See Distribution. *Subject: AR 95-1 Survival Radio Requirements.* January 05, 2009.

14. (b)(6) **CW4, AV.** *DA Form 2823, Sworn Statement.* [interv.] CW5, AV (b)(6) August 02, 2010.

15. **Armed Forces Institute of Pathology, Division of Forensic Toxicology.** AFIP 1323, Toxicological Request Form. s.l. : Sample Collected by MAJ (b)(6) DO, FS, June 30, 2010.

16. **DES, FORSCOM G3 Aviation and USAACE.** Power Point Slide Show. *HAMET Training Strategy.*

(1) Butts Radio provides flight following and KNOWN traffic advisories. Pilots must maintain communications with Butts Radio when operating to, from, and within Mountain Training Areas 1 and 2. Aircraft transitioning to, from, or within Mountain Training Area 3 will contact Denver FSS (and pass position reports to Butts radio) through Badger Mountain RCO if communications cannot be maintained.

(2) Position Reports. Make position reports departing for and arriving at each landing area. Update reports at 20 minute intervals indicating that operations are normal. Deviations from the 20 minute reporting interval must be requested from and approved by Butts radio prior to any deviations.

(3) Transponder code is Mode 3/A 1200 unless assigned otherwise by ATC.

(4) All aircraft departing for mountain operations must have a functional ELT on board or conduct dual ship operations.

e. Aircraft Lighting: Refer to paragraph 5-22

5-12. Low-Level Helicopter Training Route.
Route Hawk is established for the purpose of conducting low-level tactical navigation both day and night operations. The route is primarily counterclockwise and is one mile wide; one-half mile either side of centerline. Through coordination with Butts Radio the route may be flown clockwise. The route is depicted on maps located in BAAF Base Operations Flight Planning Area.

a. Utilization.

(1) The BAAF Base Operations is the coordinating agency for use of this route to deconflict traffic.

(2) Units will coordinate use for single aircraft operations four (4) hours prior to requested utilization period. Coordinate multi-aircraft operations 24 hours prior to requested utilization period. Exceptions to this requirement will be on a case by case basis thru BAAF operations based on availability.

(3) Requests may be made telephonically.

(4) Map Updates: The wire hazard survey map is maintained in Base Operations. If the hazard map is not updated within the last 30 days, flight below 500 ft AGL will not be conducted without a day recon prior to night flight.

b. Altitudes. The floor is 100 feet AGL and ceiling is 300 feet AGL.

c. Separation: Butts Radio provides KNOWN traffic advisories along the routes. However, aviators must be aware that this airspace is not protected for sole military use; therefore, SEE AND AVOID rules in accordance with the FARs apply.

d. For noise abatement procedures avoid all houses, buildings, people, livestock, and moving vehicles by a minimum slant range of 1/2nm.

Exhibit 1

SWORN STATEMENT

For use of this form, see AR 190-45; the proponent agency is PMG.

PRIVACY ACT STATEMENT

AUTHORITY: Title 10, USC Section 301; Title 5, USC Section 2951; E.O. 9397 Social Security Number (SSN).

PRINCIPAL PURPOSE: To document potential criminal activity involving the U.S.Army, and to allow Army officials to maintain discipline, law and order through investigation of complaints and incidents.

ROUTINE USES: Information provided may be further disclosed to federal, state, local, and foreign government law enforcement agencies, prosecutors, courts, child protective services, victims, witnesses, the Department of Veterans Affairs, and the Office of Personnel Management. Information provided may be used for determinations regarding judicial or non-judicial punishment, other administrative disciplinary actions, security clearances, recruitment, retention, placement, and other personnel actions.

DISCLOSURE: Disclosure of your SSN and other information is voluntary.

1. LOCATION	2. DATE (YYYYMMDD)	3. TIME	4. FILE NUMBER
Butts AAF, Ft. Carson, CO	2010/07/08	1506	

5. LAST NAME, FIRST NAME, MIDDLE NAME	6. SSN	7. GRADE/STATUS
(b)(6)	(b)(6)	CW3

8. ORGANIZATION OR ADDRESS

C/1-10 (TF Phoenix) 10CAB, Ft. Drum, NY 13602

9.

I, (b)(6), WANT TO MAKE THE FOLLOWING STATEMENT UNDER OATH:

I was the mission briefer for CW4 (b)(6) the Pilot-in-Command of aircraft 09-05578. This face-to-face briefing took place on 29JUN10. CW4 (b)(6) completed a Risk Assessment Matrix for his two front seat pilots he was training. We reviewed the risk assessment matrix for both crew mixes as well as the weather data, his training objectives and his route of flight. CW4 (b)(6) was to train CW2 (b)(6) first, return to BAAF for refuel, and then return to the training area with CW2 (b)(6) This was Phase III, the second night. As I was also flying the same phase of the HAMET program of instruction as CW4 (b)(6) I was intimately familiar with the tasks and training objectives he was to perform with his two pilots. We briefed multi-ship operations in the event of a link up with other aircraft for opportunity training in the area in order to support our training objectives. That night there was a forecast for excellent weather and illumination. There was nothing out of the ordinary. This was a complete briefing that provided all of the required information. There is nothing I can think of that I would would either brief differently or additionally request from CW4 (b)(6) an experienced Standardization Pilot who had been flying here for months.

(b)(6)

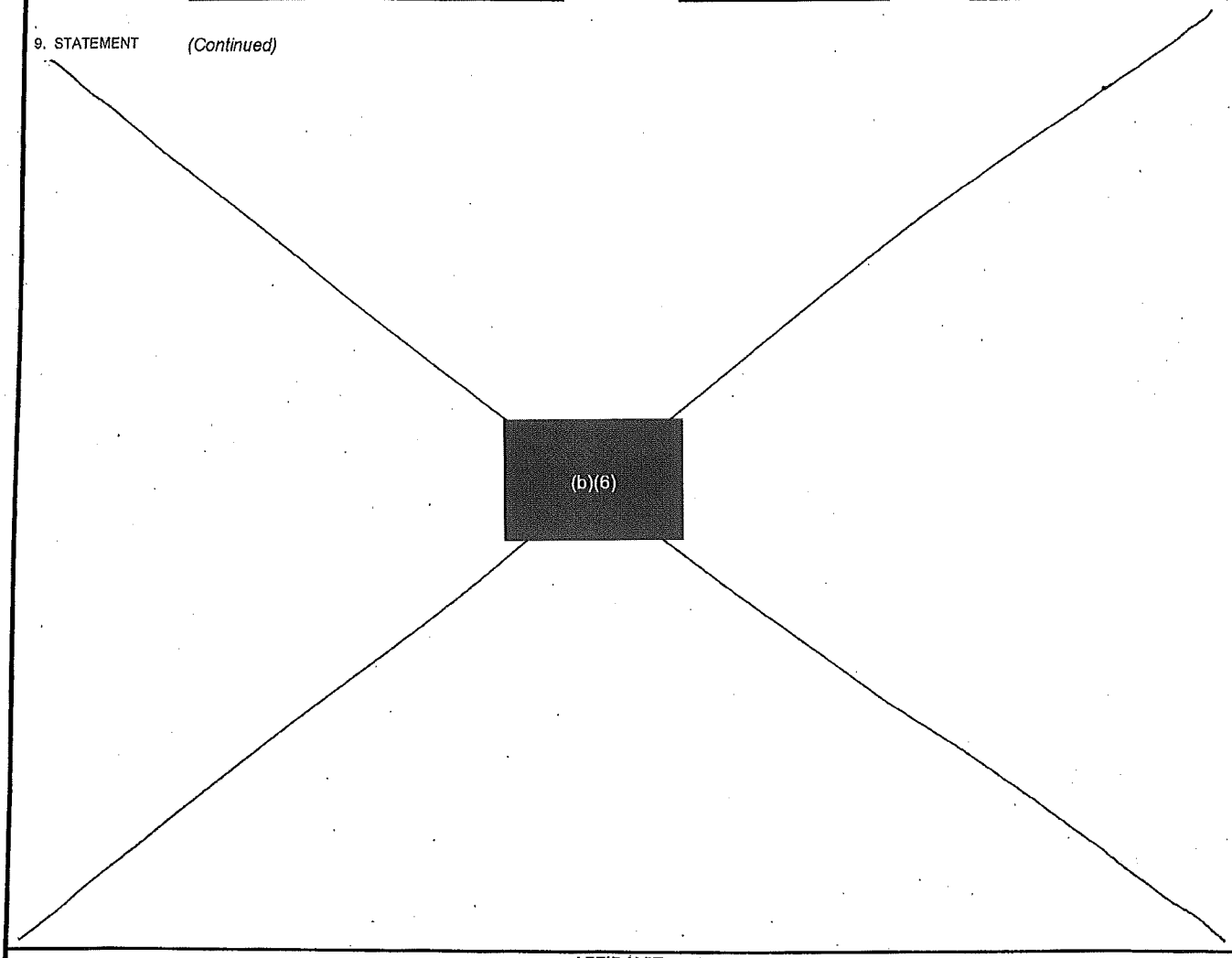
10. EXHIBIT	11. INITIALS OF PERSON MAKING STATEMENT	PAGE 1 OF 2 PAGES
	(b)(6)	

ADDITIONAL PAGES MUST CONTAIN THE HEADING "STATEMENT OF _____ TAKEN AT _____ DATED _____

THE BOTTOM OF EACH ADDITIONAL PAGE MUST BEAR THE INITIALS OF THE PERSON MAKING THE STATEMENT, AND PAGE NUMBER MUST BE INDICATED.

STATEMENT OF (b)(6) TAKEN AT BAAF DATED 2010/07/08

9. STATEMENT *(Continued)*



AFFIDAVIT

I, (b)(6), HAVE READ OR HAVE HAD READ TO ME THIS STATEMENT WHICH BEGINS ON PAGE 1, AND ENDS ON PAGE 2. I FULLY UNDERSTAND THE CONTENTS OF THE ENTIRE STATEMENT MADE BY ME. THE STATEMENT IS TRUE. I HAVE INITIALED ALL CORRECTIONS AND HAVE INITIALED THE BOTTOM OF EACH PAGE CONTAINING THE STATEMENT. I HAVE MADE THIS STATEMENT FREELY WITHOUT HOPE OF BENEFIT OR REWARD, WITHOUT THREAT OF PUNISHMENT, AND WITHOUT COERCION, UNLAWFUL INFLUENCE, OR UNLAWFUL INDUCEMENT.

(b)(6)
(Signature of Person Making Statement)

WITNESSES:

None

ORGANIZATION OR ADDRESS

ORGANIZATION OR ADDRESS

Subscribed and sworn to before me, a person authorized by law to administer oaths, this 8th day of July, 2010 at Butts AAF, Ft. Carson, CO

(Signature of Person Administering Oath)

CW5 (b)(6)
(Typed Name of Person Administering Oath)

(Authority To Administer Oaths)

INITIALS OF PERSON MAKING STATEMENT (b)(6)

DA FORM 2823, NOV 2006 APD PE v1.01ES

Exhibit 2 pg 2

SWORN STATEMENT

For use of this form, see AR 190-45; the proponent agency is PMG.

PRIVACY ACT STATEMENT

AUTHORITY: Title 10, USC Section 301; Title 5, USC Section 2951; E.O. 9397 Social Security Number (SSN).

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DISCLOSURE: Disclosure of your SSN and other information is voluntary.

1. LOCATION	2. DATE (YYYYMMDD)	3. TIME	4. FILE NUMBER
Butts AAF, Ft. Carson, CO	2010/07/08	1621	

5. LAST NAME, FIRST NAME, MIDDLE NAME	6. SSN	7. GRADE/STATUS
(b)(6)	(b)(6)	CPT

8. ORGANIZATION OR ADDRESS

C/1-10 AHB, TF Phoenix, 10CAB, Ft. Drum, NY 13602

9.

I, (b)(6), WANT TO MAKE THE FOLLOWING STATEMENT UNDER OATH:

I was the Approval Authority for the mission flown by CW4 (b)(6) the Pilot-in-Command of aircraft 09-05578. CW2 (b)(6) the second period PI brought me the risk assessment matrix and briefing sheet. I reviewed and signed the paperwork and did not give any additional instructions to CW2 (b)(6) at that time. That night when I saw the Pilots-in-Command to talk about the plan for the missions that evening and where we expected them to be complete with their training, I received the full details for the missions from all three PCs. However, I felt I had enough information at the time I was presented with the paperwork to give my approval signature because of working with CW4 (b)(6) for the last two weeks doing this training. At the time I approved this mission, I had not started Phase III myself, but had completed HAATs, which is equivalent to completing HAMET Phase II. I was familiar with the requirements of HAMET Phase III, as I sat in on the academics and local area briefs with these crews. In addition I had reviewed the nightly CONOP for what this mission would entail the night prior, which we did for all missions. These CONOPs for individual training were representational of each individual mission, as they all had identical training objectives and tasks. I understood the multi-ship portion of the risk assessment matrix was circled because this crew may have needed to link up with another AH, UH, or OH aircraft in the training area to conduct several necessary tasks and that they wanted to brief this if the opportunity arose. Even though multi-ship and formation were indicated on the briefing sheet and risk assessment matrix, I did not believe a designated Air Mission Commander (AMC) was required for the level of interaction they were planning or expected to conduct as it was not a deliberate multi-ship event. This is because it is impractical to anticipate each and every opportunity the aircrews may have to link-up in the training area. I believe I had sufficient information and received a complete enough briefing to approve this mission.
End of Statement.

(b)(6)

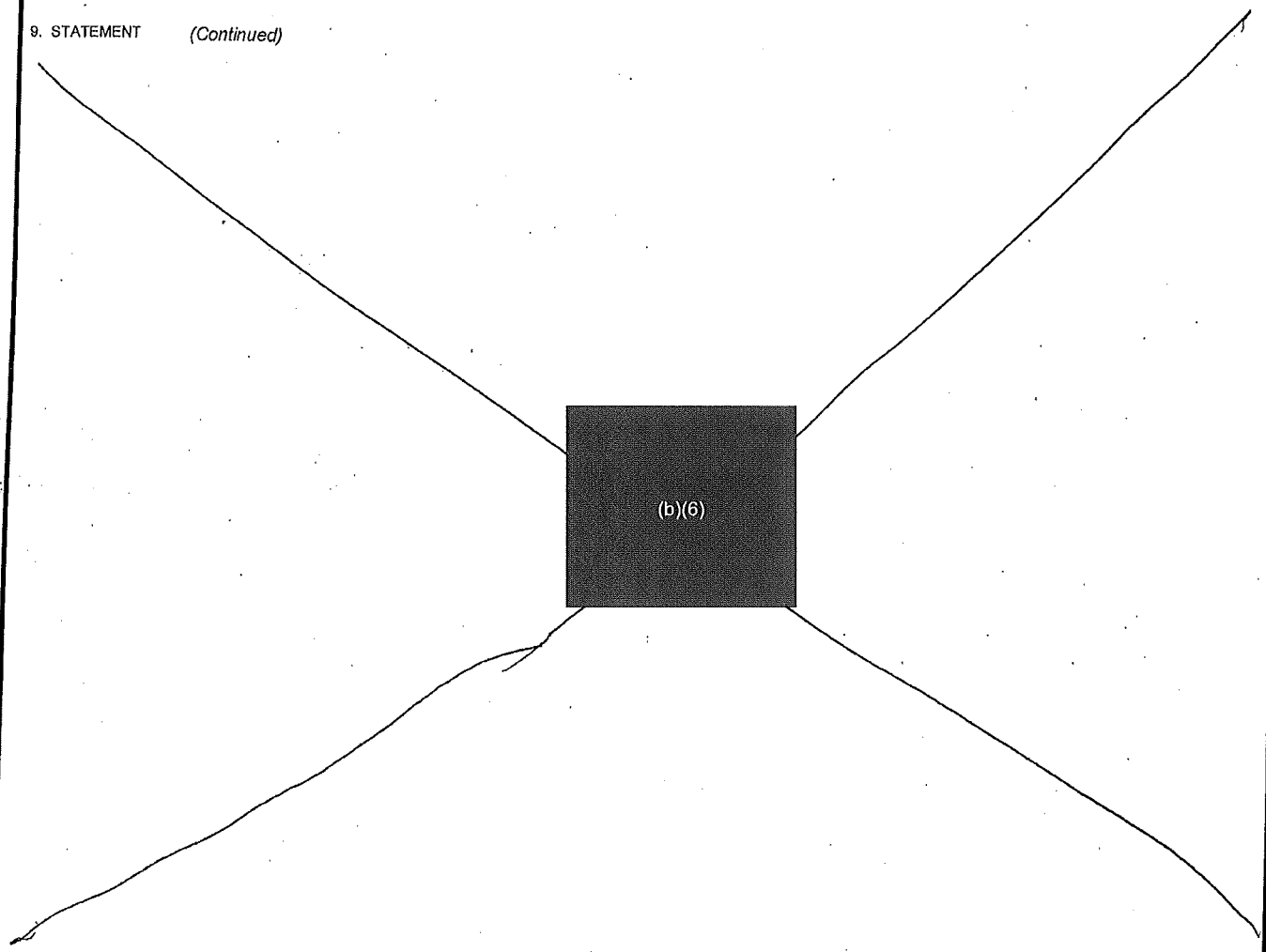
10. EXHIBIT	11. INITIALS (b)(6) MAKING STATEMENT	PAGE 1 OF 2 PAGES

ADDITIONAL PAGES MUST CONTAIN THE HEADING "STATEMENT OF _____ TAKEN AT _____ DATED _____

THE BOTTOM OF EACH ADDITIONAL PAGE MUST BEAR THE INITIALS OF THE PERSON MAKING THE STATEMENT, AND PAGE NUMBER MUST BE INDICATED.

STATEMENT OF (b)(6) TAKEN AT BAAF DATED 2010/07/08

9. STATEMENT *(Continued)*



AFFIDAVIT

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(b)(6)

g Statement)

WITNESSES:

None

ORGANIZATION OR ADDRESS

ORGANIZATION OR ADDRESS

Subscribed and sworn to before me, a person authorized by law to administer oaths, this 8th day of July 2010 at Butts AAF, Ft. Carson, CO

(b)(6)

(Signature of Person Administering Oath)

CW5 (b)(6)

(Typed Name of Person Administering Oath)

(Authority To Administer Oaths)

INITIALS OF PERSON MAKING STATEMENT (b)(6)

DA FORM 2823, NOV 2006

APD PE v1.01ES

Exhibit 3 ps 2

RISK ASSESSMENT MATRIX (10th Combat Aviation Brigade AH-OH Version 7.4.a, Feb 10)

1. COMMAND RELATIONSHIP	TOTAL	0 | 0
ASSIGNED/ORGANIC (TF ASSIGNED AND BRIEFED)		0
ATTACHED		2
OPCON or TACON		4

2. MISSION PLANNING TIME		TOTAL 2 | 2	
MISSION STATEMENT	OPTIMAL (>12 hrs)	ADEQUATE (2-12 hrs	MINIMAL (<2 hrs)
SPECIFIC	1	2	3
NON-SPECIFIC	2	4	6

3. MISSION COMPLEXITY (HIGHEST MSN MODE) (SINGLE PLT DBL VALUE)	TOTAL 7 | 7		
TASK / MISSION	DAY	NIGHT	NVG
SERVICE / SUPPORT	1	4	3
CONTINUATION TRAINING/ATM	3	6	5
MULTI-SHIP	3	6	5
MULTI-SHIP DISSIMILAR A/C	4	7	6
GUNNERY	4	N/A	5
MAINT 1-TIME EVAC MSN	7*	10*	8*
MAINTENANCE TEST FLIGHT	5	8*	6*
MAINT TEST FLT WITH NCM	7*	10**	N/A
COMBAT/COIN #(SEE BELOW)	8	6*	5
RL TNG / APART / EPs	3	5	4
# CCA, TIC, MED ESCORT, ASSLT SECURITY, RECON, C&S			

4. ADDITIONAL FACTORS (SINGLE PILOT = DOUBLE VALUE)		TOTAL 5 | 5	
RAIN/SNOW SHWRS(<3 MILES VIS)	4	ATM TASKS:1072/1074/1082 (OH58)	3
MODERATE TURBULENCE	3	NO SINGLE ENG POWER - CRUISE	5
TERRAIN FLIGHT	3	UNDER OBSTACLES / GUN TRGT	4
MOUNTAIN OPS	4	TEMP < -18°C or > 40°C (WC)	4
BLOWING SNOW / DUST OPS	7	MOPP 4 TNG	3
ANNUAL SNOW QUALIFICATION	5*	DESERT OPERATIONS	3
WIND >20KTS (OH-58D NOE)	10	FADEC Manual Throttle (Task 1102)	5
COMBAT MANEUVERING FLIGHT TNG	3(*AH)		

5. CREW SELECTION			TOTAL 5 | 7	
PC= 1	PI= 4 | 6			
FLIGHT TIME IN AREA	TOTAL FLIGHT TIME			
	≥2000	<2000	<1000	<500
>50	1	2	3	4
≥ 25	2	3	4	5
<25	3	4	5	6

6. NVD CREW SELECTION			TOTAL 2 | 2	
PC=	PI= 3 | 1			
LAST NVD FLIGHT	TOTAL NVG FLIGHT TIME			
	≥250	<250	<150	<100
WITHIN 30 DAYS	1	2	3	4
WITHIN 45 DAYS	2	3	4	5
WITHIN 60 DAYS	3	4	5	6
NOT CURRENT	4	5	6	7

7. WEATHER			TOTAL 3 | 3		
FLIGHT CONDITIONS	≥1000' 3 MILE	≥700' 2 MILE	≥500' 1 MILE	≥300' 1/2 MILE	<300' 1/2 MILE
(INCLUDING IMC)	0		4*	8**	8**
(INCLUDING IMC)	3		8*	N/A	N/A
	1		5*	10**	10**

8. ILLUMINATION % (EENT-BMNT) (N/A FOR AH-64)			TOTAL N/A	
Terrain flt (≤200' AHO) over contrasting terrain	≥ 23% and 30°		1	
	< 23% or 30°		3	
Terrain flt (≤200' AHO) over LOW contrasting terrain	≥ 23% and 30°		6	
	< 23% or 30°		7*	
FLIGHT ABOVE 200' AHO	0 - 30%	31 - 59%	60 - 100%	
	3	2	1	

9. FIGHTER MANAGEMENT			TOTAL 6 | 6	
PC = 1	PI = 1 | 1	DUTY DAY =		
QUALITY OF REST	HOURS OF REST			
	≥24	≥10	<10	
GARRISON	0	1	4*	
FIELD	1	3	6*	
MISSION COMPLETE IN FIRST THIRD OF DUTY DAY			0	
MISSION COMPLETE IN SECOND THIRD OF DUTY DAY			2	
MISSION COMPLETE IN LAST THIRD OF DUTY DAY			4	
EXTENSION IN LAST 24 HOURS			6	

10. RISK CONTROL MEASURES	TOTAL -4 | -4
PC HAS MORE THAN 12 MONTHS PC EXPERIENCE	-1
LZ / PZ / ROUTE RECONNED FOR HAZARDS WITHIN 48 HRS	-1
CREW USE OF NVGs (AH-64)	-2
FORMAL MISSION BACK BRIEF & REHEARSALS ACCOMPLISHED	-2
GCA / RADAR AVAILABLE WHEN WEATHER < 700/2	-2
PC HAS MORE THAN 1500 HOURS OF TOTAL PIC TIME	-3
	-14

11. RISK VALUE TOTALS: MSN PROFILE or MULTISHIP ACFT #

MSN/TAIL NUMBERS	1	2	3	4	5	6	7	8
1. COMMAND RELATIONSHIP	0	0						
2. MISSION PLANNING TIME	2	2						
3. MISSION COMPLEXITY	13	13						
4. ADDITIONAL FACTORS	15	15						
5. CREW SELECTION	5	7						
6. NVD CREW SELECTION	4	2						
7. WEATHER	3	3						
8. MOON ILLUMINATION	NA	NA						
9. FIGHTER MANAGEMENT	6	6						
10. RISK CONT MEASURES	-4	-4						
TOTALS	44	48						
PC INITIALS - MULTISHIP								

12. TOTAL RISK ASSESSMENT Item with single asterisk * requires BN/SQ CDR approval. Item with double asterisk ** requires BDE CDR approval

TOTAL CREW	LOW	MOD	HIGH	EXT. HIGH
1	N/A	0-45	46-65	≥66
2	0-45	46-65	66-79	≥80
APPROVAL AUTHORITY	CO / TRP / DET COMMANDER	BN / SQ (*) COMMANDER	BRIGADE (**) COMMANDER	DIVISION COMMANDER

IDENTIFIED HIGHEST MISSION RISK FACTOR	
AMC/PC VERIFICATION	(b)(6) DATE 29 JUN 10
MISSION BRIEFER VERIFICATION	(b)(6) DATE 29 JUN 10

4

B-67

Ex 4, pg 4

MISSION SCHEDULE/BRIEF

For use of the form, see AR 95-1: the proponent agency is DCOPS

DATE*	AC*	PC*	PI*	CREWMEMBER*	FLIGHT* COND	MISSION*	ETD / ETE*		INITIALS		RAV*	MS*	REMARKS
29 Jun	578	(b)(6)			2,3,5,6	HAMET	2100	6+00	(b)(6)				
29 Jun	578				2,3,5,6	HAMET	2100	6+00					

LEGEND

FLIGHT CONDITION

1. DAY
2. NIGHT
3. ND
4. IMC/SIM IMC
5. MULTI A/C
6. TERRAIN FLT

MS

MISSION STATUS CX- CANCELED
MC- MSN COMPLETE
NC-NOT COMPLETED AS BRIEFED: SEE REMARKS

* MANDATORY FOR ALL FLIGHTS

DA FORM 5484-R, FEB96 PREVIOUS EDITIONS ARE OBSOLETE USAPPC V1.00

[redacted] AIRCRAFT CALL SIGN | AIRCRAFT DESG AND TD CODE

TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
V	NA	FCS					

REMARKS

FUEL ON BD	ALTN AIRFIELD	ETE TO ALTN	NOTAM	WEATHER	WT AND BALANCE	AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION

SIGNATURE OF APPROVAL AUTHORITY | CREW/PASSENGER LIST [redacted] ATTACHED [redacted] SEE PSGR

Mission Approving Authority Verification

(Items 1-8 IAW AR 95-1, Items 9-14 IAW 10th AVN BDE Safety & Standardization SOP)

1	MSN is in support of an operational unit MSN or has been authorized by the unit CDR?	YES / NO
2	Crew understands the MSN, is aware of all tactical, technical and admin mission details?	YES / NO
3	Assigned flight crews have had adequate planning time and mission is adequately planned?	YES / NO
4	Assigned flight crews are qualified and current for the mission IAW all applicable regulations?	YES / NO
5	Forecast weather conditions (departure, enroute, and arrival) meet AR 95-1 and local directives?	YES / NO
6	Flight crews meet unit crew endurance requirements?	YES / NO
7	Commander's risk management program are completed and mitigated to the lowest level possible?	YES / NO
8	Required special mission equipment is operational?	YES / NO
9	Flight Modes Authorized: Single Ship Formation Low Level Contour NOE	
10	Flight Route: Direct Flight Plan (DD Form 175/1801) OPORD Other (specify):	
11	Weather Minimums/Abort Criteria: Day: Night: 1000-3 NVG: Other:	
12	Refuel/Rearm Locations(s): FCS	
13	Mission Restrictions (specify):	
14	Safety Considerations (specify): winds, MTN Terrain, fwc limited. Thorough brief	

APPROVAL AUTHORITY

Date: 29 Jun 2018

(b)(6)

Date:

BY:

10th AVN BDE [illegible] FORM VER. 7.4, Feb 10

10th Avn Bde Standards Digital ver 7.4

5

B-68

Ex 5 pt 5

Chapter 18 – Multi-ship Operations

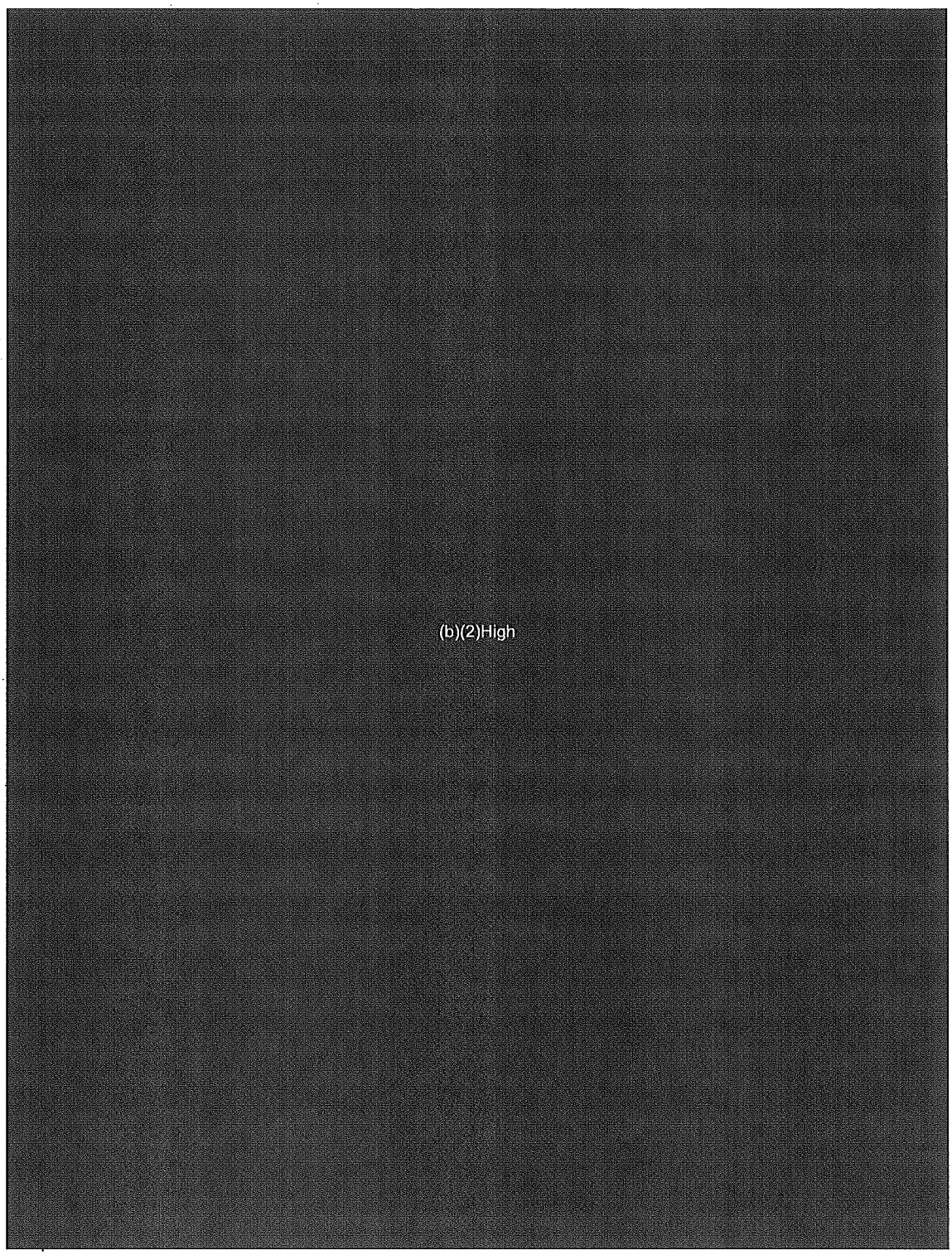


Exhibit 6

6

TASK 1058

PERFORM VISUAL METEROLOGICAL CONDITIONS APPROACH

CONDITIONS: In an AH-64D helicopter or an AH-64D simulator with the before-landing check completed and the pilot on the controls (P*) fitted with a boresighted helmet display unit (HDU).

STANDARDS: Appropriate common standards and the following:

1. Select a suitable landing area.
2. Maintain a constant approach angle to the desired point of termination (hover or touchdown) with deviations for surface conditions or obstacles at the point of termination.
3. Maintain ground track alignment with the landing direction with minimum drift.
4. Maintain rate of closure appropriate for the conditions.
5. Align aircraft with landing direction below 50 feet or as appropriate for obstacle avoidance.
6. Perform a smooth and controlled termination to a hover or to the ground at the intended point of touchdown.

DESCRIPTION:

1. Crew actions.

   a. The P* will select a flight path, an airspeed, and an altitude that afford best observation of the landing area. He will remain focused outside the aircraft to evaluate suitability of the area, evaluate the effects of wind, and clear the aircraft throughout the approach and landing. The P* will remain focused outside the aircraft. He will announce when he begins the approach, whether the approach will terminate to a hover or to the ground, the intended point of landing, and any deviation to the approach. He will announce the use of the manual stabilator.

   b. The pilot not on the controls (P) will confirm the suitability of the area, assist in clearing the aircraft, and provide adequate warning of traffic or obstacles. He will acknowledge the use of the manual stabilator and any intent to deviate from the approach. He will announce when his attention is focused inside the cockpit.

2. Procedures. Evaluate the wind direction and magnitude, noting either the tactical situation display's (TSD) wind status window, PERF page wind status window, velocity vector with a comparison of true airspeed (TAS) and ground speed (GS), or external wind cues. Select an approach angle that allows obstacle clearance while descending to the desired point of termination. Once the termination point is sighted and the approach angle is intercepted (on base or final), adjust the collective as necessary to establish and maintain a constant angle with deviations for surface conditions or obstacles at the point of termination. If desired, use the nap of the earth (NOE) approach mode or the manual stabilator mode to enhance forward visibility during the descent, or the P* can make a pedal input to enhance visibility of the intended touchdown point. Maintain entry airspeed until the rate of closure appears to be increasing. Adjust airspeed as necessary commensurate with power available, obstacles, and intended touchdown point. Select a go-around path. Above the obstacles or 50 feet above ground level (AGL), maintain ground track alignment and the aircraft in trim. Below the obstacles or 50 feet AGL, align the aircraft with the landing direction. Progressively decrease the rate of descent and rate of closure until reaching the termination point (hover, touchdown), or until a decision is made to perform a go-around.

a. Termination at a hover. The approach to a hover may terminate with a full stop over the planned termination point, or continue movement to transition to hovering flight. On short final, progressively decrease the rate of descent and rate of closure until an appropriate hover is established over the intended termination point.

b. Termination to the ground. Proceed as for an approach to a hover, except continue the descent to the ground. Prior to touchdown, if uneven surface conditions are suspected, set the parking brake. Make the touchdown with minimum forward movement. After surface contact, ensure that the aircraft remains stable until all movement stops. Smoothly lower the collective to the full down position, neutralize the pedals and cyclic.

Note 1: Steep approaches, or approaches that place the aircraft below effective translational lift (ETL) while out-of-ground effect (OGE) can place the aircraft in potential settling-with-power condition. The crew must be familiar with diagnosing and correcting this condition.

Note 2: The crew should make the decision to go around if visual contact with the touchdown point is lost or if it becomes apparent that it will be lost. Hover OGE power may be required in certain situations. Evaluate power required versus power available.

c. Go-around. Perform a go-around if a safe landing is doubtful or if visual reference with the intended termination point is lost. Once climb is established, reassess the situation and develop a new course of action.

NIGHT OR NIGHT VISION DEVICE (NVD) CONSIDERATIONS:

1. Altitude, apparent ground speed, and rate of closure are difficult to estimate at night. The rate of descent during the final 100 feet should be slightly less than during the day to avoid abrupt attitude changes at low altitudes. After establishing the descent during unaided flights, airspeed may be reduced to approximately 40 knots until apparent ground speed and rate of closure appear to be increasing. Progressively decrease the rate of descent and forward speed until termination.
2. Surrounding terrain or vegetation may decrease contrast and degrade depth perception during the approach. Before descending below obstacles, determine the need for artificial lighting.
3. Use proper scanning techniques to avoid spatial disorientation.

NIGHT VISION SYSTEM (NVS) CONSIDERATIONS:

1. To assist in determining rate of descent, the rate of climb indicator and radar altitude readouts may be used.
2. Symbology enhances approach angle determination and maintenance. When the aircraft is aligned with the intended landing area, position the line of sight (LOS) reticle on the intended landing point and reference the flight path vector (FPV). The separation between the LOS reticle and the head tracker will provide an approximate angle to touch down when correlated to aircraft attitude. The attitude of the aircraft varies as a function of the stabilator mode that is selected.
3. The location and gimbal limits of the forward looking infrared (FLIR) sensor prevent the P* from seeing the actual touchdown point. To avoid overshooting, establish a new reference point beyond the intended touchdown point.

SNOW/SAND/DUST CONSIDERATIONS:

Note: At night, use of the searchlight may cause spatial disorientation while in blowing snow/sand/dust.

1. Termination to an OGE hover. This approach requires OGE power and may be used for most snow landings and those sand/dust landings where there is only a thin obscurant covering a firm

Exhibit 7 ps 2

surface. Terminate to a stationary OGE hover over the touchdown area. Slowly lower the collective and allow the aircraft to descend. The descent may be vertical or with forward movement. The rate of descent will be determined by the rate at which the snow/sand/dust is blown from the intended landing point. During the descent, remain above the snow/sand/dust cloud until it dissipates and the touchdown point can be seen.

Note 1: Hovering OGE reduces available ground references due to blowing obscurants, and may increase the possibility of spatial disorientation. Recommend use of hold modes to decrease pilot workload and provide stability. Be prepared to transition to instruments/symbology and execute an instrument takeoff if ground reference is lost.

Note 2: Steep approaches can place the aircraft in potential settling-with-power condition. The crew must be familiar with diagnosing and correcting this condition.

2. Termination to the surface with no forward speed. This termination should be made to landing areas where slopes, obstacles, or unfamiliar terrain preclude a landing with forward speed, or where it is necessary to put the aircraft at a precise point (for example, a forward arming and fueling point [FARP]). It may not be recommended to utilize this type of approach to a snow-covered surface, unless the surface conditions under the snow are known to be suitable. The termination is made directly to a reference point on the ground with no forward speed. Establish a steeper than normal approach angle, at a slightly higher than normal rate of closure. The rate of closure and the approach angle should be such that the aircraft remains above and ahead of the blowing obscurants, until the aircrew is close enough to touchdown to see the intended point of touchdown through the obscurants. Cushion the touchdown at the bottom of the approach to avoid a hard landing.

Note: Resist the urge to attain a silky-smooth touchdown. Applying too much collective as the aircraft approaches low altitude ground effect can result in a complete brownout and spatial disorientation. Generally, 200 to 300 feet per minute (FPM) rate of descent at touchdown is desirable.

3. Termination to the surface with minimal ground roll. This termination may be made to an improved landing surface or suitable area with minimal ground obstacles. (For additional information, see Task 1064.)

Note: In snow conditions, the above approach should only be conducted in an area where the surface conditions below the snow are known to be suitable for touchdown with forward airspeed.

MOUNTAIN/PINNACLE/RIDGELINE CONSIDERATIONS:

1. Normal. Select an approach angle, based on the wind, line of demarcation, density altitude, gross weight, and obstacles. During the approach, continue to determine the suitability of the intended landing point. Lack of motion parallax cues may make the rate of closure difficult to determine until the aircraft is close to the landing area. When the approach angle is intercepted, decrease collective to establish the descent. Do not allow the aircraft to descend below the line of demarcation. Reduce airspeed to slightly above effective translational lift until the rate of closure can be determined. Progressively decrease rate of descent and forward airspeed until apparent ground speed is that of a brisk walk. Maintain the aircraft in trim above 50 feet and aligned with landing direction below 50 feet.

   a. At approximately 50 feet above the touchdown point, the aircraft should begin losing effective translational lift and termination power applied. Do not decelerate the aircraft to an out of ground effect hover. Slow the rate of closure prior to reaching the near edge of the

Exhibit 7 pg 3

landing area. Evaluate power required to continue and decide whether to continue the approach or initiate a go-around.

b. The decision to go around should be made prior to the aircraft descending below the obstacles and before the aircraft is decelerated below ETL. If the approach is continued, apply forward cyclic and reduce collective as necessary to maintain the proper descent angle.

2. To a hover. Maintain an altitude clear of obstacles with sufficient forward cyclic applied to keep the aircraft moving. When over the touchdown point, reduce collective and descend vertically.

3. To the ground. Maintain an altitude clear of obstacles with sufficient forward cyclic to keep the aircraft moving. Make a smooth and controlled touchdown with zero forward ground speed. After touching down in the landing zone (LZ) ensure the aircraft is stable prior to lowering the collective to the full down position.

Note: Continuing an approach to a pinnacle or ridgeline after allowing the aircraft to descend below the line of demarcation can result in flight in very turbulent air with poor lift characteristics. Always have a flyaway plan established prior to initiating an approach to a pinnacle or ridgeline.

CONFINED AREA CONSIDERATIONS:

1. Prior to the approach, the crew will perform a landing area reconnaissance to evaluate the size of landing area, suitability of the surface, any barriers to the approach path, approach direction, touchdown point, possible takeoff direction, and effects of wind. On final approach, the crew will perform a low reconnaissance and confirm the suitability of the selected landing area. They will evaluate obstacles, which constitute a possible hazard, and will confirm the suitability of the departure path selected during the landing area reconnaissance. If visual contact with the touchdown point is lost or if it becomes apparent that it will be lost, the crew should make a decision to modify the approach or execute a go-around. If the success of the landing is in doubt, go-around should be initiated before airspeed is reduced below effective translational lift or descending below the barriers. An approach to the forward one-third of the area will reduce the approach angle and minimize power requirements.

2. Confined areas are more difficult to evaluate at night because of low contrast. To perform successful confined area operations, the crew must know the various methods of determining the height of obstacles.

3. Before conducting confined area operations at night, the crew must ensure that the searchlight is in the desired position. If they use the searchlight, their night vision will be impaired for several minutes. Therefore, they must exercise added caution if they resume flight before reaching full dark adaptation.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training may be conducted in an AH-64D aircraft or an AH-64D simulator.
2. Evaluation will be conducted in the AH-64D aircraft.

REFERENCES: Appropriate common references.

Exhibit 7 vs 4

SWORN STATEMENT

For use of this form, see AR 190-45; the proponent agency is PMG.

PRIVACY ACT STATEMENT

AUTHORITY: Title 10, USC Section 301; Title 5, USC Section 2951; E.O. 9397 Social Security Number (SSN).

PRINCIPAL PURPOSE: To document potential criminal activity involving the U.S. Army, and to allow Army officials to maintain discipline, law and order through investigation of complaints and incidents.

ROUTINE USES: Information provided may be further disclosed to federal, state, local, and foreign government law enforcement agencies, prosecutors, courts, child protective services, victims, witnesses, the Department of Veterans Affairs, and the Office of Personnel Management. Information provided may be used for determinations regarding judicial or non-judicial punishment, other administrative disciplinary actions, security clearances, recruitment, retention, placement, and other personnel actions.

DISCLOSURE: Disclosure of your SSN and other information is voluntary.

1. LOCATION	2. DATE (YYYYMMDD)	3. TIME	4. FILE NUMBER
Butts AAF, Fort Carson, CO	2010/07/09	1400	

5. LAST NAME, FIRST NAME, MIDDLE NAME	6. SSN	7. GRADE/STATUS
(b)(6)	(b)(6)	CW4

8. ORGANIZATION OR ADDRESS

WFSB-DES S.B.A.H.P. Building L45-500 ATTN: DES, Marana, AZ 85653

9.

I, (b)(6), WANT TO MAKE THE FOLLOWING STATEMENT UNDER OATH:

The task and purpose for this flight was to conduct the POI for HAMET training. My mission was to conduct night individual training on CW2 (b)(6) and CW2 (b)(6). This would have been CW2 (b)(6)'s second night of NVS. The weather and illumination conditions in the weather briefing we received were the actual conditions in the training area during the mission. I flew CW2 (b)(6) first and a little longer than the POI called for because he had missed the previous night. After finishing his training, we went to hot gas, returning to Charlie Ramp, where we conducted a crew swap with CW2 (b)(6) and CW2 (b)(6). My assessment of CW2 (b)(6)s level of training at that time was that he was, for his hour level and experience, performing as expected for that portion of the program. He was performing as an average pilot would with his background. Also, he had a history of responding well the first time to verbal prompts and instructions. We departed BAAF and moved to Training Area 1 and conducted three or four approaches there. He was doing as expected, following verbal instructions well, monitoring his torque; we talked about the landing sequence. Then we moved to Training Area 3 and conducted a couple more approaches using the six-step landing sequence. I thought he was performing better at night than during the day portion. CW2 (b)(6) was using NVS exclusively that night. We then departed the restricted area and moved to the Airburst MOA in the vicinity of Cooper Mountain, using a large valley to conduct some dives to demonstrate the differences in performance at higher altitudes. The concept was to progressively increase the difficulty by changing the conditions in a step-by-step manner. If the pilot had trouble at any stage, we would not move on to areas with more difficult conditions until he could demonstrate capability to do so. We moved to Almagre from the Airburst MOA and approached from the West in a clockwise flight path and went through the six-step landing zone sequence and conducted a low approach to the LZ. The winds were out of the southwest at approximately 20 knots and we planned on making all of our approaches directly into the wind. CW2 (b)(6) was on the controls. We talked about the winds, power available, power margin, and that we were shooting the approach to a 1 foot in-ground-effect hover. We talked about how he was going to do the low recon portion of the approach on the next iterations, which is a mock approach that doesn't get below effective translational lift (ETL) or a safe airspeed. At this point, CW2 (b)(6) was talking through all of the required information concerning the PERF page, reasoning for the torque assessments, and the landing zone sequence. We completed the low recon, the purpose of which was to verify our assumptions on power, winds and to make a final check on the LZ and our escape route. With this complete, we then set up for our actual approach. Everything was progressing as expected. Near the terminal phase of the approach, I noticed he was shooting his approach a little short of the required LZ. I prompted him verbally to do a go-around, which he did by maintaining power and applying a little forward cyclic. We then came back around and conducted another approach. Again, everything was looking pretty good. Once again he was shooting his approach a little short and was getting a little slow. I remembers prompting him "don't get slow, don't get slow." He didn't seem to follow his normal pattern of responding to initial prompts. I felt we were starting to get too slow so I prompted him again and pushed forward on the cyclic to start us flying out. I felt I got him back on track at that point so I released my pressure on the cyclic and the nose of the aircraft immediately and unexpectedly came up. The airspeed dropped, we were short, so I immediately took the controls and attempted to initiate the escape route, a right-hand descending turn. I felt CW2 (b)(6) pull up on the collective, and I pushed the collective back down to preserve the rotor. I couldn't get the aircraft flying and we crashed.

10. EXHIBIT	11. INITIALS OF PERSON MAKING STATEMENT	PAGE 1 OF 2 PAGES
	(b)(6)	

ADDITIONAL PAGES MUST CONTAIN THE HEADING "STATEMENT OF ____ TAKEN AT ____ DATED ____"

~~*THE BOTTOM OF EACH ADDITIONAL PAGE MUST BEAR THE INITIALS OF THE PERSON MAKING THE STATEMENT, AND PAGE NUMBER MUST BE INDICATED.*~~

February 27, 2008

The Honorable David Obey
Chairman, House Committee on Appropriations
H-218, The Capitol
Washington, D.C. 20515

The Honorable Ike Skelton
Chairman, House Committee on Armed Services
2120 Rayburn House Office Building
Washington, D.C. 20515

The Honorable Jerry Lewis
Ranking Member. House Committee on Appropriations
H-218, The Capitol
Washington, D.C. 20515

The Honorable Duncan L. Hunter
Ranking Member. House Committee on Armed Services
2120 Rayburn House Office Building
Washington, D.C. 20515

Dear Gentlemen:

We are writing to thank you for supporting the National Guard and to seek your support to authorize and appropriate of $215 million additional funding in the FY2009 Defense Bill for 10 UH-60M helicopters ($158M) and 38 UH-60A to UH-60L upgrades ($57M) for the Army National Guard.

The Army National Guard is a full partner with the active Army in performing vital war and state emergency missions every day. This past year, Army National Guard H60 Black Hawk helicopters supported the full spectrum of state missions including search and rescue, utility/lift, disaster relief, fire fighting and medical evacuation, and of course deployments to Iraq, Afghanistan or wherever duty called in support of our nation.

The Guard flies many of the oldest UH-60A model Black Hawks, and as the active Army fields the new UH-60M to its units, more older UH-60As will be cascaded to guard units to fill their shortages. When all of the shortages are filled in the next few years, more than 500 of the 782 National Guard Black Hawk helicopters will be older "A" models. The average age of the UH-60A fleet is approaching 25 years old. The increased operational tempo of the last six years is simply wearing out these older helicopters much faster than the Army had planned.

Working with the active army, the National Guard has developed a two-pronged approach to modernize National Guard Black Hawk units. In order to modernize all of its UH-60As by 2014, The Guard needs to accelerate the pace of "M" model fieldings by 10 aircraft per year. They also need to re-capitalize and upgrade the older "A" series helicopters to the "L" model configuration at a rate of 38 per year to fill the gap.

The attached fact sheet prepared by the National Guard Association of the United States (NGAUS) provides additional details. These two initiatives have also been listed in the National Guard Bureau's FY2009 essential equipment top 25 un-funded list.

We appreciate the support you have provided in the past to the men and women of the National Guard. Thank you for your consideration of this critical equipment issue.

Sincerely,

Francis D. Vavala
Major General, DEARNG
President AGAUS

NGAUS
The National Guard Association of the United States

Fact Sheet

UH-60 Black Hawk

BACKGROUND

The UH-60 Black Hawk helicopter is an essential capability of the National Guard. It provides units in every state with a multi-mission aircraft for search & rescue, utility lift, disaster relief and medical evacuation. The Army National Guard (ARNG) is authorized 782 Black Hawk aircraft, but is short of this authorization by almost 100 aircraft. This shortage requires ARNG units to loan or transfer Black Hawks in support deployments, training or state missions, resulting in a higher usage rate of available airframes. Additionally, more than 500 of the 782 National Guard aircraft are older UH-60A models, with an average age of approximately 25 years.

The Army is in the process of procuring over 1200 UH-60M Black Hawks for utility, special operations and MEDEVAC missions to replace the aging UH-60A from operational units by 2016. The Army acquired 33 UH-60M Black Hawks by the end of FY07, and from FY09 to FY13, the Army plans to procure an additional 300 UH-60M Black Hawks (70 of those aircraft are programmed for ARNG units). However, without an accelerated procurement of the UH-60M and upgrade of the UH-60A to L, the Army National Guard will be operating more than 400 UH-60A helicopters beyond 2020.

The ARNG and the Active Army developed a program to support the continued modernization of the ARNG Black Hawk fleet. Unfortunately, this program is not fully funded. The ARNG plan is to accelerate the fielding of UH-60M Black Hawks by 10 aircraft per year. Although the Active Army has programmed UH-60A recapitalization for the ARNG with Operations and Maintenance (O&M) funds, which includes an airframe life extension, fleet-wide product improvements and the replacement of components, the UH-60A to L upgrade is not funded (see details of these programs are on page 2).

The UH-60L Black Hawk is more economical to operate and has 1000 lbs of additional lift than the UH-60A. The desired rate of UH-60 A to L upgrades is 38 per year.

These two ARNG aviation initiatives have been identified by the Chief of the National Guard Bureau (CNGB) as FY09 "Essential 10 - Top 25" unfunded priorities. Funding the UH-60A to L upgrade and acquiring additional UH-60M's will significantly improve the Black Hawk fleet, and assure that ARNG units are ready, deployable, and available to protect our national interests both abroad and at home.

RECOMMENDATION

The National Guard Association of the United States urges the Congress of the United States to authorize and appropriate $196M in the FY2009 Defense Budget with language directing that these funds for the Army National Guard as follows:

- Aircraft Procurement – Army, UH-60 Black Hawk (MYP): $158M for 10 UH-60M helicopters
- Aircraft Procurement – Army, UH-60 Mods: $57M to upgrade 38 UH-60A helicopters to the UH-60L configuration

NGAUS
The National Guard Association of the United States

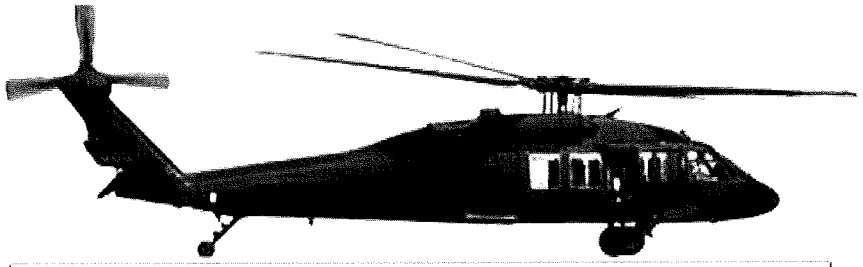
Fact Sheet

BLACK HAWK
UH-60A to UH-60L Upgrade

UH-60L Upgrade

(Aircraft Procurement, Army
UH60 Mods: $1.5M ea)

- UH-60L Improved Durability Gearbox
- UH-60L Flight control upgrades
- UH-60L (IVHMS) Integrated Vehicle Health Maintenance System
- UH-60L Overhead rescue hoist provisions
- UH-60L Overhead Rescue Hoist
- UH-60L Rescue Hoist Cable Guard
- UH-60L Digital engine control unit
- UH-60L Hydro mechanical unit
- UH-60L Signal data converter
- UH-60L Cargo hook upgrade to 9000 lbs



UH-60A Re-Capitalization

(Army Operation and Maintenance
Budget Activity 01/Activity Group 12
Subactivity Group 123: $5.7M ea)

Airframe Life extension

- Lot 30 Airframe configuration
- 31 separate Structural reinforcements
- Corrosion treatment
- Fuel Cell Area Rework
- Crew escape windows
- NVG Lighting
- Heads Up Display
- ARC – 220 HF Radio
- SLAB Battery
- Aux Fuel Panel
- Advanced Flight Control Computer
- ARN – 147

Component replacement

- UH-60L 701D Engine
- Latest Configuration (Applicable ECPs)
- Top 80 line replacement items
- Main rotor blades
- Tail rotor blades
- Tail / Intermediate gearboxes
- Stabilator actuators
- main/tail landing gear struts
- Engine high speed shafts
- Primary servos
- Accessory modules
- Hydraulic Modules
- Mixer Assy
- Tracks & Rails
- Spindles and Bearings
- Oil Cooler Fan
- Improved fuel roll-over vent valves

"HAMET use will be as follows...Avoid flying directly over identified mounds in the vicinity of LZ's 5 and 6 located on Mauna Kea." *[July EA p. 2-15]*
New.....

Nesting vs. breeding ???
p. 1-7 said ESA sec 7 consultatoin done—see BIO R sectoni

Appendix B--1-31-11 letter from Theresa Donham of SHPD to Charlene Uoki of DLNR re the December 2010 EA *[July EA, p. B-76 to 81]*
"It appears that little consultation was conducted by the applicant regarding" "potential impacts to cultural practices"
"...the project area extends mauka well beyond the identified LZs at both Ka'ohe and Humu'ula. We question why the APE *[area of potential effect]* identified in section 106 corresponsdence and the Project Area/ ROI for the EA are so divergent. It appears that most of the project area as identified in the *[December 2010]* EA will potentially be subjected to low-elevation (100-300 ft) fly-over reconnaissance, as well as hovering and/or abort, go-around procedures...
the proposed LZs are previously bulldozed, open, level areas that do not fit the requirements for landing on slopes, uneven surfaces, pinnacles or ridges, as indicated for this type of training...
the section 106 APE should minimally include the same geographic area as the project area identified in the EA, rather than six discontinuous locations. In situations where an LZ is at the boundary of the project area (i.e, LZ-3 in Humu'ula), it would appear that the APE would extend beyond the project boundary as identified in the EA."
Reports from PTA cultural resources staff did not state "The actual size of the LZs or area inspected"
"a faced mound that was observed approximately 50 meters south of LZ-6...may be within the area of rotor wash...no mitigation measures are proposed...This feature is not mentioned in the EA...
"...it appears that no thorough records search was conducted to identify and locate known historic properties..."
"..there are no statements in the text acknowledging that a portion of the project area is within this *[Mauna Kea Summit Region]* Historic District and that LZ-6 is quite close to the district boundary."
"...the information in the EA regarding historic properties for LZ-6...is not consistent with the information provided in the PTA staff memorandum regarding the archaeological inspection of this location, identified in the memo as LZ-5a..."
"At this time *[January 31, 2011, the date of the SHPD letter]* we are not confident that all of the historic properties have been identified within the areas of direct affect...We also find that no effort was made to identify, locate and assess historic properties that could be directly or indirectly affected by low flight/hover helicopter training in the project area."
"At this time *[January 31, 2011, the date of the SHPD letter]* the locations of cultural resources within the project area are mostly not known. In addition, the previously identified sites and districts have not been integrated into a comprehensive plan for avoidance...Due to the identification of multiple historic properties in the near vicinity of the LZs in Ka'ohe, it would stand to reason that there are multiple sites beyond the areas examined by PTA staff."
"We...believe that repeated use of areas for landing will result in cumulative impacts from rotor wash. The EA assumes that conditions at all six LZs are similar...however, we believe that the cinder cones in Ka'ohe will be potentially affected to a greater degree than the lava flow areas in Humu'ula."
"...the bulk of the project area [is] open for low flights and hovering. There is no consideration of this type of noise impact in the model used to generate a finding of less than significant noise impacts to cultural practices."

1.7 Agency and Public Involvement, Outreach, and Consultation *[July EA p. 1-5]*
On December 23, 2010, the USAG-HI released,...an EA and draft FNSI for the proposed action to conduct HAMET over the course of **one year for 300-400 25th CAB aviators**...The revised EA was published April 23, 2011.... The proposed action was **reduced to train 260 aviators for approximately 45 days over the course of three non-consecutive months.**" *[July EA p. 1-5, bold added]*

"To conduct HAMET at a CONUS location, the 25th CAB would need to deploy one-third of its combat helicopter fleet…The aircraft would remain at the CONUS location until all of the 25th CAB pilots had completed the training." *[April EA p. 1-3]*

"…Training at the Gypsum site is approximately 1 week…" *[July EA p. 2-18]*
??????????????????

> Kolea or Pacific Golden Plover (*Pluvialis fulva*)
> F—species of special concern S--none
> Adults return from artic [sic] nesting grounds in August, immatures in September. Most leave by early May.
> *[http://www.hawaiiaudubon.com/gallery/birds/kolea.html]*

In overview, the following changes were made to the Action Alternatives:
□ Proposed HAMET on Hawaiian Island alternatives would be conducted with two aircraft types (i.e., Black Hawks and Chinooks) rather than three types; the OH58 Kiowa Warrior would not be flown for Hawaiian Island HAMET
□ Fewer aviators will be trained (from 260 to 90), and the timeline for the Proposed Action has been refined from 3-three week periods in June, August, and October to only October 3 thru October 31, 2011.
□ Flight paths for the Proposed Action were redesigned to reduce the size of the over flight area and avoid the Mauna Kea State Recreation Area and proximity to the Mauna Kea Ice Age Natural Area Reserve. *[July EA p. 1-5]*
Graphics seem to contradict this—all seem identical to the April EA, and are all dated April 2011. Text also appears to have no substantive changes re. flight paths, but any changes were not readily discernable, because the July EA gave no indication exactly what text was changed.

□ All alternatives were re-examined.
In conjunction with changes to the Action Alternatives, the USAG-HI also performed the following:
□ Additional research and surveys regarding biological resources
□ Additional cultural resource research and surveys
□ A noise level study
□ A view plane analysis
□ A re-analysis of valued environmental components.

> 'Apapane bird (*Himatione sanquinea*)
> Federal species of special concern
> State –no listing
> "Breeding season extends at least from December until July…"
> *[http://www.state.hi.us/dlnr/consrvhi/forestbirds]*

VMC approach (typically 10 degrees) to a landing or to a 3-ft hover.
□ Abort and go-around procedures – climb-out maneuvers performed when conditions are no longer suitable for landing. A go-around procedure is a planned diversion around an LZ; for instance, it could be performed for weather-related reasons.
□ Elevated (100–500 ft [30–152 m]) reconnaissance over high-altitude LZs.
□ Slope operations – landing operations performed on an angled, uneven surface (i.e., LZ).
□ Pinnacle or ridgeline operations – landing operations performed on a pinnacle, or a formation similar to a pinnacle, that is a high point on a hill (or LZ). *[July EA p. 2-1 to 2]*

(1-m) hover; go-around, slope operations; and pinnacle or ridgeline operations. Pilots would execute multiple touch-and-go, hover, short-stop approach, full-stop landing, and elevated (100–500 ft [30–152 m]) reconnaissance *[July EA p. 2-15]*

"Although the region of the Mauna LoaLZs is thought to be part of the flyway used by petrels transiting the saddle region to colonies in Hawaii *[sic]* Volcanoes National Park, petrel presence in the flyway is indeterminable." *[July EA p. A-7]*

From: Cory (Martha) Harden [mailto:mh@interpac.net]
Sent: Tuesday, July 26, 2011 12:14 PM
To: 'ncook-lauer@westhawaiitoday.com'
Subject: Army helicopters:

HI Nancy-- statement from Sierra Club—

We commend the Army for doing additional environmental studies. But we are extremely disappointed that no public hearings are scheduled on Hawai'i Island, though

citizens have been calling for them over the past six months; that no consultation was done with stakeholders like Sierra Club; and that Federal and State Environmental Impact Statements (which are more thorough than Environmental Assessments) were not done. We feel all are warranted because the proposed action is significant. The helicopters would carry military training with safety and noise issues off the Pohakuloa base. They would overfly and land on ceded lands held in trust, impacting endangered species, cultural practitioners, hunters, hikers, and visitors.

Cory Harden
Sierra Club
PO Box 1137
Hilo, Hawai'i 96721
mh@interpac.net
808-968-8965

From: ncook-lauer@westhawaiitoday.com [mailto:ncook-lauer@westhawaiitoday.com]
Sent: Monday, July 25, 2011 10:41 AM
To: Cory (Martha) Harden
Subject: Re: Army helicopters: activist comments & independent news story, both from Colorado

Cory:

Thanks for sending this!

I will be doing a story tomorrow for Wednesday on the revised EA:

http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-High-Altitude-Mountanous-Environment-Training.pdf

Do you have any thoughts on the revised version?

thanks

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Rogers, William Mr CIV US USA IMCOM

From: Kekoa Harman [kekoaharman@gmail.com]
Sent: Wednesday, August 24, 2011 5:05 AM
To: HAMET_NEPA
Subject: Protecting the ʻĀina- Aloha ʻĀina

Dear Colonel Mulbury,

I am writing to you in regards to the Draft Environmental Assessment for the High-Altitude Mountainous Environment Training, dated July 2011(http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-High-Altitude-Mountanous-Environment-Training.pdf and http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-Hi-Alt-Mnt-Env-Trng-Appendices-A-to-D.pdf). These comments are provided to you in response to your request for comments, with the 30-day review beginning on July 23, 2011 and ending on August 23, 2011.

I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document. Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA. The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?" Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis. Why, if the army claims that "analyses did not indicate the need for an environmental impact statement" did you require this many attempts in reaching a FONSI? Even after three attempts at a FONSI, the analysis is still lacking.

The alternatives considered do not meet your stated purpose to recognize army environmental and social stewardship responsibilities within the affected region. Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii. The alternative 5 for other high-altitude training sites on the CONUS is prematurely eliminated and should have been carried forward for further analysis. This alternative should be fully considered in an EIS.

Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the army is not qualified to conduct a legitimate impact analysis. The army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture. Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the army catastrophically fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.

The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor has the community been properly consulted. Had the cultural impact assessment been completed properly, impacts to cultural resources would have been identified as significant and unmitigable.

Aside from photographs taken on a day outing to these LZs what efforts have been put into the interpretation of the sites identified? The identified sites are extremely close in proximity to each LZ and located on the tops of small puʻu. The cairns atop each puʻu are within 20 feet of the LZs. Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times. Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources. It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36CFR part 800, let alone meet the substantive portion of the law.

There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas. The substantive portion of Section 106 of the National Historic Preservation ACT of 1966 (as amended) mandates that the army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each puʻu in this project. For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawaiʻi.

The lack of information does not instill in me confidence that the army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ. It is difficult to comprehend how the army proposes to protect cultural resources without understanding what they are. More respect of the army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.

While the army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other non-army projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

While the army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii? Native Hawaiians have been unjustly targeted for the army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape. Has the army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

This EA lacks impact analysis on transportation between the islands of Oʻahu and Hawaiʻi.

Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable. I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Sincerely,

Kekoa L. Harman

--
Aloha,
Kekoa L. Harman
kekoaharman@gmail.com<mailto:kekoaharman@gmail.com>
808.322.0591

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Original Message-----
From: HAMET_NEPA
Sent: Monday, August 22, 2011 10:26 AM
To: John Beller
Subject: FW: Comments on Draft EA for High-Altitude Mountainous Environmental Training

Comment to forward, and attachment. thanks

-----Original Message-----
From: Sen. Les Ihara, Jr. [mailto:senihara@Capitol.hawaii.gov]
Sent: Monday, August 22, 2011 5:02 AM
To: HAMET_NEPA
Cc: Heather Bolan
Subject: Comments on Draft EA for High-Altitude Mountainous Environmental Training

To NEPA Program USAG-HI: I have reviewed the HAMET draft environmental assessment and would like to submit comments regarding noise concerns of constituents who reside in neighborhoods along helicopter routes.

Although the draft HAMET EA has limited its assessment of impacts to the training area, I would like to point out potential noise impacts to residential districts on Oahu, including Kaimuki and Maunalani Heights, caused by helicopters traveling from Schofield Barracks to the HAMET training areas.

In order to limit noise disturbances in residential areas, I would like to request that Schofield-based helicopters avoid routes over residential areas on Oahu. I would also like to know if Kaimuki and Maunalani Heights residents can expect noise disturbances similar to their experience in February and March of this year (as described below, and attached) -- if HAMET helicopter routes were travel over their residential communities. High-altitude routes over residential areas may be acceptable if the helicopter noise does not disrupt residents.

I appreciate the opportunity to submit these comments. Responses may be sent to my email address above. Thank you.

LES IHARA, JR.
Hawaii State Senator, 9th District
Majority Policy Leader

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Rogers, William Mr CIV US USA IMCOM

From: Clint Kalaola [kelai00@yahoo.com]
Sent: Tuesday, August 23, 2011 7:23 PM
To: HAMET_NEPA
Cc: kelai00@yahoo.com
Subject: Comments for Army EA

Dear Colonel Mulbury,

I am writing to you in regards to the Draft Environmental Assessment for the High-Altitude Mountainous Environment Training, dated July 2011(http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-High-Altitude-Mountanous-Environment-Training.pdf and http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-Hi-Alt-Mnt-Env-Trng-Appendices-A-to-D.pdf). These comments are provided to you in response to your request for comments, with the 30-day review beginning on July 23, 2011 and ending on August 23, 2011.

I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document. Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA. The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?" Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis. Why, if the army claims that "analyses did not indicate the need for an environmental impact statement" did you require this many attempts in reaching a FONSI? Even after three attempts at a FONSI, the analysis is still lacking.

The alternatives considered do not meet your stated purpose to recognize army environmental and social stewardship responsibilities within the affected region. Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii. The alternative 5 for other high-altitude training sites on the CONUS is prematurely eliminated and should have been carried forward for further analysis. This alternative should be fully considered in an EIS.

Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the army is not qualified to conduct a legitimate impact analysis. The army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture. Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the army catastrophically fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.

The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor has the community been properly consulted. Had the cultural impact assessment been completed properly, impacts to cultural resources would have been identified as significant and unmitigable.
Aside from photographs taken on a day outing to these LZs what efforts have been put into the interpretation of the sites identified? The identified sites are extremely close in proximity to each LZ and located on the tops of small pu'u. The cairns atop each pu'u are within 20 feet of the LZs. Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times. Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources. It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36CFR part 800, let alone meet the substantive portion of the law.

There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas. The substantive portion of Section 106 of the National Historic Preservation ACT of 1966 (as amended) mandates that the army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each pu'u in this project. For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawai'i.
The lack of information does not instill in me confidence that the army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ. It is difficult to comprehend how the army proposes to protect cultural resources without understanding what they are. More respect of the army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.
While the army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other non-army projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

While the army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii? Native Hawaiians have been unjustly targeted for the army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape. Has the army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

This EA lacks impact analysis on transportation between the islands of Oʻahu and Hawaiʻi.

Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable. I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Sincerely,

Clint Kalaola

P.O. Box 235109
Honolulu, Hawaii 96823
(808) 330-5858

kelai00@yahoo.com<mailto:kelai00@yahoo.com>

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Mr. Leon Kau
3715 Pukalani Place
Honolulu, Hawaii 96816

From: Heather Bolan [mailto:bolan@Capitol.hawaii.gov]
Sent: Wednesday, August 10, 2011 6:59 PM
To: HAMET_NEPA
Cc: 'ebo3715@gmail.com'
Subject: FW: Re Residential Helicopter Noise on Hi-Altitude Helicopter Training DEA

Military helicopter flight path between Honolulu and the "High-Altitude Mountainous Environment Training" on Hawaii cause environmental disturbances.

We live on Maunalani Heights in Kaimuki at about the 700 fool elevation. Military helicopters fly in both directions, west to east and returning east to west over our residence, Pukalani Place, Kaimuki, Honolulu. The helicopters fly in the "B" air space up to 2000 feet altitude. At 2000 feet they are extremely loud, i.e., air buffeting noisy and vibration and even more severe when helicopters fly in formation, four or more in a group. The large double rotor helicopter is worst of all.

Noise and vibration are even more severe when the pilots fly lower than 2000 sea level elevation. The helicopter pilots take a flight path following the H1 freeway which means they can fly over Maunalani Heights. The helicopter pilots appear to head in and out from Wheeler to a designation at Koko Crater over Honolulu. This path is far from the H1 freeway but within the "B" airspace which cause the disturbances. The military should not fly over the city (Honolulu) to train at the higher elevations on the island of Hawaii.

Previous helicopter training using Kaimuki as a gateway have been devastating to me personally. I have been trusted back into years 1968 -1969. I have trouble sleeping at night and replay the things I have experienced during my service in South Vietnam. Helicopter flights over my house have been low at times which cause me much stress. I have recently been diagnosed with high blood pressure. I'm 5'-6" tall and weigh between 134 -142 pounds depending on my mood. I seriously believe hearing, feeling and seeing the helicopters are affecting me.

Today, August10, 2011 the CH-47 Chinooks have been flying over. The 2000 foot level is inadequate. I remember the Chinooks blowing the tin of hooch's in Vietnam. Today I feel like I'm there again. If these helicopters bother me so much I can imagine the violent impact on the environment at Mauna Kea and Mauna Loa.

Respectfully,

Mr. Leon Kau
3715 Pukalani Place
Honolulu, Hawaii 96816

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Rogers, William Mr CIV US USA IMCOM

From: lawton mauai [mais8401@yahoo.com]
Sent: Tuesday, August 23, 2011 9:32 PM
To: HAMET_NEPA
Subject: Hawaii Island Environmental Impact Statement

Dear Colonel Mulbury,

I am writing to you in regards to the Draft Environmental Assessment for the High-Altitude Mountainous Environment Training, dated July 2011(http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-High-Altitude-Mountanous-Environment-Training.pdf and http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-Hi-Alt-Mnt-Env-Trng-Appendices-A-to-D.pdf). These comments are provided to you in response to your request for comments, with the 30-day review beginning on July 23, 2011 and ending on August 23, 2011.

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Sincerely,

Lauren M. Mauai

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Rogers, William Mr CIV US USA IMCOM

From: T J McAniff [oldarmy@mac.com]
Sent: Sunday, August 21, 2011 10:52 AM
To: Rogers, William Mr CIV US USA IMCOM
Cc: Niles, Rolland C LTC MIL US USA IMCOM; Troute, Stephen W Mr CIV US USA IMCOM
Subject: Army EA for HAMET

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Mr Rogers:

These are my comments on The Army's July 2011 Environmental Assessment for high altitude mountainous environment training (HAMET).

It appears that some people don't understand - or if they do understand, don't care - that the purpose of military training is to simulate combat conditions as much as possible, so as to enhance both the combat effectiveness and combat survivability of soldiers when they do indeed go into combat.

As a retired soldier with thirty-one years of active duty service, and over two years of Infantry combat experience in Vietnam, I can attest to the value of realistic training in preparation for combat, and I feel more than a bit irritated with those who have not served in the military, but nevertheless attempt to mandate the training conditions of those who do serve, and serve at the risk of their lives.

The Army makes the convincing case that helicopters operating at the higher altitudes common in Afghanistan encounter turbulent wind conditions that are uncommon at lower altitudes. Therefore, the Army must prepare helicopter crews for these conditions in a non-threatening environment before the crews encounter similar conditions while the enemy is attempting to shoot them out of the sky.

Opponents of this training insist that Army helicopter units stationed in Hawaii must conduct their training on the Mainland to avoid disturbing various species of native birds and hunters and hikers. It doesn't make any sense at all that the Army should station a Combat Aviation Brigade in Hawaii, and be required to train that brigade three thousand miles away. Nor does it make sense to us that some Americans would put obstacles in the way of other Americans who must train for the dangers of combat that they will soon endure.

Sincerely,
T J McAniff

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
2011-TA-0268

AUG 22 2011

Douglas S. Mulbury
U.S. Army Installation Management Command, Pacific Region
851 Wright Avenue, Wheeler Army Airfield
Schofield Barracks, Hawaii 96857

Subject: Comments on the Draft Environmental Assessment and Draft Finding of No Significant Impact for High Altitude Mountainous Environment Training on Mauna Kea and Mauna Loa, Hawaii

Dear Mr. Mulbury:

The U.S. Fish and Wildlife Service (Service) has reviewed the Draft Environmental Assessment (DEA) and Draft Finding of No Significant Impact (FONSI) for the proposed High Altitude Mountainous Environment Training (HAMET) on Mauna Kea and Mauna Loa, on the island of Hawaii. The U.S. Army (Army) is proposing to train helicopter air crews for high-altitude, mountainous-environment flights using six landing zones (LZs). Three LZs are located on Mauna Kea and three are on Mauna Loa at altitudes between 7,500 and 12,000 feet. We have reviewed the July 2011, DEA pursuant to National Environmental Policy Act (NEPA) of 1969, the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), as amended, and provide the following comments to assist you in developing your Final EA.

In May 2011, we commented on the Army's April 2011, DEA for HAMET and recommended that the flight path over Mauna Kea not pass over occupied palila (*Loxioides bailleui*) critical habitat and instead use the flight path shown in the December 2010, DEA. We also recommended the Army re-evaluate its determination of no effect and FONSI for the proposed HAMET training. We note these comments were not addressed in the July 2011, DEA.

The July 2011, DEA includes a determination of no effect for the proposed HAMET training. The Service maintains this determination does not adequately assess the potential impacts to palila and palila critical habitat from the proposed training for the following reasons:

- The determination of no effect only analyzes noise disturbance to resources at the LZs. There is no analysis of potential noise disturbance on the flight path over occupied palila critical habitat. Figure 4-6 in the DEA shows that noise levels over palila occupied

critical habitat will reach between 75 and 80 decibels (dB) from HAMET training at 2,000 feet. This is well above the 60 dB disturbance threshold for noise recommended in our January 24, 2011, comment letter, and just below the 80 dB disturbance level the Army set in the July 2011, DEA. Noise disturbance at the 75-80 dB level over occupied critical habitat is not consistent with a no effect determination to palila, especially over core palila area because this level of noise could impact normal behavior patterns.

- The determination of no effect does not assess the likelihood that a helicopter could stray below 2,000 feet while flying over occupied palila critical habitat. In a high altitude training exercise in 2003 an Army helicopter landed in the Mauna Kea Ice Age Natural Reserve well outside an established LZ. In February 2006, it came to our attention that a helicopter had flown over palila critical habitat outside the agreed upon flight corridor. It was at this time we learned that the on-board GPS does not record flight paths, making it difficult to track where helicopters travelled. Due to these incidents, there is a reasonable chance that a helicopter could stray below 2,000 feet over occupied palila critical habitat and cause additional noise disturbance above what was analyzed in the DEA and your ESA effect determination.
- The determination of no effect includes the statement that "the likelihood of a helicopter crash during HAMET operations was not considered tenable" (page 3). However, we recommend the potential fire ignition from an accident on Mauna Kea be further examined given the proposed flight path over core palila habitat and the high fire risk on Mauna Kea.

We recommend the Army initiate informal consultation with the Service regarding the proposed HAMET training. In addition, we recommend the Army reconsider using the original flight path to the Mauna Kea LZs proposed in the December 2010, DEA. This flight path does not cross over occupied palila critical habitat and instead follows the serpentine road and gulch up the side of Mauna Kea. This flight path eliminates the potential for noise disturbance over occupied palila critical habitat and reduces the fire risk.

If you have any questions or concerns regarding these comments, please contact Rachel Rounds, Fish and Wildlife Biologist, Consultation and Habitat Conservation Planning Program (phone: 808-792-9400, email: rachel_rounds@fws.gov).

Sincerely,

Loyal Mehrhoff
for Field Supervisor

----- Original Message -----
From: nagatas@hawaii.edu [mailto:nagatas@hawaii.edu]
Sent: Thursday, August 25, 2011 04:13 PM
To: Niles, Rolland C LTC MIL US USA IMCOM
Subject: RE: HAMET (UNCLASSIFIED)

OMKM will not be submitting comments.

Thank you for asking.

Stephanie

-----Original Message-----
From: Niles, Rolland C LTC MIL US USA IMCOM [mailto:rolland.niles@us.army.mil]
Sent: Wednesday, August 24, 2011 11:27 AM
To: Steph UH; Tiffnie Kakalia (tiffnie@hawaii.edu)
Subject: HAMET (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: FOUO

Aloha

I wanted to follow up with you on the High altitude EA v3. I wanted to confirm that you do not have any written comments on our latest version of the EA, dated 22 July. Our comment period was over on 22 August but I understand the TMT hearings consumed a lot of your time.

mahalo

Chris

ROLLAND C. NILES
LTC, FA
USAG-Pōhakuloa

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STATE OF HAWAI'I
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711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD 11/5752B

August 22, 2011

William Rogers
NEPA Program Manager
USAG-HI, Directorate of Public Works
Environmental Division (IMPC-HI-PWE)
948 Santos Dumont Ave., Bldg. 105, Wheeler Army Airfield
Schofield Barracks, HI 96857-5013

Re: Comments on draft environmental assessment and anticipated negative declaration determination for the High-Altitude Mountainous Environment Training (HAMET), Hawai'i Island

Aloha e Mr. Rogers,

The Office of Hawaiian Affairs (OHA) provides its comments on the draft environmental assessment (EA), pursuant to Hawai'i Revised Statutes, Chapter 343, for the proposed High-Altitude Mountainous Environment Training (HAMET), which requires a right-of-entry from the State of Hawai'i, Board of Land and Natural Resources in order to access six landing zones on Hawai'i Island. In addition to the draft EA, the U.S. Army Garrison-Hawai'i (USAG-HI) issued an anticipated negative declaration determination for the proposed action. OHA previously commented on the EA and draft finding of no significant impact for the HAMET project, reviewed under the federal National Environmental Policy Act (NEPA). We thank you for this further opportunity to provide input into the decision-making process.

OHA understands that the USAG-HI has prepared the instant draft EA for the proposed HAMET action by the 25th Infantry Division—25th Combat Aviation Brigade (CAB) as part of its mandatory aviator training in advance of a deployment to Afghanistan in 2012. As part of a three-phase Army helicopter training program, Phase II of the HAMET would utilize three existing helicopter landing zones on Mauna Kea and three existing helicopter landing zones on Mauna Loa. The right-of-entry would cover the training actions of 90 aviators, who would engage in no more than 180 flight hours of Phase II HAMET over a period of 20 days in October 2011. The training operation would involve UH-60 Blackhawk and CH-47 Chinook helicopters taking off from Bradshaw Army Airfield and elevating to 2,000 feet within the boundaries of the Pōhakuloa Training Area (PTA). The helicopters would proceed along a defined flight path

from PTA directly to identified release points on the slopes of Mauna Kea and Mauna Loa, before beginning a descent route from the 2,000 foot elevation to the aforementioned landing zones. At a given landing zone, the helicopters would be on the ground for no more than 10 minutes per landing, with no loading/unloading of personnel onto the helicopters.

OHA seeks clarification as to the total number of helicopters that may be present on a mountain at a given time. The draft Finding of No Significant Impact/ Anticipated Negative Determination, page 3, states "[n]o more than two aircraft would be in or around the LZs at any given time, and no more than two aircraft would be flying on either mountain simultaneously at the LZ areas." By contrast, the draft EA, page 2-9, states "[t]he maximum number of helicopters training on any mountain at one time would be three."

As you are aware, Hawai'i environmental review law requires "due consideration of the effects of human activities on native Hawaiian culture and the exercise thereof . . . to ensure the continued existence, development, and exercise of native Hawaiian culture." *Ka Pa'akai o Ka'aina v. Land Use Comm'n*, 94 Haw. 31, 47 n.28 (2000). In preparation for future review under the Chapter 343 process and as a showing of the USAG-HI's commitment to the protection of Native Hawaiian cultural resources, OHA encourages the USAG-HI to immediately commence a cultural impact study for the continued use of the helicopter landing zones on Mauna Kea and Mauna Loa. Such studies would be useful in providing some level of insight to Army personnel, who may be unfamiliar with Hawai'i and the prominence of these two mountains in the spirituality and culture of many Native Hawaiians. We also strongly advocate for public hearings on Hawai'i Island prior to future HAMET decision-making.

Finally, OHA reiterates its support for the commitment by the USAG-HI to work with the State of Hawai'i, State Historic Preservation Division (SHPD) to examine alternate sites for two existing landing zones (LZ-5 and LZ-6) on Mauna Kea where known rock mounds are located outside of the existing landing zones, but within the 328 foot (100 meter) area of potential effect. Although these features were found to have been unaffected by HAMET training in March-April 2011, OHA recognizes the effort by the USAG-HI to consider the long-term impacts of the HAMET actions.

For the limited-duration of the Phase II training actions proposed for October 2011, OHA does not oppose, nor concur, with the anticipated negative declaration determination of the USAG-HI. As stated in our letter for the NEPA review, OHA expects the USAG-HI staff to follow the Chapter 343 process for further HAMET actions beyond those proposed for October. Thank you once again for the opportunity to comment. Should you have any questions, please contact me or have your staff contact Everett Ohta at 594-0231 or by email at everetto@oha.org.

'O wau iho nō,

Clyde W. Nāmu'o
Chief Executive Officer

CWN: eo

C: Portage (HAMET project consultant)
OHA Trustee Robert K. Lindsey, Jr.
OHA East and West Hawai'i Community Resources Coordinator

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United States Department of the Interior

NATIONAL PARK SERVICE
Hawai'i Volcanoes National Park
Post Office Box 52
Hawaii National Park, Hawai'i 96718

IN REPLY REFER TO:
L76

August 16, 2011

Mr. William Rogers
United States Army Garrison, Hawaii (USAG-HI)
948 Santos Dumont Avenue
Wheeler Army Airfield, Building 105
Schofield Barracks, Hawaii 96857-5000

Dear Mr. Rogers:

This letter is in response to your agency's request for comments regarding the July 2011 draft environmental assessment (EA) for High Altitude Mountainous Environmental Training (HAMET) at Pōhakuloa Training Area on Hawaii Island. Our primary concerns lie specifically with the potential for impacts from military over flights in the airspace above or adjacent to Mauna Loa Volcano and any potential impacts to Hawai'i Volcanoes National Park.

Previous comments were submitted January 11, 2011 and May 23, 2011 and we are attaching the previous submissions for your continued consideration. While many of our comments have been addressed in the revised EA, some are still relevant.

Please note for your files related to this project and all future projects on Hawaii Island, that Hawaii Volcanoes National Park is the Section 106 contact for projects that may potentially impact the park, not the NPS Honolulu Office. Please ensure that we are added to your Section 106 consultation list for Hawaii Island.

We would appreciate the opportunity to participate in the pilot briefing that is anticipated for October, as well as any future pilot briefings regarding natural and cultural resource issues. Hawaii Volcanoes National Park has unique issues related to park resources, as well as the NOTAM for Kilauea Volcano (see letter dated January 11, 2011).

Thank you for the opportunity to comment.

Sincerely,

Cindy Orlando
Superintendent

Enclosures

cc: Elaine Jackson-Retondo, NPS, PWR-Oakland
Dr. Julie M.E. Taomia, US Army-PTA
Portage, EA Consultant

United States Department of the Interior

Hawai`i Volcanoes National Park
P.O. Box 52
Hawaii National Park, HI 96718-0052
808/985-6000
808/967-8186 (FAX)

In Reply Refer to:
L76

May 23, 2011

NEPA Program Manager
USAG-HI Directorate of Public Works
Environmental Division (IMPC HI PWE)
948 Santos Dumont Avenue, Building 105
Wheeler Army Airfield
Schofield Barracks, HI 96857-5013

This letter is in response to your agency's request for comments regarding the environmental assessment (EA) for High Altitude Mountainous Environmental Training (HAMET) at Pōhakuloa Training Area on Hawaii Island. Our primary concerns lie specifically with the potential for impacts from military over flights in the airspace above or adjacent to Mauna Loa Volcano and any potential impacts to Hawai'i Volcanoes National Park. We appreciate that the comments from our January 11, 2011 letter were addressed in the revised EA.

The revised EA states that impacts to recreation would be mitigated through public notification of the HAMET training schedule. We would like to request direct notification of the training schedule so we can alert backcountry users of any potential impacts due to the proximity of LZ-1, LZ-2, and LZ-3 in relation to the Mauna Loa Unit of designated wilderness within the park. Please send the notification of the training schedule to HAVO_Superintendent@nps.gov.

Please ensure we are on your agency list of interested stakeholders. Thank you for the opportunity to comment.

Sincerely,

Cindy Orlando
Superintendent

cc: Elaine Jackson-Retondo, NPS, PWR-Oakland
Dr. Julie M.E. Taomia, US Army-PTA

United States Department of the Interior

Hawai`i Volcanoes National Park
P.O. Box 52
Hawaii National Park, HI 96718-0052
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In Reply Refer to:

January 11, 2011

NEPA Program
USAG-HI Directorate of Public Works
Environmental Division (IMPC HI PWE)
947 Wright Ave.
Wheeler Army Airfield
Schofield Barracks, HI 96857

This letter is in response to your agency's request for comments regarding the proposed EA for High Altitude Mountainous Environmental Training at Pōhakuloa Training Area on Hawaii Island. Our primary concerns lie specifically with the potential for impacts from military over flights in the airspace above or adjacent to Mauna Loa Volcano and any potential impacts to Hawai'i Volcanoes National Park. This letter represents the formal position of Hawaii Volcanoes National Park and is submitted in addition to comments received from our NPS Honolulu Office dated November 8, 2010. We appreciate the opportunity to offer the following comments.

Since 2000, the National Park Service (NPS) has been working with the FAA to develop an Air Tour Management Plan and environmental impact statement for Hawaii Volcanoes in order to mitigate or prevent the significant impacts of commercial air tour operations over the park. Congressional and NPS concerns regarding the impacts of over flights on the national parks led to passage of the National Parks Air Tour Management Act (NPATMA) in 2000. Documentation of the impacts to national park resources (natural, cultural, visitor experience and safety and Congressionally designated wilderness) from over flights occurring over Hawai'i Volcanoes reveal a number of park sensitivities and issues of concern:

- Hawaii Volcanoes is designated a National Park and World Heritage Site/ Biosphere Reserve due to its volcanic, ecological and cultural significance. The identified project area on Mauna Loa lies adjacent to known nesting habitat within the park of the federal endangered Hawaiian Petrel ('Ua'u) and proposed endangered (state listed endangered) Band-rumped Storm Petrel ('Ake 'ake). Both species are nocturnal long distance flyers whose nesting activities and aerial displays occur within the park at 8,000'-10,000' elevation on Mauna Loa. Based on proximity and similarities in substrate age and elevation between park habitat and the proposed Mauna Loa project area, and past historical documentation, there is potential for these birds to occur within the project area and in proximity to LZs. In addition to bird strikes, the noise and sight of low flying aircraft could potentially alter bird behavior and result in negative impacts to birds. Additional site surveys and consultation with subject experts familiar with bird use in the project area are recommended to effectively evaluate potential impacts to birds by the project.

In addition, Section 4.7.2.1 states that endangered species "are limited to their habitats". In the case of the Kipuka Ainahou Nene Sanctuary, the majority of birds found there actually originate from other populations across the island and are known to move between multiple areas, including Hawaii Volcanoes National Park. Nene flight routes are unknown and not necessarily consistent. Section 4.7.3.1 states that endangered species would not be at risk of air strike because helicopters would not fly outside of project area. Because endangered Nene do indeed move in and out of the Kipuka Ainahou Sanctuary it is not possible to rule out the potential for air strike. In addition to bird strikes, the noise and sight of low flying aircraft could potentially alter bird behavior on the ground and result in negative impacts to birds. There is also an implied known response to aircraft. If there has been some relevant formal study of nene (or other endangered species) response to aircraft, it should be referenced. We appreciate your dismissal of any alternatives that might include military over flight routes which have the potential to impact the populations of these species.

- Mauna Loa Volcano is part of the park's 130,950 acres of Congressionally legislated wilderness. Known as the Mauna Loa Unit, this designation provides special protection to this area of Mauna Loa that is demarcated by the park boundary on the north and east sides of the park. We appreciate your selection of alternatives that avoid flights directly over designated park wilderness. However, our concerns include the potential sight and noise from low flying helicopters adjacent to the park's designated wilderness. The primary wilderness trail for visitors to access the Mauna Loa Summit and associated backcountry cabins run parallel to the boundary of the project area. The associated noise is unexpected for park visitors and would potentially limit opportunities for solitude that are protected under the Wilderness Act. The park's large expanse of lava produce landscapes that offer little sound shielding, creating long "time audibles" for human or mechanized sounds. In these areas, one aircraft passing through can be heard for as much as a 30 minute span of time, creating an acoustic impact on wilderness users

- The National Park Service is responsible for the National Historic Landmark program. Activities associated with the HAMAT project have the potential to both directly and indirectly impact three traditional cultural properties on Mauna Kea that are eligible for the NRHP and the National Historic Landmark on Mauna Kea. Direct and indirect impacts to these latter resources have not been adequately addressed in your current language. The Mauna Kea LZ and flight path include a section of the Historic Landmark within its boundary therefore directly impacting the Landmark. Pursuant to S 110(f) federal agencies are required to minimize harm to NHL's. The current language of the HAMAT EA is missing discussion of direct impacts of flights over archeological sites. There are a number of known cultural resources on the slopes of Mauna Loa and a number of shrines on the slopes of Mauna Kea on the eastern side of the training area. The Mauna Kea LZ flights will go directly over these sites.

- Moku'aweoweo Crater on Mauna Loa is considered one of the most sacred places for Native Hawaiians. In addition, all parklands are associated with the birth and creation of Hawaiian culture. The park Kupuna group, an informal group of Hawaiian elders, has stated that they feel the sight and presence of these low-flying aircraft to be culturally inappropriate. We appreciate your selection of alternatives that avoid the summit crater of Mauna Loa.

- Although your project does not propose flights above the park, please note Kīlauea Volcano continues to experience an ongoing summit eruption at Halemaumau Crater.

The FAA has issued a Temporary Flight Restriction, (TFR) for aircraft safety for explosive eruptions and presence of ejected volcanic particulates at Kīlauea Summit (NOTAM: Hilo Vortac (ITO) 209 degree radial at 24.6 miles (Latitude 19°24" 20" N, Longitude 155° 17"26"W for a current radius of 3 nautical miles). This is from the surface up to and including 4000'agl. Eruptive activities are continuing to produce a hazardous ash cloud which may cause aircraft engine damage/failure and abrasion damage due to airframe and windshield surfaces. Plume size fluctuates. Explosive events with large amounts of ash can appear with no warning.

- Since 2007, Hawaii Volcanoes staff have participated in the Western Pacific Airspace/Range Council meetings. The purpose of this annual meeting is to provide an opportunity for dialogue among the various branches of the military and land management agencies. The meeting is attended by active duty and civilian representatives from the US Air Force, US Navy, and Air National Guard units from throughout the western United States and top brass from Washington D.C. An ongoing dialogue with military representatives has led to a reduction in the numbers of military over flights impacting park resources due to increased awareness of NPS issues. Collectively the military at these meetings has stated that military aircraft operating at low levels and at high speeds over the national parks and their designated wilderness are not operating within the standard operating procedures of the military.

Visitors come to their national parks to experience the natural quiet and solitude. Park managers are charged with protecting critically endangered species, designated wilderness and park sound scapes as well as limiting activities that cause unnecessary noise or threaten the natural quiet. Both agencies are jointly engaged in protecting our country and it's resources. We anticipate working with you to build a cooperative relationship and resolve our concerns as the the planning progresses. Please add us to your agency list of stakeholders for all military activities involving overflights within the Hawaiian Islands.

Sincerely,

Cindy Orlando
Superintendent

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Rogers, William Mr CIV US USA IMCOM

From: Janice Palma-Glennie [palmtree7@hawaiiantel.net]
Sent: Tuesday, August 23, 2011 4:27 PM
To: HAMET_NEPA
Subject: Draft EA-(HAMET) at Pohakuloa

Aloha,

My comments are related to the July 2011 Draft Environmental Assessment (EA) for Army High-Altitude Mountainous Environment Training (HAMET) at Pohakuloa.

HAMET training could be done in a more appropriate setting than Hawai`i, with fewer impacts and likely lower costs.

Unfortunately, the Draft EA underestimates impacts on Hawai`I as compared with other locations [see comments for 2.7-- Action Alternatives]. Fort Carson was not mentioned in the April EA, nor was the expense of transport to Pohakuloa vs. Colorado.

Extensive comments on the April EA by SHPD (State Historic Preservation Division), USFWS (U.S. Fish and Wildlife Service), and Sierra Club regarding biological, cultural, and visual resources, cumulative impacts, and safety, are not addressed in the EA.

The EA lacks specifics including noise analysis and some studies appear contradictory in their projected or real outcomes. Biological impacts appear severely lacking including impacts on endangered species like nene goose and native Hawaiian bats. Information on inspection and cleaning procedures for invasive species appear to be contradictory.

The EA also ignores public access issues.

I ask that the Army go back to the drawing board to address these and other omissions and contradictions existing in this document and that alternative locations to Hawai`I be the most strongly considered. And, though I know this alternative does not fit what the Army feels it needs, I support the No Action alternative rather than training at Pohakuloa as planned.

Sincerely,
Janice Palma-Glennie
Kailua-Kona, HI

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Rogers, William Mr CIV US USA IMCOM

From: Emily Puu [kelua821@yahoo.com]
Sent: Wednesday, August 24, 2011 6:07 AM
To: HAMET_NEPA

Dear Colonel Mulbury,

I am writing to you in regards to the Draft Environmental Assessment for the High-Altitude Mountainous Environment Training, dated July 2011(http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-High-Altitude-Mountanous-Environment-Training.pdf and http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-Hi-Alt-Mnt-Env-Trng-Appendices-A-to-D.pdf). These comments are provided to you in response to your request for comments, with the 30-day review beginning on July 23, 2011 and ending on August 23, 2011.

I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document. Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA. The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?" Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis. Why, if the army claims that "analyses did not indicate the need for an environmental impact statement" did you require this many attempts in reaching a FONSI? Even after three attempts at a FONSI, the analysis is still lacking.

The alternatives considered do not meet your stated purpose to recognize army environmental and social stewardship responsibilities within the affected region. Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii. The alternative 5 for other high-altitude training sites on the CONUS is prematurely eliminated and should have been carried forward for further analysis. This alternative should be fully considered in an EIS.

Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the army is not qualified to conduct a legitimate impact analysis. The army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture. Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the army catastrophically fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.
The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor

has the community been properly consulted. Had the cultural impact assessment been completed properly, impacts to cultural resources would have been identified as significant and unmitigable.
Aside from photographs taken on a day outing to these LZs what efforts have been put into the interpretation of the sites identified? The identified sites are extremely close in proximity to each LZ and located on the tops of small pu'u. The cairns atop each pu'u are within 20 feet of the LZs. Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times. Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources. It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36CFR part 800, let alone meet the substantive portion of the law.

There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas. The substantive portion of Section 106 of the National Historic Preservation ACT of 1966 (as amended) mandates that the army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each pu'u in this project. For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawai'i.
The lack of information does not instill in me confidence that the army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ. It is difficult to comprehend how the army proposes to protect cultural resources without understanding what they are. More respect of the army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.
While the army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other non-army projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

While the army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii? Native Hawaiians have been unjustly targeted for the army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape. Has the army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

This EA lacks impact analysis on transportation between the islands of Oʻahu and Hawaiʻi.

Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable. I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Sincerely,
Emily Luana Puu

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Comments on the July 2011:
Draft Environmental Assessment, High-Altitude Mountainous Environment Training

Prepared by:
Michael Reimer, Ph.D.
Retired Geologist
August 17, 2011
GeoMike5@att.net
Kailua-Kona, HI 96740

Submitted to:
Directorate of Public Works
Environmental Division (IMPC-HI-PWE)
948 Santos Dumont Avenue, Bldg. 105
Wheeler Army Airfield
Schofield Barracks, HI 96857-5013
hamet_nepa@portageinc.com

Synopsis

I welcome the opportunity to comment on the July 2011 "Draft Environmental Assessment, High-Altitude Mountainous Environment Training," regarding proposed U.S. Army training flights using landing zones on Mauna Kea and Mauna Loa. That document will be referred to as the DEA.

This request appears to be one in a series of requests submitted to the Hawaii Department of Land and Natural Resources (DLNR) for permission to utilize these landing zones. Upon granting of a special use and entry permit, High Altitude Mountainous Environmental Training (HAMET) exercises have taken place over the last decade. It is important to note that the same landing zones used previously on Mauna Kea and Mauna Loa are proposed to be used for this current training exercise slated for October 2011. (See section 2.5 of the DEA)

This DEA is very explicit that these flights are needed to train pilots for high altitude operations for future deployment in Afghanistan. The DEA claims that the pilots also will gain the needed experience to satisfy training requirements.

From the information provided in the DEA, I do not believe the proposed use of landing zones on Hawaii will satisfy the requirements of experience and training as stated in the DEA (DEA section 2). In addition, the pilots may gain a false sense of security because the Hawaii high altitude environment is completely different than they are likely to encounter in Afghanistan. Thus, the training is simply inadequate and is a disservice to the pilots who will be deployed in Afghanistan.

Because of the inadequacies in explanation in the DEA, it does not seem worthwhile to risk irreparable damage the fragile environments of Mauna Kea and Mauna Loa for military exercises that will not meet the needs of the military programs. Thus, a permit for entry to the Landing Zones (LZ) should not be issued. At a minimum, the DEA needs revision. Because time is of the essence and prioritization can be claimed, the military should, in the interim, make every effort possible to provide training at alternative sites on the mainland, where

adequate training can be provided at sites more similar to those encountered in deployment to Afghanistan.

Critical shortcomings of Hawaii to meet training requirements

HAMET training is provided to give pilots experience with altitudes to 14,000 feet (4,267 meters) if possible. DEA section 2. The landing zones (LZ) used in Hawaii do not go greater than 11,539 feet (3,517 meters). See DEA section 2.7.2.4. Therefore, training will not provide the altitude experience needed for all Afghanistan high altitude encounters. Mountain ranges in Afghanistan frequently exceed 14,000 feet (4,276 meters) with highest peaks reaching 24,500 feet (7,468 meters). In the infamous Tora Bora region, 11,000 feet (3,353 meters) could be considered baseline with mountain peaks and ridges often going in excess of 14,000 feet (4,267 meters). See map 3, Levinger, Taking Tora Bora, 2005. Topography can be seen in that report on a Soviet General Staff map I-42-XVII, 1985, at:

http://www.lib.utexas.edu/maps/afghanistan.html

The altitude difference is significant in how it affects the performance of the helicopters (air density and winds). Of particular concern is not only the absence of the requirement or objective of 14,000 foot experience required by HAMET, but the difference in the topography. Refer here to the photograph in figure 1.1 of the DEA suggestive to represent actual activity in Afghanistan and the photographs in figures 2.8 through 2.13 of the Mauna Kea and Mauna Loa landing zones. The difference in topographic relief is clear. Mauna Loa and Mauna Kea are representative of oceanic shield volcanoes, in this instance comprised of weathered thoelitic basalt rocks whereas Afghanistan mountains are mostly granitic and associated metamorphic and sedimentary rocks of ranges resulting from collision of crustal plates and having a greater silica content giving rise to the form, mineral and obvious color differences. There are no well defined ridges or pinnacles on Mauna Loa or Mauna Kea, a requirement of the HAMET training.

The topographic relief provides for significant differences in the action of wind. I had an opportunity to speak with a career helicopter pilot, a Naval Academy graduate. Part of his naval career included being stationed in Kauai and he has for years worked for subcontractors to Federal and State agencies including the U.S. Forest Service fighting forest and wild fires in the continental U.S. and Alaska. His experience has been as pilot in numerous helicopter types in both the Hawaii environment and continental mountain ranges and includes certified training and experience to 20,000 feet. I would not hesitate to call him an expert in this specialty field of training.

He pointed out that the wind behavior is greatly different in mountain ranges compared to the gentle slopes of the shield volcanoes due to the numerous peaks and ridges that can alter air current directions and speed, creating numerous eddies and that high altitude training is thorough when it includes mountain peak, valley and ridge experiences.

Here, again, the Hawaiian topography and geology will not adequately prepare the helicopter pilots for conditions likely to be found in Afghanistan. Pinnacle and ridgeline proficiency is required for HAMET training (see DEA 2.1) but it is not available at the identified LZ sites in Hawaii.

The geology of Mauna Kea and Mauna Loa is described in detail in section 3.2 through 3.5. A more detailed geologic map of the Island of Hawaii was prepared in 1996 (Wolfe and others, 1996). There is no corresponding discussion of the geology in Afghanistan and there is great contrast between the two. The geology in Afghanistan was mapped by the U.S. Geological Survey and cooperating agencies. The geology is discussed by the Afghanistan Geological Survey at:

http://www.bgs.ac.uk/afghanminerals/geology.htm

Geologic maps (32 in all) are available on-line at:

http://www.microimages.com/documentation/TechGuides/73AfghanGeol.pdf

or directly with topographic maps and knowing the quadrangle number at:

http://pubs.usgs.gov/of/2005/1116/

In the above address, /1116/ is the quadrangle number and can be substituted with the number for the quadrangle of interest obtained from the microimages web site above.

The difference in background color and reflectance of rocks would have an effect on perception when using night vision goggles. Due to the nature of the mineral and color difference of the rocks found in Hawaii and Afghanistan would suggest the lighter color material to that found in higher altitudes in Afghanistan would be better suited to training, suggesting preference for the mainland (CONUS) locations.

Hazardous material transport

DEA section 4.13.2 discusses the possibility of transporting hazardous material into the LZ. It singles out depleted uranium (DU) and states no radioactive materials will be transported on the helicopters.

There are two concerns here not addressed in the DEA. The first is that depleted uranium (DU) has been used in munitions fired at PTA in the mid to late 1960s. Basically, record keeping of its location and use are non-existent. The areas where DU was suspected to be used have been active training areas during the last 40 years or so and that included both heavy military vehicle and high explosive use in those impact areas. Because of that, it is highly likely that the DU has been mechanically (or explosively) changed in form to small particles that can be transported elsewhere, certainly out of the firing ranges at PTA. Therefore, it is highly likely that radioactive particles could be picked up on dust deposited on the helicopters and transported, certainly inadvertently, but nonetheless transported into the HAMET LZs. Monitoring of the landing gear and collection and analysis of atmospheric (dust and aerosol) should be included in any exercise utilizing aircraft stationed at PTA and involved in landings on Mauna Kea and Mauna Loa.

It should be noted that the Nuclear Regulatory Commission (NRC) has recently cited the U.S. Army that it had been in violation of proper licensing for their possession and handling of DU at PTA and Schofield Barracks.

The second issue is the fact that DU is commonly used as ballast or counter weights on aircraft and helicopters, including the rotors and possibly gyroscopic equipment. The DEA should specifically address whether any "fixed" DU is present on the aircraft to be used.

Mission equipment critical failure

The DEA fails to address a critical issue of preparation and action that can be utilized in event of a helicopter failure, crash, or collision. There may be needs for immediate medical attention, perhaps fire control, and later cleanup and remediation of damage on the ground. Local hospitals in Kona and Hilo, even though recently recognized as level three trauma facilities, will be hard pressed to adequately treat and stabilize soldiers involved in major accidents, including crushing trauma and burn treatment.

This issue should be addressed in the DEA. It may be necessary during training exercises for the military to have on standby at Pohakuloa necessary medivac and even fire suppression crews. It is not unreasonable to suggest such readiness.

The U.S. Army clearly states in DEA 1.4:

"The *need* for the Proposed Action is to ready helicopter air crews to be successful in the combat theater to support the operational and mission requirements of the 25th CAB, 25th Infantry Division, set forth by the Department of Army and Department of Defense (DoD). It is vitally important to conduct

HAMET in order to prepare our aircrews. This training is critical to save the lives of our 25th CAB aircrews and the Soldiers they transport when operating in support of Operation Enduring Freedom in Afghanistan."

It is unfortunate that this DEA and U.S. Army request for entry permits comes so late as to place the DLNR in a very difficult position of having to fast track permission for the permits. The Army had a dwell time of 14 months (See section 1.1 of DEA) and claims now that times at alternative training areas in the continental U.S. are booked (DEA 2.7.7) and not available to the 25th Combat Aviation Brigade (CAB). Preparation should have begun months ago. The U.S. Army deadline has become the DLNR deadline but that cannot be a motivating factor for DLNR. It is unconvincing that the better training cannot be provided because time slots are not available. Time slots are merely future schedules and are always subject to change. Here, if an emergency situation is presented by upper echelon commanders, it is likely time slots can be rearranged.

It goes without saying that safety training saves lives, whether it be for steel workers on skyscrapers, electricians of high power lines, policemen and firemen in the everyday performance of their duties, and indeed our military personnel, all exposed to high risk situations that can be life threatening. Further, the better the training, the more realistic to real-life encounters, the better the chances for survival and the ability to react instinctively to avoid the greater dangers one is faced with in the course of his or her duties. Training should be the best available wherever available, not because of convenience for scheduling or because opportunities were allowed to pass.

No one wants to bear the burden of placing our troops in harm's way but there are alternatives that may provide the higher level of training to fully meet HAMET objectives and keep our troops safer. Fort Carson and Gypsum, Colorado would, as acknowledged, provide better training locales, as would Fort Bliss, Texas. (DEA 2.7.7.) The LZs in Hawaii could be reserved for lower level requirements, and with less usage, the risks of damage to the fragile environment are reduced.

While some comment is made addressing the cost associated with use of alternative sites on the mainland (DEA 2.8), it must be recognized that there will be costs associated with deployment in any case and that deployment for training is not unreasonable to be considered as part of the overall training exercise.

Conclusion

It is highly unlikely that the Hawaiian LZ sites will provide the best training environment to meet the requirements stated in DEA 1.4. By using CONUS sites, the risks and disturbances to the fragile Hawaiian environment and cultural settings are lowered. It does not seem to be in the best interest of either party for an entry permit to issued for this training exercise to be held in Hawaii.

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Rogers, William Mr CIV US USA IMCOM

From: Douglas Rodrigues [anuenueokekai@yahoo.com]
Sent: Tuesday, August 23, 2011 7:57 PM
To: HAMET_NEPA
Subject: Public comment on the draft Environmental Assessment for the High-Altitude Mountainous Environment Training
Attachments: Public comment on Hawaii High Alt EA.docx

Dear Colonel Mulbury,

I am writing to you in regards to the Draft Environmental Assessment for the High-Altitude Mountainous Environment Training, dated July 2011(http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-High-Altitude-Mountanous-Environment-Training.pdf and http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-07-23-DEA-Hi-Alt-Mnt-Env-Trng-Appendices-A-to-D.pdf). These comments are provided to you in response to your request for comments, with the 30-day review beginning on July 23, 2011 and ending on August 23, 2011.

I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document. Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA. The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?" Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis. Why, if the army claims that "analyses did not indicate the need for an environmental impact statement" did you require this many attempts in reaching a FONSI? Even after three attempts at a FONSI, the analysis is still lacking.

The alternatives considered do not meet your stated purpose to recognize army environmental and social stewardship responsibilities within the affected region. Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii. The alternative 5 for other high-altitude training sites on the CONUS is prematurely eliminated and should have been carried forward for further analysis. This alternative should be fully considered in an EIS.

Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the army is not qualified to conduct a legitimate impact analysis. The army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture. Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the army catastrophically

fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.
The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor has the community been properly consulted. Had the cultural impact assessment been completed properly, impacts to cultural resources would have been identified as significant and unmitigable.
Aside from photographs taken on a day outing to these LZs what efforts have been put into the interpretation of the sites identified? The identified sites are extremely close in proximity to each LZ and located on the tops of small pu‘u. The cairns atop each pu‘u are within 20 feet of the LZs. Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times. Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources. It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36CFR part 800, let alone meet the substantive portion of the law.

There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas. The substantive portion of Section 106 of the National Historic Preservation ACT of 1966 (as amended) mandates that the army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each pu‘u in this project. For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawai‘i.
The lack of information does not instill in me confidence that the army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ. It is difficult to comprehend how the army proposes to protect cultural resources without understanding what they are. More respect of the army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.
While the army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other non-army projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

While the army claims that they are “fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier,” at what price does this come for the people of Hawaii? Native Hawaiians have been unjustly targeted for the army’s want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape. Has the army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

This EA lacks impact analysis on transportation between the islands of Oʻahu and Hawaiʻi.

Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable. I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Sincerely,
Douglas Anuenueokekai Rodrigues
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'O wau iho no,

D. Anuenueokekai Rodrigues

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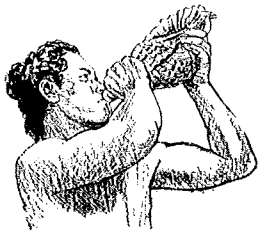

KAHEA

THE HAWAIIAN-ENVIRONMENTAL ALLIANCE

PROTECTING

NATIVE HAWAIIAN

CUSTOMARY &

TRADITIONAL RIGHTS

AND OUR FRAGILE

ENVIRONMENT

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KAHEA: the Hawaiian-Environmental Alliance is a non-profit 501(c)3 working to protect the unique natural and cultural resources of the Hawaiian islands. KAHEA translates to english as "the call."

TO: Mr. William Rogers,
U.S. Army Garrison, Hawai'i (USAG-HI)
851 Wright Avenue
Wheeler Army Airfield,
Schofield Barracks, Hawai`i 96857-5000

RE: KAHEA Commentary on HAMET EA

DATE: August 22, 2011

Mahalo for accepting KAHEA's comments on the USAG-HI's July 2011 draft Environmental Assessment (EA) for the proposed High Altitude Mountainous Environmental Training (HAMET) project. While the newly proposed HAMET seems to have scaled back earlier proposed uses of critical habitat and conservation lands, KAHEA's concerns -- and therefore opposition to the proposal -- remain, as discussed below.

HAMET Proposal Evades Public Process

The two most glaring flaws in the HAMET EA are:

1) the absence of a U.S. Fish and Wildlife Services (USFWS) consultation and
2) lack of a State of Hawai'i Conservation District Use Permit Application (CDUP).

On the first flaw, the USAG-HI must consult with the USFWS. Five endangered species have been confirmed to exist in the proposed HAMET flight paths and three of those flight paths cross critical Palila bird habitat. Yet, no consultations with the USFWS are contained in the HAMET EA. **Federal law requires that the USAG carry out a formal USFWS consultation and should publicize USFWS assessments and recommendations.**

On the second flaw, proposed HAMET exercise should not proceed without a CDUP application. As proposed, HAMET will enlarge an already significant military-impacted areas that will further fragment the otherwise contiguous conservation district subzone lands in the Mauna Kea and Mauna Loa areas.# The HAMET EA fails to consider the cumulative impacts of expanding military activities in and near the already sizeable 120,000 acre area of the Pohakuloa Training Area (PTA) that is of great concern to many who use the Mauna Loa, Mauna Kea, and Saddle areas for recreation, cultural and religious practices, and work. These uses of the proposed HAMET training area are adversely impacted in ways that the EA authors have not yet identified and without a process for public participation, these harmful impacts will remain undisclosed. **We recommend that the USAG-HI submit a CDUP application for HAMET activities, which should include opportunities for public hearings.** Allowing the HAMET project to occur under a Department of Land and Natural Resources Special Use Permit would authorize further expansion of military uses into these conservation areas without proper limitations and without meaningful opportunity for public input and participation in the final decision. By contrast, the application process for a CDUP affords the public notice and hearings (which the EA process does not require). The should USAG be required to adhere to the process that the State of Hawai'i has put in place to ensure public awareness and input into proposed uses of public lands held in trust for the people of Hawai'i.

USAG-HI attempts to justify approval of this requested special use permit on the approval of previous special use permits. The Hawai`i State Special Use Permits previously granted in 2003, 2004, 2006, and 2011 should not be a basis to allow the USAG to expand military use of public lands. Rather, these repeated requests for "special use" permissions suggests that the USAG-HI has not developed a long-term sustainable plan through which to meet their training needs. As the EA discloses, it is possible to carry out the proposed HAMET exercises in Gypsum, Colorado, if USAG planners obtained "training slots" in that area's schedule. EA, p. 2-18. Allowing HAMET to proceed in this manner would condone the USAG's failure to follow the public process for conservation district land use, which is of great concern.

Cultural and Archaeological Resources

The EA misrepresents the sacred significance of Mauna Kea by suggesting that tiered zones of significance begin at 11,000 feet. EA, p. 3-42. The entirety of the mountain is sacred.

Further, finding that the concerns of Native Hawaiians most impacted by the HAMET Project do not amount to "significant impacts" is an affront to the citizens that testified to the heavy significance of Mauna Kea and the Army's proposal to train attack helicopter pilots at this sacred site.

The EA accurately reports that any landings on Mauna Kea or Mauna Loa will cause significant impacts according to the assessments of some Native Hawaiians. EA, p. 4-26. However, the EA disregards these Native Hawaiians in favor of those "who believe that cultural practices can exist along side with secular activities [and] will see that compliance with regulations and careful planning and implementation can ensure less-than-significant impacts to cultural significant lands." EA, p. 4-26. This assessment method fails to acknowledge the logical proposition that those closest to the impacted lands will also find more significance in that land's use. In other words, those Native Hawaiians, such as members of Nā Kūpuna Moku o Keawe, who are cultural and religious practitioners of Mauna Kea, Mauna Loa, and the saddle areas find that HAMET activities will have significant impacts.

Yet, the EA ignores assessments of Native Hawaiians who know most about the project's impacts on their practices in favor of others who do not object to HAMET. The EA's finding that HAMET will not impact Native Hawaiian cultures and religions is a self-serving recitation of the supposed benefits that the HAMET project will afford for cultural resources. See, HAR §11-200-14 (1993) ("[T]he EIS process... shall not be merely a self-serving recitation of benefits and a rationalization of the proposed action"). Put plainly, the impacts of HAMET are here assessed by considering only those Native Hawaiians whose cultural and religious practices conveniently do not interfere with proposed actions.

Proposed mitigation for the cultural and religious impacts of HAMET actions on Native Hawaiians are nonsensical. The EA asserts that HAMET flights will not occur on Hawaiian "cultural holidays" (EA p. 4-26), but the only holiday identified in Section 2 is October 10th, "Columbus Day," which does not have celebratory significance in most Hawaiian cultures. Ceasing HAMET activities on "known scheduled ceremonies" (EA, p. 2-10) demonstrate a severe lack of awareness Native Hawaiians cultural practices in these areas. Burials, *piko* deposition, pilgrimage, and worship are purposefully not widely publicized so as to be "known" and occur in alignment with "schedules" that the HAMET EA makes no effort to recognize. The EA's emphasis on *known* ceremonies betrays the USAG's fundamental misunderstanding of Hawaiian ceremonies, which are *not* supposed to be known. As such, the

EA thus fails to assess the significant impacts of HAMET training on these crucial aspects of Native Hawaiian cultural practice.

Few cultural surveys have been conducted on military-occupied lands at PTA, perhaps because of the military's resistance to such work. In a restricted three day survey Christopher Monahan identified a precontact Hawaiian shelter at PTA, which he recommended be registered with the National Register of Historic Places, and "avoided and preserved in perpetuity." This is difficult to do in a military training area, as Monahan points out, "By its very nature, training means that people will sometimes drive where they are not supposed to, and shoot in the wrong place."# **We request a full cultural impact assessment of HAMET activities on Native Hawaiian cultural practitioners and on archaeological resources.**

Such ceremonial uses *are* described in the University of Hawai`i's Comprehensive Management Plan (CMP), but the HAMET EA improperly relies on this document as an authority on cultural (3.7), biological (3.6.2.3), and archeological resources (3.7.2.2) on Mauna Kea. The CMP findings concern only the Science Reserve Area, which is a subset of the areas affected by HAMET. Further, cultural consultations for the CMP were conducted in the context of telescope development and are therefore irrelevant for purposes of assessing the impacts of HAMET flight and landing activities. **Consultations with Native Hawaiian practitioners of the Mauna Kea, Mauna Loa, and saddle area should be carried out with specific reference to attack helicopter trainings.**

Biological Resources

The HAMET EA acknowledges that four endangered bird species are confirmed to be in the flight paths to the LZs – the Nēnē, 'Io, 'Akiapola'au, and the Palila. EA Table 3-5, p. 3-25. LZ-3 is threateningly close to the Kīpuka 'Ainahou Nenē Sanctuary. Fig. 3-16, p. 3-54. Intended flight paths to LZ-4, LZ-5, and LZ-6 also cross critical palila bird habitat, but are planned to maintain a 2,000 foot minimum altitude to minimize or avoid impacts on these endangered birds. Bird strikes are acknowledged as "a possibility" and **we therefore request a map or studies that identify locations of surveyed endangered birds** throughout the project area. **We also request documentation of studies that verify that the 2000 ft altitude provides enough barrier to avoid noise disturbance/ physical impacts on these endangered birds.** The abovementioned USFWS consultation document should address these impacts on endangered species as well.

To ensure that trainee pilots flying over critical bird habitats adhere to the 2,000 foot minimum altitude, **we further request that the USAG maintain records of flight altitudes and GPS logs to substantiate the proposed 2,000ft buffer area avoidance and minimization measure.** The maintenance and disclosure of such records would contribute to public assurances of the USAG's ability to carry out its proposed plans to avoid Palila bird critical habitat.

The EA also discloses that endangered Hawaiian Petrels have not been found within 2,000 feet of the Landing Zones, although breeding colonies exist south of the LZs. EA p. 3-31. These findings do not disclose whether Hawaiian Petrels have been found beyond 2,000 feet. **We request copies of studies that support the EA's finding that the Hawaiian Petrels will not be affected by HAMET activities**, p. 3-32.

The EA also emphasizes the introduction of invasive plant species as a result of HAMET activities. Helicopters carrying invasive plant species from the LZs and O'ahu may deposit them during flight into the māmane and naio forests that provide critical habitat to the Palila or in other areas where they may outcompete native species, p. 4-12. To mitigate this highly alarming adverse impact of the proposed HAMET, the EA suggests mitigation measures that amount to helicopter inspection and cleaning, p. 4-13. All personnel should be trained in invasive species identification and removal in order to carry out these helicopter inspections. We request documentation of procedures for invasive species detection and disposal that would be implemented for the HAMET vehicles. To substantiate compliance with these procedures, **we request the maintenance of records of personnel training and of each inspection, detection, and removal of invasive species during the course of HAMET activities.**

Recreational Users

HAMET will entail significant impacts on recreation and public safety. Unlike other trails, the trail to the Mauna Loa Observatory is not afforded a "buffer region" and lies close to the LZ 1-3 cluster. The fact that the LZs are not 'destinations' for recreationists does not confirm that the increased noise and unpredictable presence of attack helicopters will not interfere with the public's enjoyment of these public trust lands. Merely notifying the Observatory, the National Park Service, and public users of HAMET training near this trail is insufficient and presumes that the HAMET training is a higher priority usage of these state

lands, p. viii. The use of press releases is an insufficient form of notice for recreationists and other members of the public. The Mauna Loa LZs are very close to the only access roads and Saddle Road, a public highway, passes through the HAMET areas. **In addition to press releases local and statewide media outlets, we recommend holding public hearings to alert recreationists to the USAG's use of public lands.**

Spills and "Hard Landings"

HAMET entails inexpert pilots and crews manipulating Black Hawks, Chinooks, and Kiowa Warrior attack helicopters under challenging high-altitude conditions, characterized by "high wind, high-density altitude..., turbulence, and atmospheric instability" p. 1-2. Such **high-risk maneuvers have no place in a wildlife sanctuary, a forest reserve, near public park users, nor the sacred temple of Mauna Kea.**

In 2009, the CAB lost two pilots when their Kiowa Warrior helicopters took a "hard landing" and crashed in flames near Schofield Barracks. Two other army aviators died when their Cobra helicopter malfunctioned over Schofield in 1996. Six soldiers (4 of whom were from the CAB) were killed and 11 injured when two Black Hawk helicopters collided during a night training exercise over Kahuku in 2001. Further, the November 2003 accidental landing of a Black Hawk helicopter three and one-half miles east of a LZ and within the Mauna Kea Ice Age NAR and within the Mauna Kea Adze Quarry demonstrated that even if the LZs and flight paths do not directly cross endangered species critical habitats, the margin of helicopter pilot error defeats such demarcations. The EA's proposed solutions – to better educate HAMET personnel on environmental and cultural issues – do not directly address the problem of trainee pilot accidents. And, the belated decision to install GPS devices in attack helicopters after this accident calls us to question how well the HAMET project has been planned as a whole. **At minimum, a formal assessment of trainee pilot margins of error is needed.**

More recently in March 2011, four Marines who had recently returned from Afghanistan crashed their CH-53D Sea Stallion helicopter into the Kane'ohe Bay sand bar. In addition to the damage caused by the impact of a 21-ton helicopter on the reef, the helicopter had two main fuel tanks each with a capacity of 680 gallons. One ruptured and all the fuel leaked out overnight. A disclosed estimation of 880 gallons spilled into the ocean.

Spills on HAMET project areas are likewise "uncontainable", as the EA discloses, due to the high permeability and percolation rates through the porous lava rock in the LZs, p. 4-10.

Groundwater could be adversely impacted "through the contamination of an aquifer. If an emergency (i.e., mechanical failure resulting in a crash) were to result in a spill, it would likely be uncontainable due to the high permeability and percolation rates through the porous lava rock. Therefore, it would be likely for a spill to percolate through the lava rock and possibly contaminate an aquifer below." p. 4-10. This means that contamination of the ground water in the LZs may impact water resources and therefore do not justify a finding of no significant impact. **Emergency plans should be developed for spill and leak containment, workers should be trained in emergency procedures, and records of these plans and trainings should be maintained and disclosed to the public.**

In conclusion, the EA is not forthcoming about the threats that HAMET training poses to Native Hawaiian rights, fragile ecosystems, nor to other recreational uses of the area. Beyond the EA, the USAG has not complied with state and federal laws relating to conservation district land use and endangered species protections for the HAMET proposal. Thank you for offering this opportunity to present our concerns. Please contact us with any questions.

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Sierra Club
Hawai`i Chapter
PO Box 2577, Honolulu, HI 96803
808.538.6616 hawaii.chapter@sierraclub.org

August 22, 2011

RESPONSE to HAMET EA (July 2011, Version 3) and Draft FONSI

NEPA PROGRAM
Mr William Rogers, USAG-HI, Directorate of Public Works
Environmental Division (IMPC-HI-PWE)
948 Santos Dumont Avenue, Bldg. 105
Wheeler Army Airfield
Schofield Barracks, HI 96857-5013

Cc: Hamet_nepa@portageinc.com

RE: Comments on July 2011 Draft Environmental Assessment (DEA3) for High-Altitude Mountainous Environment Training (HAMET) for the 25th Combat Aviation Brigade, Hawai'I Island, and Draft FONSI

The Environmental Assessment Draft 3 (DEA3) for this proposed project continues to be insufficient; the draft FONSI should be rejected. We request that HEPA and NEPA EIS be conducted concurrently to address deficiencies in this document, and the cumulative impacts of the proposal, within the context of the sizable expansion of training activities at Pohakuloa Training Area (PTA).

Public involvement, consultation and outreach were not adequate

A FOIA request FOIA dated June 15 that all biological references referred to in the Draft Environmental Assessment (DEA) dated April-June 2011, title Memorandum For Record conducted by senior author Peshut, PJ be made available for review, and provided as Appendices in the DEA. These documents are not available for review, and no response has been provided for the FOIA request, in spite of multiple follow up requests.

We requested that all respondents to the first and second DEAs be provided with notice that a third DEA was available for comment. Neither a response to their comments, nor a notice (beyond notice in OEQC and 2 newspapers) was provided. The claim that "copies were also mailed to interested individuals...if requested" did not include providing copes to those who had commented in the past, and therefore were obviously interested. Their comments are not appended in this DEA.

While the Executive Summary states that there was public comment analysis, the DEA3 does not provide any way to review the comments or the analysis. Changes to the document were not highlighted, so changes in response to comments provided for earlier drafts were difficult to discern. We request that the Final EA provide documentation of all public comments, and responses.

Requests for consultation by Sierra Club were ignored, and others who provided comments in earlier drafts were not consulted. We note that the Army for addressed a few of the concerns identified by the community in two previous responses to the initial two drafts, and for providing more information regarding reduced training request, and more information about the landing zone locations. However, serious concerns remain.

This letter identifies some specific areas of deficiency in this document.

1.4 The need for proposed training in Hawaii
HAMET proposes to adapt the National Guard's 4-day helicopter training to provide two hours of training in Hawaii. It is not clear why the two hours of training considered adequate for deployment in the zone of activity in Afghanistan or Iraq could not be conducted better at a training facility in Colorado, if only 3 aircraft are proposed be utilized at any one time in Hawaii. It is not clear that training in conditions of high wind, turbulence and atmospheric instability would be accomplished during a two-hour training. The document indicates that the landing zones are flattened sites, but the training goal to land on sloped or uneven surfaces, pinnacles or ridges is consistent with the landing zone description.

1.7 Public involvement, consultation and outreach were not adequate.
Sierra Club was one of many responders to the first DEA, but the response was not acknowledged, nor was the club invited to consult as we requested. The letters of response were not included in the DEA2 or DEA3, nor were responders listed in the DEA3. While some of the responder's concerns were addressed, other issues were not addressed.

Sierra Club requested a hard copy of the DEA2 because maps sized 8"x13" were reduced to 4"x 6" in the pdf version made available to the public via the website, and were completely illegible. Thank you for sending the hard copy of the 3rd DEA.

The US Army has a responsibility to consult with parties who have an interest in the land being considered. Sierra Club is an organization with over 3000 members statewide, with a history of hiking for recreation, and active efforts to protect and restore the natural environment, specifically in conservation districts, including game management areas. Other groups with recreational interests include hunters, cavers, wildlife sightseers, and many more. Although volunteer members of a community advisory board for the Mauna Kea Science Reserve were identified (incorrectly) as consulted parties, the MKSR is only one of several neighbors. The Natural Area Reserve System, Hawaii Volcanoes National Park, Department of Hawaiian Homelands are all neighbors to this proposed project, yet these groups with interests were not consulted.

This may violate CFR: "a plan to include all interested or affected parties should be developed...[and] will include the following...3) Consultation with appropriate persons and agencies. [32 CFR V 651.36 (e)] "Distribution of the draft FNSI should include any agencies, organizations, and individuals that

have expressed interest in the project, those who may be affected, and others deemed appropriate." [32 CFR V 651.35 (f)]

Public involvement was inadequate, despite years of public interest in military actions. " where impacts are... suspected to be of public interest, public involvement should be initiated early in the EA (scoping) process. [32 CFR V 651.39(c) \4\]

Requirements for public meetings may not have been met—several commenters called for meetings open to the general public, but none were held.

> "The proponent shall also ensure appropriate public and agency meetings, which may be required to facilitate the NEPA process in completing the EA." [32 CFR V 651.35 (h)]

1.8 Regulatory Framework: Cumulative impact of military expansion must be addressed

Federal law says any EA longer than 25 pages may indicate the need for an EIS. The EA cites this law but appears to disregard it.

> "Any analysis that exceeds 25 pages in length should be evaluated to consider whether the action and its effects are significant and thus warrant an EIS." Cited in EA references [32 CFR V 651.32 (b)]

We continue to be concerned that the significant expansion of military activities, including the Pohakuloa Training Area, with additional construction, Stryker land use, and other proposed projects, is being partitioned into separate segments. Hawaii is a small land area in the middle of the Pacific Ocean, 2000 miles from a continental land mass. The people of Hawaii have virtually no recompense when land is usurped and never returned. The cumulative impact on the region, the regular use of the land in question by Hawaii residents, and the damage to the flora and fauna by military practice, accidents, waste, release of hazardous materials, and satisfactory mitigation are not addressed in this document or any other partitioned proposal. The expansion of PTA training into the Conservation District(s) (which are ceded lands held in trust, managed by the Department of Land and Natural Resources (DLNR)), will negatively impact natural, cultural, and recreational resources in ways that are not assessed or addressed in this document. This is why a NEPA EIS must be conducted for this and other projects. The intended use of the State of Hawaii Conservation District Limited subzone may also trigger the development of at HEPA EIS, including a Cultural Impact Statement.

2. Description of the proposed action and alternatives
Alternatives do not provide adequate detail
In this document, impacts from transporting helicopters and soldiers between O`ahu and Pohakuloa, and an increased number of flights to and around Pohakuloa, are not evaluated.

Alternative V was not given adequate consideration; the statement that aircraft (23 in April DEA, now "many" in July DEA) would have to be transported begs the question: if only three aircraft would be

used simultaneously in Hawaii training, even if an additional number were undergoing fueling and maintenance, why would so "many" be needed for training in Colorado?

The document does identify a time frame under which the proposed actions would occur; October 2011. Is the request for Right of Entry (ROE) permit is limited to the specified 2011 timeframe? **A specific end date for proposed training during the preferred alternative should be identified.**

Although ROE permits have been issued in the past, the document does not identify the State or Hawaii rules which govern the use of State land, nor does the document cite case law used to bolster the "right of entry" permit over the Conservation District Use Permit (CDUA). **A CDUA would provide the public and the BLNR a broader role in the site selection and conditions of use.**

Sierra Club would like to incorporate by reference the comments of Moku Loa Group of Sierra Club on the Safety Record and Human Health and Safety Hazards.

2.7.2.2 HAMET flight details
The proposed action is to train 90 (reduced from 300-400) helicopter aviators for mountainous high altitude flights. Actions proposed will include approach and hover (3 ft), abort and go-round, elevated reconnaissance, landing on an angled uneven surface, landing on a pinnacle or pu`u in fragile alpine ecosystems, including operations conducted at night.

"The area 3,280 ft (1000 m) from the center of each LZ would be the training area where helicopters would be expected to be at terrain flight altitudes of 200 feet (61 m) above ground level (AGL). " This is 3/5 of a mile radius, or more than a mile in diameter, and given the proximity of the landing zones, the area where flying at 200 ft or less is significantly higher than maps and related text would make it appear. The document should detail the low (<201 ft) elevation flight path visibly on maps and graphics.

3. Affected Environment
3.1 Meteorological conditions that may impact the LZs are the effects of diurnal wind patterns and temperature inversions, restricting visibility, due to cloud or fog. The areas are frequently closed to the public due to extreme drought conditions and high fire hazard. High winds also impact the higher elevations frequently. The document does not describe what impact these hazards would have on training, and how the training would be altered due to hazard restrictions. The area is currently closed due to extreme fire hazard. Would this hazard trigger cessation of training activities? The safety of training is in question, given numerous accidents cited in the Moku Loa Group comments, but no mitigation is described to cope with aviation failures, crashes, fires, fuel dumping, and hazardous releases into the environment.

3.6 Biological Resources: Table 3-5 on page 3-24 lists federal- and state-listed T&E species potentially impacted by the project. The ML and MK LZs are above tree-line in alpine grasslands and alpine stone deserts. Of the 43 species listed as endangered, threatened, candidate and sensitive species, insufficient information is provided about specific surveys conducted in the proposed training areas. The flight paths are over subalpine dry forests and shrublands, including palila critical habitat. The noise and vibrations associated with training operations on bird breeding and rearing success, and mitigation is not described in sufficient detail. The statement in the Executive Summary that "noise could impact sensitive species by causing wildlife to flee the area and interrupting life-cycle events like breeding" is our great concern. A species on the brink of extinction does not have the luxury of latitude; negative impacts may seal their fate. Similarly, the endangered Hawaiian Hawk or `io has been recorded in the area of the Mauna Loa LZ, and the statement that "it is anticipated that the population densities at the LZs is zero" is highly speculative, and not based in science. Observation of bats in the vicinity, reported by commenter Ron Terry, were not addressed, and the presence of petrel nesting in the area should cause discontinuance of the area altogether. Has a detailed analysis of the threats to T&E species been conducted by USFWS? If so, we would like to see the correspondence in the document.

Protocols addressing drought hazards such as the one described in the recent DOFAW press release are not addressed; see the announcement:
Pursuant to Hawaii Revised Statutes (HRS) 185, the Land Fire Protection Law, the Department of Land and Natural Resources, Division of Forestry and Wildlife is extending the closure of Mauna Kea Forest Reserve and Kaohe Game Management Area until February 28, 2011, due to continuing extreme fire hazard conditions. Though portions of the area have received some rainfall over the last few weeks, drought conditions still persist due to lack of rainfall over the past year and the vegetation is drier than normal. As of December 23, 2010, the U.S. Drought Monitor still considers much of the area as being categorized as drought intensity D-2 (severe) and D-3 (extreme). Vegetation surveys in the affected areas have confirmed that extreme fire hazard conditions persist. The closed area includes portions of the forest reserve, below 10,000 feet elevation, between Waikahalulu Gulch, west to the gate 1.1 miles past Kemole, all of the Kaohe Game Management Area, and all roads in the Ahumoa and Skyline area. No public access will be allowed until sufficient rainfall reduces the fire risk in the area. Pohakuloa Training Area will also be closed to public access until further notice by the Department of Defense.

If the access roads are closed to the public for safety reasons, would military operations be curtailed as well, to avoid additional hazard? This question was posed by Sierra Club in the previous comment period, but was not addressed.

3.7 Cultural Overview
The extremely limited cultural consultation with affected cultural practitioners, and with lineal families associated with the areas proposed is a glaring omission, which in and of itself calls for denial of the FONSI.

The cultural significance of cultural features described must be considered, and a thorough survey, literature review and oral history documentation is absent from this document. The Humu`ula trail and others are identified on the maps. Present day cultural and spiritual practitioners utilize these areas, and no note is taken of present day use. Old government maps and surveys include cultural details, and should be included.

Located in close proximity to the Mauna Kea Historic District, the landing zones on Mauna Kea desrve closer review. Will tactical operations in preparation for war affect the cultural and spiritual practice of those who ascend the Pu`u Poliahu, only to see helicopters landing on the distant cones?

3.9 Regional Land Use

Will light from nighttime operations have any effect on the astronomy facilities?

3.10 Recreation
Mauna Loa Recreation (3.10.2) was inadequately addressed

The Mauna Loa (ML) LZs are immediately adjacent to the Mauna Loa Observatory access road, the project area boundary is directly adjoining the Kipuka `Ainahou Nene Sanctuary and game management area (GMA). This area is utilized, not only by astronomers accessing the ML Solar Observatory, but by cultural practitioners, hunters, hikers, cavers, birders, those accessing the Hawaii Volcanoes National Park, and many others. The document claims that dispersed recreational activities may occur within the project area. No data was provided to describe which activities occur or the frequency of use: however activities may include hiking, hunting, camping and sightseeing. Mauna Loa Access Road is used by regularly by hikers to the summit of ML, hunters, astronomers, cavers and tourists. There is data on the hunters, at the very least! The LZs are not destinations, but the LZs activities will impact use of the area by everyone else. The users affected by the proposed training area were not consulted, nor were the impacts of training activities on these users addressed.

Mauna Kea Recreation (3.10.1) was inadequately addressed
The Mauna Kea (MK) LZs are remote, accessible by 4-WDR trail. Adjacent to the Mauna Kea Science reserve boundary, adjacent to the Historic District boundary, and adjacent to the MKIA NAR boundary. LZ 5 and LZ6 are on top of cinder cones.

The Mauna Kea summit landscape is a National Natural Landmark. The National Park Service contends that the permanent destruction of any surface geologic structures within the Mauna Kea NNL is significant and it denigrates from its overall status as a national natural landmark. Consultation with NPS regarding this landmark must be included in the final EA.

"The National Natural Landmarks Program was established under the authority of the Historic Sites Act of 1935 (16 U.S. C. 461-467). Mauna Kea Summit Region, designated as a national natural landmark, is a national significant natural area that has been designated to the Secretary of the Department of the Interior . To be nationally significant, a site must be one of the best examples of a type of biotic community or geologic feature in its bio-physiographic province. Examples of the natural diversity include terrestrial and aquatic ecosystems, fossil evidence of biological evolution, as well as features, exposures and landforms that record active geologic processes, such as the Mauna Kea NNL. The determination that a site is one of the best examples of a particular feature is a natural region or bio-physiographic province is based on primary criteria of illustrative value and condition of the specific feature; secondary criteria include rarity, diversity, and value for science and education (Federal Register-title 36 Chapter 1 Part 62.)

In the case of Mauna Kea, it met this test in 1972, when it was added to the National Registry of Natural Landmarks In fact few sites possess better credentials to justify their national significance than does Mauna Kea and the criterion still holds today. The Mauna Kea National Natural Landmark is held in trust by the State of Hawaii and its 83,900-acre boundary incorporates the lands within the Conservation District, including the Mauna Kea Science Reserve, Ice Age Natural Area Reserve, and the Mauna Kea Forest Reserve.

First and foremost, Mauna Kea is the exposed portion of the highest insular mountain in the United States, rising up over 30,000 feet above its submerged base in the Pacific Ocean. Second, on its slopes is found Lake Waiau, the highest lake in the United States. Third, though located in the tropics, indisputable evidence of glaciations is present above the 11,000 foot level. Lastly, possibly transcending all of these nationally significant qualities, is the fact that Mauna Kea is the most majestic expression of shield volcanism in the Hawaiian Archipelago if not in the world.
"The National Park Service contends that the permanent destruction of any surface geologic structures within the Mauna Kea NNL is significant and it denigrates from its overall status as a national natural landmark. " Quotes from DEIS comments made by Rory Westberg, NPS Acting Regional Director to the DEIS for the Thirty Meter Telescope project.

DLNR Chair Laura Thielen also noted re the DEIS for the Thirty Meter Telescope project :
"The objectives of the NNL program are fourfold: to encourage the preservation of sites illustrating the geological and ecological character of the United States; to enhance the scientific and educational value of the sites thus preserved; to strengthen public appreciation of natural history; to foster a greater concern for the conservation of the nation's natural heritage."

The area is utilized by cultural practitioners, hunters, hikers, and others. Additionally, the Office of Mauna Kea Management reports that over 400,000 residents and visitors are estimated to be using the Mauna Kea Access road to view the wild and scenic resources of the mountainous terrain. The spiritual value of this unique resource led National Geographic magazine to honor among the sacred places of the world in a (January 2011) Special Edition titled, "The Earth's Holiest Places: Sacred Journeys."

3.11 Noise Measurements and Effects
We incorporate by reference the comments of Moku Loa Group and M. Cory Harden with regard to noise.

The document acknowledges that the ambient noise sources are currently birds, insects and wind. This would be exactly what one would expect in a wilderness designated as conservation district.

Noise analyzed by the common metric DNL (day night average over a 24 hour period), while it may be commonly used, does not accurately reflect the disturbance caused by the transient drone and vibration of an approaching and receding helicopter. The distraction, disturbance and vibration have effects on humans and fauna that will not be accurately reported is a 24 hour average is used. The A-weighted dBA scale is shown on table 3-6 on page 3-41.)

The document claims that up to 35 percent of the population would by highly annoyed by the noise of training activities at dBA of 90 at the LZs. The EPA recommends using the DNL (total noise averaged over 24 hours) to quantify the intrusiveness of nighttime noise. The document states without an explanation that the State of Hawaii noise standards do not apply to the proposed activities.

Table 3-8 in the document states that Aviation dBA of greater than 75 is in the Zone III Land Use Planning Zone, which is incompatible with noise-sensitive land use.

Recent events on the mainland, when hundreds of birds fell from the sky to their deaths, were attributed to the noise from aerial fireworks. The palila bird is already Endangered and in close proximity to a constant barrage of aerial bombing, live fire, and other military noise. How would additional helicopter flights over their Critical Habitat improve their chances for recovery?

3.11 Visual and Aesthetic Resources
The visual quality of an area is defined in terms of areas of high scenic quality, recreation areas characterized by high numbers of users, quality (parks), and important historic or archaeological locations. The tour users of Mauna Kea are numbered at 400 per night, according to UH. The project area is within the Historic property boundary, and the broad vistas of the Saddle Rd are important features of the Mauna Kea State Park as well. The impact of nighttime training activities would be highly significant to these and other users.

3.12 Human Health and Safety Hazards
The document states that hazards are non-existent unless a human is in the landing zone. The ML LZs are very close to the only ML access roads, and any approach and takeoff could impact users of the road. The safety hazards would require restrictions on the use of the access road, yet no discussion of road restriction is presented. Aviation failures with similar aircraft have occurred in Hawaii, resulting in death of the aviators. The document fails to disclose this information.

3.13.2 Aerial traffic: During training operations, the airspace around the flight corridor and over the LZs would be closed to civilian aircraft. How would this impact civilian tour operators? This is not discussed.

4.0 Environmental Consequences

4.4.3 Land Use summary of impacts
Table 4-3 claims that disruption, impediment, or discouragement of recreational activities is less than significant. Since these users were not consulted, there is no data to confirm this finding. In fact, Sierra Club takes issue with the contention that recreational activity in the Conservation District land is less than significant. Our members utilize this resource regularly, and would be negatively impacted by training exercises, day or night.

4.5 Geology, soils and Topography
4.6 Biological Resources

The Appendix A Section 7 Consultation Memorandum For Record states in part that "the potential for helicopter collision with the Hawaiian Hoary Bat is unlikely because bats are ... only active from sunset to sunrise..." and yet training is planned to take place under "day and night conditions" according to Section 2.1.

The wekiu bug (Nysius) critical habitat is almost entirely made up of the loose uncompacted cinder scoria on the sides and top of cinder cones, since these were areas not covered during the glaciation, the loose cinder is not filled with dust , and is not compacted. The approach and landing of helicopters will most certainly affect the dust and compaction of the habitat. Monitoring is planned but mitigation is not addressed.

Table 4-5 details the potential impacts to T&E species, including fire, invasive species, noise, and collisions. Wildlife could flee the area, modify behavior, or disrupt life-cycle (mating, brood rearing) activities. All impacts were deemed less than significant. We ask for independent evaluation by scientists with an understanding of behavior and autecology of the relevant species!

As admitted on page 4-15, "According to DoD operational noise manual, the specific reaction of a a specific species can only be known after subsequent studies. ... results from studies cannot be applied across species..." An analysis by Peshut 2011 referenced in the document regarding insignificant impact should be evaluated by an independent body of qualified scientists.

4.7 Cultural resources
Physical alteration, or introduction of visual, audible, or atmospheric elements that are out of character can have impacts. State Historic Preservation Office did respond to a request for consultation, appended as . LZs 4-6 each have historic properties nearby. Pohakuloa is the land of the night of the long prayer--a cultural landscape, and Mauna Kea is a temple, noted in current issue of

National Geographic as a significant world sacred journey. According to cultural practitioner Kealoha Pisciotta, training should take place only in the most desolate areas, and no attack helicopters are appropriate on Mauna Kea!

4.11.1.1Noise
The use of surrogate species and studies to judge another species' response to noise would appear to contradict the DoD manual on this subject.

In figure 4.5 - 4.9, it would appear that LZ have dB levels lower (or none) than levels on the 2000' elevation flight path, in spite of proximity to the ground. Areas directly adjacent to the landing zones would appear to have no added noise.

4.12 Visual and Aesthetic Resources
Sierra Club appreciates the provision of maps to identify viewplanes of the proposed project from a variety of vantage points. The Viewer Groups identified are narrowly construed, and should be expanded by consultation with user groups. For example, virtually every vantage point named is used and enjoyed by Sierra Club members who are residents. Many of these residents would attest to the disturbance of ambience and scenic beauty by the presence of any helicopters, including those training for war, in an area of spiritual and aesthetic beauty.

4.13 Landing zone safety is deemed an insignificant hazard, even from noise and flying debris on the ML access road because the pilot would conduct a reconnaissance flyover to visually inspect the LZ. These statements are not consistent with the recreational, cultural and scientific use of the area by users not consulted in preparation of this document.

5. Cumulative impacts
5.5 Biological Resources
The mitigation of impact described in earlier sections is not specifically committed to in the Conservation District (beyond the confines of PTA). Any mitigation activities intended for the proposed project should be specifically described in such detail that the impacts (intended or otherwise) can be ascertained.

Consulted parties
Deficiencies in this document reflect the desultory effort to learn of potential impacts of this proposed project. Of the consulted parties, only a few listed were civilian, and the actual consultation was ineffective. For example, the Department of Hawaiian Homelands, Sierra Club, KAHEA, Conservation Council of Hawaii, Hawaiian civic associations were not consulted. The training activities would most directly impact the adjacent lands, yet those closely associated were not aware of the proposed project.

In conclusion, we restate: The Environmental Assessment for this proposed project is insufficient to determine the cumulative impact of broad military expansion into conservation district lands. The draft FONSI should be rejected. We call for preparation of a NEPA EIS to address cumulative impacts of military expansion in Hawaii. Ignorance of potential impacts is not a reason to pretend there will be none.

Comments Prepared by Deborah Ward, Conservation Co-chair, Hawaii Chapter
Sierra Club Mauna Kea Issues Committee, Hawaii Chapter

Please return response to
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808-966-7361

Cc: Governor Neil Abercrombie
DLNR Chair William Aila
DLNR District Administrator Lisa Hadway
US Fish and Wildlife Service, Loyal Mehrhoff
Hawaii Volcanoes National Park Superintendent, Cindy Orlando

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 6 2011

Office of the Garrison Commander

Ms. Leslie Agorastos
PO Box 337
Kamuela, HI 96743-0337

Dear Ms. Agorastos:

We are in receipt of your letter dated July 28, 2011. Thank you very much for providing comments on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA).

As indicated in the HAMET EA, our Soldiers require the best training they can receive prior to deployment. The use of landing zones on Mauna Kea and Mauna Loa will help achieve this critical need by allowing pilots of the 25th Combat Aviation Brigade to experience wind, weather, and elevation conditions similar to those they will experience when deployed to the mountainous regions of Afghanistan.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 6 2011

Office of the Garrison Commander

Valerie Amby-Kamakeeaina
valleialoha@yahoo.com

Dear Ms. Amby-Kamakeeaina:

Thank you very much for your comments, set forth in your email dated August 23, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are enclosed.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Comment: I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the Army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an environmental impact statement (EIS) is not required.

Comment: Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impact levels were based on federal and state requirements, which mandate the analyst to consider the context and intensity of potential impacts. Context normally refers to the setting, weather local or regional, and intensity describes the severity of the impact. The Army feels that the impact levels have been appropriately assessed.

Comment: In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA.

Response: The document has been reviewed and re-reviewed and we have done our best to ensure the grammar is correct. The Army apologizes if any grammatical errors may still exist. The Army's proposed action has changed and the State of Hawaii required compliance with Hawaii Revised Statutes (HRS) Chapter 343, therefore we are required to re-issue an EA in compliance with the law.

Comment*:* The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?"

Response: In the July EA, the Army modified the proposed action. With the modification of the proposed action, the Army has re-analyzed the potential impacts.

Comment: Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis.

Response: The state of Hawaii requested that the Army comply with Hawaii Revised Statutes (HRS) Chapter 343. Compliance with HRS Chapter 343 was not an afterthought. By complying with the National Environmental Policy Act (NEPA) we complied with a vast majority of HRS Chapter 343. In doing so, the Army needed to insert that we complied with HRS Chapter 343 in the document as well as responding to all comments that we have received.

The Army relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
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- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

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The Army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture.

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Response: The Army does understand the sacredness of wahi pana (Section 3.7.2.1). Based on the information that has been gathered, the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor has the community been properly consulted. Had the cultural impact assessment been

completed properly, impacts to cultural resources would have been identified as significant and unmitigable.

Response: The United States Army Garrison, Hawaii (USAG-HI) relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

Through our consultations and EA process, we were unable to identify and consult with individuals that have genealogical ties (or attachments) with knowledge of the landing zone areas potentially affected by the proposed action.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

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Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the Army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times.

Response: The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those marked sites during pilot training.

Comment: Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the Army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources.

Response: The Army assessed the sites to the extent possible based on the information gathered.

Comment: It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36 CFR part 800, let alone meet the substantive portion of the law.

Response: In addition to the photos, the Army conducted physical surveys, and extensive research to meet the regulatory requirements of 36 *Code of Federal Regulations* (CFR), part 800. In addition, the information gathered was used to support consultation activities.

Comment: There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the Army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas.

Response: The Army assessed the sites to the extent possible within the area that may be affected by the training. These are the same aircraft that have used these LZs in the past. Requests to the State to test the mounds in order to investigate the nature of these features were denied.

Comment: The substantive portion of Section 106 of the National Historic Preservation Act of 1966 (as amended) mandates that the Army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each pu‘u in this project.

Response: The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawai‘i.

Response: The Army does understand the spiritual and cultural heritage of Hawaii. However, based on the information that has been gathered the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians.

Comment: The lack of information does not instill in me confidence that the Army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

Comment: It is difficult to comprehend how the Army proposes to protect cultural resources without understanding what they are. More respect of the Army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.

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The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those sites during pilot training.

Comment: While the Army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

Response: The Army used outside information to assist us in the development of our EA to get a comprehensive look at cultural impacts. This information was used to help guide our surveys and our consultation efforts.

Comment: While the Army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii?

Response: The Army recognized that conducting the training comes at a cost. This cost is analyzed in the EA and mitigations have been put in place to limit the costs to the People and resources of Hawaii.

Comment: Native Hawaiians have been unjustly targeted for the Army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

Response: The EA analyzed environmental justice in accordance with "executive order 12898 'Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Using this criteria, no impacts were identified.

Comment: The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape.

Has the Army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

Response: Noise modeling was conducted in accordance with Army Regulation 200-1 for assessing effects of helicopter noise on land uses and wildlife (Section 4.11 page 4-31). The noise monitoring was conducted in accordance with the "American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 2: Measurement of Long-Term, Wide Area Sound" (ANSI S12.9-1992).

The Army did consult with the National Park Service. Their comments and our responses are included in the appendices of the final EA.

Comment: The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell, 4 pp). These documents have been added as an appendix to the final EA.

Comment: This EA lacks impact analysis on transportation between the islands of O'ahu and Hawai'i.

Response: HAMET would be integrated into other scheduled flight training (Section 2.1, page 2-1). Transportation between the islands of Oahu and Hawaii are a part of the existing scheduled training. The EA analyzes the potential impacts associated with the additional HAMET training activities.

Comment: Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impacts have been analyzed and mitigations proposed to support a finding of no significant impacts.

Comment: I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an EIS is not required.

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Kananimae'ole P. Amina
kanani16@gmail.com

Dear Ms. Amina:

Thank you very much for your comments, set forth in your letter dated August 24, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are enclosed.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Comment: I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the Army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an environmental impact statement (EIS) is not required.

Comment: Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impact levels were based on federal and state requirements, which mandate the analyst to consider the context and intensity of potential impacts. Context normally refers to the setting, weather local or regional, and intensity describes the severity of the impact. The Army feels that the impact levels have been appropriately assessed.

Comment: In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA.

Response: The document has been reviewed and re-reviewed and we have done our best to ensure the grammar is correct. The Army apologizes if any grammatical errors may still exist. The Army's proposed action has changed and the State of Hawaii required compliance with Hawaii Revised Statutes (HRS) Chapter 343, therefore we are required to re-issue an EA in compliance with the law.

Comment*:* The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?"

Response: In the July EA, the Army modified the proposed action. With the modification of the proposed action, the Army has re-analyzed the potential impacts.

Comment: Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis.

Response: The state of Hawaii requested that the Army comply with Hawaii Revised Statutes (HRS) Chapter 343. Compliance with HRS Chapter 343 was not an afterthought. By complying with the National Environmental Policy Act (NEPA) we complied with a vast majority of HRS Chapter 343. In doing so, the Army needed to insert that we complied with HRS Chapter 343 in the document as well as responding to all comments that we have received.

The Army relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

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Comment: Native Hawaiians have been unjustly targeted for the Army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

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Comment: I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an EIS is not required.

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 6 2011

Office of the Garrison Commander

Wayne Blyth
Mauna Kea Recreational Users Group
447 Kalanianole Avenue
Hilo, HI 96720

Dear Mr. Blyth:

Thank you very much for your comments, set forth in your letter dated August 22, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). We are pleased to have the opportunity to respond to your concerns directly.

Regarding your concern that in reading the EA you did not find mention of Off Highway Vehicle (OHV) use, the Hawaii trail systems, which include trails OHV riders use, are shown in the EA on Figure 3-20. The Army acknowledges there is no specific narrative section regarding OHV use in the EA. "Dispersed recreational activities may occur near or at the LZs; however, the LZs are not normally destinations for recreational activities" (p. 4-30) is inclusive of all recreation types.

The Army recognizes the popularity of OHV use and the financial contribution OHV users make to the Big Island's trail systems. Many soldiers and their families participate and enjoy the OHV opportunities unique to the Big Island.

Regarding your request that the U.S. Army make a dedicated effort to increase access to what is cherished hunting, bow hunting, hiking, off road vehicle, and general outdoor recreation associated with Pohakuloa Military Base, we appreciate your comment. Unfortunately, it is not directly related to this EA, which is concentrated on training on Mauna Kea and Mauna Loa. However, if you send this particular request to the Public Affairs Office at 742 Santos Dumont, WAAF, Schofield Barracks, HI 96857, they will forward it to the appropriate contact for further consideration.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

John Carse
R.R.2, Box 4852
Pahoa, HI 96778

Dear Mr. Carse:

Thank you very much for your comments, set forth in your e-mail dated August 18, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are enclosed.

Thank you for participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Comment: I am very concerned about the impact to the environment that will be caused the proposal to deploy more aircraft on the already overburdened and under-monitored air space of the Island of Hawaii.

Response: The Army shares your concern for the environment and has conducted the EA to ensure that our proposed action to land on small areas (150 x150 ft) of land on Mauna Kea and Mauna Loa for a 20-day period in October 2011 would not have any significant impacts.

Comment: First, what is the minimum height that these aircraft will be allowed to fly over our residential areas and national parks? And how much noise will that create? Although the Federal Aviation Administration requires all aircraft to maintain a standoff distance of 1500 feet for safety reasons, the Honolulu FAA Flight Standards District Office has voided this commonsense regulation on the Island of Hawaii. Currently, air tours are allowed to buzz our homes at 500 feet and vast swaths of our precious Hawai'i Volcanoes National Park at 200 feet. .. Will the military aircraft be operating at these ridiculously unsafe heights, too, despite the fact that these new regulations were created -- in violation of the FAA's own written policies -- without an Environmental Impact Statement?

Response: The aircraft will not be flying over residential areas or national parks as part of HAMET. Section 4.11 of the EA provides an analysis and explanation of the noise anticipated. The helicopters will fly at a minimum of 2,000 ft once they leave PTA and prior to approaching the LZs.

Comment: And how will we report the inevitable barnstorming that pilots seem unable to suppress? Will there be someone to contact when immature pilots start strafing our communities? And will reporting unacceptable behavior achieve anything? Currently, the FAA claims to have the sole jurisdiction when it comes to enforcing aircraft regulations, despite the fact the inspectors have failed miserably at this task. In fact, although the Honolulu FAA FSDO has received literally thousands of complaints, there is no evidence that it has ever found a pilot guilty based on the details provided by concerned citizens. Will the military follow the FAA's example and completely ignore complaints from residents of the Island of Hawaii? Or will you help us to identify and prosecute pilots who violate laws, rules, regulations and ordinances?

Response: Please refer all noise and low flying helicopter concerns to Ms. Kayla Overton, Community Relations, U.S. Army Garrison-Hawaii at 808-656-3159.

Comment: Also, it wasn't that many years ago that a showboating military pilot strafed Spencer Beach Park so low that the prop wash collapsed tents and caused the injury of a Boy Scout so severe that he required hospitalization. Will the names of the offending pilots be made available to that we can seek financial restitution from them in our civil courts for damages caused?

Response: We understand your concern but it is not directly related to this EA, which is concentrated on training on Mauna Loa and Mauna Kea. However, regarding these types of concerns, please direct them to the Public Affairs Office at 742 Santos Dumont, WAAF, Schofield Barracks, HI 96857. They will forward your concern to the appropriate contact for further consideration.

Comment: And what method will be used to track these aircraft when they operate over our neighborhoods? The FAA currently has no way to identify any aircraft without a photograph clearly showing the N-number, despite the fact that these numbers are impossible to be seen when aircraft fly overhead. And they have absolutely no way to identify any aircraft operating at night. Will anything be done to rectify this travesty?

Response: The aircraft will not be flying over residential areas or national parks as part of HAMET.

Comment: Also, according to Hawai'i Volcanoes National Park Superintendent Cynthia Orlando, the park is planning to use the entry fees provided by air tours to establish a monitoring program, even though they refuse to tell their neighbors what it will be or how it works. Will you be contacting the National Park Service to make sure that their monitoring efforts are synchronized with those created for this proposed program?

Response: The Army has consulted with the National Park Service on this project.

Comment: Because of the tremendous damage currently be done to the environment by irresponsible pilots and uncaring FAA officials, efforts are now being made to establish state and county monitoring systems that include specific route and height regulations as well as penalties for pilots who violate them. Will the military be joining us in our efforts to make aviators accountable?

Response: We understand your request but it is not directly related to this EA, which is concentrated on training on Mauna Loa and Mauna Kea. However, regarding these types of requests, please direct them to the Public Affairs Office at 742 Santos Dumont, WAAF, Schofield Barracks, HI 96857. They will forward your request to the appropriate contact for further consideration.

Comment: Currently, pilots are destroying the Big Island citizens' right to privacy, land values, and quality of life. What will you be doing to prevent further increasing this mayhem?

Response: The Army shares your concerns. We have prepared the EA to ensure that our proposed action to land on small areas (150 x150 ft) of land on Mauna Kea and Mauna Loa for a 20-day period in October 2011 would not have any significant impacts.

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 6 2011

Office of the Garrison Commander

Paul J. Conry, Administrator
State of Hawai'i, Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street, Room 325
Honolulu, HI 96813

Dear Mr. Conry:

Thank you very much for your review and consideration of our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA).

We are formally acknowledging your August 30, 2011, letter in which you indicated we have addressed all the items/issues that were identified and commented on in the previous EA (April 2011) in the July 2011 EA. We also acknowledge your statement that the Division of Forestry and Wildlife has no further comments to the July EA.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Pua Corpuz
rashanemail@gmail.com

Dear Mr. Corpuz:

Thank you very much for your comments, set forth in your letter dated August 23, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are enclosed.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Comment: I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the Army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an environmental impact statement (EIS) is not required.

Comment: Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impact levels were based on federal and state requirements, which mandate the analyst to consider the context and intensity of potential impacts. Context normally refers to the setting, weather local or regional, and intensity describes the severity of the impact. The Army feels that the impact levels have been appropriately assessed.

Comment: In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA.

Response: The document has been reviewed and re-reviewed and we have done our best to ensure the grammar is correct. The Army apologizes if any grammatical errors may still exist. The Army's proposed action has changed and the State of Hawaii required compliance with Hawaii Revised Statutes (HRS) Chapter 343, therefore we are required to re-issue an EA in compliance with the law.

Comment*:* The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?"

Response: In the July EA, the Army modified the proposed action. With the modification of the proposed action, the Army has re-analyzed the potential impacts.

Comment: Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis.

Response: The state of Hawaii requested that the Army comply with Hawaii Revised Statutes (HRS) Chapter 343. Compliance with HRS Chapter 343 was not an afterthought. By complying with the National Environmental Policy Act (NEPA) we complied with a vast majority of HRS Chapter 343. In doing so, the Army needed to insert that we complied with HRS Chapter 343 in the document as well as responding to all comments that we have received.

The Army relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

Comment: Why, if the Army claims that "analyses did not indicate the need for an environmental impact statement" did you require this many attempts in reaching a FONSI?

Response: The proposed action included in the EA issued in December 2010 provided for a larger action. The EA issued in April 2011 addressed the comments raised during the December 2010 EA review period and clarified our proposed action. The EA issued in July 2011 is based on the April 2011 EA and incorporates HRS Chapter 343 requirements based on the State of Hawaii's request. Draft EA's published since December 2010 analzyed reduced proposed actions, thus requiring the Army to inform the public and publish a revised EA.

Comment: Even after three attempts at a FONSI, the analysis is still lacking.

Response: The Army has thoughtfully considered all likely potential impacts. Several dozen technical experts have spent many hundreds of hours researching and analyzing potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

Comment: The alternatives considered do not meet your stated purpose to recognize Army environmental and social stewardship responsibilities within the affected region.

Response: All alternatives considered meet the stated purpose and are in keeping with the Army's mission, environmental and social stewardship responsibilities.

Comment: Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii.

Response: Alternatives were evaluated to determine if they could meet the purpose and need. The alternatives evaluated were not limited to Hawaii.

Comment: The alternative 5 for other high-altitude training sites on the CONUS is prematurely eliminated and should have been carried forward for further analysis. This alternative should be fully considered in an EIS.

Response: Alternative 5 did not meet purpose or need of training up to 90 pilots that cannot train elsewhere in the time from October to deployment so it was screened out. For these individuals whom the training is primarily directed, it is not possible to do the training anywhere else.

Comment: Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the Army is not qualified to conduct a legitimate impact analysis.

The Army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture.

Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the Army catastrophically fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.

Response: The Army does understand the sacredness of wahi pana (Section 3.7.2.1). Based on the information that has been gathered, the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor has the community been properly consulted. Had the cultural impact assessment been

completed properly, impacts to cultural resources would have been identified as significant and unmitigable.

Response: The United States Army Garrison, Hawaii (USAG-HI) relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

Through our consultations and EA process, we were unable to identify and consult with individuals that have genealogical ties (or attachments) with knowledge of the landing zone areas potentially affected by the proposed action.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

Comment: Aside from photographs taken on a day outing to these LZs what efforts have been put into the interpretation of the sites identified? The identified sites are extremely close in proximity to each LZ and located on the tops of small pu‘u. The cairns atop each pu‘u are within 20 feet of the LZs.

Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the Army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times.

Response: The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those marked sites during pilot training.

Comment: Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the Army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources.

Response: The Army assessed the sites to the extent possible based on the information gathered.

Comment: It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36 CFR part 800, let alone meet the substantive portion of the law.

Response: In addition to the photos, the Army conducted physical surveys, and extensive research to meet the regulatory requirements of 36 *Code of Federal Regulations* (CFR), part 800. In addition, the information gathered was used to support consultation activities.

Comment: There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the Army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas.

Response: The Army assessed the sites to the extent possible within the area that may be affected by the training. These are the same aircraft that have used these LZs in the past. Requests to the State to test the mounds in order to investigate the nature of these features were denied.

Comment: The substantive portion of Section 106 of the National Historic Preservation Act of 1966 (as amended) mandates that the Army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each pu‘u in this project.

Response: The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawai‘i.

Response: The Army does understand the spiritual and cultural heritage of Hawaii. However, based on the information that has been gathered the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians.

Comment: The lack of information does not instill in me confidence that the Army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

Comment: It is difficult to comprehend how the Army proposes to protect cultural resources without understanding what they are. More respect of the Army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those sites during pilot training.

Comment: While the Army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

Response: The Army used outside information to assist us in the development of our EA to get a comprehensive look at cultural impacts. This information was used to help guide our surveys and our consultation efforts.

Comment: While the Army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii?

Response: The Army recognized that conducting the training comes at a cost. This cost is analyzed in the EA and mitigations have been put in place to limit the costs to the People and resources of Hawaii.

Comment: Native Hawaiians have been unjustly targeted for the Army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

Response: The EA analyzed environmental justice in accordance with "executive order 12898 'Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Using this criteria, no impacts were identified.

Comment: The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape.

Has the Army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

Response: Noise modeling was conducted in accordance with Army Regulation 200-1 for assessing effects of helicopter noise on land uses and wildlife (Section 4.11 page 4-31). The noise monitoring was conducted in accordance with the "American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 2: Measurement of Long-Term, Wide Area Sound" (ANSI S12.9-1992).

The Army did consult with the National Park Service. Their comments and our responses are included in the appendices of the final EA.

Comment: The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut, 7 pp.), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell, 47 pp.), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell, 4 pp.). These documents have been added as an appendix to the final EA.

Comment: This EA lacks impact analysis on transportation between the islands of O'ahu and Hawai'i.

Response: HAMET would be integrated into other scheduled flight training (Section 2.1, page 2-1). Transportation between the islands of Oahu and Hawaii are a part of the existing scheduled training. The EA analyzes the potential impacts associated with the additional HAMET training activities.

Comment: Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impacts have been analyzed and mitigations proposed to support a finding of no significant impacts.

Comment: I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an EIS is not required.

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Sofronio Estores
59-206 Alapio Road
Haleiwa, HI 96712

Dear Mr. Estores:

Thank you very much for your comments, set forth in your letter postmarked August 22, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are enclosed.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Comment: There is excessive redundant information throughout the document.

Response: The rigor of the National Environmental Policy Act (NEPA) and Hawaii Revised Statutes (HRS) Chapter 343 environmental assessment (EA) processes often results in the restating of similar information throughout the environmental document.

Comment: Numerous references throughout the document are irrelevant to the HAMET operations of two types of helicopters conducting repeat operations at isolated sites. References are made to incomplete studies, lack of data, and unclear "reconnaissance level" surveys. The following samples of portions of statements indicate the lack of specifics directly related to helicopter operations:

- "... and it is anticipated that the population densities of ... is zero."
- "… should have no effect ...."
- "... could potentially occur ...."
- "There are no identified active petrel breeding colonies ...."
- "....is not expected occur...."
- "…it is expected that ...".
- " ...it is anticipated that birds would vacate the area while noise levels are high ..."

Response: Environmental Assessment analyses require use of the best available information to determine impacts. In some cases the exact outcome of an action is not known but is projected; anticipated, expected, etc. The Army has thoroughly reviewed available literature, considered all input received during the public comment period, performed site specific surveys, and conducted test flights to assist in making our conclusion.

Comment: Irrelevant information include "Socio-economics & Environmental Justice~', Land Use; the whole picture/diagram of Hiking Trails along the coastline; reference to selected previous UH and Stryker EIS findings which are not related to helicopter operations; a lot of propaganda information about PTA, military training and usage and management of the land and historic, cultural sites on the reservation, traffic densities, and the analysis of noise concentrated on humans rather than on the animals, birds and insects which is more appropriate to the resultant effects of these operations; the section on air quality and the lengthy coverage of "Geology and Topography" add pages of reading that are not necessary.

Response: There are certain "affected environments" that are required to be analyzed as part of any NEPA analysis. Socio-economics and environmental justice are two areas that are required by Presidential Executive Order to be analyzed. The analysis of land use, geology, and topography are all important to ensure that the proposed action does not have any significant impacts on these resources.

Comment: The gentle slopes of both Mauna Kea and Mauna Loa and the selected HAMET training sites do not have the flying effects and characteristics associated with mountain environments. They will only give pilots high altitude and slope conditions. The LZs are not configured to give pilots the full spectrum of conditions of mountain flying which include strong wind sheer, up and down drafts, considerable turbulence, and quick changing atmospheric

conditions. The sites will not adequately prepare the pilots for the challenges of real mountain conditions. Denying pilots the true effects of mountain training elsewhere due to costs and time away from families put the crews at risks that are not acceptable.

Response: Alternatives were evaluated to determine if they could meet the purpose and need. The specific training requirements and the applicability of the proposed action to meet them are discussed in section 2.1, and 2.7 under the alternatives.

Comment: The archaeological rock mound surveys and monitoring resulting in "no effects from HAMET training" are not proven. The fact that some rock was tumbled indicates some effects. Later checks do show that the same flight approaches or type of helicopter used in training were duplicated to cause more effects. Therefore, the surveys were useless and to incorporate these findings are inappropriate.

Response: Rocks had tumbled off of the mounds prior to the surveys and prior to the helicopters flying to the LZs. The results of monitoring the mounds during and after the two weeks of the noise study showed that there was no change to the mounds as a result of the helicopters touching down and lifting off from the LZs. The purpose of the initial surveys was to identify any sites and evaluate the potential for the project to affect them, which was accomplished. Based on pilot operational experience, the rotor wash generated from the helicopter blades (by the time it reaches the mounds) is no greater than natural wind speeds experienced at these locations.

Comment: The noise monitor placement Memorandum for the Record dated 22 March 2011 merely addresses placement of the devices and the outcomes or results are not included. Installation of the devices should have preceded the 25th CAB training in that time frame to ascertain the effects. The memo covers the installation and refers to "no archaeological sites were found within the (each) area. Noise is only one dimension of helicopter flying; there is the question of blade and jet engine noise/frequencies that are not addressed by these monitors. Use of this Memo for concluding there is no effect from HAMET operations is not deemed appropriate and, needs to be proven.

Response: Section 4.11.3 of the EA addresses the specifics of the noise monitoring study. The noise monitors were placed prior to helicopters flying during the March to April 2011 study. The monitors collect all noise resulting from natural ambient, helicopter related, and other man-made noise occurring while the monitors were placed.

Comment: There should be an alternate that considers the War Fighting Center concept where CAB Units go through high altitude training and evaluation like all other combat units that must pass through NTC in predeployment processing. Upon completion , of the training, they load up the helicopters for deployment directly into theater and the personnel return to home station to complete the rest of the mobilization processing to include home leave. This alternative ensures pilots are trained and evaluated close to the time they will need to fly missions in high altitudes and mountainous conditions.

Response: This proposed COA does not consider the increase in Soldier’s deployed days or permit CAB commanders the flexibility to train their units based on other requirements and constraints to include funding and training area availability. Additionally, active duty units do not mobilize like National Guard and Reserve units. All CABs send units to the National Training Center, Joint Readiness Training Center and Combat Maneuver Training Center as part

of their additional redeployment training requirements. Additionally CONUS-based CABs send units to FT Carson and FT Bliss for HAMET.

Comment: When referencing to "State and commercial helicopters are using the Helicopter LZ sites"- are you implying if they are using the sites then it is ok for the military to use them? The Blackhawk and the Chinook are considerably larger helicopters and will make a significantly more impact from dust and displacement of loose stones and pebbles from their downdraft during landings, hovering and takeoffs.

Response: The referenced statement does not exist in the July 2011 EA. The following statement does exist; “their disturbed surface areas indicate evidence of previous use.” The note is not meant to suggest that since the sites are used that it is ok to use them for military use but to describe the current environment of the sites.

Comment: Use of terms "final EA" and "draft FONSI" in a document that is going out for review and comments gives the reader the impression that there is already a preconceived determination that there will be no need to perform an EIS with the required public reviews and hearings and that there are no significant impacts. Such wording tends to raise suspicion about the process and intentions of the US Army in such a serious matter of interest to the Native Hawaiian community on the Island of Hawaii.

Response: The Army released a Draft EA and Draft FNSI July 23, 2011 for public review and comment. Through the EA process, the Army has determined that there are no significant impacts and an EIS is not required. Issuance of a final EA along with a draft FONSI is in accordance with the Department of Defense’s environmental analysis process (32 *Code of Federal Regulations* 651).

Comment: The document does not fully support the finding of no significant impact from HAMET helicopter operations. A full Environmental Impact Statement is needed to ensure no short term and long lasting effects on the sacred mountains in respect for the Hawaiian culture.

Response: Through the EA process, the Army has determined that there are no significant impacts from training up to 90 pilots for 20 days and an EIS is not required.

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 6 2011

Office of the Garrison Commander

Hanalei Fergerstrom
Na Kupuna Moku O Keawe
PO Box 951
Kurtistown, HI 96760
808-938-9994

Dear Mr. Fergerstrom:

Thank you very much for your comments, set forth in your e-mail dated August 22, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are enclosed.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Responses to Comments

Comment: The USAG-HI will review comments received during the public comment period to determine whether the Proposed Action has potentially significant impacts that could not be reduced to less than significant with the application of mitigation. If impacts are found to have the potential to be Significant after the application of mitigation measures, The USAG-HI would be required to publish a notice of intent to prepare an environmental impact statement in the Federal Register."

Response: You are correct in that if impacts were found to be significant and not mitigatable, a notice of intent to prepare an environmental impact statement (EIS) would be required.

Comment: Previously we brought to your attention the “Critical Habitat” of the endangered species Palila, which is protected by the National Endangered Species Act. The Palila bird has played an important part in the ecology of Mauna Kea. Since the Palila gained it's classification as an endangered species, Mountain and Muflon sheep were forcefully removed from the slopes of Mauna Kea for the protection of Critical Habitat essential for the survival of the Palila Bird. The National Endangered Species Act and the protection of Critical Habitat reigns legally superior over the proposed HAMET program and the State of Hawaii is also bound to protect the critical habitat of the Palila as a recipient of federal funds specifically for that purpose.

Response: In May 2011 the USAG-HI received comments from the United Sates Fish and Wildlife Service (USFWS) on our April 2011 EA (which proposed a larger action in terms of time and flights). USAG-HI was asked to re-evaluate the proposed flight path due to the palilia habitat, provide survey information and methodology for biological investigations, and re-evaluate using the landing zones (LZs) if Hawaiian petrels or the band-rumped storm petrels are detected in the areas near the LZs.

Since May we have re-evaluated the potential for impact to resources from the flight path depicted in both the April 2011 and July 2011 EA. In addition, our staff biologists conducted site specific surveys for the presence of threatened and endangered species and assessed the potential for impacts to these resources. Memoranda For Record, that detailed the level of effort conducted to address the concerns of both the USFWS and the State of Hawaii Division of Forestry (DOFAW), were provided to both organizations. Electronic copies of these memoranda were emailed to you on September 6, 2011.

As a result of previous discussions between Dr. Peter Peshut, Pohakuloa Training Area (PTA) biologist and Dr. Jeff Zimpfer, United States Fish and Wildlife (USFWS) staff member, and the findings from our biological assessments, our test flights, and the EA process, the Army has made a determination that the proposed action will have no significant effect on listed species or critical habitat, and therefore we are not initiating informal consultation at this time.

Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), and the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp). These documents are includedas an appendix to the final EA. Mitigations are in place to avoid these areas (Section 4.6.3, p. 4-14).

The current proposed route, as detailed in the July 2011 EA puts us over the palila core population but at an elevation that we feel will not adversely disrupt palila behavior patterns and is sufficient to minimize impacts. Moreover, transit time over the occupied critical habitat is less than 1 minute per fly over. However, to address your concerns about noise with the use of the Army's preferred flight path, the CAB considered attaining a higher altitude of 3,000 feet above ground level (AGL). They have determined that unless severe weather and safety conditions dictate a need to fly at 2,000 feet AGL, helicopters will maintain an altitude of 3,000 feet AGL when they are over the core palila population. Additionally, attaining a 3,000-foot AGL would reduce noise levels even further than as stated in the EA. The change in elevation was added to the EA.

The Army, through development of the EA, has reviewed and included within the EA (Section 4.13.3) the potential risk of fire due to an Army helicopter crash. Factors considered in determining whether any alternative would have a significant wildfire ignition potential include the extent or degree to which implementing an alternative would involve the following wildfire ignition issues:

- Historical safety record
- Operation of aircraft at high altitudes
- Occurrence of nighttime training

The aircraft proposed for HAMET would be unarmed for HAMET flights. Onboard HAMET aircraft are two 5 pound ABC fire extinguishers to extinguish fires manually. The CH-47 and UH-60 have self-sealing primary and auxiliary fuel systems for rotary winged aircraft to reduce the possibility of leakage, fire and explosion during impact.

The potential ignition of a wildfire within the flightpath and training area was analyzed. Based on the methodology and factors considered, the risk would be less-than-significant because the only credible risk of a wildfire would be as the result of a crash within a vegetated area with fuel loads (vegetation) sufficient to carry fire. HAMET flights are considered low risk, according to the 25th CAB Risk Assessment Worksheet and the possibility of a wildfire as a result of a crash was determined to be extremely remote. This conclusion is based on thousands of hours flown and the CAB's historical safety record, that training would be conducted outside of vegetated areas (i.e., at LZs), and that the minimal flight time over vegetated areas (less than 1 minute per flight) would be occurring.

Comment: Mauna Kea and Mauna Loa are very, sacred to the Hawaiian People both religiously and culturally. They represent the embrace of the male and female energies and are symbolic of the continuum of life. The spiritual significance of these mountains is not limited to just the Hawaiian People but is shared with many who come to these islands. It is for these reasons that the very thought of training attack helicopters is contrary to the belief in the sanctity of life and spiritual ambiance of the mountains.

Response: The Army understands the sacredness of Mauna Loa and Mauna Kea and its importance to Native Hawaiians and other visitors. Attack helicopters will not be used in the proposed action. The EA recognizes that the introduction of visual, audible, and atmospheric elements due to the presence of military aircraft that could impact the quality or frequency of cultural practices and beliefs (Section 4.7.2 page 4-21).

Comment: Both Mauna Kea and Mauna Loa are in Conservation Use Districts and therefore are required to meet and satisfy conservation district use criteria. We are also concerned that the USAG-HI has tried to evade following State of Hawaii Administrating Rules regarding Conservation District Use Permits and instead is seeking a special use permit directly through the Chairperson of the Department of Land and Natural Resources.

Response: The Army is a federal agency. Under the Supremacy Clause of the U.S. Constitution, State governments cannot impose regulations on the federal government that may impede or impair its ability to operate unless it is specifically authorized by Congress. Thus, the Army cannot be required to enter into a state CDUP process. The Army does however recognize the need to comply with the protections and safeguards of Hawaii's CDUP. Thus, the Army will seek a right of entry for landing on State lands which will inevitably comply with all relevant portions of the CDUP prerequisites and mitigation measures.

Comment: Another point of serious concern is the military "taking" of public property. Such a taking is certainly illegal and would need to go through the proper legal procedures applied to any eminent domain project.

Response: HAMET will not include a taking of public property. The HAMET EA considers the additional training requirement for the CAB that consists of landing on small areas (150 x 150 ft) of land on Mauna Kea and Mauna Loa for a 20-day period in October 2011. Permits are being sought from the State for the temporary use of these areas, which remain under the jurisdiction of the State of Hawaii whether the permits are issued or not.

Comment: In conclusion, Na Kupuna Moku O Keawe, stands in opposition to the proposed HAMET program and urges the USAG-HI to immediately file with the Federal Register to complete full Environmental Impact Statement.

Response: Through the EA process the Army has determined that there are no significant impacts and an EIS is not required.

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 6 2011

Office of the Garrison Commander

Sue Pekarsky Gary
David R. Gary
59-566 Lokelani Place
PO Box 44362
Kamuela, HI 96743-4362

Dear Mr. and Mrs. Gary:

Thank you very much for your comments, set forth in your e-mail dated July 27, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA).

In our April 2011 revision of the National Environmental Policy Act (NEPA) EA, as well as the current EA which complies with Hawaii Revised Statutes (HRS) Chapter 343, the Army eliminated the Kiowa helicopter from the proposed October 2011 training. HAMET will involve only utility helicopters and cargo helicopters such as the Black Hawk and Chinook, respectively, and will not involve attack helicopters such as the Apache or Cobra. No live firing is proposed as part of HAMET nor will munitions be carried on the helicopters used.

Cultural and natural resource surveys were conducted in the vicinity of proposed landing zone areas. Two areas, adjacent to landing zones on Mauna Kea, contained rock pile features of unknown origin. These features will be avoided. No cultural features were identified at any other landing zone areas. No federally-listed flora were identified in the areas surrounding the landing zones. Wildlife species protected under the Endangered Species Act and the Migratory Bird Treaty Act were either absent from the landing zones, or were considered to be transitory within the landing zone areas, and it is expected that the presence of these species will be limited to only rare and infrequent events. Mitigations will be in place to reduce impacts to habitat area and any fauna/avifauna, if encountered. A noise study was also conducted that indicated only temporary disturbances if, and only if, one was in the immediate vicinity of the landing zones.

Thank you for participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 6 2011

Office of the Garrison Commander

Sierra Club
Moku Loa Group
Attn: Cory Harden
PO Box 1137
Hilo, HI 96721
808-968-8965

Dear Ms. Harden

Thank you very much for your comments, set forth in your letter dated August 22, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are attached.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Responses to Comments

Comment: There is a necessity for high-quality training. But it appears that the EA underestimates impacts, and that HAMET training could be done in a more appropriate setting, with fewer impacts, in Colorado or Afghanistan. Also, an Army investigation of last year's HAMET crash in Colorado said "There are few, foreseeable mission requirements in the theater of Afghanistan which would require Army reconnaissance and attack rotary wing aircraft to land to pinnacles and ridgelines at high altitudes—even in the event of an emergency." [see comments for 2.7-- Action Alternatives]

Response: Pilots need to be trained prior to deployment in Afghanistan. Conducting this training in Afghanistan during combat operations is not an option. Our proposed action in this EA is the training of air crews who cannot make it to Colorado to receive this training. Army reconnaissance and attack air craft will not be used as part of our proposed action in Hawaii. Training in Hawaii minimizes time pilot are away from their families.

Comment: The Army is to be commended for relocating some training to Colorado and revising the draft EA twice to address community concerns and follow environmental law. But extensive comments on the April EA by SHPD (State Historic Preservation Division), USFWS (U.S. Fish and Wildlife Service), and Sierra Club re. biological, cultural, and visual resources, cumulative impacts, and safety, are not addressed in the July EA, and Sierra Club was not consulted. Review was hampered by no information re. specific text changes, no appendices in the online July EA, and no response to Sierra Club's Freedom of Information Act request for background memoranda.

Response: The Army provided a copy of the July EA to all who commented on the April EA. We also advertised a notice of availability in the OEQC environmental notice as well as in a local newspaper that circulates on the island of Hawaii. All comments received on this as well as our responses are provided as an appendix in the final EA. In addition, the Sierra Club was offered the opportunity to attend a briefing and flight demonstration concerning HAMET -- the Sierra Club declined to participate. The MFRs requested by Deborah Ward through the Freedom of Information Act request were sent, and we show received, on August 23, 2011.

Comment: The alternative now being used, Fort Carson, was not mentioned in the April EA. The time, expense, difficulty, and impacts of transport to Pohakuloa vs. Colorado is not disclosed. The alternative of doing HAMET after arrival in Afghanistan is not considered.

Response: The Department of the Army Headquarters assigned 1-2 Attack Battalion to the 25th CAB for deployment and therefore co-locating with a subordinate unit stationed at Fort Carson saved time and money as compared to moving HAMET to another CONUS location. Prior to the deployment, Fort Carson was not an option. The Fort Carson alternative is not feasible at this time because there is no time to send newly arriving pilots to CO. Additionally there are no CH-47F aircraft available in Gypsum, Colorado

Pilots need to be trained prior to deployment in Afghanistan. Conducting this training in Afghanistan during combat operations is not an option. Army reconnaissance and attack air craft will not be used as part of our proposed action in Hawaii. Training in Hawaii minimizes time pilot are away from families.

Comment: The EA lacks specifics re. how much time will be spent, at what altitudes, and where, for the maneuvers it describes: descent, reconnaissance from 100-500 feet up, short-stop approach, abort, go-around, climb out, full-stop landing, multiple touch-and-go, landing on uneven surfaces and pinnacles, hovering at 3 feet, and flying at 200 feet in a 1 ¼ mile diameter circle centered on each LZ. The EA estimate of only 10 minutes of noise at each landing zone appears unrealistic.

Response: Based on training requirements and logistics, on observations during the March 2011 data-collection training period, the Army feels that the training times are realistic.

Comment: Noise analysis remains inadequate. Noise maps contradict written information, and show levels at some LZs as quieter than locations farther away. Day-night and even annual averages, and a method that under-estimates low-frequency noise, are used. The only study quoted re. noise impacts on wildlife was done by the Army. Inadequate data is presented re. HAMET training-day noise levels. It is unclear whether noise analysis considers a likely scenario of more than one helicopter at a time flying on one mountain. Vibration is not evaluated.

Response: (1) It is important to note that noise levels appearing on Figures 4.5 through 4.9 represent modeled average noise levels over a 24-hour period. Because the same two flight corridors (one for Mauna Kea and one for Mauna Loa) will be used for all three LZs on each mountain, the flight frequency along the two flight corridors have a higher flight frequency than the flight frequencies at each individual LZ. A higher flight frequency equates to a higher average noise level (DNL). Therefore, average noise levels along the flight corridor are higher than those surrounding the LZs. In particular, the modeled flight frequency did not generate average noise levels above 60 dBA at the Mauna Kea LZs.

(2) The majority of United States noise guidelines for assessing human exposure to environmental/community noise are based on the DNL metric, and it is the required noise metric per U.S. Environmental Protection Agency noise guidelines and Chapter 14 of Army Regulation 200-1. The DNL was not averaged over a year period, it was averaged over a 45-day period, which is the actual number of days annually for which HAMET training was originally proposed, far more than the 20-day period currently proposed. Using a 45-day averaging period minimized any potential dilution of noise levels that would occur if an annual averaging period were used.

(3) The EA includes preliminary noise monitoring data collected during an actual HAMET training iteration in March and April 2011. As stated in section 4.11.3 of the EA, a complete assessment of this noise data is presented in a separate noise monitoring report.

(4) Because the DNL is a 24-hour average, the number of helicopters flying concurrently is insignificant. The total number of flights within the 24-hour time period as well as whether they are daytime (7 a.m. to 10 p.m.) or nighttime (10 p.m. to 7 a.m.) flights affects the DNL.

Comment: Text and graphics re. flight paths are contradictory. It appears helicopters will start descending from 2,000 feet while still over palila critical habitat. One LZ is directly adjacent to a nene sanctuary and three LZs are inside ‘io range. Helicopters will fly at 200 feet in a circle over a mile wide around landing zones, but some biological surveys only cover a square one-tenth that size. Several birds and a bat, all at risk, may occur below flight paths and breed in October, when training is proposed. Information on inspection and cleaning procedures for invasive species is contradictory.

Response: The Army will stay above the palila critical habitat (PCH) outside of the PTA. Unless severe weather and safety conditions dictate a need to fly at 2,000 feet AGL, helicopters will maintain an altitude of 3,000 feet AGL when they are over the core palila population. As stated in 4.6.3, surveys in March 2011 to identify potential wildlife species that could be impacted by noise from helicopters were conducted within the area formed by a 2,000-ft (610-m) radius from the center of the LZ based on the 80-dBA buffer. On Mauna Kea and Mauna Loa, many of the wildlife species' ranges are not located within the helicopter flight paths, but bird and bat species have been known to cross into the specified areas. In addition, the minimum 2,000-ft (610-m) above ground level (AGL) altitude is outside of the flight paths of many birds and bats. It has been noted from viewing birds from helicopters in flight that birds will change their flight paths to avoid the helicopters (Peshut 2011b). The nene were not found near the LZs. The 'Io was not found near the LZs, and it is not anticipated that they will be there as there is nothing for them to eat.

Comment: Safety analysis is inadequate for aircraft maneuvers so difficult they require three weeks of specialized training. The EA does not mention two high-altitude helicopter crashes in Colorado (one fatal), nor two fatal helicopter crashes and one forced landing in Hawai'i. The safety of aging UH-60A Black Hawk helicopters is not evaluated. There is no analysis of causes or environmental impacts for the 2003 Hawai'i HAMET landing over three miles off the LZ. The EA does not does not say whether lights will used at night to avoid aircraft collisions. Information on rotor wash and vortices is contradicted by information from other sources.

Response: As stated in section 3.13, the Army has procedures in place to investigate and plan for possible hazards. As part of flight operations, a risk assessment is completed by a commanding office and addresses general and specific hazards for each flight mission. Pilots are briefed on the risk assessment, hazards, mitigative actions, and emergency procedures during preflight briefings prior to the start of each training mission.

The 25th CAB safety record is evaluated in section 2.6. To date, the CAB has had zero accidents related to flight at high altitude, both in theater and in and around Hawaii. The 25th CAB has had two Class A accidents involving rotary-wing aircraft on the island of Oahu in February 2001 and May 2009. The 2001 incident was during an air-assault training operation in the Kahuku training area, and the 2009 incident was during general maintenance test flight on Wheeler Army Airfield.

As stated in section 4.3, the intensity of rotor wash on the localized area is directly related to many factors, including helicopter weight, disc area of the helicopter being used, and the height of the helicopter from the ground. Air quality analysis was conservative and estimated the area of impact to be 100 m from the center of the LZ, or roughly twice as large as the typical rotor-wash area. Figure 4-3 is a photo of a Black Hawk that is hovering 12 in. from the ground on LZ-5 during the March 2011 data-collection training period. The photo shows no dust visible.

Comment: Instead of analyzing cumulative aircraft visual and noise impacts with HAMET added, the EA uses existing aircraft impacts as a rationale for generating more. Cumulative impacts from future HAMET operations are not evaluated.

Response: As stated in 4.11, noise associated with proposed training operations has the potential to impact various land uses and wildlife in the region of influence (ROI). Modeled average noise levels (DNLs) and maximum noise levels were used in accordance with Army Regulation 200-1

(U.S. Army 2007a) to assess effects of helicopter noise on land uses and wildlife in the area. The EA analyzes the impacts associated with the addition of HAMET training.

Comment: The EA does not evaluate impacts from restricting public access, saying BLNR (State Board of Land and Natural Resources), not the Army, may restrict access.

Response: For HAMET flights, the 25th CAB will prepare a press release (p. 4-60), which would be released to media outlets such as, but not limited to, newspapers, radio stations, and television stations. Press releases would possibly be re-posted by recipients to other locations, such as hunter check stations. Press releases are our best method of notifying the public at large. HAMET does not restrict public access.

Comment: For July 2011 EA content with no substantive changes compared to the April 2011 EA, please see Sierra Club comments on the April EA. Impacts from transporting personnel and equipment between O'ahu and Pohakuloa should be evaluated.

Response: HAMET would be integrated into other scheduled flight training (Section 2.1, page 2-1). Transportation between the inlands of Oahu and Hawaii are a part of the existing scheduled training. The EA analyzes the potential impacts associated with the additional HAMET training activities. The purpose of this EA does analyze the increased flight around PTA.

Comment: 1.4 Need for Proposed Action [July EA p. 1-2]"…the proposed LZs are previously bulldozed, open, level areas that do not fit the requirements for landing on slopes, uneven surfaces, pinnacles or ridges, as indicated for this type of training…" [letter from Theresa Donham of SHPD to Charlene Uoki of DLNR re the December 2010 EA, July EA, p. B-76 to 81]

Response: As stated in section 1.4, an increased density altitude decreases the effectiveness of the rotor blades in providing both overall lift and thrust power to the tail rotor for directional control (i.e., increasing density altitude increases "drag"). Thus, an increased angle of attack and increased power are required to offset the increased drag. Simultaneously, the engine is less capable of producing power in the thinner air of higher altitudes, and the higher the altitude, the greater these effects have on the aircraft. As such, it is imperative that pilots master performance planning, power management, and high-altitude flight techniques to compensate for decreased aircraft performance in high-altitude, mountainous environments (Munger 2010a).

Comment: The alternative of doing HAMET after arrival in Afghanistan is not considered. "To conduct HAMET at a CONUS location, the 25th CAB aircrews will spend up to an additional 45 days away from Families prior to the upcoming deployment." [July EA p. 1-3] The EA should specify the minimum, as well as the maximum, time away from families, and compare that to time away if soldiers train at Pohakuloa, where families cannot come.

Response: Pilots need to be trained prior to deployment in Afghanistan. Conducting this training in Afghanistan during combat operations is not an option. Training in Hawaii minimizes time pilots are away from families. While training in Hawaii, pilots are able to return to their families each night.

Comment: "Flight paths for the Proposed Action were redesigned to reduce the size of the over flight area and avoid the Mauna Kea State Recreation Area and proximity to the Mauna Kea Ice

Age Natural Area Reserve. " [July EA p. 1-5] Graphics seem to contradict this—all seem identical to the April EA, and are all dated April 2011. Text also appears to have no substantive changes re. flight paths.

Response: The discussion on flight path changes is in reference to the December 2010 EA. This reference is changed in the final EA. There were no changes in the flight path since the April EA.

Comment: 1.7.1 Outreach [July EA p. 1-5 to 1-6] Sierra Club was not consulted, despite bringing this up in comments on the December 2010 and April 2011 EAs.

Response: The Army provided draft copies of the July EA to all who commented on the April EA. We also advertised out notice of availability in the OAQC environmental notice as well as in a local newspaper that circulates on the island of Hawaii. All comments received on this as well as our responses are provided as an appendix in the final EA. In addition the Sierra Club was offered the opportunity to attend a briefing and flight demonstration concerning HAMET -- the Sierra Club declined to participate.

Comment: 1.7.2 Cultural Consultation [July Ea p. 1-6] "In January 2011, SHPD provided a memo in response to the EA that also covered Section 106 concerns. The Army responded with a letter dated April 15, 2011." [July EA p. 1-6] The SHPD memo was unavailable for public review in the April EA.

Response: The SHPD letter was not available in time for the April EA printing.

Comment: 1.7.4 Public Involvement [July EA p. 1-7] Involvement by the public and regulatory agencies has been seriously hampered by

- the time demanded to comment on three different versions of the EA released within six months, none indicating exactly how text and graphics were changed
- the omission of all appendices from the online July EA
- no response to a June 15 Freedom of Information Act request by Debbie Ward of Sierra Club requesting memoranda associated with biological studies conducted for the EA

Response: The executive summary of the EAs released noted the changes from the previous releases. The MFRs requested by Debra Ward through the Freedom of Information Act request were sent and, we show, received on August 23, 2011.

Comment: 2.1 HAMET Training Overview [July EA p. 2-2]

"…tasks…VMC approach (typically 10 degrees) or to a 3-ft. hover…Abort and go-around…climbout…100-500 ft.…reconnaissance over high-altitude LZs…" [July EA p. 2-2] The EA should have maps/ graphics showing

- expected altitudes
- expected locations for each altitude
- expected amount and percentage of time spent at each altitude
- relation of all these to
- critical habitat and range for wildlife at risk

- cultural sites

Response: The EA provides graphics showing expected altitudes and expected locations for each altitude (See figures 2-15 through 2-23). Expected time at differing altitudes will depend on the proficiency of each pilot. Maps are provided designating habitat (figures 3-10 through 3-14) and cultural sites (Figure 3-15 and 3-16).

Comment: The EA should describe and evaluate cumulative impacts from future plans for HAMET. It has been conducted intermittently for eight years, and a source with Army contacts told me there are plans to continue that at some point after October 2011.

Response: The Army is only requesting the use the six LZs for 20 days in October 2011. Additional HAMET training is not anticipated at this time.

Comment: 2.6 25th CAB Safety Record [July EA p. 2-7]

Information from Sierra Club comments on safety for the April EA was not added. How do 25th CAB procedures differ from those used in the HAMET crash in Colorado last year? Excerpts below are from the AR-15-6 Investigation Findings and Recommendations for Accident of Aircraft #09- 05578 re. the June 30, 2010 crash. Page numbers refer to the enclosed PDF of the complete report. "The ad hoc command and control of the HAMET training program contributed to the delay in discovering that a crash occurred, and recovering the crash victims in a timely manner" [PDF p. 6] One crash victim "attempted to transmit mayday calls on two separate frequencies. Since he did not get a response, he set it to 'beacon' and put the radio down to pull out his cell phone."

"…it…took nearly four and one-half hours to get the pilot off the crash site and into a position to transport him…the capabilities, locations, and contact information of local rescue services must not be a discovery learning process…" [PDF p. 14]

Response: HAMET training standards are the same regardless of location. No attack helicopters (AH-64 Apaches) or reconnaissance helicopters (OH-58D Kiowa Warrior) will conduct HAMET on Mauna Loa and Mauna Kea LZs.

Comment: Evaluate the safety of the UH-60A Black Hawk in light of the following (discussed with different emphases in the July EA p. C-4). Would Black Hawks used for HAMET be upgraded? "The average age of the UH-60A fleet is approaching 25 years old. The increased operational tempo of the last six years is simply wearing out these older helicopters much faster than the Army had planned." [2-27-08 letter from National Guard Major General Francis Vavala to Congress people, enclosed]

Response: 25th CAB flies updated and upgraded UH-60L and UH-60A+. After each deployment CAB helicopters undergo reset. In reset each helicopter was completely disassembled, rebuilt, upgraded, and flight tested prior to being released back to the CAB. US Army not restained by State budgets like Hawaii National Guard.

Comment: "Twenty two percent of the UH-60A helicopters within the fleet were over 20 years old at the end of FY00 and 66 percent had exceeded their service half life. Increased operational tempo and the technological age of the airframe, components, and systems are adversely impacting the UH-60 resulting in increased O&S costs and decreased reliability and

maintainability. The UH-60 does not have the necessary digital avionics architecture to meet interoperability communication requirements… Current UH-60A/L navigation systems do not provide the precision required to insert troops and equipment during future combat (land and over-water) operations especially in darkness and adverse weather conditions… A Service Life Extension Program (SLEP) was planned for the UH-60 beginning in FY99… In March 2001 the Army received the go-ahead from the Defense Acquisition Board to upgrade its aging fleet of 1,500 UH-60 Black Hawk helicopters to the UH-60M (previously UH-60L+) configuration…" [http://www.globalsecurity.org/military/systems/aircraft/uh-60a.htm]

Response: 25th CAB flies updated and upgraded UH-60L and UH-60A+. After each deployment CAB helicopters undergo reset. In reset each helicopter was completely disassembled, rebuilt, upgraded, and flight tested prior to being released back to the CAB.

Comment: Will the Fatcow Chinook be used? If so, analyze safety in light of this statement: "The Fatcow is a CH-47D with the Extended Range Fuel System [ERFS] II system located in the cargo bay… The ERFS tanks are airworthy when installed, operated, and maintained as described in TM 55-1560-307- 13&P. With this configuration, however, fuel can leak into the cabin and a catastrophic incident can occur in the event of a hard landing or an accident. When the non-crashworthy ERFS tanks are installed, the potential for fires during a crash increases…"

[http://www.globalsecurity.org/military/systems/aircraft/ch-47d.htm]

Response: As described in 2.2, the UH-60 Black Hawk and CH-47 Chinook will be used. No specific mission type training or equipment including Fatcow will be part of HAMET.

Comment: 2.7 Action Alternatives [July EA p. 2-7]

"…conducting HAMET entirely through simulation…was considered briefly but dismissed. Such an alternative would not address purpose and need, because it does not meet the mandatory in air training requirements." [July EA p. 2-7] The EA should explain the apparent contradiction between this and the excerpt below, from AR 15-6 Investigation Findings and Recommendations for Accident of Aircraft #09-05578, August 10, 2010, Commander, 10th CAB, Fort Drum, New York. (PDF enclosed.)

"There are few, foreseeable mission requirements in the theater of Afghanistan which would require Army reconnaissance and attack rotary wing aircraft to land to pinnacles and ridgelines at high altitudes—even in the event of an emergency. Yet, the HAMET program (based on the successful and long established HAATS) focuses almost exclusively on landing helicopters, no matter their mission, type, design, or series, high up in the mountain. Yes, there certainly is a requirement for heavily-laden attack helicopters to take off and land to their normal bases of operations, but the very first page of the HAATS Student Book states: 'This is achieved by creating a four-torque reference system (to be described later in this chapter) used in three flight tasks involving the simulation of maximum gross weight.' Simulating a fully loaded Apache can be done with ease on one's home airfield and at moderate (5- to 8-thousand foot) altitudes by simulating a low maximum torque and preventing the pilot from exceeding that training limit.

Response: Attack type helicopters like the AH-64 Apache are not part of the Hawaii HAMET EA. HAATS is not HAMET. HAATS uses OH-58C and UH-60A helicopters and does not meet any deployment requirements. Additionally the OH-58C is not the OH-58D nor are their missions the same nor are 25th CAB pilots qualified to fly the OH-58C.

Comment: According to the unclassified FORSCOM Deployment Training Guidance For Follow-ON Forces Deploying ISO SWA, dated 01MAY10, P 15.B.7.A., HAMET is an opportunity, not a requirement."

Response: In accordance with the current FORSCOM Predeployment Training Guidance ISO Combatant Commands, dated 01DEC10, P 23, paragraph 1.A(7) OEF units only. Deploying aviation commanders must place special emphasis on aircraft power management and HAMET. The goal for all units is to expose all aircrews to the challenges of high altitude mountain flight. Units must consider crew training and hand-on operations above 6,000 feet MSL. Stand-To! Edition: Tuesday, March 9, 2010. HAMETS facilitates success on the battlefield and increases safety margins by ensuring Army Aviators better understand the aerodynamics and atmospheric effects on their aircraft, at altitudes up to 14,000 feet.

Comment: "HAMET is not an expansion of PTA or any of its facilities." [July EA p. 2-8]

There would be no change in maps or structures, but there would be a significant change in actions and impacts.

Response: HAMET will not expand the current PTA foot print. The HAMET EA considers the additional training requirement for the CAB that consists of landing on six small areas (150 x150 ft) of land on Mauna Kea and Mauna Loa for a 20-day period in October.

Comment: "Figure 2-5. Simulated vertical view of HAMET flight from an RP to an LZ." [p. 2-10]. The graphic lacks detail and clarity. See comment for 2.1 HAMET Training Overview p. 2-2., section 2.7.2.3 HAMET Conduct [July EA p. 2-10]

Response: The Army feels that Figure 2-5 provided the detail and clarity required to present the information intended.

Comment: Will helicopters use flares, tracers, lights, or (as reported by observers of Colorado HAMET) strobe lights?

"Conditions the Board [of Land and Natural Resources] adds could involve… the public (e.g., implementing temporary access restrictions or closure of areas)." [July EA p. 2-12] This seems to suggest that BLNR, not the Army, will be to blame for any restrictions, and precludes EA analysis of impacts. As the party most familiar with the action, the Army should spell out recommended restrictions and evaluate the impacts.

Response: Helicopters will not be using flares, tracers or strobe lights.

Comment: "Pilots would execute multiple touch-and-go, hover, short-stop approach, full-stop landing, and elevated (100–500 ft. [30–152 m]) reconnaissance over the high-altitude LZs." [July EA p. 2-15] See comment for 2.1 HAMET Training Overview p. 2-2.

Response: See response to the referenced comment

Comment: 2.7.2.4 LZ Selection

"The proposed LZs…are approximately 150 by 150 ft. (46 by 46 m)." [July EA p. 2-11] "I have guidance from the military about Chinook landing sites. They recommend that a rectangular area

measuring 100m x 100m, cleared to ground level and free from immovable objects that are more than 2 feet high should be provided for these aircraft." [2-16-11 e-mail from Helicopter Adviser Peter Rover to Cory Harden, enclosed. Rover is cited as the author of a report on a helipad prepared in 2010 for Southampton University Hospital, U.K.,

http://www.southampton.gov.uk/moderngov/mgConvert2PDF.aspx?ID=2964] See also comments for p. 4-3.

Response: See response to the referenced comment

Comment: 2.7.2.5 Use of LZs [July EA p. 2-15]

"Flight paths of this alternative [Alternative 1] avoid designated wilderness areas and are designed to avoid close proximity to Kipuka 'Ainahou Nene Sanctuary…and fly high enough over palila critical habitat as not to disturb palila…" [July EA p. 2-16] But Figure 2-14 shows LZ-3 just outside the Nene Sanctuary. Re. palila see comments for. 2.1 HAMET Training Overview p. 2-2, and for p. 2-10.

Response: The Army will stay above the PCH outside of the PTA. Unless severe weather and safety conditions dictate a need to fly at 2,000 feet AGL, helicopters will maintain an altitude of 3,000 feet AGL when they are over the core palila population. As stated in 4.6.3, Surveys in March 2011 to identify potential wildlife species that could be impacted by noise from helicopters were conducted within the area formed by a 2,000-ft (610-m) radius from the center of the LZ based on the 80-dBA buffer. On Mauna Kea and Mauna Loa, many of the wildlife species' ranges are not located within the helicopter flight paths, but bird and bat species have been known to cross into the specified areas. In addition, the 2,000-ft (610-m) AGL is outside of the flight paths of many birds and bats. It has been noted from viewing birds from helicopters in flight that birds will change their flight paths to avoid the helicopters (Peshut 2011b). The nene were not found near the LZs. The 'io was not found near the LZs, and it is not anticipated that they will be there as there is nothing for them to eat.

Comment: 2.7.7 Other High-Altitude Training Sites [July EA p. 2-18]

"Another possible offsite location for HAMET that the 25th CAB considered is at Fort Carson in Colorado Springs, Colorado…most of the 25th CAB is going to conduct a majority of the HAMET requirement at Fort Carson…" [July EA p. 2-18] Why was this alternative—now being used-- not mentioned in the April EA?

Response: The proposed action in the July EA requires evaluation of Fort Carson as an alternative.

Comment: [with HAMET done at Fort Carson] "Aircrews will spend up to an additional 45 days away from Families prior to the upcoming deployment; and helicopters and maintenance crews will spend additional time on the mainland…" [July EA p. 2-18] See comment for p. 1-3.

Response: See response to the referenced comment

Comment: Figures 2-15 through 2-20. See comment for 2.1 HAMET Training Overview p. 2-2.

Response: See response to the referenced comment

Comment: 3.6 Biological Resources [July EA p. 3-22 ff.]

The EA should evaluate impacts from loss of potential habitat which might enhance survival of endangered species, even if they are not using the habitat now.

Response: As stated in section 4.6.3, wildlife and vegetation species under the flight paths are not anticipated to be impacted from HAMET activities.

Comment: Below are listed several at-risk species that may occur below flight paths (per Table 3-5 on p. 3-24) and may breed/ nest in October, when the training is planned.

"HAMET Phase II…will be conducted during October 2011." [July EA p. 2-10]

ʻAke ʻake or Band-rumped storm petrel (Oceancodroma castro) candidate for Federal endangered species list on State endangered species list "In Hawaiʻi, eggs are laid between May and June, and nestlings fledge in October."

[http://www.state.hi.us/dlnr/dofaw/cwcs/files/NAAT%20final%20CWCS/Chapters/Terrestrial%20Fact%20Sheets/Seabirds/band-rumped%20storm%20petrel%20NAAT%20final%20!.pdf]

Response: In May 2011, the USAG-HI received comments from the United Sates Fish and Wildlife Service (USFWS) on our April 2011 EA (which proposed a larger action in terms of time and flights). USAG-HI was asked to re-evaluate the proposed flight path, provide survey information and methodology for biological investigations, and re-evaluate using the landing zones (LZs) if Hawaiian petrels or the band-rumped storm petrels are detected in the areas near the LZs.

Since May, we have re-valuated the potential for impact to resources from the flight path depicted in both the April 2011 and July 2011 EAs. In addition, our staff biologists conducted site specific surveys for the presence of threatened and endangered species and assessed the potential for impacts to these resources. Memoranda For Record, that detailed the level of effort conducted to address the concerns of both the USFWS and the State of Hawaii Division of Forestry (DOFAW), were provided to both organizations. An electronic copy of these technical memoranda will be provided to you via email by the time you receive this letter.

As a result of previous discussions between Dr. Peter Peshut, Pohakuloa Training Area (PTA) biologist and Dr. Jeff Zimpfer, United States Fish and Wildlife (USFWS) staff member, and the findings from our biological assessments, our test flights, and the EA process, the Army has made a determination that the proposed action will have no significant effect on listed species or critical habitat.

Comment: `Akiapola`au or Hammerhead bird (Hemignathus munroi) On Federal and State endangered species lists "Two nests of the `Akiapola`au have been found, one in October and one in February… `Akiapola`au may have a prolonged breeding period." [http://www.state.hi.us/dlnr/consrvhi/forestbirds]

Response: See preveous comment. As stated in 4.6.3, wildlife and vegetation species under the flight paths are not anticipated to be impacted from HAMET activities.

Comment: Amakihi bird (Hemignathus virens virens) Federal species of special concern

State –no listing "On the island of Hawai'i, their breeding season extends from late October through August."

[Kern, Michael and Charles van Riper, Altitudinal variations in the nests of the Hawaiian honeycreeper Hemignathus virens virens, The Condor 86:443-454, http://www.jstor.org/pss/1366825]

Response: The Amakihi bird is federally listed but not a state-listed species on the island of Hawaii. It is not known to occur on the island of Hawaii. See Table 3-5.

Comment: Hawai'i `Elepaio (Chasiempis sandwichensis) Federal species of special concern State –no listing "Nesting dates range from January to August depending on the population, and even between years (perhaps in response to rainfall)." [http://birds.audubon.org/species/elepai]

Response: The Hawaii Elepaio bird is federally listed but not a state-listed species on the island of Hawaii. It is not likely to occur on the island of Hawaii. See Table 3-5.

Comment: 'Io or Hawaiian Hawk (Buteo solitarus) on Federal and State endangered species lists "Although the complete biology of this species is not known, the breeding season runs from February through August and possibly September, with pairs having their own schedule that may be dependent on locality." [http://www.hilozoo.com/zoo_facts_animals_birds.php]

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are provided as an appendix to the final EA.

Comment: Nēnē or Hawaiian goose (Branta sandvicensis) on Federal and State endangered species lists "…breeding season, extending from October through February…" [http://www.state.hi.us/dlnr/consrvhi/forestbirds]

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2001a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are provided as an appendix to the final EA.

Comment: `Ope`ape`a or Hawaiian Hoary Bat (Lasiurus cinereus semotus) on Federal and State endangered species lists "It is believed that mating occurs between September and December…" [http://www.state.hi.us/dlnr/dofaw/cwcs/files/hawaiian_hoary_bat.pdf

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys

(Peshut and Schnell 2011a, 47 pp).. These documents are provided as an appendix to the final EA.

Comment: Palila bird (Loxioides bailleui) on Federal and State endangered species lists "Breeding season begins in March and continues through August…. young…remain in the nest for up to 31 days before fledging." [http://www.state.hi.us/dlnr/consrvhi/forestbirds]

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are provided as an appendix to the final EA.

Comment: 'Ua'u or Hawaiian petrel (Pterodroma sandwichensis) on Federal and State endangered species lists 'Most eggs are laid in May and June and most birds fledge by December."
http://www.state.hi.us/dlnr/dofaw/cwcs/files/NAAT%20final%20CWCS/Chapters/Terrestrial%20Fact%20Sheets/Seabirds/Hawaiian%20petrel%20NAAT%20final%20!.pdf]

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are provided as an appendix to the final EA.

Comment: "The flight path is also over a portion of palila critical habitat…" [July EA p. 3-22]

See comment for 2.1 HAMET Training Overview p. 2-2. {added below}

2.1 HAMET Training Overview [July EA p. 2-2]

"…tasks…VMC approach (typically 10 degrees) or to a 3-ft. hover…Abort and go-around…climbout…

100-500 ft.…reconnaissance over high-altitude LZs…" [July EA p. 2-2]

The EA should have maps/ graphics showing

- expected altitudes
- expected locations for each altitude
- expected amount and percentage of time spent at each altitude
- relation of all these to
- critical habitat

Response: See response to the referenced comment.

Comment: "In February, March, May and June 2011, presence surveys for vegetation, birds, bats, and arthropods were conducted at the proposed LZs…" [July EA p. 3-23] It appears Cory Harden's comments for the April EA were not addressed --"Helicopters will fly 200 feet about ground level in a 6560-foot (1 ¼ mile) diameter circle around the LZs [EA p. 2-9]…But surveys conducted by the Pohakuloa Natural Resources Office were within a square only one-tenth that size for plants, bat habitat, and wekiu bugs. Surveys were within a circle only two-thirds that size for birds. [EA p.A-4 to A-5]"

Response: Concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are provided as an appendix to the final EA.

Comment: "There are no identified active petrel breeding colonies near (within the 2000-ft radius survey area) the Mauna Kea and Mauna Loa LZs…" [July EA p. 3-31 and 4-14] This information from the April EA should be included: " The March 2011 presence survey conducted at the Mauna Loa LZs found evidence of a potential colony within 350 ft.…of the Mauna Loa LZ.. suspected Hawaiian petrel nesting sites are within the 2,000-ft… buffer of the Mauna Loa and Mauna Kea LZs." "[April EA p. 3-32]

Response: Concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are provided as an appendix to the final EA.

Comment: "In February, March, May and June 2011, surveys for birds, bats, arthropods, and vegetation within survey areas up to 2,000-ft (610-m) radius of LZs on Mauna Kea and Mauna Loa were conducted to determine whether significant resources were present, and no significant resources were found at those locations…" [July EA p. 3-37]

Were the species likely to be present at this time of year, in the same numbers as in October?

Response: Concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are provided as an appendix to the final EA.

Comment: 3.7.1 Cultural Overview [July EA pp. 3-41 to 42] "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain." [July EA p. 3-42]

This and other additions to 3.7, the Cultural Resources section, are commendable. Unfortunately, there is still no response to Cory Harden's comments on this section for the April 2011 and December 2010 EAs.

Response: We have contacted SHPD, USFWS, and the Sierra Club and responded to the comments provided by each. The comments are addressed in the EA. The Army considered all comments and addressed relevant concerns.

Comment: 'Perhaps because it is an active volcano that erupted as recently as 1984, literature searches reveal much less cultural information about Mauna Loa than either Mauna Kea or the Saddle Region…" [July EA p. 3-50] This was not corrected despite the January 31, 2011 letter by Theresa Donham of the State Historic Preservation Division. It says Donham is incorrectly cited as a reference and "Common sense would indicate that there is less information for Mauna Loa because there have been fewer actions triggering the need for impact assessments…" [July EA p. B-80]

Response: This statement was corrected in the final EA.

Comment: 4.3 Air Quality [July EA p. 4-3] "Figure 4-3 is a photo of a Black Hawk that is hovering 12 in.(30 cm) from the ground on LZ-5…The photo shows no dust visible." [July EA p. 4-4] Would no dust be visible for a Chinook?

Response: The determination as to whether dust would be visible for a Chinook is dependent on several factors including the particle size of sand/dust, the moisture content, and the wind speeds across LZ. At times the wind speed is greater than the helicopter rotor wash.

Comment: The EA should include more specific information on rotor wash and vortices--windspeed, size and shape of affected area, and effects on different weights of objects on the ground—based on independent studies. That information, plus the following statements, should be analyzed in relation to biological resources, noise, and safety, as well as air quality.

The rotor wash from the CH- 47 [Chinook] presents a safety hazard to smaller aircraft." [http://www.globalsecurity.org/military/systems/aircraft/ch-47d.htm]

"…a DAILY analysis of the Army's aviation mishap database dating back to the 1970s shows that Chinooks and AH-1 Cobras are the two leading helicopters for downwash-related incidents. The review of about 100,000 records identified 65 mishaps involving rotorwash or downwash as a probable or possible cause, with the Chinook being the named culprit in about two dozen of them." [Rotor-wash concerns buffet Chinook, Michael Fabey/Aerospace Daily & Defense Report, Aviation Week, copyright 2011, [http://www.aviationweek.com/aw/jsp_includes/articlePrint.jsp?headLine=Rotorwash%20concerns%20buffet%20Chinook&storyID=news/5CSAR060508.xml]

"…a DAILY analysis of Army aviation incidents dating back to the late 1970s and into the first years of the current conflicts in Iraq and Afghanistan shows about two dozen cases of injury or damage were related to Chinook downwash…

* July 24, 1993: "The rotor wash from the CH-47 pushed the OH-58 three feet to the right, then picked it up onto the right skid, it then pivoted 35 to 45 degrees to the left deflecting the tailboom a total of 7 to 8 feet." The entire left side of the OH-58 was blasted with dirt, dust and rocks. The damage to the aircraft included: sand and small rocks got into the transmission compartment,

injector tubes, swirltubes engine inlet and engine exhaust collector. The exposed tail rotor driveshaft hangar bearings required purging to clean out the dirt and dust. An engine mechanic determined that the engine requires disassembly and multiple inspections.

*March 25, 1996: "The rotor downwash from the CH-47 caused the door of the OH-58 to blow off."

*Jan. 8, 2000: "A heavily loaded CH-47 picked up to a hover upwind of a parked UH-60A. The blades of the UH-60A began to spin and flap up and down causing damage to the spindle." The downwash also damaged buildings:

* June 4, 1990: "Aircraft flew over Bajio (Panama) and portion of roof collapsed. Four service members were reported to be struck by flying debris with one of four soldiers admitted to hospital for two days of observation. Other service members were treated with minor injuries." * March 25, 1996: CH-47D helicopter was on final approach to soccer field at Kankintu, Panama, carrying a 15,000-pound external load. Resulting rotorwash lifted a poorly secured roof from an adjacent shed despite every effort by aircrew to land as far away as possible avoiding overflight of the building."

Response: The EA analyzed rotor wash based on published data and operational information. The Army believes that this information is accurate and representative of actual conditions.

Comment: And the rotor wash has been associated with injuries:

* July 5, 1992: "Soldier on ground was injured when he was hit on the head by the cross beam of the camouflage netting which was blown down by the CH-47D. The injury to the soldier required three stitches to close the wound."

* Jan. 5, 1999: "The rotor wash from the CH-47D knocked the injured personnel down. The injured personnel tried to break his fall with his hand and injured his wrist." [Chinook Downwash Moved Other Helos, Blew Off Roofs, Michael Fabey/Aerospace Daily & Defense Report , Aviation Week, Jul 3, 2007,http://www.aviationweek.com/aw/generic/story_generic.jsp?channel=defense&id=news/CHIN070 307.xml&headline=Chinook%20Downwash%20Moved%20Other%20Helos,%20Blew%20Off%20 Roofs]

"I have guidance from the military about Chinook landing sites. They recommend that a rectangular area measuring 100m x 100m, cleared to ground level and free from immovable objects that are more than 2 feet high should be provided for these aircraft. The AUW of a Chinook is over 23 tonnes and its overall length, which being a twin rotor machine is equivalent to its effective rotor diameter, is just over 30m. In still air it is reckoned that down wash will dissipate into the ambient wind at a range of about 3 x the rotor diameter away from the edges of the rotor disk. This means that the down wash effect will be felt up to about 90m from the edges of the rotor. If there is any wind blowing, the effect will extend further down wind and be reduced up wind depending on the wind strength. The maximum velocity of the down wash is equivalent to hurricane force so, generally, the Chinook should not be allowed anywhere near civilization!

The Black Hawk is a 10 tonne helicopter with a rotor diameter of about 16.5 m . It will generate a mass down wash equivalent to 10 tonnes which will dissipate into the ambient wind flow at a range of about 50m from the rotor edges. The design of the blade tips gives rise to a particularly vicious type of blade tip vortex which can displace light building cladding and any loose objects within this range of 50m at least. The duration of the effects will depend on how long the pilot holds a hover; if the pilot does not delay but gets on with the landing the effect will be felt for about a minute to a minute and a half." [2-16-11 e-mail from Helicopter Adviser Peter Rover to Cory Harden, enclosed. Rover is cited as the author of a report on a helipad prepared in 2010 for Southampton University Hospital, U.K., http://www.southampton.gov.uk/moderngov/mgConvert2PDF.aspx?ID=2964]

"The Black Hawk, which…has a smaller rotor diameter at 53 ft. (16 m), begins to affect a localized environment when the pilot lowers it to 79 ft. (24 m) AGL." [July EA p. 4-4] Explain the apparent contradiction with the statement and graph below, both from the same source: "If the Black Hawk were hovering, it would have to be well over 160 feet to achieve a rotor wash less than 30 mph."

[Rotor Wash, U.S. Department of Agriculture Forest Service Aerial Delivery System User Information, revision date 1/26/05, http://www.fs.fed.us/outernet/rm/fire/pubs/pdfpubs/user_gd/ug-15.pdf]

Response: Personnel will not be located on the LZs during operation. During the reconnaissance flyover, pilots would visually inspect the LZ to ensure landing would not create an unreasonable risk to human health or safety. This procedural step would ensure that unauthorized personnel or wildlife are not exposed to the hazards associated with the training exercises.

Comment: 4.6 Biological Resources [July EA p. 4-11] "…a mitigation measure…calls for inspecting and cleaning the aircraft as required, if invasive species are identified." [July EA p. 4-13] This should not have been watered down compared to April EA, which says "a mitigation measure…calls for cleaning the aircraft." [April EA p. 4-13]

Response: The Army feels that the mitigation measures as defined in the July EA are appropriate.

Comment: "The potential impacts of noise to the endangered and threatened wildlife species were determined to be insignificant because the noise generated by HAMET operations at LZs will be intermittent and of short duration (generally less than 10 minutes)…" [July EA p. 4-13] Surely there will be more than 10 minutes of noise from all maneuvers-- descent, reconnaissance from 100-500 feet up, short-stop approach, abort, go-around, climb-out, full-stop landing, multiple touch-and go, landing on uneven surfaces and pinnacles, hovering 3 feet up, and flying at 200 feet in a 1 ¼ mile diameter circle centered on each LZ. [see July EA pp. 2-1 to 2, 2-9, and 2-15]

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the draft EA. In addition concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are provided as an appendix to the final EA.

Comment: It appears Sierra Club comments on noise for the April EA were not considered.

Response: All substantive comments that were provided in the earlier draft were addressed in this EA.

Comment: "Surveys for petrels were conducted at all LZs in March and June 2011." [July EA p. 4-14] See comments for p. 3-23. [Here are the comments for 3-23]

"In February, March, May and June 2011, presence surveys for vegetation, birds, bats, and arthropods were conducted at the proposed LZs…" [July EA p. 3-23]

It appears Cory Harden's comments for the April EA were not addressed --"Helicopters will fly 200 feet about ground level in a 6560-foot (1 ¼ mile) diameter circle around the LZs [EA p. 2-9]…But surveys conducted by the Pohakuloa Natural Resources Office were within a square only one-tenth that size for plants, bat habitat, and wekiu bugs. Surveys were within a circle only two-thirds that size for birds. [EA p. A-4 to A-5]"

"There are no identified active petrel breeding colonies near (within the 2000-ft radius survey area) the Mauna Kea and Mauna Loa LZs…" [July EA p. 3-31 and 4-14]

This information from the April EA should be included: " The March 2011 presence survey conducted at the Mauna Loa LZs found evidence of a potential colony within 350 ft.…of the Mauna Loa LZ.. suspected Hawaiian petrel nesting sites are within the 2,000-ft… buffer of the Mauna Loa and Mauna Kea LZs." " [April EA p. 3-32]

"In February, March, May and June 2011, surveys for birds, bats, arthropods, and vegetation within survey areas up to 2,000-ft (610-m) radius of LZs on Mauna Kea and Mauna Loa were conducted to determine whether significant resources were present, and no significant resources were found at those locations…" [July EA p. 3-37]

Were the species likely to be present at this time of year, in the same numbers as in October?

Response: Concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are provided as an appendix to the final EA.

Comment: "Palila…Mitigation measures are in place to lessen the impact of the noise by maintaining an altitude of at least 2,000 ft. (610 m) AGL while flying outside of the PTA and at locations near the designated LZs…" [July EA p. 4-14] But Figure 3-12 shows checkpoints, where helicopters would start descending, above palila critical habitat.

Response: Checkpoints are waypoints along the flight path. The release points where the aircraft begin to descend to the LZs are approximately 1000 m from the respective LZs and are shown in Figure 2-5 and on paragraph 2.7.2.2 of the EA. The release points are not shon on the maps, only checkpoints. 1000m from the LZs along the flight paths on Mauna Kea is well outside the Palila critical habitat.

Comment: "…measures are in place to inspect and clean equipment and helicopters if necessary to avoid the transportation of nonnative species…" [July EA p. 4-14]

See comments on this topic for p.4-13.

Response: See response to referenced comment.

Comment: 4.11 Noise [July EA p. 4-31] 4.12 Visual and Aesthetic Resources [July EA p. 4-50] 4.13 Human Health and Safety Hazards [July EA p. 4-58] These are major concerns for many citizens, and Sierra Club made extensive comments on these issues for the April EA, but apparently no changes were made.

Response: All substantive comments that were provided in the earlier draft were addressed in this EA.

Comment: Re. safety, see also comments for p. 2-7. What are plans for helicopters "socked in" at landing zones by one of the sudden weather changes common on mountains?

Response: As stated in section 3.13, The Army has procedures (Army regulation 95-1) in place to investigate and plan for possible hazards. As part of flight operations, a risk assessment is completed by a commanding office and addresses general and specific hazards for each flight mission. Pilots are briefed on the risk assessment, hazards, mitigative actions, and emergency procedures during preflight briefings prior to the start of each training mission.

Comment: Appendixes should include the 5-23-11 comments from U.S. Fish and Wildlife Service.

Response: The comments received from the USFWS on the July EA are included in the final EA.

Comment: Memorandum by Peter Peshut, Program Manager, Natural Resources Office, PTA—Appendix A "Botanical surveys were conducted 23 February 2011…and 24 February 2011…" [July EA p. A-4] "Surveys to assess potential available treeland roosting habitat and potential foraging habitat for the federally-listed Hawaiian Hoary Bat were conducted 02 March 2011…and 03 March 2011…" [July EA p. A-5] Would results have been different in June?

Response: Concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are provided as an appendix to the final EA.

Comment: "Several bird species protected under the Migratory Bird Treaty Act were identified at the LZs…Overall densities of these birds within the survey areas were extremely low. These bird species are expected to vacate the immediate vicinities of the aircraft and LZs if present during HAMET operations." [July EA p. A-6] This could be disruptive to feeding, raising young, and breeding.

Response: Concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp),

the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are provided as an appendix to the final EA.

Comment: "The spread of invasive species within the project area will be reduced by inspecting and cleaning the exterior of the HAMET aircraft at the Bradshaw Army Air Field prior to training flights…Helicopters will be inspected for invasive arthropod and plant species prior to each mission, and cleaning protocols will be followed if invasive species are identified." [July EA p. A-7] This seems to contradict p. 4-13 and p. 4-14—see comments for those pages.

Response: The pages referenced note that the mitigation measures call for inspecting and cleaning aircraft as needed. This is consistent with the statement referenced.

Comment: "HAMET operations will produce ~10 minutes of noise disturbance per LZ landing event…" [July EA p. A-7] See comments on noise for p. 4-13.

Response: See Response to referenced comment.

Comment: Appendix B—4-15-11 letter from Douglas Mulbury of the Army to William Aila of DLNR [July EA p. B-3 to 4] "Based upon discussions with the pilots, rotor wash begins to affect the ground once the helicopters have reached an altitude of 90 feet above ground level. This altitude will be reached at 100 meters from the center of the landing zone. In addition, most of the effects of rotor wash on the ground are felt on liftoff.... Thus, the overall acreage for the six discontinuous APEs is 14.8 acres."

No supporting evidence is cited except "discussions with the pilots".

Response: The reference to grounds affect is based on pilot operating experience.

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Kekoa Harman
kekoaharman@gmail.com

Dear Mr. Harman:

Thank you very much for your comments, set forth in your letter dated August 24, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are enclosed.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Comment: I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the Army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an environmental impact statement (EIS) is not required.

Comment: Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impact levels were based on federal and state requirements, which mandate the analyst to consider the context and intensity of potential impacts. Context normally refers to the setting, weather local or regional, and intensity describes the severity of the impact. The Army feels that the impact levels have been appropriately assessed.

Comment: In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA.

Response: The document has been reviewed and re-reviewed and we have done our best to ensure the grammar is correct. The Army apologizes if any grammatical errors may still exist. The Army's proposed action has changed and the State of Hawaii required compliance with Hawaii Revised Statutes (HRS) Chapter 343, therefore we are required to re-issue an EA in compliance with the law.

Comment*:* The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?"

Response: In the July EA, the Army modified the proposed action. With the modification of the proposed action, the Army has re-analyzed the potential impacts.

Comment: Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis.

Response: The state of Hawaii requested that the Army comply with Hawaii Revised Statutes (HRS) Chapter 343. Compliance with HRS Chapter 343 was not an afterthought. By complying with the National Environmental Policy Act (NEPA) we complied with a vast majority of HRS Chapter 343. In doing so, the Army needed to insert that we complied with HRS Chapter 343 in the document as well as responding to all comments that we have received.

The Army relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

Comment: Why, if the Army claims that "analyses did not indicate the need for an environmental impact statement" did you require this many attempts in reaching a FONSI?

Response: The proposed action included in the EA issued in December 2010 provided for a larger action. The EA issued in April 2011 addressed the comments raised during the December 2010 EA review period and clarified our proposed action. The EA issued in July 2011 is based on the April 2011 EA and incorporates HRS Chapter 343 requirements based on the State of Hawaii's request. Draft EA's published since December 2010 analzyed reduced proposed actions, thus requiring the Army to inform the public and publish a revised EA.

Comment: Even after three attempts at a FONSI, the analysis is still lacking.

Response: The Army has thoughtfully considered all likely potential impacts. Several dozen technical experts have spent many hundreds of hours researching and analyzing potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

Comment: The alternatives considered do not meet your stated purpose to recognize Army environmental and social stewardship responsibilities within the affected region.

Response: All alternatives considered meet the stated purpose and are in keeping with the Army's mission, environmental and social stewardship responsibilities.

Comment: Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii.

Response: Alternatives were evaluated to determine if they could meet the purpose and need. The alternatives evaluated were not limited to Hawaii.

Comment: The alternative 5 for other high-altitude training sites on the CONUS is prematurely eliminated and should have been carried forward for further analysis. This alternative should be fully considered in an EIS.

Response: Alternative 5 did not meet purpose or need of training up to 90 pilots that cannot train elsewhere in the time from October to deployment so it was screened out. For these individuals whom the training is primarily directed, it is not possible to do the training anywhere else.

Comment: Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the Army is not qualified to conduct a legitimate impact analysis.

The Army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture.

Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the Army catastrophically fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.

Response: The Army does understand the sacredness of wahi pana (Section 3.7.2.1). Based on the information that has been gathered, the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor has the community been properly consulted. Had the cultural impact assessment been

completed properly, impacts to cultural resources would have been identified as significant and unmitigable.

Response: The United States Army Garrison, Hawaii (USAG-HI) relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

Through our consultations and EA process, we were unable to identify and consult with individuals that have genealogical ties (or attachments) with knowledge of the landing zone areas potentially affected by the proposed action.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
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Comment: Aside from photographs taken on a day outing to these LZs what efforts have been put into the interpretation of the sites identified? The identified sites are extremely close in proximity to each LZ and located on the tops of small puʻu. The cairns atop each puʻu are within 20 feet of the LZs.

Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the Army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times.

Response: The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those marked sites during pilot training.

Comment: Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the Army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources.

Response: The Army assessed the sites to the extent possible based on the information gathered.

Comment: It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36 CFR part 800, let alone meet the substantive portion of the law.

Response: In addition to the photos, the Army conducted physical surveys, and extensive research to meet the regulatory requirements of 36 *Code of Federal Regulations* (CFR), part 800. In addition, the information gathered was used to support consultation activities.

Comment: There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the Army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas.

Response: The Army assessed the sites to the extent possible within the area that may be affected by the training. These are the same aircraft that have used these LZs in the past. Requests to the State to test the mounds in order to investigate the nature of these features were denied.

Comment: The substantive portion of Section 106 of the National Historic Preservation Act of 1966 (as amended) mandates that the Army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each pu‘u in this project.

Response: The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawai‘i.

Response: The Army does understand the spiritual and cultural heritage of Hawaii. However, based on the information that has been gathered the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians.

Comment: The lack of information does not instill in me confidence that the Army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

Comment: It is difficult to comprehend how the Army proposes to protect cultural resources without understanding what they are. More respect of the Army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those sites during pilot training.

Comment: While the Army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

Response: The Army used outside information to assist us in the development of our EA to get a comprehensive look at cultural impacts. This information was used to help guide our surveys and our consultation efforts.

Comment: While the Army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii?

Response: The Army recognized that conducting the training comes at a cost. This cost is analyzed in the EA and mitigations have been put in place to limit the costs to the People and resources of Hawaii.

Comment: Native Hawaiians have been unjustly targeted for the Army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

Response: The EA analyzed environmental justice in accordance with "executive order 12898 'Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Using this criteria, no impacts were identified.

Comment: The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape.

Has the Army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

Response: Noise modeling was conducted in accordance with Army Regulation 200-1 for assessing effects of helicopter noise on land uses and wildlife (Section 4.11 page 4-31). The noise monitoring was conducted in accordance with the "American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 2: Measurement of Long-Term, Wide Area Sound" (ANSI S12.9-1992).

The Army did consult with the National Park Service. Their comments and our responses are included in the appendices of the final EA.

Comment: The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut, 7 pp.), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell, 47 pp.), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell, 4 pp.). These documents have been added as an appendix to the final EA.

Comment: This EA lacks impact analysis on transportation between the islands of O'ahu and Hawai'i.

Response: HAMET would be integrated into other scheduled flight training (Section 2.1, page 2-1). Transportation between the islands of Oahu and Hawaii are a part of the existing scheduled training. The EA analyzes the potential impacts associated with the additional HAMET training activities.

Comment: Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impacts have been analyzed and mitigations proposed to support a finding of no significant impacts.

Comment: I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an EIS is not required.

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Les Ihara, Jr.
Hawaii State Senator, 9th District
Majority Policy Leader
senihara@Capitol.hawaii.gov

Dear Senator Ihara:

Thank you very much for your comments, set forth in your email dated August 22, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). We are pleased to have the opportunity to respond to your concerns directly.

Regarding the noise concerns of your constituents who reside in neighborhoods along helicopter routes and the travel of helicopters from Schofield Barracks to the HAMET training areas, HAMET would be integrated into other scheduled flight training (Section 2.1, page 2-1). Transportation between the islands of Oahu and Hawaii are a part of the existing scheduled training. There will be no additional helicopter traffic between Oahu and Hawaii due to proposed HAMET. The EA analyzes the potential impacts associated with the proposed HAMET training activities.

Regarding your request that Schofield-based helicopters avoid routes over residential areas (particularly Kaimuki and Maunalani Heights) on Oahu to limit noise disturbances in residential areas, we understand your concern. Unfortunately it is not within the scope of this EA, which is concentrated on training on Mauna Kea and Mauna Loa. Transportation between the islands of Oahu and Hawaii are a part of the existing scheduled training.

With regard to addressing your noise concerns on Oahu in general, requests can be sent to the Public Affairs Office at 742 Santos Dumont, WAAF, Schofield Barracks, HI 96857, they will forward it to the appropriate contact for further consideration.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Clint Kalaola
Kelai00@yahoo.com
P.O. Box 235109
Honolulu, Hawaii 96823
(808) 330-5858

Dear Mr. Kaloala:

Thank you very much for your comments, set forth in your email dated August 23, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The Army's response to your comments is enclosed.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Response to Comments

Response to Comments

Comment: I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the Army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an environmental impact statement (EIS) is not required.

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Comment: In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA.

Response: The document has been reviewed and re-reviewed and we have done our best to ensure the grammar is correct. The Army apologizes if any grammatical errors may still exist. The Army's proposed action has changed and the State of Hawaii required compliance with Hawaii Revised Statutes (HRS) Chapter 343, therefore we are required to re-issue an EA in compliance with the law.

Comment*:* The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?"

Response: In the July EA, the Army modified the proposed action. With the modification of the proposed action, the Army has re-analyzed the potential impacts.

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Comment: Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii.

Response: Alternatives were evaluated to determine if they could meet the purpose and need. The alternatives evaluated were not limited to Hawaii.

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Comment: Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the Army is not qualified to conduct a legitimate impact analysis.

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Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the Army catastrophically fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.

Response: The Army does understand the sacredness of wahi pana (Section 3.7.2.1). Based on the information that has been gathered, the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

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Comment: The substantive portion of Section 106 of the National Historic Preservation Act of 1966 (as amended) mandates that the Army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each pu‘u in this project.

Response: The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawai‘i.

Response: The Army does understand the spiritual and cultural heritage of Hawaii. However, based on the information that has been gathered the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians.

Comment: The lack of information does not instill in me confidence that the Army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

Comment: It is difficult to comprehend how the Army proposes to protect cultural resources without understanding what they are. More respect of the Army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those sites during pilot training.

Comment: While the Army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

Response: The Army used outside information to assist us in the development of our EA to get a comprehensive look at cultural impacts. This information was used to help guide our surveys and our consultation efforts.

Comment: While the Army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii?

Response: The Army recognized that conducting the training comes at a cost. This cost is analyzed in the EA and mitigations have been put in place to limit the costs to the People and resources of Hawaii.

Comment: Native Hawaiians have been unjustly targeted for the Army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

Response: The EA analyzed environmental justice in accordance with "executive order 12898 'Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Using this criteria, no impacts were identified.

Comment: The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape.

Has the Army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

Response: Noise modeling was conducted in accordance with Army Regulation 200-1 for assessing effects of helicopter noise on land uses and wildlife (Section 4.11 page 4-31). The noise monitoring was conducted in accordance with the "American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 2: Measurement of Long-Term, Wide Area Sound" (ANSI S12.9-1992).

The Army did consult with the National Park Service. Their comments and our responses are included in the appendices of the final EA.

Comment: The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut, 7 pp.), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell, 47 pp.), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell, 4 pp.). These documents have been added as an appendix to the final EA.

Comment: This EA lacks impact analysis on transportation between the islands of O'ahu and Hawai'i.

Response: HAMET would be integrated into other scheduled flight training (Section 2.1, page 2-1). Transportation between the islands of Oahu and Hawaii are a part of the existing scheduled training. The EA analyzes the potential impacts associated with the additional HAMET training activities.

Comment: Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impacts have been analyzed and mitigations proposed to support a finding of no significant impacts.

Comment: I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an EIS is not required.

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Mr. Leon Kau
3715 Pukalani Place
Honolulu, HI 96816

Dear Mr. Kau:

We are in receipt of your e-mail dated August 10, 2011. Thank you very much for your comments concerning our draft high altitude mountainous environment training (HAMET) environmental assessment (EA) dated July 2011.

Our 25th Combat Aviation Brigade will not use more than three helicopters at any time on the landing zones (LZ) on Mauna Loa and no more than two helecopiters at any one time on Mauna Kea. Unless severe weather and safety conditions dictate a need to fly at 2,000 feet AGL, helicopters will maintain an altitude of 3,000 feet AGL when they are over the core palila population. The noise impacts at this altitude will only be temporary and should not exceed, in terms of decibel levels, the equivalent of a loud conversation to receptors 2000 feet below.

Army civilian specialists conducted natural resource surveys in the LZ areas as part of our analysis. The survey results did not indicate the presence of fauna or avifauna at the LZ areas. Our pilots will avoid Threatened and Endangered species encountered during flight.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Lauren M. Mauai
mais8401@yahoo.com

Dear Ms. Mauai:

Thank you very much for your comments, set forth in your letter dated August 23, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are enclosed.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Comment: I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the Army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an environmental impact statement (EIS) is not required.

Comment: Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impact levels were based on federal and state requirements, which mandate the analyst to consider the context and intensity of potential impacts. Context normally refers to the setting, weather local or regional, and intensity describes the severity of the impact. The Army feels that the impact levels have been appropriately assessed.

Comment: In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA.

Response: The document has been reviewed and re-reviewed and we have done our best to ensure the grammar is correct. The Army apologizes if any grammatical errors may still exist. The Army's proposed action has changed and the State of Hawaii required compliance with Hawaii Revised Statutes (HRS) Chapter 343, therefore we are required to re-issue an EA in compliance with the law.

Comment*:* The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?"

Response: In the July EA, the Army modified the proposed action. With the modification of the proposed action, the Army has re-analyzed the potential impacts.

Comment: Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis.

Response: The state of Hawaii requested that the Army comply with Hawaii Revised Statutes (HRS) Chapter 343. Compliance with HRS Chapter 343 was not an afterthought. By complying with the National Environmental Policy Act (NEPA) we complied with a vast majority of HRS Chapter 343. In doing so, the Army needed to insert that we complied with HRS Chapter 343 in the document as well as responding to all comments that we have received.

The Army relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

Comment: Why, if the Army claims that "analyses did not indicate the need for an environmental impact statement" did you require this many attempts in reaching a FONSI?

Response: The proposed action included in the EA issued in December 2010 provided for a larger action. The EA issued in April 2011 addressed the comments raised during the December 2010 EA review period and clarified our proposed action. The EA issued in July 2011 is based on the April 2011 EA and incorporates HRS Chapter 343 requirements based on the State of Hawaii's request. Draft EA's published since December 2010 analzyed reduced proposed actions, thus requiring the Army to inform the public and publish a revised EA.

Comment: Even after three attempts at a FONSI, the analysis is still lacking.

Response: The Army has thoughtfully considered all likely potential impacts. Several dozen technical experts have spent many hundreds of hours researching and analyzing potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

Comment: The alternatives considered do not meet your stated purpose to recognize Army environmental and social stewardship responsibilities within the affected region.

Response: All alternatives considered meet the stated purpose and are in keeping with the Army's mission, environmental and social stewardship responsibilities.

Comment: Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii.

Response: Alternatives were evaluated to determine if they could meet the purpose and need. The alternatives evaluated were not limited to Hawaii.

Comment: The alternative 5 for other high-altitude training sites on the CONUS is prematurely eliminated and should have been carried forward for further analysis. This alternative should be fully considered in an EIS.

Response: Alternative 5 did not meet purpose or need of training up to 90 pilots that cannot train elsewhere in the time from October to deployment so it was screened out. For these individuals whom the training is primarily directed, it is not possible to do the training anywhere else.

Comment: Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the Army is not qualified to conduct a legitimate impact analysis.

The Army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture.

Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the Army catastrophically fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.

Response: The Army does understand the sacredness of wahi pana (Section 3.7.2.1). Based on the information that has been gathered, the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor has the community been properly consulted. Had the cultural impact assessment been

completed properly, impacts to cultural resources would have been identified as significant and unmitigable.

Response: The United States Army Garrison, Hawaii (USAG-HI) relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

Through our consultations and EA process, we were unable to identify and consult with individuals that have genealogical ties (or attachments) with knowledge of the landing zone areas potentially affected by the proposed action.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

Comment: Aside from photographs taken on a day outing to these LZs what efforts have been put into the interpretation of the sites identified? The identified sites are extremely close in proximity to each LZ and located on the tops of small pu‘u. The cairns atop each pu‘u are within 20 feet of the LZs.

Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the Army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times.

Response: The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those marked sites during pilot training.

Comment: Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the Army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources.

Response: The Army assessed the sites to the extent possible based on the information gathered.

Comment: It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36 CFR part 800, let alone meet the substantive portion of the law.

Response: In addition to the photos, the Army conducted physical surveys, and extensive research to meet the regulatory requirements of 36 *Code of Federal Regulations* (CFR), part 800. In addition, the information gathered was used to support consultation activities.

Comment: There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the Army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas.

Response: The Army assessed the sites to the extent possible within the area that may be affected by the training. These are the same aircraft that have used these LZs in the past. Requests to the State to test the mounds in order to investigate the nature of these features were denied.

Comment: The substantive portion of Section 106 of the National Historic Preservation Act of 1966 (as amended) mandates that the Army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each pu‘u in this project.

Response: The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawai‘i.

Response: The Army does understand the spiritual and cultural heritage of Hawaii. However, based on the information that has been gathered the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians.

Comment: The lack of information does not instill in me confidence that the Army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

Comment: It is difficult to comprehend how the Army proposes to protect cultural resources without understanding what they are. More respect of the Army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those sites during pilot training.

Comment: While the Army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

Response: The Army used outside information to assist us in the development of our EA to get a comprehensive look at cultural impacts. This information was used to help guide our surveys and our consultation efforts.

Comment: While the Army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii?

Response: The Army recognized that conducting the training comes at a cost. This cost is analyzed in the EA and mitigations have been put in place to limit the costs to the People and resources of Hawaii.

Comment: Native Hawaiians have been unjustly targeted for the Army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

Response: The EA analyzed environmental justice in accordance with "executive order 12898 'Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Using this criteria, no impacts were identified.

Comment: The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape.

Has the Army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

Response: Noise modeling was conducted in accordance with Army Regulation 200-1 for assessing effects of helicopter noise on land uses and wildlife (Section 4.11 page 4-31). The noise monitoring was conducted in accordance with the "American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 2: Measurement of Long-Term, Wide Area Sound" (ANSI S12.9-1992).

The Army did consult with the National Park Service. Their comments and our responses are included in the appendices of the final EA.

Comment: The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut, 7 pp.), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell, 47 pp.), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell, 4 pp.). These documents have been added as an appendix to the final EA.

Comment: This EA lacks impact analysis on transportation between the islands of O'ahu and Hawai'i.

Response: HAMET would be integrated into other scheduled flight training (Section 2.1, page 2-1). Transportation between the islands of Oahu and Hawaii are a part of the existing scheduled training. The EA analyzes the potential impacts associated with the additional HAMET training activities.

Comment: Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impacts have been analyzed and mitigations proposed to support a finding of no significant impacts.

Comment: I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an EIS is not required.

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Mr. T.J. McAniff
oldarmy@mac.com

Dear Mr. McAniff:

Thank you for your comments, set forth in your e-mail dated August 21, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA).

As indicated in the HAMET EA, our Soldiers require the best training they can receive prior to deployment. The use of landing zones on Mauna Kea and Mauna Loa will help achieve this critical need by allowing pilots of the 25th Combat Aviation Brigade to experience wind, weather, and elevation conditions similar to those they will experience when deployed to the mountainous regions of Afghanistan.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 6 2011

Office of the Garrison Commander

Dr. Loyal Mehrhoff
Field Supervisor
Pacific Islands Fish and Wildlife Office
US Fish and Wildlife Service
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaii 96850

Dear Dr. Mehrhoff:

This letter is in response to your letter, dated August 22, 2011, subject: Comments on the Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact for High-Altitude Mountainous Environment Training (HAMET) on Mauna Kea and Mauna Loa, Island of Hawaii. Thank you for your comments. I take this opportunity to respond to your recommendations.

In May 2011 the USAG-HI received comments from the United Sates Fish and Wildlife Service (USFWS) on our April 2011 EA (which proposed a larger action in terms of time and flights). USAG-HI was asked to re-evaluate the proposed flight routes, provide survey information and methodology for biological investigations, and re-evaluate using the landing zones (LZs) if Hawaiian petrels or the band-rumped storm petrels are detected in the areas near the LZs.

Since May, we have re-evaluated the potential for impact to resources from the flight path depicted in both the April 2011 and July 2011 EAs. In addition, our staff biologists conducted site-specific surveys for the presence of threatened and endangered species and assessed the potential for impacts to these resources. Memoranda For Record,that detail the level of effort to address the concerns of both the USFWS and the State of Hawaii Division of Forestry and Wildlife (DOFAW), were provided to both organizations. An electronic copy of these technical memoranda will be provided to you personally via email by the time you receive this letter.

As a result of previous discussions between Dr. Peter Peshut, Pohakuloa Training Area (PTA) biologist and Dr. Jeff Zimpfer, United States Fish and Wildlife (USFWS) staff member, and the findings from our biological assessments, our March 2011 data collection flights, and the EA process, the Army has made a determination that the proposed action will have no significant impact on listed species or critical habitat, and therefore we are not initiating informal consultation at this time.

As suggested, we reconsidered using the orginal flight path to the Mauna Kea LZs that was proposed in our December 2010 EA. Based on comments received, we agreed that the flight path would put us too close to the Mauna Kea Ice Age Natural Area Reserve (NAR) and Mauna Kea State Recreation Area Park. During our December 2010 – January 2011 EA comment response period other agency and groups expressed concern of the close proximity to these resources and requested adjustment. For this reason (also indicated in the July 2011 EA) we analyzed the route in the current EA. Additionaly, after a telephone discussion with your office, the 25th Combat Aviation Brigade (CAB) explored a more direct route which would essentially be a direct ascent from Bradshaw Army Airfield (BAAF) to the Mauna Kea LZs. This route is not permitted due to the airspace requirements above BAAF. Lastly, moving even further west from the current proposed route would put flight routes closer (and possibly over) the Waikii Ranch homes due to the extent of the occupied palila habitat.

The current proposed route, as detailed in the July 2011 EA, puts us over the palila core population but at an elevation that we feel will not adversely disrupt palila behavior patterns and is sufficient to minimize impacts. Moreover, transit time over the occupied critical habitat is less than 1 minute per fly over. However, in order to address your concerns about noise with the use of the Army's preferred flight path, the CAB has indicated they may be able to attain an altitude of 3,000 feet Above Ground Level (AGL) but will still follow the same flight path. Unless severe weather and safety conditions dictate a need to fly at 2,000 feet AGL, helicopters will maintain an altitude of 3,000 feet AGL when they are over the core palila population. Attaining a 3,000-foot AGL would reduce noise levels even further than as stated in the EA.

Pilots and aircrew will be provided mandatory pre-excercise briefings detailing the proposed flight routes, release points, and altitudes they must maintain, as well as safety and emergency requirements/protocols they must follow. The Army is well aware of the overflight and low hovering incidents that had occurred in the past. As part of a programmed upgrade, our helicopters have been equipped with state of the art navigation systems and our traffic controllers have monitoring equipment capable of tracking the progress of each and every flight. If any deviations were to occur the pilots will be notified immediately to correct course adjustments.

The Army, through development of the EA, has reviewed and included within the EA (Section 4.13.3) the potential risk of fire due to an Army helicopter crash. Factors considered in determining whether any alternative would have a significant wildfire ignition potential include the extent or degree to which implementing an alternative would involve the following wildfire ignition issues:

- Historical safety record
- Operation of aircraft at high altitudes
- Occurrence of nighttime training

The aircraft proposed for HAMET would be unarmed for HAMET flights. Onboard HAMET aircraft are two 5 pound ABC fire extinguishers to extinguish fires manually. The

CH-47 and UH-60 have self-sealing primary and auxiliary fuel systems for rotary winged aircraft to reduce the possibility of leakage, fire and explosion during impact.

The potential ignition of a wildfire within the flightpath and training area was analyzed. Based on the methodology and factors considered, the risk would be less-than-significant because the only credible risk of a wildfire would be as the result of a crash within a vegetated area with fuel loads (vegetation) sufficient to carry fire. HAMET flights are considered low risk, according to the 25th CAB Risk Assessment Worksheet and the possibility of a wildfire as a result of a crash was determined to be extremely remote. This conclusion is based on thousands of hours flown and the CAB's historical safety record, that training would be conducted outside of vegetated areas (i.e., at LZs), and that the minimal flight time over vegetated areas is less than 1 minute per flight.

In brief, all of the factors discussed above (proximity to recreation areas, homes, cultural sites, safety recoreds, flight hours without incident, upgrades to and acquisition of new aircraft, mitigations) leads the Army to conclude that our flight route is safe and one that best serves the mission, and the one that will have the least impact on people and the environment.

Please contact me if you should have any concerns or questions. I look forward to working with you to ensure our continued protection of the environment.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 6 2011

Office of the Garrison Commander

Stephanie Nagata
Office of Mauna Kea Management
640 N. Aohoku Place
Hilo, HI 96720

Dear Ms. Nagata:

Thank you very much for your review and consideration of our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA).

We are formally acknowledging your August 25, 2011, e-mail in which you indicated you would not be submitting comments on the July EA.

Thank you again for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 6 2011

Office of the Garrison Commander

Clyde W. Namu'o
State of Hawai'i Office of Hawaiian Affairs
711 Kapi'olani Blvd., Ste. 500
Honolulu, HI 96813

Dear Mr. Namu'o:

Thank you very much for your comments, set forth in your letter dated August 22, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are enclosed.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Responses to Comments

Comment: OHA understands that the USAG-HI has prepared the instant draft EA for the proposed HAMET action by the 25th Infantry Division-25th Combat Aviation Brigade (CAB) as part of its mandatory aviator training in advance of a deployment to Afghanistan in 2012. As part of a three-phase Army helicopter training program, Phase II of the HAMET would utilize three existing helicopter landing zones on Mauna Kea and three existing helicopter landing zones on Mauna Loa.

The right-of-entry would cover the training actions of 90 aviators, who would engage in no more than 180 flight hours of Phase II HAMET over a period of 20 days in October 2011. The training operation would involve UH-60 Blackhawk and CH-47 Chinook helicopters taking off from Bradshaw Army Airfield and elevating to 2,000 feet within the boundaries of the Pohakuloa Training Area (PTA). The helicopters would proceed along a defined flight path from PTA directly to identified release points on the slopes of Mauna Kea and Mauna Loa, before beginning a descent route from the 2,000 foot elevation to the aforementioned landing zones.

At a given landing zone, the helicopters would be on the ground for no more than 10 minutes per landing, with no loading/unloading of personnel onto the helicopters.

OHA seeks clarification as to .the total number of helicopters that may be present on a mountain at a given time. The draft Finding of No Significant Impact/ Anticipated Negative Determination, page 3, states "[n]o more than two aircraft would be in or around the LZs at any given time, and no more than two aircraft would be flying on either mountain simultaneously at the LZ areas." By contrast, the draft EA, page 2-9, states "[t]he maximum number of helicopters training on any mountain at one time would be three."

Response: Our 25th Combat Aviation Brigade will not use more than three helicopters at any time on the landing zones (LZ) on Mauna Loa and no more than two helicopters at any one time on Mauna Kea.

Comment: As you are aware, Hawai'i environmental review law requires "due consideration of the effects of human activities on native Hawaiian culture and the exercise thereof ... to ensure the existence,-/ development, and exercise of native Hawaiian culture." *Ka Pa 'akai 0 Ka 'aina* v. *Land Use Comm 'n,* 94 Haw. 31, 47 n.28 (2000). In preparation for future review under the Chapter 343 process and as a showing of the USAG-HI's commitment to the protection of Native Hawaiian cultural resources, OHA encourages the USAG-HI to immediately commence a cultural impact study for the continued use of the helicopter landing zones on Mauna Kea and Mauna Loa. Such studies would be useful in providing some level of insight to Army personnel, who may be unfamiliar with Hawai'i and the prominence of these two mountains in the spirituality and culture of many Native Hawaiians.

Response: The United States Army Garrison, Hawaii (USAG-HI) relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

Through our consultations and EA process, we were unable to identify and consult with individuals that have genealogical ties (or attachments) with knowledge of the landing zone areas potentially affected by the proposed action.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

Comment: We also strongly advocate for public hearings on Hawai'i Island prior to future HAMET decision-making. Finally, OHA reiterates its support for the commitment by the USAG-HI to work with the State of Hawai'i, State Historic Preservation Division (SHPD) to examine alternate sites for two existing landing zones (LZ-5 and LZ-6) on Mauna Kea where known rock mounds are located /' outside of the existing landing zones, but within the 328 foot (l00 meter) area of potential effect. Although these features were found to have been unaffected by HAMET training in March-April 2011, OHA recognizes the effort by the USAG-HI to consider the long-term impacts of the HAMET actions.

Response: The USAG- HI will conduct public hearings on Hawaii Island concerning HAMET if and or when an environmental impact statement (EIS) for a longer term requirement is undertaken.

Comment: For the limited-duration of the Phase II training actions proposed for October 2011, OHA does not oppose, nor concur, with the anticipated negative declaration determination of the USAG-HI.

Response: Thank you for your position statement on Phase II training, October 2011.

Commet: As stated in our letter for the NEPA review, OHA expects the USAG-HI staff to follow the Chapter 343 process for further HAMET actions beyond those proposed for October.

Response: The United States Army Garrison, Hawaii (USAG-HI) relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs, and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

Through our consultations and EA process, we were unable to identify and consult with individuals that have genealogical ties (or attachments) with knowledge of the landing zone areas potentially affected by the proposed action.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

The USAG- HI will also follow HRS Chapter 343, as well as conduct public hearings on Hawaii Island concerning HAMET, if and or when an environmental impact statement (EIS) for a longer term requirement is undertaken.

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Cindy Orlando, Superintendent
Hawai'i Volcanoes National Park
PO Box 52
Hawai'i National Park, HI 96718

Dear Ms. Orlando:

Thank you for your comments, set forth in your letter dated August 16, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA).

We have noted in our files to include Hawai'i Volcanoes National Park, not the National Park Service Honolulu Office, regarding Section 106 concerns that could potentially impact the park.

As indicated in Section 3.13 of the EA, "Pilots are briefed on the risk assessment, hazards, mitigative actions, and emergency procedures during preflight briefings prior to the start of each training mission...." During HAMET pilots will be rotated through Pohakuloa Training Area (PTA) on various days in October. We welcome your participation in our pilot briefings to provide information regarding the natural and cultural resource issues unique to Hawai'i Volcanoes National Park. Our PTA staff can contact you with a proposed date and how best to incorporate your input into our October pilot awareness briefings.

Furthermore the Army will contact Hawai'i Volcanoes National Park directly at HAVO_Superintendent@nps.gov and provide a notification of the HAMET training schedule in order for the park to alert backcountry users of the use of landing zone (LZ)-1, LZ-2 and LZ-3 on Mauna Loa.

Lastly, the 25th Combat Aviation Brigade (CAB) pilots will not conduct over flights above Hawai'i Volcanoes National Park. Natural and cultural resource surveys were conducted in the LZ-1, LZ-2 and LZ-3 areas adjacent to the park. No cultural or natural resources of significant concern were identified and no contributing elements to the National Natural Landmark (Mauna Kea) will be significantly impacted. If threatened and endangered avifauna are observed in flight or at the LZ's they will be avoided to prevent bird strikes.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO ATTENTION OF:

Office of the Garrison Commander

Janice Palma-Glennie
Palmtree7@hawaiiantel.net
Kailua-Kona, HI

Dear Ms. Palma-Glennie:

Thank you very much for your comments, set forth in your email dated August 23, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). We are pleased to have the opportunity to respond to your concerns directly.

We appreciate your concerns that HAMET should be done in a more appropriate setting than Hawaii, and that the EA underestimated impacts on Hawaii as compared with other locations (e.g., Fort Carson). However, we believe that the EA accurately estimates the costs and impacts on Hawaii. The proposed action in the July EA was significantly changed, from earlier proposed actions, due to the immediate need for the 25th combat aviation brigade (CAB) to begin HAMET. Therefore the Army was required to provide an evaluation of Fort Carson as an alternative.

We appreciate your concern about the comments on the April EA made by the SHPD (State Historic Preservation Division), USFWS (U.S. Fish and Wildlife Service), and Sierra Club regarding biological, cultural, and visual resources, cumulative impacts, and safety, not being addressed in the EA. We provided the SHPD, USFWS, and the Sierra Club an opportunity to review and comment on our proposed action and responded to the comments provided by each. The comments are addressed in the EA and responses to their comments included as an appendix. The Army considered all comments and addressed relevant concerns.

Regarding your concern that the EA lacks specifics including noise analysis and some studies appear contradictory in their projected or real outcomes, the Army conducted noise modeling and monitoring in accordance with the U.S. Environmental Protection Agency noise guidelines and Chapter 14 of Army Regulation 200-1 and the American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 2: Measurement of Long-Term, Wide Area Sound" (ANSI S12.9-1992). In addition to the DNL, maximum noise levels associated with the Chinook were also used in the EA to assess potential effects of HAMET training activities on wildlife. "The A-weighted scale most closely represents the response of the human ear to sound." These analyses determined that there would no significant impacts to humans or fauna associated with HAMET (Section 4.11.1.1 pg 4-32.)

Regarding your concern that biological impacts appear severely lacking including impacts on endangered species like nene goose and native Hawaiian bats, the potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated June 10, 2011 pertaining to Hawaiian

Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are added, in full, as an appendix to the final EA.

Regading your concern about information on inspection and cleaning procedures for invasive species being contradictory, we would like to direct you to the mitigation measures in section 6.3, page 6-10 of the EA.

Regarding your concern that the EA also ignores public access issues, as stated in the EA (e.g., pp. vi, vii, 4-25, 4-26, 4-30), neither the proposed action nor the alternatives restrict public access. Thus, restricting access was not further evaluated. The Army is confident in its ability, procedures, and processes to implement training and assure safety without the need to restrict access. The Army does acknowledge that the DLNR may choose to restrict access (p. 2-12), but only because they have done so in the past. They have neither reason nor requirement to do so, and they have not disclosed whether or not they plan to do so for the October 2011 training period.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Emily Puu
kelua821@yahoo.com

Dear Ms. Puu:

Thank you very much for your comments, set forth in your letter dated August 24, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are enclosed.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Comment: I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the Army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an environmental impact statement (EIS) is not required.

Comment: Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impact levels were based on federal and state requirements, which mandate the analyst to consider the context and intensity of potential impacts. Context normally refers to the setting, weather local or regional, and intensity describes the severity of the impact. The Army feels that the impact levels have been appropriately assessed.

Comment: In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA.

Response: The document has been reviewed and re-reviewed and we have done our best to ensure the grammar is correct. The Army apologizes if any grammatical errors may still exist. The Army's proposed action has changed and the State of Hawaii required compliance with Hawaii Revised Statutes (HRS) Chapter 343, therefore we are required to re-issue an EA in compliance with the law.

Comment*:* The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?"

Response: In the July EA, the Army modified the proposed action. With the modification of the proposed action, the Army has re-analyzed the potential impacts.

Comment: Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis.

Response: The state of Hawaii requested that the Army comply with Hawaii Revised Statutes (HRS) Chapter 343. Compliance with HRS Chapter 343 was not an afterthought. By complying with the National Environmental Policy Act (NEPA) we complied with a vast majority of HRS Chapter 343. In doing so, the Army needed to insert that we complied with HRS Chapter 343 in the document as well as responding to all comments that we have received.

The Army relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

Comment: Why, if the Army claims that "analyses did not indicate the need for an environmental impact statement" did you require this many attempts in reaching a FONSI?

Response: The proposed action included in the EA issued in December 2010 provided for a larger action. The EA issued in April 2011 addressed the comments raised during the December 2010 EA review period and clarified our proposed action. The EA issued in July 2011 is based on the April 2011 EA and incorporates HRS Chapter 343 requirements based on the State of Hawaii's request. Draft EA's published since December 2010 analzyed reduced proposed actions, thus requiring the Army to inform the public and publish a revised EA.

Comment: Even after three attempts at a FONSI, the analysis is still lacking.

Response: The Army has thoughtfully considered all likely potential impacts. Several dozen technical experts have spent many hundreds of hours researching and analyzing potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

Comment: The alternatives considered do not meet your stated purpose to recognize Army environmental and social stewardship responsibilities within the affected region.

Response: All alternatives considered meet the stated purpose and are in keeping with the Army's mission, environmental and social stewardship responsibilities.

Comment: Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii.

Response: Alternatives were evaluated to determine if they could meet the purpose and need. The alternatives evaluated were not limited to Hawaii.

Comment: The alternative 5 for other high-altitude training sites on the CONUS is prematurely eliminated and should have been carried forward for further analysis. This alternative should be fully considered in an EIS.

Response: Alternative 5 did not meet purpose or need of training up to 90 pilots that cannot train elsewhere in the time from October to deployment so it was screened out. For these individuals whom the training is primarily directed, it is not possible to do the training anywhere else.

Comment: Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the Army is not qualified to conduct a legitimate impact analysis.

The Army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture.

Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the Army catastrophically fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.

Response: The Army does understand the sacredness of wahi pana (Section 3.7.2.1). Based on the information that has been gathered, the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor has the community been properly consulted. Had the cultural impact assessment been

completed properly, impacts to cultural resources would have been identified as significant and unmitigable.

Response: The United States Army Garrison, Hawaii (USAG-HI) relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

Through our consultations and EA process, we were unable to identify and consult with individuals that have genealogical ties (or attachments) with knowledge of the landing zone areas potentially affected by the proposed action.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

Comment: Aside from photographs taken on a day outing to these LZs what efforts have been put into the interpretation of the sites identified? The identified sites are extremely close in proximity to each LZ and located on the tops of small pu‘u. The cairns atop each pu‘u are within 20 feet of the LZs.

Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the Army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times.

Response: The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those marked sites during pilot training.

Comment: Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the Army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources.

Response: The Army assessed the sites to the extent possible based on the information gathered.

Comment: It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36 CFR part 800, let alone meet the substantive portion of the law.

Response: In addition to the photos, the Army conducted physical surveys, and extensive research to meet the regulatory requirements of 36 *Code of Federal Regulations* (CFR), part 800. In addition, the information gathered was used to support consultation activities.

Comment: There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the Army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas.

Response: The Army assessed the sites to the extent possible within the area that may be affected by the training. These are the same aircraft that have used these LZs in the past. Requests to the State to test the mounds in order to investigate the nature of these features were denied.

Comment: The substantive portion of Section 106 of the National Historic Preservation Act of 1966 (as amended) mandates that the Army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each pu‘u in this project.

Response: The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawai‘i.

Response: The Army does understand the spiritual and cultural heritage of Hawaii. However, based on the information that has been gathered the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians.

Comment: The lack of information does not instill in me confidence that the Army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

Comment: It is difficult to comprehend how the Army proposes to protect cultural resources without understanding what they are. More respect of the Army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those sites during pilot training.

Comment: While the Army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

Response: The Army used outside information to assist us in the development of our EA to get a comprehensive look at cultural impacts. This information was used to help guide our surveys and our consultation efforts.

Comment: While the Army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii?

Response: The Army recognized that conducting the training comes at a cost. This cost is analyzed in the EA and mitigations have been put in place to limit the costs to the People and resources of Hawaii.

Comment: Native Hawaiians have been unjustly targeted for the Army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

Response: The EA analyzed environmental justice in accordance with "executive order 12898 'Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Using this criteria, no impacts were identified.

Comment: The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape.

Has the Army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

Response: Noise modeling was conducted in accordance with Army Regulation 200-1 for assessing effects of helicopter noise on land uses and wildlife (Section 4.11 page 4-31). The noise monitoring was conducted in accordance with the "American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 2: Measurement of Long-Term, Wide Area Sound" (ANSI S12.9-1992).

The Army did consult with the National Park Service. Their comments and our responses are included in the appendices of the final EA.

Comment: The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut, 7 pp.), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell, 47 pp.), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell, 4 pp.). These documents have been added as an appendix to the final EA.

Comment: This EA lacks impact analysis on transportation between the islands of O'ahu and Hawai'i.

Response: HAMET would be integrated into other scheduled flight training (Section 2.1, page 2-1). Transportation between the islands of Oahu and Hawaii are a part of the existing scheduled training. The EA analyzes the potential impacts associated with the additional HAMET training activities.

Comment: Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impacts have been analyzed and mitigations proposed to support a finding of no significant impacts.

Comment: I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an EIS is not required.

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 6 2011

Office of the Garrison Commander

Michael Reimer, Ph.D.
GeoMike5@att.net
Kailua-Kona, HI 96740

Dear Dr. Reimer:

Thank you very much for your comments, set forth in your letter dated August 17, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are attached.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Responses to Comments

Comment: This request appears to be one in a series of requests submitted to the Hawaii Department of Land and Natural Resources (DLNR) for permission to utilize these landing zones. Upon granting of a special use and entry permit, High Altitude Mountainous Environmental Training (HAMET) exercises have taken place over the last decade. It is important to note that the same landing zones used previously on Mauna Kea and Mauna Loa are proposed to be used for this current training exercise slated for October 2011. (See section 2.5 of the DEA)

This DEA is very explicit that these flights are needed to train pilots for high altitude operations for future deployment in Afghanistan. The DEA claims that the pilots also will gain the needed experience to satisfy training requirements. From the information provided in the DEA, I do not believe the proposed use of landing zones on Hawaii will satisfy the requirements of experience and training as stated in the DEA (DEA section 2).

In addition, the pilots may gain a false sense of security because the Hawaii high altitude environment is completely different than they are likely to encounter in Afghanistan. Thus, the training is simply inadequate and is a disservice to the pilots who will be deployed in Afghanistan.

Response: Alternatives were evaluated to determine if they could meet the purpose and need. The specific training requirements, and the applicability of the proposed action to meet them, are discussed in sections 2.1, and 2.7 under the alternatives.

Comment: Risk to the environment and wildlife is discussed in multiple sections in Section 4, Environmental Consequences.

Training requirements as stated in Section 2 p. 35 are taken from ARCENT/CFLCC 95-1. The specific training requirements and the applicability of the proposed action to meet them are discussed in section 2.1, and 2.7 under the alternatives.

Because of the inadequacies in explanation in the DEA, it does not seem worthwhile to risk irreparable damage the fragile environments of Mauna Kea and Mauna Loa for military exercises that will not meet the needs of the military programs. Thus, a permit for entry to the Landing Zones (LZ) should not be issued. At a minimum, the DEA needs revision. Because time is of the essence and prioritization can be claimed, the military should, in the interim, make every effort possible to provide training at alternative sites on the mainland, where adequate training can be provided at sites more similar to those encountered in deployment to Afghanistan.

Response: Alternatives were evaluated to determine if they could meet the purpose and need. The specific training requirements and the applicability of the proposed action to meet them are discussed in sections 2.1 and 2.7 under the alternatives.

Comment: Critical shortcomings of Hawaii to meet training requirements HAMET training is provided to give pilots experience with altitudes to 14,000 feet (4,267 meters) if possible. DEA section 2. The landing zones (LZ) used in Hawaii do not go greater than 11,539 feet (3,517 meters).

See DEA section 2.7.2.4. Therefore, training will not provide the altitude experience needed for all Afghanistan high altitude encounters. Mountain ranges in Afghanistan frequently exceed 14,000 feet (4,276 meters) with highest peaks reaching 24,500 feet (7,468 meters). In the infamous Tora Bora region, 11,000 feet (3,353 meters) could be considered baseline with mountain peaks and ridges often going in excess of 14,000 feet (4,267 meters). See map 3, Levinger, Taking Tora Bora, 2005. Topography can be seen in that report on a Soviet General Staff map I- 42-XVII, 1985, at: http://www.lib.utexas.edu/maps/afghanistan.html

Response: High altitude training as defined in Section 2.1 (p. 35) is above 8,000 ft. Slope operations, elevated reconnaissance and ridgeline operations are discussed in Section 2.1. Section 3.3 (p. 74) discusses the geology and topography of the action area. Alternatives were evaluated to determine if they could meet the purpose and need. The specific training requirements, and the applicability of the proposed action to meet them are discussed in sections 2.1 and 2.7 under the alternatives.

Comment: The altitude difference is significant in how it affects the performance of the helicopters (air density and winds). Of particular concern is not only the absence of the requirement or objective of 14,000 foot experience required by HAMET, but the difference in the topography. Refer here to the photograph in figure 1.1 of the DEA suggestive to represent actual activity in Afghanistan and the photographs in figures 2.8 through 2.13 of the Mauna Kea and Mauna Loa landing zones. The difference in topographic relief is clear. Mauna Loa and Mauna Kea are representative of oceanic shield volcanoes, in this instance comprised of weathered thoelitic basalt rocks whereas Afghanistan mountains are mostly granitic and associated metamorphic and sedimentary rocks of ranges resulting from collision of crustal plates and having a greater silica content giving rise to the form, mineral and obvious color differences. There are no well-defined ridges or pinnacles on Mauna Loa or Mauna Kea, a requirement of the HAMET training.

Response: High altitude training as defined in Section 2.1 (p. 35) is above 8,000 ft. Slope operations, elevated reconnaissance and ridgeline operations are discussed in Section 2.1.Section 3.3 (p. 74) discusses the geology and topography of the action area. Alternatives were evaluated to determine if they could meet the purpose and need. The specific training requirements and the applicability of the proposed action to meet them are discussed in sections 2.1 and 2.7 under the alternatives.

Comment: The topographic relief provides for significant differences in the action of wind. I had an opportunity to speak with a career helicopter pilot, a Naval Academy graduate. Part of his naval career included being stationed in Kauai and he has for years worked for subcontractors to Federal and State agencies including the U.S. Forest Service fighting forest and wild fires in the continental U.S. and Alaska. His experience has been as pilot in numerous helicopter types in both the Hawaii environment and continental mountain ranges and includes certified training and experience to 20,000 feet. I would not hesitate to call him an expert in this specialty field of training.

He pointed out that the wind behavior is greatly different in mountain ranges compared to the gentle slopes of the shield volcanoes due to the numerous peaks and ridges that can alter air current directions and speed, creating numerous eddies and that high altitude training is thorough when it includes mountain peak, valley and ridge experiences.

Response: High altitude training as defined in Section 2.1 (p. 35) is above 8,000 ft. Slope operations, elevated reconnaissance and ridgeline operations are discussed in Section 2.1.Section 3.3 (p. 74) discusses the geology and topography of the action area. Alternatives were evaluated to determine if they could meet the purpose and need. The specific training requirements and the applicability of the proposed action to meet them are discussed in sections 2.1 and 2.7 under the alternatives.

Comment: Here, again, the Hawaiian topography and geology will not adequately prepare the helicopter pilots for conditions likely to be found in Afghanistan. Pinnacle and ridgeline proficiency is required for HAMET training (see DEA 2.1) but it is not available at the identified LZ sites in Hawaii.

Response: High altitude training as defined in Section 2.1 (p. 35) is above 8,000 ft. Slope operations, elevated reconnaissance and ridgeline operations are discussed in Section 2.1.Section 3.3 (p. 74) discusses the geology and topography of the action area. Alternatives were evaluated to determine if they could meet the purpose and need. The specific training requirements and the applicability of the proposed action to meet them are discussed in sections 2.1 and 2.7 under the alternatives.

Comment: The geology of Mauna Kea and Mauna Loa is described in detail in section 3.2 through 3.5. A more detailed geologic map of the Island of Hawaii was prepared in 1996 (Wolfe and others, 1996). There is no corresponding discussion of the geology in Afghanistan and there is great contrast between the two.

Response: High altitude training as defined in Section 2.1 (p. 35) is above 8,000 ft. Slope operations, elevated reconnaissance and ridgeline operations are discussed in Section 2.1.Section 3.3 (p. 74) discusses the geology and topography of the action area. Alternatives were evaluated to determine if they could meet the purpose and need. The specific training requirements and the applicability of the proposed action to meet them are discussed in sections 2.1 and 2.7 under the alternatives.

Comment: The difference in background color and reflectance of rocks would have an effect on perception when using night vision goggles. Due to the nature of the mineral and color difference of the rocks found in Hawaii and Afghanistan would suggest the lighter color material to that found in higher altitudes in Afghanistan would be better suited to training, suggesting preference for the mainland (CONUS) locations.

Response: Pilots need to be trained prior to deployment in Afghanistan. Conducting this training in Afghanistan during combat operations is not an option. The OCONUS alternative is not feasible because there is no time to send newly arriving pilots to OCONUS. Additionally there are no CH-47F aircraft available in Colorado.

Comment: Hazardous material transport DEA section 4.13.2 discusses the possibility of transporting hazardous material into the LZ. It singles out depleted uranium (DU) and states no radioactive materials will be transported on the helicopters.

There are two concerns here not addressed in the DEA. The first is that depleted uranium (DU) has been used in munitions fired at PTA in the mid to late 1960s. Basically, record keeping of its location and use are non-existent. The areas where DU was suspected to be used have been active training areas during the last 40 years or so and that included both heavy military vehicle

and high explosive use in those impact areas. Because of that, it is highly likely that the DU has been mechanically (or explosively) changed in form to small particles that can be transported elsewhere, certainly out of the firing ranges at PTA.

Therefore, it is highly likely that radioactive particles could be picked up on dust deposited on the helicopters and transported, certainly inadvertently, but nonetheless transported into the HAMET LZs. Monitoring of the landing gear and collection and analysis of atmospheric (dust and aerosol) should be included in any exercise utilizing aircraft stationed at PTA and involved in landings on Mauna Kea and Mauna Loa.

It should be noted that the Nuclear Regulatory Commission (NRC) has recently cited the U.S. Army that it had been in violation of proper licensing for their possession and handling of DU at PTA and Schofield Barracks.

Response: Hazardous materials are discussed in Section 4.13.2., "Depleted uranium or other radiological materials will not be transported onboard aircraft participating in HAMET." Helicopters will not be utilizing any LZ's, prior to HAMET, that through DU surveys are suspect.

Comment: The second issue is the fact that DU is commonly used as ballast or counter weights on aircraft and helicopters, including the rotors and possibly gyroscopic equipment. The DEA should specifically address whether any "fixed" DU is present on the aircraft to be used.

Response: Section 2.2 (p. 35) discusses the specific aircraft used in HAMET operations. As noted in Section 4.13.2., "Depleted uranium or other radiological materials will not be transported onboard aircraft participating in HAMET."

Comment: Mission equipment critical failure. The DEA fails to address a critical issue of preparation and action that can be utilized in event of a helicopter failure, crash, or collision. There may be needs for immediate medical attention, perhaps fire control, and later cleanup and remediation of damage on the ground. Local hospitals in Kona and Hilo, even though recently recognized as level three trauma facilities, will be hard pressed to adequately treat and stabilize soldiers involved in major accidents, including crushing trauma and burn treatment.

This issue should be addressed in the DEA. It may be necessary during training exercises for the military to have on standby at Pohakuloa necessary medevac and even fire suppression crews. It is not unreasonable to suggest such readiness.

Response: Emergency operations are discussed in Section 4.13 (p. 208). As stated in Section 3.15.3., "…emergency medical services are provided by Army staff based at PTA." Pilots and aircrew will be provided mandatory pre-exercise briefings detailing the proposed flight routes, release points, and altitudes they must maintain, as well as safety and emergency requirements/protocols they must follow. The Army is well aware of the over flight and low hovering incidents that had occurred in the past. As part of a programmed upgrade, our helicopters have been equipped with state-of-the-art navigation systems and our traffic controllers have monitoring equipment capable of tracking the progress of each and every flight. If any deviations were to occur, the pilots will be notified immediately to correct course adjustments.

The Army, through development of the EA, has reviewed and included within the EA (Section 4.13.3) the potential risk of fire due to an Army helicopter crash. Factors considered in determining whether any alternative would have a significant wildfire ignition potential include the extent or degree to which implementing an alternative would involve the following wildfire ignition issues:

- Historical safety record
- Operation of aircraft at high altitudes
- Occurrence of nighttime training

The aircraft proposed for HAMET would be unarmed for HAMET flights. Onboard HAMET aircraft are two 5 pound ABC fire extinguishers to extinguish fires manually. The CH-47 and UH-60 have self-sealing primary and auxiliary fuel systems for rotary winged aircraft to reduce the possibility of leakage, fire and explosion during impact.

The potential ignition of a wildfire within the flight path and training area was analyzed. Based on the methodology and factors considered, the risk would be less-than-significant because the only credible risk of a wildfire would be as the result of a crash within a vegetated area with fuel loads sufficient to carry fire. HAMET flights are considered low risk, according to the 25th CAB Risk Assessment Worksheet and the possibility of a wildfire as a result of a crash was determined remote. This conclusion is based thousands of hours flown and the CAB's historical safety record and the fact that training would be conducted outside of vegetated areas (i.e., at LZs), and the minimal flight time (less than 1 minute per flight) that would be spent over vegetated areas.

Comment: The U.S. Army clearly states in DEA 1.4, "The need for the Proposed Action is to ready helicopter air crews to be successful in the combat theater to support the operational and mission requirements of the 25th CAB, 25th Infantry Division, set forth by the Department of Army and Department of Defense (DoD). It is vitally important to conduct HAMET in order to prepare our aircrews. This training is critical to save the lives of our 25th CAB aircrews and the Soldiers they transport when operating in support of Operation Enduring Freedom in Afghanistan."

It is unfortunate that this DEA and U.S. Army request for entry permits comes so late as to place the DLNR in a very difficult position of having to fast track permission for the permits. The Army had a dwell time of 14 months (See section 1.1 of DEA) and claims now that times at alternative training areas in the continental U.S. are booked (DEA 2.7.7) and not available to the 25th Combat Aviation Brigade (CAB). Preparation should have begun months ago.

Response: Regardless of the amount of advanced planning, there is no time to send newly arriving pilots to OCONUS. Additionally there are no CH -47F aircraft available in Colorado.

Comment: The U.S. Army deadline has become the DLNR deadline but that cannot be a motivating factor for DLNR. It is unconvincing that the better training cannot be provided because time slots are not available. Time slots are merely future schedules and are always subject to change. Here, if an emergency situation is presented by upper echelon commanders, it is likely time slots can be rearranged.

Response: Regardless of the amount of advanced planning, there is no time to send newly arriving pilots to OCONUS. Additionally there are no CH -47F aircraft available in Colorado.

Comment: It goes without saying that safety training saves lives, whether it be for steel workers on skyscrapers, electricians of high power lines, policemen and firemen in the everyday performance of their duties, and indeed our military personnel, all exposed to high risk situations that can be life threatening. Further, the better the training, the more realistic to real-life encounters, the better the chances for survival and the ability to react instinctively to avoid the greater dangers one is faced with in the course of his or her duties. Training should be the best available wherever available, not because of convenience for scheduling or because opportunities were allowed to pass.

Response: Thank you for your comment

Comment: No one wants to bear the burden of placing our troops in harm's way but there are alternatives that may provide the higher level of training to fully meet HAMET objectives and keep our troops safer. Fort Carson and Gypsum, Colorado would, as acknowledged, provide better training locales, as would Fort Bliss, Texas. (DEA 2.7.7.)

Response: The Fort Carson alternative is not feasible because there is no time to send newly arriving pilots to CO. Additionally there are no CH-47F aircraft available in Gypsum Colorado. There are no aircraft available for use at Ft. Bliss.

Comment: The LZs in Hawaii could be reserved for lower level requirements, and with less usage, the risks of damage to the fragile environment are reduced.

Response: The Army is only requesting the use the six, 150 x 150 ft LZs for 20 days. Through our analysis, we have determined that the proposed action will not have significant impacts to flora, fauna, cultural resources, or result in any release of hazardous materials to the environment.

Comment: While some comment is made addressing the cost associated with use of alternative sites on the mainland (DEA 2.8), it must be recognized that there will be costs associated with deployment in any case and that deployment for training is not unreasonable to be considered as part of the overall training exercise.

Response: The costs associated with deployment to the mainland are above and beyond what would be required for performing HAMET under the proposed action.

Comment: It is highly unlikely that the Hawaiian LZ sites will provide the best training environment to meet the requirements stated in DEA 1.4. By using CONUS sites, the risks and disturbances to the fragile Hawaiian environment and cultural settings are lowered. It does not seem to be in the best interest of either party for an entry permit to issued for this training exercise to be held in Hawaii.

Response: The Fort Carson alternative is not feasible because there is no time to send newly arriving pilots to CO. Additionally there are no CH-47F available in Gypsum Colorado. Through our analysis, we have determined that the proposed action will not have significant impacts to flora, fauna, cultural resources, or result in any release of hazardous materials to the environment.

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Douglas Rodrigues
P.O. Box 700895
Kapolei, Hawaii 96709
anuenueokekai@yahoo.com

Dear Mr. Rodrigues:

Thank you very much for your comments, set forth in your letter dated August 23, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are enclosed.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Comment: I am deeply concerned and believe that the impact analysis is inadequate and flawed. I demand that the Army prepare an environmental impact statement to rectify the shortcomings of the existing EA and to correct the erroneous impact levels identified throughout your document.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an environmental impact statement (EIS) is not required.

Comment: Impact levels are wrongly assessed for cultural resources, environmental justice, biological resources, noise, and visual and aesthetics resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impact levels were based on federal and state requirements, which mandate the analyst to consider the context and intensity of potential impacts. Context normally refers to the setting, weather local or regional, and intensity describes the severity of the impact. The Army feels that the impact levels have been appropriately assessed.

Comment: In addition to the military and aviation jargon used, the poor grammar in your document sometimes makes it difficult to understand what you are trying to say. Knowing that this is the third time that the EA has been released it seems as if this might be an attempt to "salvage" a report to make it "fit" your current need for a state EA.

Response: The document has been reviewed and re-reviewed and we have done our best to ensure the grammar is correct. The Army apologizes if any grammatical errors may still exist. The Army's proposed action has changed and the State of Hawaii required compliance with Hawaii Revised Statutes (HRS) Chapter 343, therefore we are required to re-issue an EA in compliance with the law.

Comment*:* The inconsistencies throughout your document and the manner in which words are half hazardly stuck in place begs the question, "Did the Army truly re-analyze the impacts of the proposed action as they say they did?"

Response: In the July EA, the Army modified the proposed action. With the modification of the proposed action, the Army has re-analyzed the potential impacts.

Comment: Inserting the term "HRS Chapter 343" in various locations throughout the document seems an afterthought. I question the validity of the impact analysis.

Response: The state of Hawaii requested that the Army comply with Hawaii Revised Statutes (HRS) Chapter 343. Compliance with HRS Chapter 343 was not an afterthought. By complying with the National Environmental Policy Act (NEPA) we complied with a vast majority of HRS Chapter 343. In doing so, the Army needed to insert that we complied with HRS Chapter 343 in the document as well as responding to all comments that we have received.

The Army relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

Comment: Why, if the Army claims that "analyses did not indicate the need for an environmental impact statement" did you require this many attempts in reaching a FONSI?

Response: The proposed action included in the EA issued in December 2010 provided for a larger action. The EA issued in April 2011 addressed the comments raised during the December 2010 EA review period and clarified our proposed action. The EA issued in July 2011 is based on the April 2011 EA and incorporates HRS Chapter 343 requirements based on the State of Hawaii's request. Draft EA's published since December 2010 analzyed reduced proposed actions, thus requiring the Army to inform the public and publish a revised EA.

Comment: Even after three attempts at a FONSI, the analysis is still lacking.

Response: The Army has thoughtfully considered all likely potential impacts. Several dozen technical experts have spent many hundreds of hours researching and analyzing potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

Comment: The alternatives considered do not meet your stated purpose to recognize Army environmental and social stewardship responsibilities within the affected region.

Response: All alternatives considered meet the stated purpose and are in keeping with the Army's mission, environmental and social stewardship responsibilities.

Comment: Nor do your Department of Army and DOD flight requirements state that this training needs to be in Hawaii.

Response: Alternatives were evaluated to determine if they could meet the purpose and need. The alternatives evaluated were not limited to Hawaii.

Comment: The alternative 5 for other high-altitude training sites on the CONUS is prematurely eliminated and should have been carried forward for further analysis. This alternative should be fully considered in an EIS.

Response: Alternative 5 did not meet purpose or need of training up to 90 pilots that cannot train elsewhere in the time from October to deployment so it was screened out. For these individuals whom the training is primarily directed, it is not possible to do the training anywhere else.

Comment: Your EA erroneously states that, "Native Hawaiians generally consider Mauna Kea to be of special cultural significance and many find it difficult to reconcile modern activities based in a foreign culture with the sacredness of the mountain." This statement clearly demonstrates the lack of understanding of what this resource is and the true value of such a unique location. Without truly understanding the value of this wahi pana, without ʻike (true knowledge), the Army is not qualified to conduct a legitimate impact analysis.

The Army needs to understand that it is non-Hawaiians that find it difficult to reconcile the sacredness of this wahi pana with modern activities imposed by a foreign culture.

Without truly understanding the cultural landscape of Mauna Kea and Mauna Loa the Army catastrophically fails and underestimates the SIGNIFICANT IMPACTS on cultural resources which are not mitigable.

Response: The Army does understand the sacredness of wahi pana (Section 3.7.2.1). Based on the information that has been gathered, the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: The cultural impact assessment was improperly done and information presented in this section and in Appendix B is incomplete. The areas proposed for activities have not been studied nor has the community been properly consulted. Had the cultural impact assessment been

completed properly, impacts to cultural resources would have been identified as significant and unmitigable.

Response: The United States Army Garrison, Hawaii (USAG-HI) relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

Through our consultations and EA process, we were unable to identify and consult with individuals that have genealogical ties (or attachments) with knowledge of the landing zone areas potentially affected by the proposed action.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

Comment: Aside from photographs taken on a day outing to these LZs what efforts have been put into the interpretation of the sites identified? The identified sites are extremely close in proximity to each LZ and located on the tops of small pu‘u. The cairns atop each pu‘u are within 20 feet of the LZs.

Without a comprehensive, planned, and researched archaeological survey, preceded by archival and literature reviews, how can the Army assume there is no adverse effects on historic properties? In order to asses impacts one must know, not only what is physically present, but the nature of the site and its place within the context of history and present times.

Response: The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those marked sites during pilot training.

Comment: Scientific and cultural understanding is necessary to assess and avoid impacts. A well rounded understanding of the historic resources will enable the Army to fulfill its obligation to uphold the considerable federal and state laws which protect cultural resources.

Response: The Army assessed the sites to the extent possible based on the information gathered.

Comment: It takes more than a collection of pictures showing photo scales and stacked rocks to meet the regulatory requirements of 36 CFR part 800, let alone meet the substantive portion of the law.

Response: In addition to the photos, the Army conducted physical surveys, and extensive research to meet the regulatory requirements of 36 *Code of Federal Regulations* (CFR), part 800. In addition, the information gathered was used to support consultation activities.

Comment: There has been no thorough investigation of the area or research which investigates the nature of the sites identified near each LZ. Yet, the Army states that there will be no impacts and requests to land significantly larger aircraft than have ever set down in these areas.

Response: The Army assessed the sites to the extent possible within the area that may be affected by the training. These are the same aircraft that have used these LZs in the past. Requests to the State to test the mounds in order to investigate the nature of these features were denied.

Comment: The substantive portion of Section 106 of the National Historic Preservation Act of 1966 (as amended) mandates that the Army protect cultural resources. The extreme altitude, blowing winds, snow, loose rocks and general inhospitable terrain testifies to the importance of the sites found on the top of each pu‘u in this project.

Response: The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties; it does not prohibit property disturbance.

Comment: For Hawaiians to have journeyed to these places, which are physically and logistically trying for us to reach today, is in itself a reason to step back and really ask ourselves how important these sites and these places are to the spiritual and cultural heritage of Hawai‘i.

Response: The Army does understand the spiritual and cultural heritage of Hawaii. However, based on the information that has been gathered the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians.

Comment: The lack of information does not instill in me confidence that the Army has put thoughtful consideration into identifying and documenting historic properties potentially impacted at each LZ.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

Comment: It is difficult to comprehend how the Army proposes to protect cultural resources without understanding what they are. More respect of the Army is required when dealing with any archaeological resource, let alone culturally significant ones atop Mauna Kea.

Response: The Army has thoughtfully considered the historic properties. Several dozen technical experts have spent hundreds of hours analyzing the CAB's potential impacts. The NEPA/HRS Chapter 343 process has been followed to create a substantive and thorough environmental assessment.

The mounds are more than 56 meters from the LZs. The mounds will be marked on the LZ cards that each pilot uses and they will avoid those sites during pilot training.

Comment: While the Army claims that they have reached out to community members and local organizations, references are made to cultural impact assessments completed for other projects. Relying on cultural impact assessments and consultations completed for different projects such as the telescopes to derive HAMET project impact levels is inappropriate.

Response: The Army used outside information to assist us in the development of our EA to get a comprehensive look at cultural impacts. This information was used to help guide our surveys and our consultation efforts.

Comment: While the Army claims that they are "fully committed to protecting the Big Island's environment, while at the same time providing this essential training to protect its most valuable resource -- the American soldier," at what price does this come for the people of Hawaii?

Response: The Army recognized that conducting the training comes at a cost. This cost is analyzed in the EA and mitigations have been put in place to limit the costs to the People and resources of Hawaii.

Comment: Native Hawaiians have been unjustly targeted for the Army's want of the use of our precious resources. Environmental justice impacts are improperly assessed. At what point does it become feasible to sacrifice the future of the Hawaiian race and their religion and cultural beliefs for the sake of saving limited lives. The planning is short sited. Impacts are significant and unmitigable.

Response: The EA analyzed environmental justice in accordance with "executive order 12898 'Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Using this criteria, no impacts were identified.

Comment: The noise studies conducted are inadequate and do not reflect the true level of impacts that flying helicopters would have on our sacred mountains and the cultural landscape.

Has the Army consulted with the National Park Service to ensure that impacts will not affect park lands? This should also be included in a new noise study and published in an EIS. Impacts are significant and unmitigable.

Response: Noise modeling was conducted in accordance with Army Regulation 200-1 for assessing effects of helicopter noise on land uses and wildlife (Section 4.11 page 4-31). The noise monitoring was conducted in accordance with the "American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 2: Measurement of Long-Term, Wide Area Sound" (ANSI S12.9-1992).

The Army did consult with the National Park Service. Their comments and our responses are included in the appendices of the final EA.

Comment: The proposed flight paths are dangerously close to habitat of endangered avian species. Impacts are significant and unmitigable. Claims to the contrary should be supported with studies and modeling.

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut, 7 pp.), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell, 47 pp.), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell, 4 pp.). These documents have been added as an appendix to the final EA.

Comment: This EA lacks impact analysis on transportation between the islands of O'ahu and Hawai'i.

Response: HAMET would be integrated into other scheduled flight training (Section 2.1, page 2-1). Transportation between the islands of Oahu and Hawaii are a part of the existing scheduled training. The EA analyzes the potential impacts associated with the additional HAMET training activities.

Comment: Because analysis is flawed, impact levels are wrongly assessed for many of the environmental resources. Impact levels from your proposed action are significant and not mitigable.

Response: Impacts have been analyzed and mitigations proposed to support a finding of no significant impacts.

Comment: I am insisting that the Army immediately publish a notice to prepare an EIS and to hold scoping meetings to continue with the EIS process. Thank you in advance for your prompt action on this matter.

Response: After conducting an extensive environmental assessment, the Army has come to the conclusion that there are no significant impacts and an EIS is not required.

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 6 2011

Office of the Garrison Commander

KAHEA
c/o Marti Townsend
PO Box 37368
Honolulu, HI 96813

Dear Mr. Townsend:

Thank you very much for your comments, set forth in your letter dated August 22, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are attached.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Comment: While the newly proposed HAMET seems to have scaled back earlier proposed uses of critical habitat and conservation lands, KAHEA's concerns and therefore opposition to the proposal remain, as discussed below.

HAMET Proposal Evades Public Process The two most glaring flaws in the HAMET EA are: 1) the absence of a U.S. Fish and Wildlife Services (USFWS) consultation and 2) lack of a State of Hawai'i Conservation District Use Permit Application (CDUP).

Response: The ESA does not necessarily require formal inter-agency consultation. Formal consultation under ESA Section 7(c) is an option in order to receive a non-jeopardy opinion and a take statement if the federal action agency feels that the proposed action will have potential for adverse impacts to a federally-listed species. If the federal action agency (in this case, US Army Garrison-Hawaii) opts to make a Determination of No Effect, then ESA Section 7(c) requirements are satisfied. The formal consultation and subsequent non-jeopardy opinion and take statement are essentially an insurance policy, in case there is take (harm, harassment, death) of a listed species. If the federal action agency chooses to make a Determination of No Effect, and there is no take of a species, then the action agency has committed no wrong, and the judgment exercised by the action agency is validated.

The Army is a federal agency. Under the Supremacy Clause of the U.S. Constitution, State governments cannot impose regulations on the federal government that may impede or impair its ability to operate unless it is specifically authorized by Congress. Thus, the Army cannot be required to enter into a state CDUP process. The Army does however recognize the need to comply protections and safeguards of Hawaii's CDUP. Thus, the Army will seek a right of entry for landing on State lands which will inevitably comply with all relevant portions of the CDUP prerequisites and mitigation measures.

Comment: On the first flaw, the USAG-HI must consult with the USFWS. Five endangered species have been confirmed to exist in the proposed HAMET flight paths and three of those flight paths cross critical Palila bird habitat. Yet, no consultations with the USFWS are contained in the HAMET EA. Federal law requires that the USAG carry out a formal USFWS consultation and should publicize USFWS assessments and recommendations.

Response: In May 2011 the USAG-HI received comments from the United States Fish and Wildlife Service (USFWS) on our April 2011 EA (which proposed a larger action in terms of time and flights). USAG-HI was asked to re-evaluate the proposed flight path, provide survey information and methodology for biological investigations, and re-evaluate using the landing zones (LZs) if Hawaiian petrels or the band-rumped storm petrels are detected in the areas near the LZs.

Since May, we have re-evaluated the potential for impact to resources from the flight path depicted in both the April 2011 and July 2011 EAs. In addition, our staff biologists conducted site specific surveys for the presence of threatened and endangered species and assessed the potential for impacts to these resources. Memoranda For Record, that detailed the level of effort conducted to address the concerns of both the USFWS and the State of Hawaii Division of Forestry (DOFAW), were provided to both organizations. An electronic copy of these technical memoranda will be provided to you via email by the time you receive this letter.

As a result of previous discussions between Dr. Peter Peshut, Pōhakuloa Training Area (PTA) biologist and Dr. Jeff Zimpfer, United States Fish and Wildlife (USFWS) staff member, and the findings from our biological assessments, our March 2011 data collection flights, and the EA process, the Army has made a determination that the proposed action will have no significant effect on listed species or critical habitat, and therefore we are not initiating informal consultation at this time.

The ESA does not necessarily require formal inter-agency consultation. Formal consultation under ESA Section 7(c) is an option in order to receive a "non-jeopardy" opinion and a "take statement" if the federal action agency feels that the proposed action will have potential for adverse impacts to a federally-listed species. If the federal action agency (in this case, US Army Garrison-Hawaii) makes a Determination of No Effect, then ESA Section 7(c) requirements are satisfied. The formal consultation and subsequent non-jeopardy opinion and take statement are essentially an insurance policy, in case there is take (harm, harassment, death) of a listed species. If the federal action agency makes a Determination of No Effect, and there is no take of a species, then the action agency has committed no wrong, and the judgment exercised by the action agency is validated.

Comment: On the second flaw, proposed HAMET exercise should not proceed without a CDUP application.

Response: The Army as a federal agency cannot be required to enter into a state CDUP process. The Army will however seek a right of entry for landing on State lands which will comply with relevant portions of the CDUP prerequisites and mitigation measures.

Comment: As proposed, HAMET will enlarge an already significant military-impacted areas that will further fragment the otherwise contiguous conservation district subzone lands in the Mauna Kea and Mauna Loa areas.

The HAMET EA fails to consider the cumulative impacts of expanding military activities in and near the already sizeable 120,000 acre area of the Pōhakuloa Training Area (PTA) that is of great concern to many who use the Mauna Loa, Mauna Kea, and Saddle areas for recreation, cultural and religious practices, and work. These uses of the proposed HAMET training area are adversely impacted in ways that the EA authors have not yet identified and without a process for public participation, these harmful impacts will remain undisclosed. We recommend that the USAG-HI submit a CDUP application for HAMET activities, which should include opportunities for public hearings.

Response: HAMET will not expand the current PTA foot print. The HAMET EA considers the additional training requirement for the CAB that consists of landing on small areas (150 x150 ft) of land on Mauna Kea and Mauna Loa for a 20-day period in October. The Army, through its 30-day comment period, permits public participation and attempts to solicit additional not yet identified impacts.

Comment: Allowing the HAMET project to occur under a Department of Land and Natural Resources Special Use Permit would authorize further expansion of military uses into these conservation areas without proper limitations and without meaningful opportunity for public input and participation in the final decision.

Response: The Army is required to appear before the Land Board in order to receive permission to undertake the proposed action. The DNLR land board hearing provides meaningful opportunity for public input and participation.

Comment: By contrast, the application process for a CDUP affords the public notice and hearings (which the EA process does not require). The should USAG be required to adhere to the process that the State of Hawai‘i has put in place to ensure public awareness and input into proposed uses of public lands held in trust for the people of Hawai‘i. USAG-HI attempts to justify approval of this requested special use permit on the approval of previous special use permits. The Hawai`i State Special Use Permits previously granted in 2003, 2004, 2006, and 2011 should not be a basis to allow the USAG to expand military use of public lands. Rather, these repeated requests for "special use" permissions suggests that the USAG-HI has not developed a long-term sustainable plan through which to meet their training needs.

Response: The Army is a federal agency. Under the Supremacy Clause of the U.S. Constitution, State governments cannot impose regulations on the federal government that may impede or impair its ability to operate unless it is specifically authorized by Congress. Thus, the Army cannot be required to enter into a state CDUP process. The Army does however recognize the need to comply with the protections and safeguards of Hawaii's CDUP. Thus, the Army will seek a right of entry for landing on State lands which will inevitably comply with all relevant portions of the CDUP prerequisites and mitigation measures. The DNLR land board hearing provides meaningfully opportunity for public input and participation.

Comment: As the EA discloses, it is possible to carry out the proposed HAMET exercises in Gypsum, Colorado, if USAG planners obtained "training slots" in that area's schedule. EA, p. 2-18.

Response: Regardless of the amount of advanced planning, there is no time to send newly arriving pilots to CO. Additionally, there are no CH-47F aircraft available in Gypsum, Colorado.

Comment: Allowing HAMET to proceed in this manner would condone the USAG's failure to follow the public process for conservation district land use, which is of great concern.

Response: The Army is following the procedures as provided by the State of Hawaii in order to use state land.

Comment: Cultural and Archaeological Resources

The EA misrepresents the sacred significance of Mauna Kea by suggesting that tiered zones of significance begin at 11,000 feet. EA, p. 3-42. The entirety of the mountain is sacred.

Response: In Section 3.7.1, page 3-41, the Army recognized the cultural significance of Mauna Kea. The analysis of stratified zones on Mauna Kea was based on previously published material, which was drawn from interviews with Native Hawaiians. This concept was also discussed with a group of Native Hawaiians with particular interest and concern for Mauna Kea in reference to the HAMET project. The basic concept was not objected to in that meeting. The Army does recognize the place of Mauna Kea as a whole in Native Hawaiian cosmology and beliefs.

Comment: Further, finding that the concerns of Native Hawaiians most impacted by the HAMET Project do not amount to "significant impacts" is an affront to the citizens that testified

to the heavy significance of Mauna Kea and the Army's proposal to train attack helicopter pilots at this sacred site.

Response: After careful consideration of input received, the Army recognizes that there are cultural impacts to conducting HAMET. However, due to the fact that training will only last 20 days, the Army does not feel that the impacts rise to the level of being significant. No attack helicopters will be used. Only cargo and utility helicopters will be used. In addition, the Army will conduct cultural awareness training for all HAMET personnel, with particular emphasis on intangible resources and their importance to Native Hawaiians. The Army will continue to participate in open communication with Native Hawaiians, other land use groups, and other interested parties to evaluate resources and reduce impacts.

Comment: The EA accurately reports that any landings on Mauna Kea or Mauna Loa will cause significant impacts according to the assessments of some Native Hawaiians. EA, p. 4-26. However, the EA disregards these Native Hawaiians in favor of those "who believe that cultural practices can exist along side with secular activities [and] will see that compliance with regulations and careful planning and implementation can ensure less-than-significant impacts to cultural significant lands." EA, p. 4-26.

Response: The Army does not disregard Native Hawaiians in the EA. The EA recognizes that the introduction of visual, audible, or atmospheric element due to the presence of military aircraft that could impact the quality or frequency of cultural practices and beliefs (Section 4.7.2 page 4-21). Mitigations will be in place to reduce impacts.

Comment: This assessment method fails to acknowledge the logical proposition that those closest to the impacted lands will also find more significance in that land's use. In other words, those Native Hawaiians, such as members of Nā Kūpuna Moku O Keawe, who are cultural and religious practitioners of Mauna Kea, Mauna Loa, and the saddle areas, find that HAMET activities will have significant impacts. Yet, the EA ignores assessments of Native Hawaiians who know most about the project's impacts on their practices in favor of others who do not object to HAMET.

Response: The Army has consulted with Native Hawaiians, conducted literature reviews, and performed archaeological surveys to fully understand the potential impacts associated with the proposed action. Information was sought regarding cultural activities in the area of the proposed LZs. No information was revealed by Native Hawaiians who were consulted with regard to cultural practices in the immediate vicinity of the LZs.

Comment: The EA's finding that HAMET will not impact Native Hawaiian cultures and religions is a self-serving recitation of the supposed benefits that the HAMET project will afford for cultural resources. See, HAR §11-200-14 (1993) ("[T]he EIS process… shall not be merely a self-serving recitation of benefits and a rationalization of the proposed action"). Put plainly, the impacts of HAMET are here assessed by considering only those Native Hawaiians whose cultural and religious practices conveniently do not interfere with proposed actions.

Response: The Army does understand the concerns of Native Hawaiians. Based on the information that has been gathered, the Army has determined that the effects of the project will be less than significant. The areas proposed for activities have been studied through thorough literature review, archaeological survey, and consultation with Native Hawaiians. The Army requested permission to test the mounds in an effort to determine age and function, but this was

not granted by the State at this time. The landing zones are located in Mauna Kea Forest Reserve, which is managed by the State, not the Army. The Army conducted research for which it was granted access to these areas. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on historic properties, it does not prohibit properties from being disturbed.

Comment: Proposed mitigation for the cultural and religious impacts of HAMET actions on Native Hawaiians are nonsensical. The EA asserts that HAMET flights will not occur on Hawaiian "cultural holidays" (EA p. 4-26), but the only holiday identified in Section 2 is October 10th, "Columbus Day," which does not have celebratory significance in most Hawaiian cultures. Ceasing HAMET activities on "known scheduled ceremonies" (EA, p. 2-10) demonstrate a severe lack of awareness Native Hawaiians cultural practices in these areas. Burials, piko deposition, pilgrimage, and worship are purposefully not widely publicized so as to be "known" and occur in alignment with "schedules" that the HAMET EA makes no effort to recognize. The EA's emphasis on known ceremonies betrays the USAG's fundamental misunderstanding of Hawaiian ceremonies, which are not supposed to be known. As such, the 4 EA thus fails to assess the significant impacts of HAMET training on these crucial aspects of Native Hawaiian cultural practice.

Response: The Army reached out through the EA process and did not receive any information on any cultural holidays occurring in October. However, no HAMET will be conducted on weekends or any known cultural ceremony dates or on state/federal holidays, to include Columbus Day.

Through the public comment process, the Army made every attempt to obtain information on sensitive days. Any information regarding these sensitive dates or times would be incorporated into the CAB's training schedule and would kept confidential. If during operations, pilgrimages or ceremonies are observed they would be avoided by helicopters.

Comment: Few cultural surveys have been conducted on military-occupied lands at PTA, perhaps because of the military's resistance to such work. In a restricted three day survey Christopher Monahan identified a precontact Hawaiian shelter at PTA, which he recommended be registered with the National Register of Historic Places, and "avoided and preserved in perpetuity." This is difficult to do in a military training area, as Monahan points out, "By its very nature, training means that people will sometimes drive where they are not supposed to, and shoot in the wrong place." We request a full cultural impact assessment of HAMET activities on Native Hawaiian cultural practitioners and on archaeological resources.

Response: The Army relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located. Unfortunately, through our consultations and EA process, we were unable to identify and consult with individuals that have genealogical ties (or attachments) with knowledge of the landing zone areas potentially affected by the proposed action.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

Comment: Such ceremonial uses are described in the University of Hawai'i's Comprehensive Management Plan (CMP), but the HAMET EA improperly relies on this document as an authority on cultural (3.7), biological (3.6.2.3), and archeological resources (3.7.2.2) on Mauna Kea.

Response: The Army used the document to obtain a broad understanding of the cultural biological and archeological resources. We relied in part on the CMP in preparation of the EA and to support consultation, outreach and site-specific surveys. The Army relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

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The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

Comment: The CMP findings concern only the Science Reserve Area, which is a subset of the areas affected by HAMET.

Response: See our response to the previous comment.

Comment: Further, cultural consultations for the CMP were conducted in the context of telescope development and are therefore irrelevant for purposes of assessing the impacts of HAMET flight and landing activities.

Response: See our response to the previous comment.

Comment: Consultations with Native Hawaiian practitioners of the Mauna Kea, Mauna Loa, and saddle area should be carried out with specific reference to attack helicopter trainings.

Response: Attack helicopters will not be used as part of the proposed action. Section 1-7 (pages 1-5 to 1-7) provides a description of the outreach and consultation that the Army performed in support of this EA. The Army relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

Comment: Biological Resources The HAMET EA acknowledges that four endangered bird species are confirmed to be in the flight paths to the LZs – the Nēnē, ʻIo, ʻAkiapolaʻau, and the Palila. EA Table 3-5, p. 3-25. LZ-3 is threateningly close to the Kīpuka ʻAinahou Nenē Sanctuary. Fig. 3-16, p. 3-54.

Response: The Army recognizes that it will be operating near the Nēnē, ʻIo, ʻAkiapolaʻau, and the Palila sanctuary. Precautions will be taken as necessary to avoid the areas to the greatest extent possible.

Comment: Intended flight paths to LZ-4, LZ-5, and LZ-6 also cross critical palila bird habitat, but are planned to maintain a 2,000 foot minimum altitude to minimize or avoid impacts on these endangered birds. Bird strikes are acknowledged as "a possibility" and we therefore request a map or studies that identify locations of surveyed endangered birds throughout the project area.

Response: Our maps indicate the Palila critical habitat areas. To conduct HAMET, the Army would only be transiting the area for less than a minute for each training flight and unless severe weather and safety conditions dictate a need to fly at 2,000 feet AGL, helicopters will maintain an altitude of 3,000 feet AGL when they are over the core palila population. Potential impacts associated with avian species are discussed in Section 4.6.3 of the draft EA. In addition concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are included as an appendix to the final EA. Mitigations are in place to avoid these areas (Section 4.6.3, page 4-14).

Comment: We also request documentation of studies that verify that the 2,000 ft altitude provides enough barrier to avoid noise disturbance/ physical impacts on these endangered birds. The abovementioned USFWS consultation document should address these impacts on endangered species as well.

Response: The 2,000 ft minimum altitude is based on FAA advisory circular (AC) 91-36 *Visual Flight Rules (VFR) Near Noise-Sensitive Areas,* which addresses the requirements in noise sensitive areas.

Comment: To ensure that trainee pilots flying over critical bird habitats adhere to the 2,000 foot minimum altitude, we further request that the USAG maintain records of flight altitudes and GPS logs to substantiate the proposed 2,000ft buffer area avoidance and minimization measure.

Response: Pilots and aircrew will be provided mandatory pre-exercise briefings detailing the proposed flight routes, release points, and altitudes they must maintain, as well as safety and emergency requirements/protocols they must follow. The Army is well aware of the over flight

and low hovering incidents that had occurred in the past. As part of a programmed upgrade our helicopters have been equipped with state of the art navigation systems and our traffic controllers have monitoring equipment capable of tracking the progress of each and every flight. If any deviations were to occur the pilots will be notified immediately to correct course adjustments. The Army does, and will maintain records of the flight routes taken during HAMET.

Comment: The maintenance and disclosure of such records would contribute to public assurances of the USAG's ability to carry out its proposed plans to avoid Palila bird critical habitat.

Response: Members of the public may request information from the Army through the Freedom of Information Act (FOIA). Please contact the Public Affairs Office; 742 Santos Dumont, WAAF, Schofield Barracks, HI

Comment: The EA also discloses that endangered Hawaiian Petrels have not been found within 2,000 feet of the Landing Zones, although breeding colonies exist south of the LZs. EA p. 3-31. These findings do not disclose whether Hawaiian Petrels have been found beyond 2,000 feet. We request copies of studies that support the EA's finding that the Hawaiian Petrels will not be affected by HAMET activities, p. 3-32.

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the draft EA. In addition concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are included as an appendix to the final EA. Mitigations are in place to avoid these areas (Section 4.6.3, page 4-14).

Comment: The EA also emphasizes the introduction of invasive plant species as a result of HAMET activities. Helicopters carrying invasive plant species from the LZs and O'ahu may deposit them during flight into the māmane and naio forests that provide critical habitat to the Palila or in other areas where they may outcompete native species, p. 4-12. To mitigate this highly alarming adverse impact of the proposed HAMET, the EA suggests mitigation measures that amount to helicopter inspection and cleaning, p. 4-13.

All personnel should be trained in invasive species identification and removal in order to carry out these helicopter inspections.

Response: The potential for the spread of invasive plant species and arthropod species will be mitigated by adhering to existing protocols (which includes thorough washing via "birdbath") for movement of military equipment between islands. In addition, HAMET crews will be trained to inspect, and clean if required, the under-carriage of HAMET aircraft prior to missions, and the Natural Resources Office, Pōhakuloa, will inspect the aircraft parking areas of Bradshaw Army Airfield for infestations of invasive plant and arthropod species. If discovered, the Natural Resources Office, Pōhakuloa, will treat infestations with appropriate pesticides.

Comment We request documentation of procedures for invasive species detection and disposal that would be implemented for the HAMET vehicles. To substantiate compliance with these

procedures, we request the maintenance of records of personnel training and of each inspection, detection, and removal of invasive species during the course of HAMET activities.

Response: The potential for the spread of invasive plant species and arthropod species will be mitigated by adhering to existing protocols (which includes thorough washing via "birdbath") for movement of military equipment between islands. In addition, HAMET crews will be trained to inspect, and clean if required, the under-carriage of HAMET aircraft prior to missions, and the Natural Resources Office, Pōhakuloa, will inspect the aircraft parking areas of Bradshaw Army Airfield for infestations of invasive plant and arthropod species. If discovered, the Natural Resources Office, Pōhakuloa, will treat infestations with appropriate pesticides.

Comment: Recreational Users

HAMET will entail significant impacts on recreation and public safety. Unlike other trails, the trail to the Mauna Loa Observatory is not afforded a "buffer region" and lies close to the LZ 1-3 cluster.

Response: The Army acknowledges that LZs 1-3 are located very near to the Mauna Loa Observatory road. As indicated in Section 3.13 of the EA, "Pilots are briefed on the risk assessment, hazards, mitigative actions, and emergency procedures during preflight briefings prior to the start of each training mission…"

The hazards to nonmilitary personnel or wildlife in the vicinity of LZs, and those LZs in particular, during HAMET flights would be mitigated by the pilot conducting a reconnaissance flyover prior to conducting any HAMET maneuvers. During the reconnaissance flyover, pilots would visually inspect the LZ to ensure landing would not create an unreasonable risk to human health or safety. This procedural step would ensure that unauthorized personnel or wildlife are not exposed to the hazards associated with the training exercises. The road would not be restricted by the Army

Comment: The fact that the LZs are not 'destinations' for recreationists does not confirm that the increased noise and unpredictable presence of attack helicopters will not interfere with the public's enjoyment of these public trust lands.

Merely notifying the Observatory, the National Park Service, and public users of HAMET training near this trail is insufficient and presumes that the HAMET training is a higher priority usage of these state lands, p. viii.

Response: The EA does acknowledge the interference factor that noise may cause to recreationists on, for example p. 4-30 as follows, "Noise -- recreationists may experience and perceive noise as a distraction/annoyance under all Action Alternatives. However, the extent and magnitude of the distraction would be dependent on the distance the recreationist is from the noise source (HAMET flight) at any point in time during HAMET flights." Attack helicopters will not be used as part of the proposed action.

As presented in the Conservation Recommendations section of the July 2011 EA, observatory personnel and NPS personnel have been contacted per their respective requests. The public will also be notified in response to numerous public comments wanting to know when HAMET is occurring, i.e., removing the "unpredictability" aspect of HAMET.

For HAMET flights, the 25th CAB will prepare a press release (p. 4-60), which would be released to media outlets such as, but not limited to, newspapers, radio stations, and television stations. Press releases would possibly be re-posted by recipients to other locations, such as hunter check stations. Press releases are our best method of notifying the public at large. We have acknowledged in the EA that noise and visual impacts are possible, but transient. HAMET does not restrict public access and, thus, is not a higher priority use. HAMET would be occurring concurrently with multiple other uses of the area by the public. Furthermore the Army will contact Hawai'i Volcanoes National Park directly at HAVO_Superintendent@nps.gov and provide a notification of the HAMET training schedule in order for the park to alert backcountry users of the use of landing zone (LZ)-1, LZ-2 and LZ-3 on Mauna Loa.

Comment: The use of press releases is an insufficient form of notice for recreationists and other members of the public. The Mauna Loa LZs are very close to the only access roads and Saddle Road, a public highway, passes through the HAMET areas. In addition to press releases local and statewide media outlets, we recommend holding public hearings to alert recreationists to the USAG's use of public lands.

Response: In addition to the press releases to notify the public, the National Park Service will be notified per their request as will DNLR prior to training to notify the public as they requested.

Comment: Spills and "Hard Landings"

HAMET entails inexpert pilots and crews manipulating Black Hawks, Chinooks, and Kiowa Warrior attack helicopters under challenging high-altitude conditions, characterized by "high wind, high-density altitude…, turbulence, and atmospheric instability" p. 1-2. Such high-risk maneuvers have no place in a wildlife sanctuary, a forest reserve, near public park users, nor the sacred temple of Mauna Kea.

Response: The Kiowa warrior is not included in the proposed action. The Army conducts formal pre-flight risk assessment for every flight. A formal assessment of a pilot performance is conducted after each flight. GSPs were installed after 2003 on each aircraft as a programmed upgrade. Pilots and aircrew will be provided mandatory pre-exercise briefings detailing the proposed flight routes, release points, and altitudes they must maintain, as well as safety and emergency requirements/protocols they must follow. The Army is well aware of the over flight and low hovering incidents that had occurred in the past. As part of a programmed upgrade, our helicopters have been equipped with state-of-the-art navigation systems and our traffic controllers have monitoring equipment capable of tracking the progress of each and every flight. If any deviations were to occur the pilots will be notified immediately to correct course adjustments.

Comment: In 2009, the CAB lost two pilots when their Kiowa Warrior helicopters took a "hard landing" and crashed in flames near Schofield Barracks. Two other Army aviators died when their Cobra helicopter malfunctioned over Schofield in 1996. Six soldiers (4 of whom were from the CAB) were killed and 11 injured when two Black Hawk helicopters collided during a night training exercise over Kahuku in 2001. Further, the November 2003 accidental landing of a Black Hawk helicopter three and one-half miles east of a LZ and within the Mauna Kea Ice Age NAR and within the Mauna Kea Adze Quarry demonstrated that even if the LZs and flight paths do not directly cross endangered species critical habitats, the margin of helicopter pilot error defeats such demarcations.

Response: HAMET flights are considered low risk, according to the 25th CAB Risk Assessment Worksheet and the possibility of a wildfire as a result of a crash was determined to be remote. This conclusion is based hundreds of thousands of hours flown, the CAB's historical safety record, the fact that training would be conducted outside of vegetated areas (i.e., at LZs), and the minimal flight time (less than 1 minute per flight) that would be spent over vegetated areas.

Comment: The EA's proposed solutions – to better educate HAMET personnel on environmental and cultural issues – do not directly address the problem of trainee pilot accidents. And, the belated decision to install GPS devices in attack helicopters after this accident calls us to question how well the HAMET project has been planned as a whole. At minimum, a formal assessment of trainee pilot margins of error is needed.

Response: Pilots and aircrew will be provided mandatory pre-exercise briefings detailing the proposed flight routes, release points, and altitudes they must maintain, as well as safety and emergency requirements/protocols they must follow. The Army is well aware of the over flight and low hovering incidents that had occurred in the past. As part of a programmed upgrade, our helicopters have been equipped with state-of-the-art navigation systems and our traffic controllers have monitoring equipment capable of tracking the progress of each and every flight. If any deviations were to occur the pilots will be notified immediately to correct course adjustments. Attack helicopters will not be used as part of the proposed action.

Comment: More recently in March 2011, four Marines who had recently returned from Afghanistan crashed their CH-53D Sea Stallion helicopter into the Kane'ohe Bay sand bar. In addition to the damage caused by the impact of a 21-ton helicopter on the reef, the helicopter had two main fuel tanks each with a capacity of 680 gallons. One ruptured and all the fuel leaked out overnight. A disclosed estimation of 880 gallons spilled into the ocean.

Spills on HAMET project areas are likewise "uncontainable," as the EA discloses, due to the high permeability and percolation rates through the porous lava rock in the LZs, p. 4-10. Groundwater could be adversely impacted "through the contamination of an aquifer. If an emergency (i.e., mechanical failure resulting in a crash) were to result in a spill, it would likely be uncontainable due to the high permeability and percolation rates through the porous lava rock. Therefore, it would be likely for a spill to percolate through the lava rock and possibly contaminate an aquifer below." p. 4-10.

This means that contamination of the ground water in the LZs may impact water resources and therefore do not justify a finding of no significant impact. Emergency plans should be developed for spill and leak containment, workers should be trained in emergency procedures, and records of these plans and trainings should be maintained and disclosed to the public.

Response: Army helicopters have self-sealing primary and auxiliary fuel systems for rotary winged aircraft to reduce the possibility of leakage, fire and explosion during impact (Section 4.5.3). The likelihood of a leak that would contaminate groundwater from a crash is extremely low due to these safety features.

Comment: In conclusion, the EA is not forthcoming about the threats that HAMET training poses to Native Hawaiian rights, fragile ecosystems, nor to other recreational uses of the area. Beyond the EA, the USAG has not complied with state and federal laws relating to conservation district land use and endangered species protections for the HAMET proposal. Thank you for offering this opportunity to present our concerns. Please contact us with any questions.

Response: Thank you for your participation in our EA process.

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

SEP 0 6 2011

Sierra Club
Hawai'i Chapter
Attn: Deborah Ward
PO Box 918
Kurtistown, HI 96760
808-966-7361

Dear Ms. Ward:

Thank you very much for your comments, set forth in your letter dated August 22, 2011, on our July 2011 draft high altitude mountainous environment training (HAMET) environmental assessment (EA). The responses to your comments are attached.

Thank you for your participation in the HAMET EA review process.

Sincerely,

Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosure: Responses to Comments

Comment: We request that HEPA and NEPA EIS be conducted concurrently to address deficiencies in this document, and the cumulative impacts of the proposal, within the context of the sizable expansion of training activities at Pohakuloa Training Area (PTA).

Response: The EA document sent for your review is both compliant with National Environmental Policy Act (NEPA) and Hawaii Revised Statutes (HRS) Chapter 343. The Army has come to the conclusion that there are no significant impacts and an EIS is not required.

Comment: Public involvement, consultation and outreach were not adequate A FOIA request FOIA dated June 15 that all biological references referred to in the Draft Environmental Assessment (DEA) dated April-June 2011, title Memorandum For Record conducted by senior author Peshut, P.J., be made available for review, and provided as Appendices in the DEA. These documents are not available for review, and no response has been provided for the FOIA request, in spite of multiple follow up requests.

Response: The MFRs requested by Debra Ward through the Freedom of Information Act request were sent and received on August 23, 2011.

Comment: We requested that all respondents to the first and second DEAs be provided with notice that a third DEA was available for comment. Neither a response to their comments, nor a notice (beyond notice in OEQC and 2 newspapers) was provided. The claim that "copies were also mailed to interested individuals…if requested" did not include providing copes to those who had commented in the past, and therefore were obviously interested. Their comments are not appended in this DEA.

Response: The Army provided copies of the July EA to all who commented on the April EA. We also advertised our notice of availability in the OEQC environmental notice as well as in a local newspaper that circulates on the island of Hawaii. All comments received on this as well as our responses are provided as an appendix in the final EA.

Comment: While the Executive Summary states that there was public comment analysis, the DEA3 does not provide any way to review the comments or the analysis. Changes to the document were not highlighted, so changes in response to comments provided for earlier drafts were difficult to discern. We request that the Final EA provide documentation of all public comments, and responses.

Response: See our response to the previous comment.

Comment: Requests for consultation by Sierra Club were ignored, and others who provided comments in earlier drafts were not consulted.

Response: The Sierra Club was offered the opportunity to attend a briefing and flight demonstration concerning HAMET - the Sierra Club declined to participate. All relevant comments that were provided in the earlier draft were addressed in the July EA.

Comment: We note that the Army for addressed a few of the concerns identified by the community in two previous responses to the initial two drafts, and for providing more information regarding reduced training request, and more information about the landing zone

locations. However, serious concerns remain. This letter identifies some specific areas of deficiency in this document.

1.4 The need for proposed training in Hawaii

HAMET proposes to adapt the National Guard's 4-day helicopter training to provide two hours of training in Hawaii. It is not clear why the two hours of training considered adequate for deployment in the zone of activity in Afghanistan or Iraq could not be conducted better at a training facility in Colorado, if only 3 aircraft are proposed be utilized at any one time in Hawaii.

Response: The pre-deployment requirement for HAMET includes classroom instruction, simulator training and individual flight techniques training. The flight time of 2 hours is the time anticipated to be needed outside PTA.

Comment: It is not clear that training in conditions of high wind, turbulence and atmospheric instability would be accomplished during a two-hour training. The document indicates that the landing zones are flattened sites, but the training goal to land on sloped or uneven surfaces, pinnacles or ridges is consistent with the landing zone description.

Response: Refer back to EA section 2.1 page 2-2. We are landing at high altitudes to prepare for the power management issues to conduct these tasks in the future.

Comment: 1.7 Public involvement, consultation and outreach were not adequate. Sierra Club was one of many responders to the first DEA, but the response was not acknowledged, nor was the club invited to consult as we requested. The letters of response were not included in the DEA2 or DEA3, nor were responders listed in the DEA3. While some of the responder's concerns were addressed, other issues were not addressed.

Response: The Sierra Club was offered the opportunity to attend a briefing and flight demonstration concerning HAMET - the Sierra Club declined to participate. All relevant comments that were provided in the earlier draft were addressed in this EA.

Comment: The US Army has a responsibility to consult with parties who have an interest in the land being considered. Sierra Club is an organization with over 3000 members statewide, with a history of hiking for recreation, and active efforts to protect and restore the natural environment, specifically in conservation districts, including game management areas. Other groups with recreational interests include hunters, cavers, wildlife sightseers, and many more. Although volunteer members of a community advisory board for the Mauna Kea Science Reserve were identified (incorrectly) as consulted parties, the MKSR is only one of several neighbors. The Natural Area Reserve System, Hawaii Volcanoes National Park, Department of Hawaiian Homelands are all neighbors to this proposed project, yet these groups with interests were not consulted.

This may violate CFR: "a plan to include all interested or affected parties should be developed…[and] will include the following…3) Consultation with appropriate persons and agencies. [32 CFR V 651.36 (e)] "Distribution of the draft FNSI should include any agencies, organizations, and individuals that have expressed interest in the project, those who may be affected, and others deemed appropriate." [32 CFR V 651.35 (f)]

Response: The Army has provided copies of the EA and FNSI to interested parties who commented early on in the process. Section 1-7 (pages 1-5 to 1-7) provides a description of the

outreach and consultation the Army performed in support of this EA. Through these efforts, the Army feels that we have met the consultation requirements for a project of this scope.

Comment: Public involvement was inadequate, despite years of public interest in military actions. "where impacts are… suspected to be of public interest, public involvement should be initiated early in the EA (scoping) process. [32 CFR V 651.39(c) \4\]

Response: The proposed action has been significantly reduced in the July EA. We used documents and input from the previous EAs that had larger proposed actions using the comments as scoping information and to help revise the resulting proposed action.

Comment: Requirements for public meetings may not have been met—several commenters called for meetings open to the general public, but none were held.

"The proponent shall also ensure appropriate public and agency meetings, which may be required to facilitate the NEPA process in completing the EA." [32 CFR V 651.35 (h)]

Response: The Army provided copies of the July EA to all who commented on the April EA. We also advertised our notice of availability in the OEQC environmental notice as well as in a local newspaper that circulates on the island of Hawaii. All comments received on this as well as our responses are provided as an appendix in the final EA. In addition, the Sierra Club was offered the opportunity to attend a briefing and flight demonstration concerning HAMET and the Sierra Club declined to participate.

Comment: 1.8 Regulatory Framework: Cumulative impact of military expansion must be addressed Federal law says any EA longer than 25 pages may indicate the need for an EIS. The EA cites this law but appears to disregard it. "Any analysis that exceeds 25 pages in length should be evaluated to consider whether the action and its effects are significant and thus warrant an EIS." Cited in EA references [32 CFR V 651.32 (b)]

Response: The suggestion of 25 pages may indicate the need for an EIS but does not define the need for an EIS. The EA determined that there were no significant impacts and as such an EIS is not warranted.

Comment: We continue to be concerned that the significant expansion of military activities, including the Pohakuloa Training Area, with additional construction, Stryker land use, and other proposed projects, is being partitioned into separate segments.

Response: Impacts of Army activities that have independent utility have been addressed in accordance with and will be conducted in accordance with 32 CFR 651.32.

Comment: Hawaii is a small land area in the middle of the Pacific Ocean, 2000 miles from a continental land mass. The people of Hawaii have virtually no recompense when land is usurped and never returned. The cumulative impact on the region, the regular use of the land in question by Hawaii residents, and the damage to the flora and fauna by military practice, accidents, waste, release of hazardous materials, and satisfactory mitigation are not addressed in this document or any other partitioned proposal. The expansion of PTA training into the Conservation District(s) (which are ceded lands held in trust, managed by the Department of Land and Natural Resources (DLNR)), will negatively impact natural, cultural, and recreational resources in ways that are not assessed or addressed in this document. This is why a NEPA EIS must be conducted for this and

other projects. The intended use of the State of Hawaii Conservation District Limited subzone may also trigger the development of at HEPA EIS, including a Cultural Impact Statement.

Response: The Army is only requesting the use the six, 150 x 150 ft LZs for 20 days. Through our analysis, we have determined that the proposed action will not have significant impacts to flora, fauna, cultural resources, or result in any release of hazardous materials to the environment.

Comment: Description of the proposed action and alternatives do not provide adequate detail In this document, impacts from transporting helicopters and soldiers between O`ahu and Pohakuloa, and an increased number of flights to and around Pohakuloa, are not evaluated.

Response: HAMET would be integrated into other scheduled flight training (Section 2.1, page 2-1). Transportation between the inlands of Oahu and Hawaii are a part of the existing scheduled training. The EA analyzes the potential impacts associated with the additional HAMET training activities. The EA does analyze the increased flight around PTA.

Comment: Alternative V was not given adequate consideration; the statement that aircraft (23 in April DEA, now "many" in July DEA) would have to be transported begs the question: if only three aircraft would be used simultaneously in Hawaii training, even if an additional number were undergoing fueling and maintenance, why would so "many" be needed for training in Colorado?

Response: Since there are limited organic maintenance capabilities in Colorado and the LZs in Colorado are 15 to 20 minutes away from base, additional aircraft are required in order to maintain the same level of operations.

Comment: The document does identify a time frame under which the proposed actions would occur; October 2011. Is the request for Right of Entry (ROE) permit is limited to the specified 2011 timeframe? A specific end date for proposed training during the preferred alternative should be identified.

Response: The proposed action is intended to be conducted in October starting at the earliest October 3 and ending at the latest on October 31, 2011, as stated on page 1-5 of the EA.

Comment: Although ROE permits have been issued in the past, the document does not identify the State or Hawaii rules which govern the use of State land, nor does the document cite case law used to bolster the "right of entry" permit over the Conservation District Use Permit (CDUA). A CDUA would provide the public and the BLNR a broader role in the site selection and conditions of use.

Response: The Army as a federal agency cannot be required to enter into a state CDUP process. The Army will however seek a right of entry for landing on State lands which will comply with relevant portions of the CDUP prerequisites and mitigation measures.

Comment: Sierra Club would like to incorporate by reference the comments of Moku Loa Group of Sierra Club on the Safety Record and Human Health and Safety Hazards.

Response: The responses to the Moku Loa Group and Sierra Club are provided in the appendix of the final EA.

Comment: 2.7.2.2 HAMET flight details

The proposed action is to train 90 (reduced from 300-400) helicopter aviators for mountainous high altitude flights. Actions proposed will include approach and hover (3 ft), abort and go-round, elevated reconnaissance, landing on an angled uneven surface, landing on a pinnacle or pu`u in fragile alpine ecosystems, including operations conducted at night.

"The area 3,280 ft (1000 m) from the center of each LZ would be the training area where helicopters would be expected to be at terrain flight altitudes of 200 feet (61 m) above ground level (AGL). " This is 3/5 of a mile radius, or more than a mile in diameter, and given the proximity of the landing zones, the area where flying at 200 ft or less is significantly higher than maps and related text would make it appear. The document should detail the low (<201 ft) elevation flight path visibly on maps and graphics.

Response: Rotor wash may not affect the ground until the helicopter is less than 90 ft AGL. This is consistent with the diagrams depicted on the maps in the EA.

Comment: 3. Affected Environment

3.1 Meteorological conditions that may impact the LZs are the effects of diurnal wind patterns and temperature inversions, restricting visibility, due to cloud or fog. The areas are frequently closed to the public due to extreme drought conditions and high fire hazard. High winds also impact the higher elevations frequently. The document does not describe what impact these hazards would have on training, and how the training would be altered due to hazard restrictions. The area is currently closed due to extreme fire hazard. Would this hazard trigger cessation of training activities? The safety of training is in question, given numerous accidents cited in the Moku Loa Group comments, but no mitigation is described to cope with aviation failures, crashes, fires, fuel dumping, and hazardous releases into the environment.

Response: As stated in section 3.13, The Army has procedures (Army regulation 95-1) in place to investigate and plan for possible hazards. As part of flight operations, a risk assessment is completed by a commanding office and addresses general and specific hazards for each flight mission. Pilots are briefed on the risk assessment, hazards, mitigative actions, and emergency procedures during preflight briefings prior to the start of each training mission.

Comment: 3.6 Biological Resources: Table 3-5 on page 3-24 lists federal- and state-listed T&E species potentially impacted by the project. The Mauna Loa and Mauna Kea LZs are above tree-line in alpine grasslands and alpine stone deserts. Of the 43 species listed as endangered, threatened, candidate and sensitive species, insufficient information is provided about specific surveys conducted in the proposed training areas.

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the draft EA. In addition, concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are included as an appendix to the final EA.

Comment: The flight paths are over subalpine dry forests and shrublands, including palila critical habitat. The noise and vibrations associated with training operations on bird breeding and rearing success, and mitigation is not described in sufficient detail.

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the draft EA. In addition concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are included as an appendix to the final EA. See Section 4.6.3.1.1 pg 4-14, 4.11.3.2.1 pg 4-50

Comment: The statement in the Executive Summary that "noise could impact sensitive species by causing wildlife to flee the area and interrupting life-cycle events like breeding" is our great concern. A species on the brink of extinction does not have the luxury of latitude; negative impacts may seal their fate.

Response: Potential impacts associated with avian species are discussed in Section 4.6.3 of the draft EA. In addition concerns for avian species in the action area are addressed in the Memorandum For Record dated 20 June 2011 pertaining to the Determination of No Effect (Peshut 2011b, 7 pp), the Memorandum For Record dated 04 April 2011 pertaining to Hawaiian Avifauna Surveys (Peshut and Schnell 2011a, 47 pp), and the Memorandum For Record dated 10 June 2011 pertaining to Hawaiian Petrel Surveys (Peshut and Schnell 2011b, 4 pp). These documents are included as an appendix to the final EA. In addition the Army would be flying at altitudes of 3,000 ft AGL or at 2,000 ft AGLwhich is a national standards for flying over designated wilderness and national parks. See Section 4.6.3.1.1 pg 4-14.

Comment: Similarly, the endangered Hawaiian Hawk or `io has been recorded in the area of the Mauna Loa LZ, and the statement that "it is anticipated that the population densities at the LZs is zero" is highly speculative, and not based in science.

Response: Bio The 'Io is not anticipated to frequent the area of the LZs is based on avifauna surveys. Reference MFR Peshut and Schnell 2011a

Comment: Observation of bats in the vicinity, reported by commenter Ron Terry, were not addressed, and the presence of petrel nesting in the area should cause discontinuance of the area altogether. Has a detailed analysis of the threats to T&E species been conducted by USFWS? If so, we would like to see the correspondence in the document.

Response: The Section 7 consultation with the USFWS was not conducted because it is anticipated that no effect to T&E species will occur as is described in the "Letter of No Effect". Reference MFR Peshut and Doratt 2011b, Peshut and Schnell 2011a, Peshut and Schnell 2011b, See section 4.6.3.1.1 pg 4-14, and Peshut 2011b. The MFRs are included in as an appendix in the final EA.

Comment: Protocols addressing drought hazards such as the one described in the recent DOFAW press release are not addressed; see the announcement: Pursuant to Hawaii Revised Statutes (HRS) 185, the Land Fire Protection Law, the Department of Land and Natural Resources, Division of Forestry and Wildlife is extending the closure of Mauna Kea Forest

Reserve and Kaohe Game Management Area until February 28, 2011, due to continuing extreme fire hazard conditions. Though portions of the area have received some rainfall over the last few weeks, drought conditions still persist due to lack of rainfall over the past year and the vegetation is drier than normal.

As of December 23, 2010, the U.S. Drought Monitor still considers much of the area as being categorized as drought intensity D-2 (severe) and D-3 (extreme). Vegetation surveys in the affected areas have confirmed that extreme fire hazard conditions persist. The closed area includes portions of the forest reserve, below 10,000 feet elevation, between Waikahalulu Gulch, west to the gate 1.1 miles past Kemole, all of the Kaohe Game Management Area, and all roads in the Ahumoa and Skyline area. No public access will be allowed until sufficient rainfall reduces the fire risk in the area. Pohakuloa Training Area will also be closed to public access until further notice by the Department of Defense.

If the access roads are closed to the public for safety reasons, would military operations be curtailed as well, to avoid additional hazard? This question was posed by Sierra Club in the previous comment period, but was not addressed.

Response: The Army will adhere and abide to any restriction stipulated by DLNR. Currently our action is proposed to occur in October 2011 beyond the closure noted. At this time we are unaware of any drought related restrictions presently. See section 3.13.4 pg 3-76.

Comment: 3.7 Cultural Overview

The extremely limited cultural consultation with affected cultural practitioners, and with lineal families associated with the areas proposed is a glaring omission, which in and of itself calls for denial of the FONSI.

Response: Native Hawaiians were consulted, as were SHPD and OHA. No specific individuals with attachments to descendants of this area were identified. Survey was conducted of the areas of potential effects; beyond that the Forest Reserves are State jurisdiction, and as the Army does not have a project affecting the remainder of this area there is no trigger for a federal survey. Discussions with individuals at Pu'u Poliahu and other areas in that vicinity indicated that they were not aware of the helicopters flying to the landing zones.

The United States Army Garrison, Hawaii (USAG-HI) relied on both its consultation with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs and published and available literature to document in our EA the cultural resources and cultural significance within the broad geographical area where our proposed flight routes and landing zones are located.

Unfortunately, through our consultations and EA process, we were unable to identify and consult with individuals that have genealogical ties (or attachments) with knowledge of the landing zone areas potentially affected by the proposed action.

The Army's EA assess the impacts of the proposed action and alternatives on the known cultural resources, practices and beliefs to the extent possible, that the information sought through consultation and in the public comment period was provided.

In the EA the Army provides:

- A discussion of consultation with individuals and organizations
- A description of attempts to identify and locate individuals with genealogical ties to the project area
- References to the source materials consulted
- An Appendix that provides comments, both supportive and opposing, to the proposed action
- A discussion concerning the cultural resources, practices and beliefs identified
- To the extent possible, a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

Comment: The cultural significance of cultural features described must be considered, and a thorough survey, literature review and oral history documentation is absent from this document. The Humu`ula trail and others are identified on the maps. Present day cultural and spiritual practitioners utilize these areas, and no note is taken of present day use. Old government maps and surveys include cultural details, and should be included.

Response: A thorough survey of the defined project areas was conducted, and the features identified were reported. A thorough literature review was conducted, including a review of historic maps. Most of what are considered "historic maps" are either perspective drawings that are not comparable to modern maps, or are at a scale that does not allow for an evaluation of the relationship between the project areas and the features depicted on the maps.

No physical manifestation of trails was observed near the project areas, or in them, and parties consulted with did not indicate that the trails pass within or close to the project area. All of the information that was obtained about cultural and spiritual practices indicated that it was centered around Lake Waiau, Pu'u Poliahu and other locations in the summit region. In the vicinity of the locations where observers were during the noise testing they were unable to detect the presence of helicopters during the test flights.

Comment: Located in close proximity to the Mauna Kea Historic District, the landing zones on Mauna Kea reserve closer review. Will tactical operations in preparation for war affect the cultural and spiritual practice of those who ascend the Pu`u Poliahu, only to see helicopters landing on the distant cones?

Response: HAMET will provide for pilot training, not tactical operations. People who ascend Pu'u Poliahu could under ideal conditions potentially see a helicopter during pilot training. HAMET pilot training as stated in the EA has been designed to avoid all known recreational, cultural and spiritual practices by time and location.

Comment: 3.9 Regional Land Use

Will light from nighttime operations have any effect on the astronomy facilities?

Response: During night-time operations, pilots use night vision goggles (p. 2-11) and not visual light for navigation. Helicopter running lights will be used in accordance with FAA regulations. No impact is expected from running lights. The Army made contact with the astronomy and

observatory personnel for both Mauna Kea and Mauna Loa seeking input to the proposed action. Neither entity indicated any concerns regarding nighttime HAMET operations.

Comment: 3.10 Recreation

Mauna Loa Recreation (3.10.2) was inadequately addressed The Mauna Loa (ML) LZs are immediately adjacent to the Mauna Loa Observatory access road, the project area boundary is directly adjoining the Kipuka `Ainahou Nene Sanctuary and game management area (GMA). This area is utilized, not only by astronomers accessing the ML Solar Observatory, but by cultural practitioners, hunters, hikers, cavers, birders, those accessing the Hawaii Volcanoes National Park, and many others. The document claims that dispersed recreational activities may occur within the project area. No data was provided to describe which activities occur or the frequency of use: however activities may include hiking, hunting, camping and sightseeing.

Response: Section 3.10.2 discusses the Mauna Loa Trail System. Our subcontractor made numerous requests on our behalf between 3/23/11 and the publication of the April 2011 EA to obtain hunter use data. They have documented their attempts via a conversation record that is located in the HAMET administrative record.

The helicopters will avoid any personnel in the areas and traffic in the areas of the LZs. The Army has consulted with the NPS and they have requested that we provide to them the dates and time the Army would be training.

Comment: Mauna Loa Access Road is used by regularly by hikers to the summit of ML, hunters, astronomers, cavers and tourists. There is data on the hunters, at the very least!

Response: Information on recreational activities is located on pg 3-65 and impact analysis on pages 4-30. Our subcontractor made numerous requests on our behalf between 3/23/11 and the publication of the April 2011 EA to obtain hunter use data. They have documented their attempts via a conversation record that is located in the HAMET administrative record. The helicopters will avoid any personnel in the areas and traffic in the areas of the LZs. The Army has consulted with the NPS and they have requested that we provide to them the dates and time the Army would be training.

Comment: The LZs are not destinations, but the LZs activities will impact use of the area by everyone else.

Response: The EA does acknowledge the interference factor that noise may impact on recreational use, for example p. 4-30 as follows, "Noise, recreationists may experience and perceive noise as a distraction/annoyance under all Action Alternatives. However, the extent and magnitude of the distraction would be dependent on the distance the recreationist is from the noise source (HAMET flight) at any point in time during HAMET flights." The EA also discloses our plans to notify the public about HAMET training times such that users can be minimally impacted.

Comment: The users affected by the proposed training area were not consulted, nor were the impacts of training activities on these users addressed.

Response: The Army provided draft copied of the July EA to all who commented on the April EA. We also advertised out notice of availability in the OEQC environmental notice as well as in a local newspaper that circulates on the Island of Hawaii. All comments received on this as well

as our responses are provided as an appendix in the final EA. Section 1-7 (pages 1-5 to 1-7) provides a description of the outreach and consultation the Army performed in support of this EA. Through efforts, the Army feels that we have met the consultation requirements for a project of this scope.

Comment: Mauna Kea Recreation (3.10.1) was inadequately addressed The Mauna Kea (MK) LZs are remote, accessible by 4-WDR trail. Adjacent to the Mauna Kea Science reserve boundary, adjacent to the Historic District boundary, and adjacent to the MKIA NAR boundary. LZ 5 and LZ6 are on top of cinder cones.

The Mauna Kea summit landscape is a National Natural Landmark. The National Park Service contends that the permanent destruction of any surface geologic structures within the Mauna Kea NNL is significant and it denigrates from its overall status as a national natural landmark. Consultation with NPS regarding this landmark must be included in the final EA.

Response: The proposed action will not result in any destruction of any surface geologic structures or elements that contribute the designation of the Mauna Kea NNL. As is noted in Section 4.9.3 of the EA, "Mauna Kea is one of the best examples of a type of biotic community or geologic feature in its biophysiographic providence." HAMET activities would not compromise or disturb the illustrative value or condition of the features for which Mauna Kea was designated NNL status. Thus, the proposed action does not impact any of the criteria with regard to Mauna Kea's NNL designation, and implementing HAMET would have no impact on NNL designation.

Comment: "The National Natural Landmarks Program was established under the authority of the Historic Sites Act of 1935 (16 U.S. C. 461-467). Mauna Kea Summit Region, designated as a national natural landmark, is a national significant natural area that has been designated to the Secretary of the Department of the Interior . To be nationally significant, a site must be one of the best examples of a type of biotic community or geologic feature in its bio-physiographic province. Examples of the natural diversity include terrestrial and aquatic ecosystems, fossil evidence of biological evolution, as well as features, exposures and landforms that record active geologic processes, such as the Mauna Kea NNL. The determination that a site is one of the best examples of a particular feature is a natural region or bio-physiographic province is based on primary criteria of illustrative value and condition of the specific feature; secondary criteria include rarity, diversity, and value for science and education (Federal Register Title 36 Chapter 1 Part 62.)

In the case of Mauna Kea, it met this test in 1972, when it was added to the National Registry of Natural Landmarks In fact few sites possess better credentials to justify their national significance than does Mauna Kea and the criterion still holds today. The Mauna Kea National Natural Landmark is held in trust by the State of Hawaii and its 83,900-acre boundary incorporates the lands within the Conservation District, including the Mauna Kea Science Reserve, Ice Age Natural Area Reserve, and the Mauna Kea Forest Reserve.

First and foremost, Mauna Kea is the exposed portion of the highest insular mountain in the United States, rising up over 30,000 feet above its submerged base in the Pacific Ocean. Second, on its slopes is found Lake Waiau, the highest lake in the United States. Third, though located in the tropics, indisputable evidence of glaciations is present above the 11,000 foot level. Lastly, possibly transcending all of these nationally significant qualities, is the fact that Mauna Kea is

the most majestic expression of shield volcanism in the Hawaiian Archipelago if not in the world. "The National Park Service contends that the permanent destruction of any surface geologic structures within the Mauna Kea NNL is significant and it denigrates from its overall status as a national natural landmark. " Quotes from DEIS comments made by Rory Westberg, NPS Acting Regional Director to the DEIS for the Thirty Meter Telescope project.

DLNR Chair Laura Thielen also noted re the DEIS for the Thirty Meter Telescope project: "The objectives of the NNL program are fourfold: to encourage the preservation of sites illustrating the geological and ecological character of the United States; to enhance the scientific and educational value of the sites thus preserved; to strengthen public appreciation of natural history; to foster a greater concern for the conservation of the nation's natural heritage."

The area is utilized by cultural practitioners, hunters, hikers, and others. Additionally, the Office of Mauna Kea Management reports that over 400,000 residents and visitors are estimated to be using the Mauna Kea Access road to view the wild and scenic resources of the mountainous terrain. The spiritual value of this unique resource led National Geographic magazine to honor among the sacred places of the world in a (January 2011) Special Edition titled, "The Earth's Holiest Places: Sacred Journeys."

Response: The proposed action will not result in any destruction of any surface geologic structures or elements that contribute the designation of the Mauna Kea NNL. As is noted in Section 4.9.3 of the EA "Mauna Kea is one of the best examples of a type of biotic community or geologic feature in its biophysiographic providence. HAMET activities would not compromise or disturb the illustrative value or condition of the features for which Mauna Kea was designated NNL status. Thus, the Proposed Action does not impact any of the criteria with regard to Mauna Kea's NNL designation, and implementing HAMET would have no impact on NNL designation.

Comment: 3.11 Noise Measurements and Effects

We incorporate by reference the comments of Moku Loa Group and M. Cory Harden with regard to noise.

Response: See responses to the comments by the Moku Loa Group and Cory Harden.

Comment: The document acknowledges that the ambient noise sources are currently birds, insects and wind. This would be exactly what one would expect in a wilderness designated as conservation district. Noise analyzed by the common metric DNL (day night average over a 24 hour period), while it may be commonly used, does not accurately reflect the disturbance caused by the transient drone and vibration of an approaching and receding helicopter. The distraction, disturbance and vibration have effects on humans and fauna that will not be accurately reported is a 24 hour average is used. The A weighted dBA scale is shown on table 3-6 on page 3-41.)

Response: The majority of United States noise guidelines for assessing human exposure to environmental/community noise is based on the DNL metric, and it is the required noise metric per USEPA noise guidelines and Chapter 14 of Army Regulation 200-1. In addition to the DNL, maximum noise levels associated with the Chinook were also used in the EA to assess potential effects of HAMET training activities on wildlife. "The A-weighted scale most closely represents the response of the human ear to sound." These analysis determined that there would no significant impacts to humans or fauna associated with HAMET. Section 4.11.1.1 pg 4-32.

Comment: The document claims that up to 35 percent of the population would by highly annoyed by the noise of training activities at dBA of 90 at the LZs. The EPA recommends using the DNL (total noise averaged over 24 hours) to quantify the intrusiveness of nighttime noise. The document states without an explanation that the State of Hawaii noise standards do not apply to the proposed activities. Table 3-8 in the document states that Aviation dBA of greater than 75 is in the Zone III Land Use Planning Zone, which is incompatible with noise-sensitive land use.

Response: (1) The annoyance percentages presented in Table 4-13 of the document are based on maximum noise levels and a frequency of more than 50 flights per day, which may not represent the same frequency of HAMET training operations. In addition, noise levels within immediate vicinity of the LZs would be in the range of 90 dBA; outside this area, maximum noise levels drop below 85 dBA. As part of the Army's flight safety measures, helicopter crews will not land on the LZs if people are in the immediate vicinity of the LZs; therefore, exposure to noise levels in above the 90 dBA range is not anticipated.

(2) The DNL represents the average noise level of a specific noise source over a 24-hour period, which includes both daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods. It places a 10-decibel penalty on noise occurring during nighttime hours to account for increase annoyance with nighttime noise. Because HAMET flights may be conducted after 10 p.m., the DNLs presented in the EA include this 10-dBA penalty for nighttime flights.

(3) There are no promulgated standards for helicopter noise in the State of Hawaii Noise Standards. As stated in the EA, the State of Hawaii Noise Standards only apply to stationary noise sources, and equipment related to agricultural and construction activities; helicopter training does not fall into these categories.

Comment: Recent events on the mainland, when hundreds of birds fell from the sky to their deaths, were attributed to the noise from aerial fireworks. The palila bird is already Endangered and in close proximity to a constant barrage of aerial bombing, live fire, and other military noise. How would additional helicopter flights over their Critical Habitat improve their chances for recovery?

Response: Helicopters will not be using live fire or pyrotechnics during HAMET training. It is not anticipated that noise will significantly impact the palila. Academic studies have indicated that bird species are more affected by ground-based noise, such as hiking and hunting, than air-based noise. Mitigation efforts have been established to reduce the impact of noise, such as the 3,000 ft AGL flight path over (less than 1 minute transit time per filght) the PCH. Recovery of the palila will not be affected by helicopter flight over their habitat. Section 4.6.3.11 pg 4-13, 4-14.

Comment: 3.11 Visual and Aesthetic Resources

The visual quality of an area is defined in terms of areas of high scenic quality, recreation areas characterized by high numbers of users, quality (parks), and important historic or archaeological locations. The tour users of Mauna Kea are numbered at 400 per night, according to UH. The project area is within the Historic property boundary, and the broad vistas of the Saddle Rd are important features of the Mauna Kea State Park as well. The impact of nighttime training activities would be highly significant to these and other users.

Response: The HAMET flight paths and LZ are not within the Historic property boundary (See figure 3-15). Training activities are anticipated to be short in duration and would not result in obstructing recreationists' views of the high scenic quality of the region. Section 4.10.3 pg 4-31.

Comment: 3.12 Human Health and Safety Hazards

The document states that hazards are non-existent unless a human is in the landing zone. The ML LZs are very close to the only ML access roads, and any approach and takeoff could impact users of the road. The safety hazards would require restrictions on the use of the access road, yet no discussion of road restriction is presented. Aviation failures with similar aircraft have occurred in Hawaii, resulting in death of the aviators. The document fails to disclose this information.

Response: The Army acknowledges that LZs 1-3 are located very near to the Mauna Loa Observatory road. The hazards to nonmilitary personnel or wildlife in the vicinity of LZs, and those LZs in particular, during HAMET flights would be mitigated by the pilot conducting a reconnaissance flyover prior to conducting any HAMET maneuvers. During the reconnaissance flyover, pilots would visually inspect the LZ to ensure landing would not create an unreasonable risk to human health or safety. This procedural step would ensure that unauthorized personnel or wildlife are not exposed to the hazards associated with the training exercises. The road would not be restricted by the Army. The military's safety record was provided in section 2.6; other safety records are out of the scope of this EA.

Comment: 3.13.2 Aerial traffic: During training operations, the airspace around the flight corridor and over the LZs would be closed to civilian aircraft. How would this impact civilian tour operators? This is not discussed.

Response: The airspace will remain Class G uncontrolled. As discussed in section 4.14.2.3, pilots performing HAMET operations will use the Island Traffic Advisory Frequencies and the Common Traffic Advisory Frequency for communications and deconfliction with other aircraft.

Comment: 4.0 Environmental Consequences

4.4.3 Land Use summary of impacts

Table 4-3 claims that disruption, impediment, or discouragement of recreational activities is less than significant. Since these users were not consulted, there is no data to confirm this finding. In fact, Sierra Club takes issue with the contention that recreational activity in the Conservation District land is less than significant. Our members utilize this resource regularly, and would be negatively impacted by training exercises, day or night.

Response: The EA does acknowledge the interference factor that noise may impact on recreational use, for example p. 4-30 as follows, "Noise, recreationists may experience and perceive noise as a distraction/annoyance under all Action Alternatives. However, the extent and magnitude of the distraction would be dependent on the distance the recreationist is from the noise source (HAMET flight) at any point in time during HAMET flights." The EA also discloses our plans to notify the public about HAMET training times such that users can be minimally impacted.

Comment: 4.6 Biological Resources

The Appendix A Section 7 Consultation Memorandum For Record states in part that "the potential for helicopter collision with the Hawaiian Hoary Bat is unlikely because bats are … only active from sunset to sunrise…" and yet training is planned to take place under "day and night conditions" according to Section 2.1.

Response: Training is scheduled to take place during night conditions while bats are active, but a collision with the Hawaiian Hoary Bat is not anticipated because the LZs are located in areas that are devoid of suitable bat habitat. See section 4.6.3.1.1pg 4-13 and 4-14, and the Memoranda for Record (Peshut and Doratt 2011a), which is included in an appendix in the EA.

Comment: The wekiu bug (Nysius) critical habitat is almost entirely made up of the loose uncompacted cinder scoria on the sides and top of cinder cones, since these were areas not covered during the glaciation, the loose cinder is not filled with dust , and is not compacted. The approach and landing of helicopters will most certainly affect the dust and compaction of the habitat. Monitoring is planned but mitigation is not addressed.

Response. Surveys for the wekiu bug were conducted around the Mauna Kea LZs, and none were found. It is anticipated that training activities will not contribute dust to the wekiu bug habitat because of the lack of particulate matter near the LZs and will not compact habitat because surveys determined that wekiu bug habitat is not found within the LZs. Furthermore, mitigation efforts have been addressed through inspecting and cleaning the exterior of the aircraft for invasive species, especially invasive ants that invade wekiu bug habitat. Section 4.6.3.2.1 pg 4-15 and 4-16, Peshut and Doratt 2011b and Peshut and Doratt 2011c. The Memoranda for Record are included in an appendix in the EA.

Comment: Table 4-5 details the potential impacts to T&E species, including fire, invasive species, noise, and collisions. Wildlife could flee the area, modify behavior, or disrupt life-cycle (mating, brood rearing) activities. All impacts were deemed less than significant. We ask for independent evaluation by scientists with an understanding of behavior and autecology of the relevant species!

Response: The scientist who prepared the assessment is well qualified to make the assessment. Further evaluations are not warranted at this time due to several reviews of the academic literature and consultations.

Comment: As admitted on page 4-15, "According to DoD operational noise manual, the specific reaction of a specific species can only be known after subsequent studies. … results from studies cannot be applied across species…" An analysis by Peshut 2011 referenced in the document regarding insignificant impact should be evaluated by an independent body of qualified scientists.

Response: The scientist who prepared the assessment is well qualified to make the assessment. Based on available information, surveys, literature, and consultations further evaluations are not warranted.

Comment: 4.7 Cultural resources

Physical alteration, or introduction of visual, audible, or atmospheric elements that are out of character can have impacts. State Historic Preservation Office did respond to a request for consultation, appended as . LZs 4-6 each have historic properties nearby. Pohakuloa is the land

of the night of the long prayer - a cultural landscape, and Mauna Kea is a temple, noted in current issue of National Geographic as a significant world sacred journey. According to cultural practitioner Kealoha Pisciotta, training should take place only in the most desolate areas, and no attack helicopters are appropriate on Mauna Kea!

Response: The SHPD reviewed USAG-HI letter dated April 15, 2011 and the revised EA issued July 2011 and noted that new information provided and program modifications made address their Section 106 and NEPA concerns noted in our January 31, 2011, memo and comply with State law. The SHPD informally communicated that they feel that there will be no adverse effects to historic properties for the single 20-day training period proposed for October 2011.

Comment: 4.11.1.1 Noise

The use of surrogate species and studies to judge another species' response to noise would appear to contradict the DoD manual on this subject.

Response: Based on academic literature, it is appropriate to assume that bird species can co-exist with loud noises. Section 4.6.3.1 pg 4-13.

Comment: In figure 4.5 - 4.9, it would appear that LZ have dB levels lower (or none) than levels on the 2000' elevation flight path, in spite of proximity to the ground. Areas directly adjacent to the landing zones would appear to have no added noise.

Response: It is important to note that noise levels appearing on Figures 4.5 through 4.9 represent modeled average noise levels over a 24-hour period. Because the same two flight corridors (one for Mauna Kea and one for Mauna Loa) will be used for all three LZs on each mountain, the flight frequency along the two flight corridors have a higher flight frequency than the flight frequencies at each individual LZ. A higher flight frequency equates to a higher average noise level (DNL). Therefore, average noise levels along the flight corridor are higher than those surrounding the LZs. In particular, the modeled flight frequency did not generate average noise levels above 60 dBA at the Mauna Kea LZs.

Comment: 4.12 Visual and Aesthetic Resources

Sierra Club appreciates the provision of maps to identify viewplanes of the proposed project from a variety of vantage points. The Viewer Groups identified are narrowly construed, and should be expanded by consultation with user groups. For example, virtually every vantage point named is used and enjoyed by Sierra Club members who are residents. Many of these residents would attest to the disturbance of ambience and scenic beauty by the presence of any helicopters, including those training for war, in an area of spiritual and aesthetic beauty.

Response: As identified in the EA section 4.12.3, under ideal conditions, the potential for a viewer to see a helicopter during HAMET from view points is possible. However, as noted, and shown in the photograph, it is highly unlikely that a viewer would be able to see the a helicopter unless the viewer was very near the vicinity of the flight path.

Comment: 4.13 Landing zone safety is deemed an insignificant hazard, even from noise and flying debris on the ML access road because the pilot would conduct a reconnaissance flyover to visually inspect the LZ. These statements are not consistent with the recreational, cultural and scientific use of the area by users not consulted in preparation of this document.

Response: The Army acknowledges that LZs 1-3 are located very near to the Mauna Loa Observatory road. The hazards to nonmilitary personnel or wildlife in the vicinity of LZs, and those LZs in particular, during HAMET flights would be mitigated by the pilot conducting a reconnaissance flyover prior to conducting any HAMET maneuvers. During the reconnaissance flyover, pilots would visually inspect the LZ to ensure landing would not create an unreasonable risk to human health or safety. This procedural step would ensure that unauthorized personnel or wildlife are not exposed to the hazards associated with the training exercises.

The Army provided draft copied of the July EA to all who commented on the April EA. We also advertised out notice of availability in the OAQC environmental notice as well as in two local newspapers that circulate on the Island of Hawaii. All comments received on this as well as our responses are provided as an appendix in the final EA. Section 1-7 (pages 1-5 to 1-7) provides a description of the outreach and consultation the Army performed in support of this EA. Through efforts, the Army feels that we have met the consultation requirements for a project of this scope.

Comment: 5. Cumulative impacts

5.5 Biological Resources

The mitigation of impact described in earlier sections is not specifically committed to in the Conservation District (beyond the confines of PTA). Any mitigation activities intended for the proposed project should be specifically described in such detail that the impacts (intended or otherwise) can be ascertained.

Response: Mitigation activities associated with each potential impact are described in section 4 for the entire proposed action including activities on and off PTA.

Comment: Consulted parties

Deficiencies in this document reflect the desultory effort to learn of potential impacts of this proposed project. Of the consulted parties, only a few listed were civilian, and the actual consultation was ineffective. For example, the Department of Hawaiian Homelands, Sierra Club, KAHEA, Conservation Council of Hawaii, Hawaiian civic associations were not consulted. The training activities would most directly impact the adjacent lands, yet those closely associated were not aware of the proposed project.

Response: The Army provided copies of the July EA to all who commented on the April EA. We also advertised out notice of availability in the OAQC environmental notice as well as in a local newspaper that circulates on the island of Hawaii. All comments received on this as well as our responses are provided as an appendix in the final EA. Section 1-7 (pages 1-5 to 1-7) provides a description of the outreach and consultation the Army performed in support of this EA. Through efforts, the Army feels that we have met the consultation requirements for a project of this scope.

Comment: In conclusion, we restate: The Environmental Assessment for this proposed project is insufficient to determine the cumulative impact of broad military expansion into conservation district lands. The draft FONSI should be rejected. We call for preparation of a NEPA EIS to address cumulative impacts of military expansion in Hawaii. Ignorance of potential impacts is not a reason to pretend there will be none.

Response: The Army has come to the conclusion that there are no significant impacts and an EIS is not required.

Appendix C

Section 7 Consultation

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DEPARTMENT OF THE ARMY
HEADQUARTERS,
UNITED STATES ARMY GARRISON
PŌHAKULOA
PO BOX 4607
HILO, HAWAII 96720-0607

IMPC-HI-PS

MEMORANDUM FOR RECORD 15 April 2011

SUBJECT: ESA-7(c) Determination of No Effect for High-Altitude Mountainous Environmental Training (HAMET) at Mauna Loa and Mauna Kea, Hawaii Island

The US Army developed the HAMET program to prepare pilots for successful combat operations as part of Operation Enduring Freedom in Afghanistan (US Army, 2009). HAMET involves three phases: 1) academic and simulator training; 2) basic qualification, and; 3) tactical operations exercises. HAMET is essential pilot training because high altitudes and mountainous terrain produce aerodynamic and atmospheric effects on rotary-wing aircraft that differ from effects at lower altitudes and over moderate terrain. Conditions at high altitudes may include high winds, extreme turbulence, low air density, and unpredictable air mass stability. These conditions can significantly affect engine performance and handling characteristics of rotary-wing aircraft (US Army, 2011). Army helicopter pilots need to understand and experience the challenges of flight planning and aircraft operations at high altitudes in order to be competent for missions in mountainous environments such as Afghanistan.

In preparation for deployment to theatre of operation and to satisfy compulsory aviation training requirements, the 25th Combat Aviation Brigade stationed at Wheeler Army Airfield, Hawaii, proposes to provide HAMET for helicopter aviators at landing zones (LZs) on Mauna Loa and Mauna Kea, Hawaii. The proposed action sustains Department of Army and Department of Defense training requirements and meets HAMET Phase 3 objectives. Aviators and crews will train on aircraft internal to the 25th Combat Aviation Brigade, Hawaii.

The US Army has developed Action Alternatives and a No Action Alternative to evaluate the proposed HAMET Action, as described in the HAMET Environmental Assessment (US Army, 2011). The No Action Alternative serves as a benchmark against which the proposed alternatives can be evaluated. Since the proposed action is to conduct HAMET Phase 3 tactical operations exercises, the purpose of the Action will not be achieved if the No Action Alternative is selected (US Army, 2011).

Action Alternatives involve the execution of HAMET flights between Bradshaw Army Airfield at Pohakuloa Training Area and six landing zones (LZs) selected on Mauna Kea and Mauna Loa. These six LZs were chosen based on training-appropriate characteristics and safety considerations. The selected LZs meet the criteria for HAMET objectives and are suitable for use without further modification.

Biological resources within the HAMET project area include vegetation and wildlife. Potential impacts to vegetation resources (including palila critical habitat) include habitat loss from wildland fire, temporary impacts from dust and wind generated from helicopter rotorwash, and the spread of invasive species. Potential impacts to wildlife resources are limited to noise disturbance and direct impact with aircraft.

Botanical surveys were conducted 23 February 2011 at Mauna Loa LZ 1, LZ 2 and LZ 3, and 24 February 2011 at Mauna Kea LZ 4, LZ 5 and LZ 6, to determine the presence of federally-listed plant species and to assess overall vegetation in the general vicinities of the LZs. See Peshut and Evans Memorandum For Record 30 March 2011 (see References). Survey areas for each LZ included a square ~650 ft (200 m) on each side centered on the geographic coordinate of respective LZs. No federally-listed or candidate species were located at any of the LZs or within any LZ survey area. In general, vegetation at the LZs is extremely sparse or absent, and is limited to a few common native or introduced species.

Surveys to assess potential available treeland roosting habitat and potential foraging habitat for the federally-listed Hawaiian Hoary Bat were conducted 02 March 2011 at Mauna Loa LZ 1, LZ 2 and LZ 3, and 03 March 2011 at Mauna Kea LZ 4, LZ 5 and LZ 6, to determine the potential for bat presence in the general vicinities of the LZs. See Peshut and Doratt Memorandum For Record 04 April 2011 (see References). Survey areas for each LZ included a square ~650 ft (200 m) on each side centered on the geographic coordinate of respective LZs, similar to the survey area for the botanical surveys. Botanical survey data was used to augment the assessment of potential bat habitat. As described for the botanical surveys, in general, vegetation at the LZs is extremely sparse or absent, and is limited to common native or introduced species. The Mauna Kea LZs are essentially devoid of vegetation and provide no habitat that could reasonably be considered as potential roosting or foraging habitat for the Hawaiian Hoary Bat. Vegetation at the Mauna Loa LZs is also extremely sparse, and there is no vegetation greater than 3 ft in height within any of the Mauna Loa LZ survey areas. Overall, the LZs do not provide significant potential roosting or foraging habitat for the Hawaiian Hoary Bat. Bat presence within the LZ areas is expected to be limited to rare and infrequent transiting bats, and bat density in the LZ areas is expected to be extremely low.

Surveys to assess the potential presence of the candidate species *Nysius wekiuicola* (Wekiu bug) and the presence of invasive arthropod species were conducted 02 March 2011 at Mauna Kea LZ 4, LZ 5 and LZ 6. The Wekiu bug does not inhabit Mauna Loa LZs. See Peshut and Doratt Memorandum For Record 04 April 2011 (see References). Survey areas for each LZ included a circle of ~650 ft (200 m) radius centered on the geographic coordinate of respective Mauna Kea LZs. Although surveys were considered preliminary due to seasonality of Wekiu bug behavior, the summit of cinder cones for LZ 5 and LZ 6 do not provide preferred Wekiu bug habitat. The conditions at LZ 4 do not provide Wekiu bug habitat. No invasive arthropods were found during the surveys. Surveys will be repeated during the April-June time frame to provide a conclusive determination of Wekiu bug absence or presence at the Mauna Kea LZs.

Surveys to determine bird presence and habitat use in the general vicinities of the LZs were conducted 02 March 2011 at Mauna Loa LZ 1, LZ 2 and LZ 3, and 03 March 2011 at Mauna Kea LZ 4, LZ 5 and LZ 6. See Peshut and Schnell Memorandum For Record 04 April 2011 (see References). Survey areas for each LZ included a circle of 2000 ft (610 m) radius centered on the geographic coordinate of respective LZs, corresponding to the 80 dB noise contour for helicopter operations at LZs. Although surveys for seabirds were considered preliminary due to seasonality of seabird behavior, potential seabird colony habitat within the LZ areas is minimal and the presence of colonies is considered highly unlikely. Surveys will be repeated during the May-August time frame to provide a conclusive determination of seabird colony absence or presence at the LZs. Several bird species protected under the Migratory Bird Treaty Act were identified at the LZs, as were game bird species not protected under federal law. Overall densities of these birds within the survey areas were extremely low. These bird species are expected to temporarily vacate the immediate area during HAMET operations. The Hawaiian Goose (Nene) is known to frequent the regions within several miles of the Mauna Loa LZs, but geese densities are expected to be extremely low in the areas of LZs, and if present geese are expected to temporarily vacate the immediate area during HAMET operations. Nene are not expected to be present in the vicinities of the Mauna Kea LZs.

Use of the selected LZs for HAMET operations will not significantly affect threatened and endangered species or designated critical habitat as protected under the Endangered Species Act. Use of the selected LZs will not significantly affect bird species that are protected under the Migratory Bird Treaty Act. Upland game birds, not protected under federal law, but which are considered to be an important part of the biological resources in the vicinities of the LZs, will not be significantly affected by HAMET operations.

The impact to vegetation resources from wildland fire generated from a helicopter crash at an LZ is negligible because of the extremely sparse vegetation around the LZs, which provides a low density fuel load and limits the spread of fire. The effects to vegetation communities surrounding the LZs due to wind and dust generated from helicopter

landings and maneuvers is insignificant because vegetation in the vicinity of the LZs is extremely sparse and low lying, or absent, and there is little or no entrained fine-grained material in the lava substrate of the LZs.

There are no effects to vegetation from human foot traffic because there is no disembarkation of personnel during HAMET operations.

The impact to vegetation and wildlife resources from wildland fire generated from a helicopter crash along a flight path to an LZ (including over palila critical habitat) during flight operations, is considered negligible. For the military, hundreds of helicopter flights and thousands of hours of flight time are logged at Pohakuloa each year. Moreover, commercial helicopters plying the tourist trade on Hawaii Island transit palila critical habitat regularly throughout the year, with no restrictions on flight paths or elevation. At a larger scale, thousands of commercial flights for public and private travel cross population centers and biologically sensitive areas daily, across the globe. Aircraft crashes are phenomenally rare given the numbers of aircraft and flight hours logged worldwide. The potential for a helicopter crash from HAMET operations is insignificant by comparison. The significant probability of a helicopter crash during HAMET operations was not considered tenable.

The spread of invasive species within the project area will be reduced by inspecting and cleaning the exterior of the HAMET aircraft at the Bradshaw Army Air Field prior to training flights.

The potential impact to federally-listed wildlife from collisions with aircraft is insignificant. The potential for a collision with the Hawaiian Hoary Bat is unlikely because the bats are solitary, are only active from sunset to sunrise, only roost in trees in forested areas, and are not expected to depend upon the habitat around the LZs for resources. Collision with palila is highly unlikely because the selected flight paths are over the unoccupied portions of the habitat and aircraft will maintain an altitude of at least 2000 feet above ground level when flying over critical habitat. An air collision with the Nene is equally unlikely. The island-wide population of nene is ~500, of which only ~200 are known to transit Pohakuloa between population centers in Hakalau (east) and Puuanahulu (west). Nene do not spend a significant portion of their time in the air, and do not typically fly at night. Nene spend most of their time on the ground, loafing, feeding, sleeping, or tending nests. For these reasons, the likelihood of an air collision with Nene is considered to be remote.

The impact to biological resources due to noise is considered negligible. HAMET operations will produce ~10 minutes of noise disturbance per LZ landing event, with the highest noise levels ~100 dB within ~100 ft of the geographic center of the LZ.

In summary, the US Army will implement the following mitigation measures for HAMET operations to minimize or eliminate the likelihood of adverse effects to plant and animal species within the project area:

- Helicopters will maintain an altitude of at least 2000 feet above ground level when flying over palila critical habitat;
- Helicopters will utilize selected flight paths to avoid flying over the occupied palila critical habitat;
- Helicopters will be inspected for invasive arthropod and plant species prior to each mission, and cleaning protocols will be followed if invasive species are identified;
- Firefighting resources will be on stand-by while HAMET operations are conducted and transportation will be available for firefighting personnel;
- All pilots will be briefed on the mitigation requirements prior to HAMET missions.

Based on field surveys and supporting documents, the US Army has determined that the HAMET operations will have no effect on federally-listed species or federally-designated critical habitat within the project area.

This assessment and supporting documents satisfy US Army responsibilities under Section 7(c) of the Endangered Species Act at this time. The US Army will continue to remain aware of any change in the status of these species or critical habitat, and will be prepared to re-evaluate potential project impacts if necessary.

Point of contact to discuss this no effect determination is Peter Peshut, 808-969-1966, peter.peshut@us.army.mil.

PETER J. PESHUT, PhD
Program Manager
Natural Resources Office
Pohakuloa Training Area

References

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US Army. 2009. Army Aviation High-Altitude Mountainous Environmental Training Strategy. http://www.army.mil/standto/archive/2010/03/09/print.html. Web page updated 09 March 2010.

US Army. 2011. Environmental Assessment for High-Altitude Mountainous Environmental Training (HAMET) for the 25th Combat Aviation Brigade.

Appendix D

Section 106 Consultation

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

APR 15 2011

Office of the Commander

Mr. William Aila
State Historic Preservation Officer
Chairperson
Department of Land and Natural Resources Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, HI 96707

Dear Mr. Aila:

I am in receipt of the memo from Ms. Theresa Donham, SHPD Hawaii Island Archaeologist, regarding the Environmental Assessment (EA) and Section 106 consultation for the proposed High Altitude Mountainous Environment Training (HAMET). I am writing to clarify some points raised by the letter. The Environmental Assessment is currently under revision, and some of the points raised by Ms Donham will be addressed in the revised document.

With regard to the discrepancies between the EA project area and Area of Potential Effect (APE), we have revised the APE to include an area encompassing 100 meters diameter from the center of the landing zones (Enclosure 1) to take into account the potential effects of rotor wash. The helicopters will follow specific flight routes for the proposed trainings (Enclosure 2). They will fly 2000 feet above ground level to a release point, and from that point they will begin descent to the landing zones. Based upon discussions with the pilots, rotor wash begins to affect the ground once the helicopters have reached an altitude of 90 feet above ground level. This altitude will be reached at 100 meters from the center of the landing zone. In addition, most of the effects of rotor wash on the ground are felt on liftoff. Thus, the overall acreage for the six discontinuous APEs is 14.8 acres. The map in the original draft EA depicted available airspace according to the Federal Aviation Administration, and was not intended to depict the project area. Training will be restricted to these landing zone locations using modern GPS equipment, which has improved in recent years in accuracy and reliability. In addition, the pilots are briefed before they begin the high altitude training on the sensitivity of the area for cultural resources and the importance of landing only in the landing zones.

PTA Cultural Resources staff has surveyed the APE as defined above (see Enclosures 3 and 4). The flight routes are generally available to all aircraft that fly through the Saddle Region and are not specific to effects from this project. No historic properties were identified within the 100 meter square area at the LZs on Mauna Loa. On Mauna Kea, the mound previously identified by PTA Cultural Resources staff (Godby & Head 2003) was found to be 50 meters from the center of the LZ. For the purposes of the EA and this consultation this LZ is identified as LZ 6; it was formerly identified as LZ 5a. The mound is still present on this unnamed pu'u, and is in good condition. In addition, two more mounds were identified near LZ 5. One mound is 80 meters from the center of LZ 5, the other is 146 meters from the center of the LZ. Detailed descriptions of these mounds can be found in Enclosure 4. The mounds consist of piled ʻaʻā cobbles. No other materials – pre-Contact artifacts, historic artifacts, or modern rubbish – were found in association with these mounds.

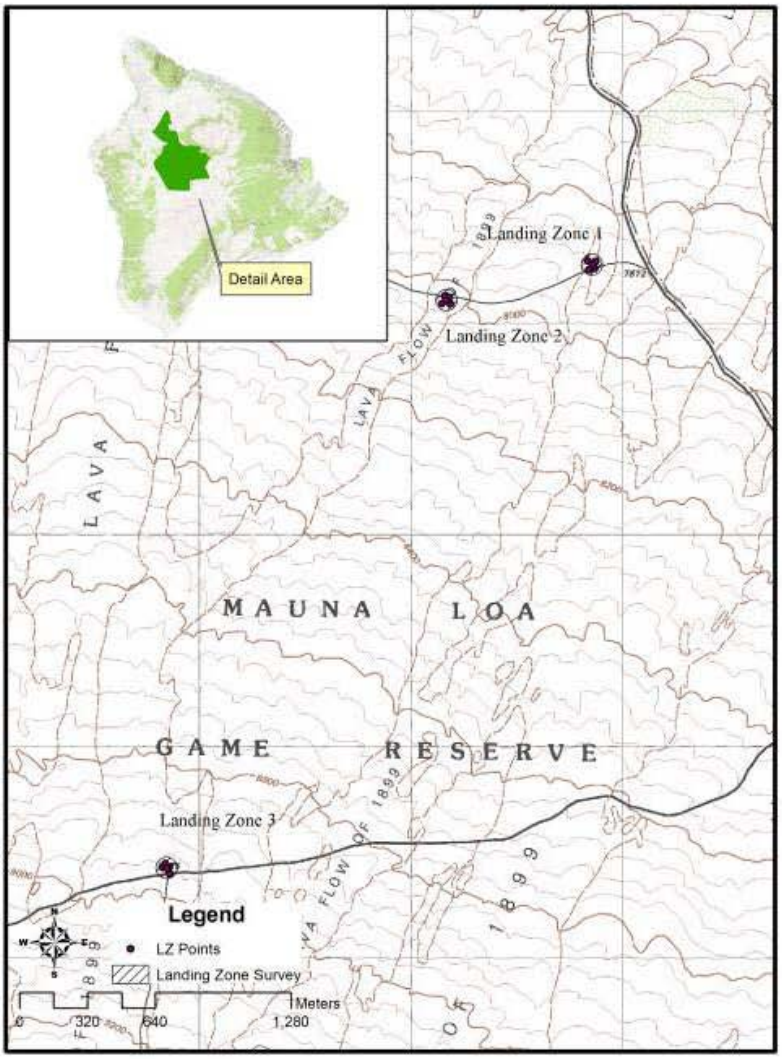
During a two week period for which DLNR issued a permit for Army helicopters to fly to the Mauna Kea landing zones for the purposes of collection additional data for the EA, PTA Cultural Resources staff revisited the Mauna Kea LZs twice to assess any effects of rotor wash or other unanticipated effects of the helicopter training scenarios on the mounds. Details of the first visit, after the first two days of helicopter flights, are found in Enclosure 5; details of the final site visit, after completion of the two week period, are found in Enclosure 6. There were no observable effects to the mounds from the helicopter activities. Noise monitoring was also done during this time, with monitors placed at the locations indicated on the map at Enclosure 7. PTA Cultural Resources staff accompanied the personnel who placed the noise monitors and an Office of Mauna Kea Management Ranger to ensure that no archaeological sites on Mauna Kea were disturbed either in the placement of the monitors or in the hike to the monitoring locations.

In sum, the concerns expressed by the SHPD have been addressed in this letter with regard to the Section 106 consultation. Concerns specific to NEPA are being addressed in the revised EA. The US Army Garrison Hawaii anticipates presenting the EA and the request to conduct training at these LZs to the Board of Land and Natural Resources hearing in late May or early June. We would appreciate notification from the SHPD of any additional concerns by May 6, 2011 so that they can be addressed. In the absence of an indication that there remain concerns regarding this Section 106 consultation we will assume that there are none and that you concur with my determination that this project will have no adverse effect to historic properties. Should you require additional information about this project, please contact Dr. Julie M. E. Taomia, PTA Archeologist, at telephone number (808) 969-1966.

Sincerely,

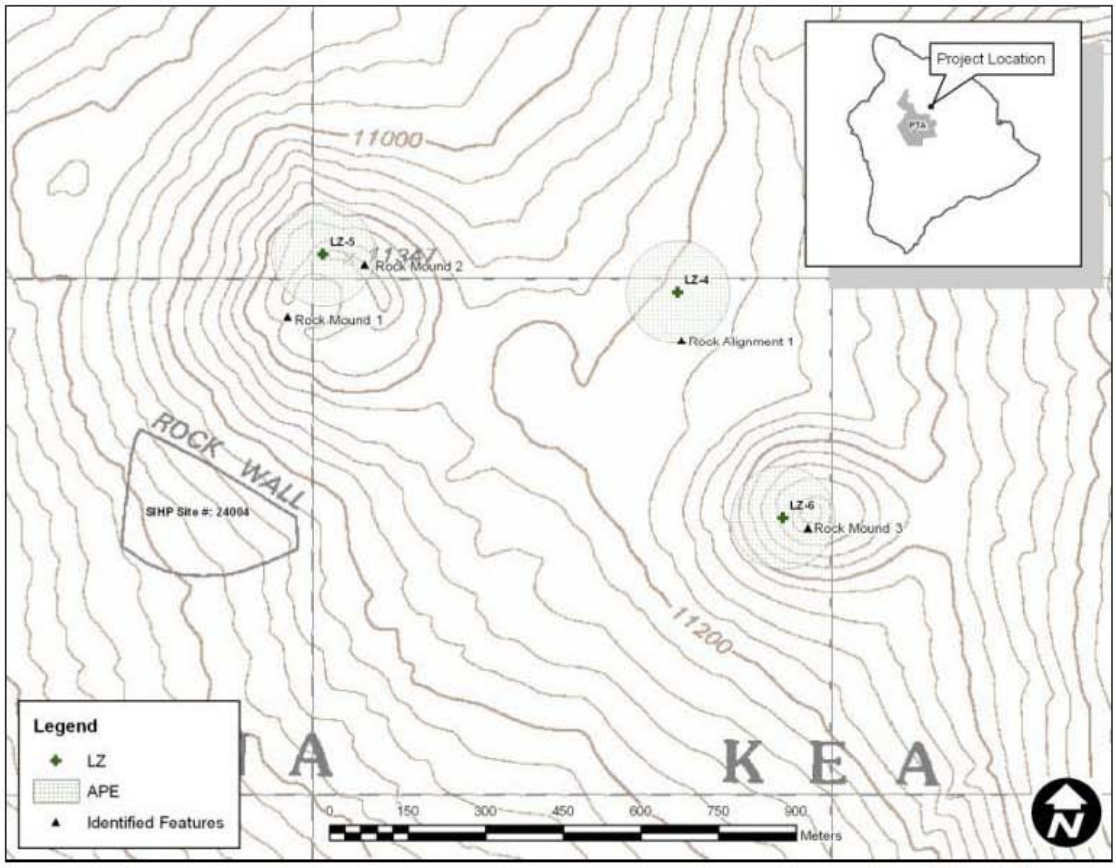
Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosures

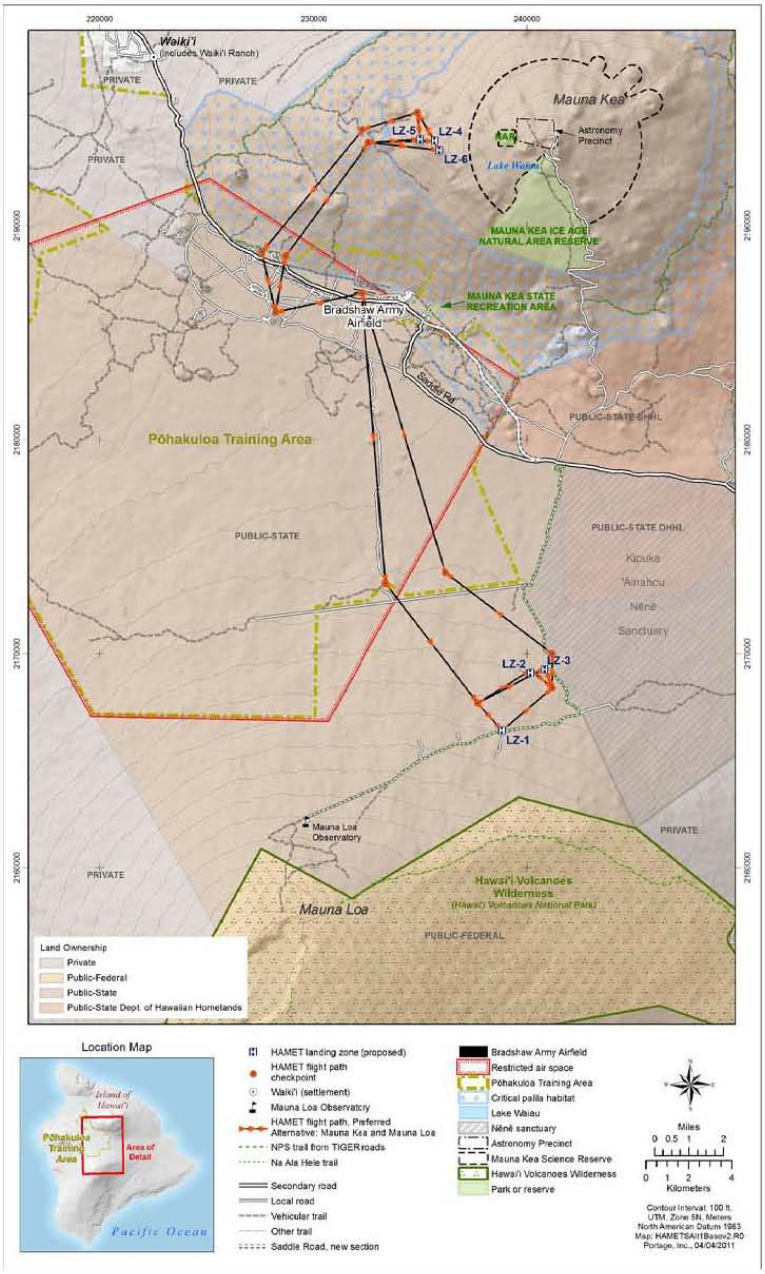


Mauna Loa APE

Enclosure 1



Mauna Kea APE



Flight paths for high altitude training

Enclosure 2

IMPC-HI-PWE March 2, 2011

MEMORANDUM FOR THE RECORD
SUBJECT: Survey of proposed landing zones on State Land on Mauna Loa (TMK: (3) 3-8-001:001) in Humu'ula Ahupua'a, North Hilo District, Hawai'i Island.

1. On February 14, 2011, Dr. Julie Taomia, PTA Archeologist, Ms. Lauren Morawski and Ms. Teresa Davan, USAG-HI Cultural Resources Specialists, travelled to Mauna Loa to conduct surveys of three proposed landing zones (LZ). The landing zones had been previously surveyed (Rumsey 2009), but rotor wash was not taken into account at that time. Therefore, in conjunction with the revision of the Environmental Assessment for the High Altitude Mountainous Environment Training proposed by the CAB, PTA Cultural Resources staff with assistance from O'ahu conducted surveys of each LZ covering 100 meters from the center of the LZ, the distance to which rotor wash would affect anything.
2. Landing Zone 2 is a leveled area in 'a'ā lava of the 1899 Mauna Loa lava flow (Figure 1, 2 below). No historic properties were identified within 100 meters of the center of the LZ (Figures 3-8).
3. Landing Zone 1 is a leveled area in 'a'ā lava along another finger of the 1899 Mauna Loa lava flow (Figures 1, 2). Pāhoehoe lava is present around the edges of the LZ. Several cavities were identified in this pāhoehoe; these were investigated, but no cultural resources were identified. An area 100 meters from the center of the LZ was surveyed, and no historic properties were identified within this area (Figures 9-11). Bulldozer tread marks were identified on some of the adjacent pāhoehoe (Figure 10).
4. Landing Zone 3 is a previously leveled area on the south side of the road to the Mauna Loa NOAA Observatory (Figure 12). The LZ is in 'a'ā from the 1899 Mauna Loa lava flow, and the remnants of a wind sock are present across the road from the LZ. No historic properties were identified within the 100 meter survey area at this landing zone.
5. The use of the three previously existing landing zones on Mauna Loa will not have any effect on historic properties, as none are present in the vicinity of the landing zones.

Julie M. E. Taomia, Ph.D.
Archeologist
Environmental Office, PTA

Enclosure 3

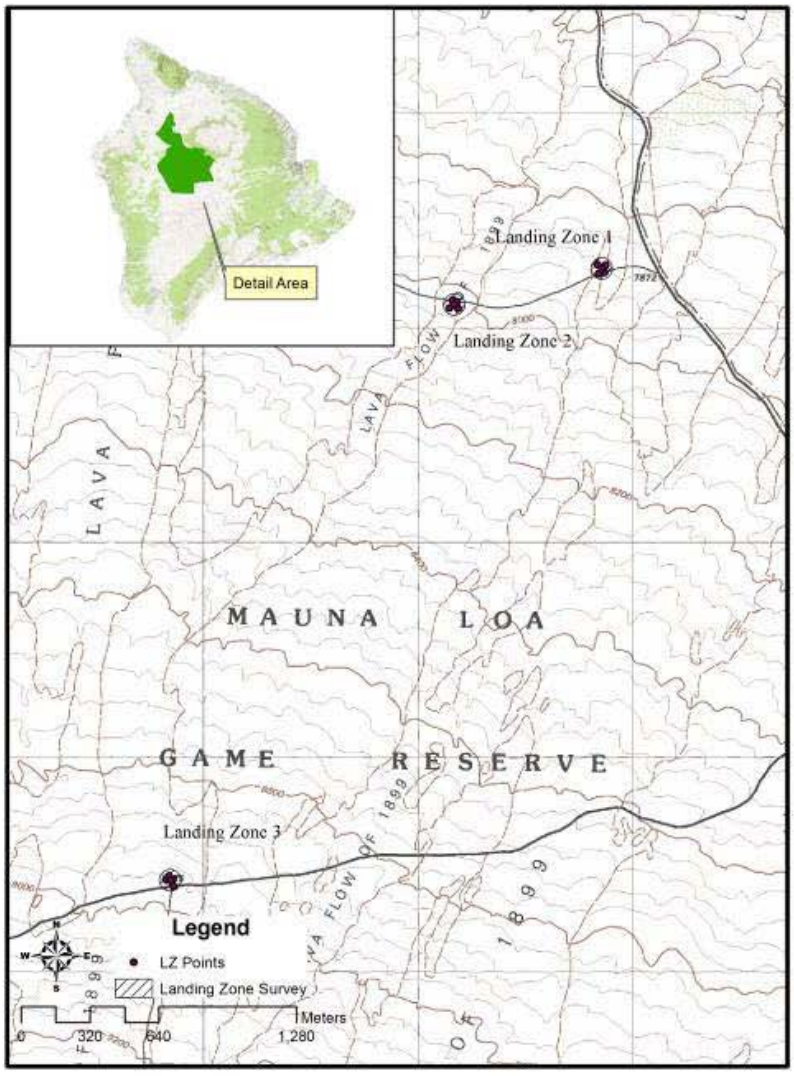


Figure 1. Overview of Mauna Loa Landing Zone locations

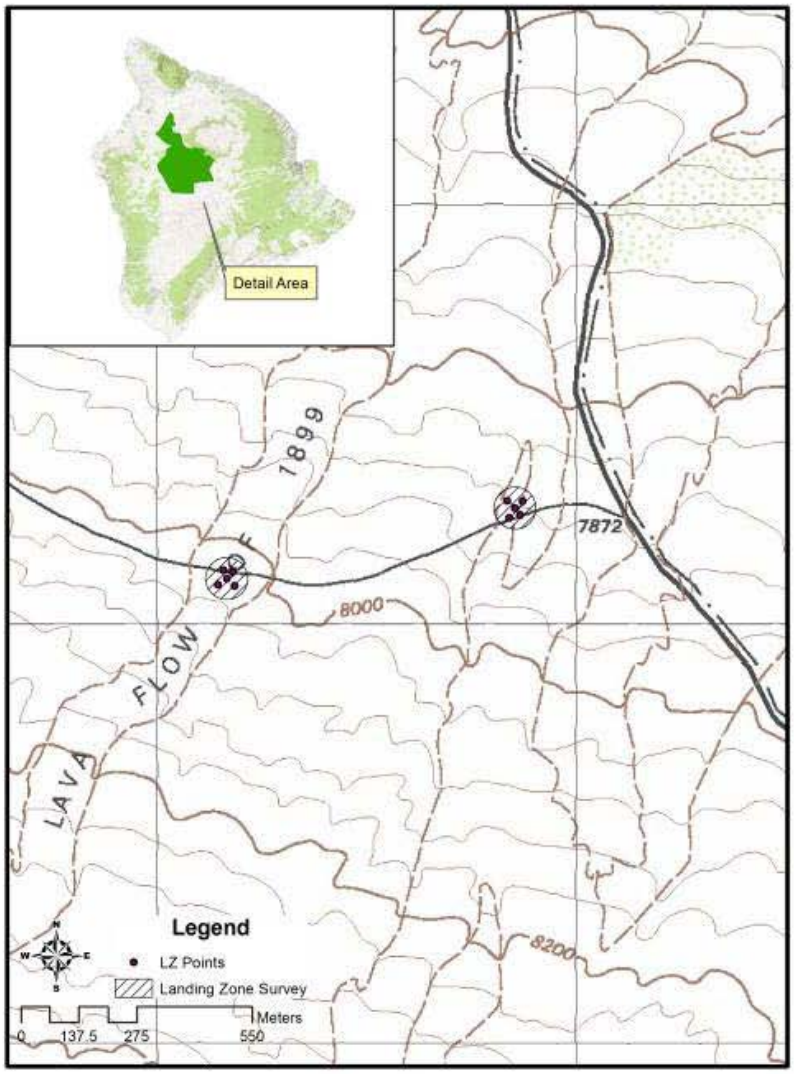


Figure 2. Detail of two lower level Mauna Loa Landing Zone Locations

Figure 3. LZ 2 View from the west edge beyond end of rotor wash area

Figure 4. LZ 2 View to south beyond end of rotor wash area

Figure 5. LZ 2 View to east beyond edge of LZ and rotor wash area

Figure 6. LZ 2 View to the west across LZ

Figure 7. LZ 2 View to the north across the LZ to the road

Figure 8. LZ 2 View to the north, beyond area of rotor wash influence.

Figure 9. LZ 1 view to northeast across LZ toward older lava.

Figure 10. LZ 1 view to southeast showing bulldozer tread marks, beyond edge of rotor wash.

Figure 11. LZ 1 Photo to the north showing road created by bulldozer, also edge of rotor wash area

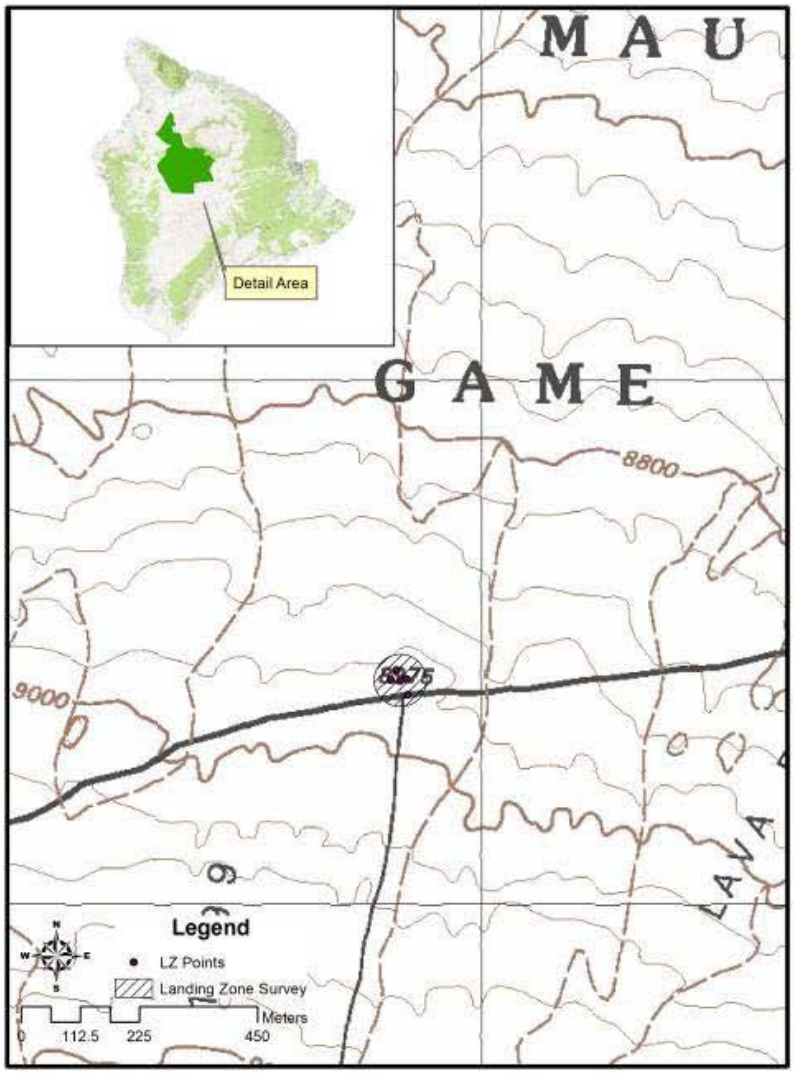


Figure 12. Detail location of LZ 3

Figure 12. LZ 3 view to the west showing rotor wash area

Figure 13. LZ 3 View to the west across the LZ

Figure 14. LZ 3 View to the north beyond the rotor wash area

Figure 15. LZ 3 view to the northwest beyond rotor wash area, poured concrete in foreground

Figure 16. View to the east beyond rotor wash area

Figure 17. View to the south showing road, power line, beyond extent of rotor wash

IMPC-HI-PWE **24 February 2011**

MEMORANDUM FOR THE RECORD

SUBJECT: Cultural Resources Reconnaissance Survey of Existing High Altitude Mountainous Environmental Training (HAMET) Landing Zones (LZ) on Mauna Kea, [TMK (3) 4-4-015:001, Kaʻohe Ahupuaʻa, Hāmākua District, Hawaiʻi Island.

1. On February 24, 2010, Mr. David Crowell and Ms. Kehaulani S. Kerr, Cultural Resources Program Manager and Cultural Resources Specialist at Pōhakuloa Training Area (PTA) and Ms. Dominique L. Cordy, intern with the U.S. Army Corps of Engineers (USACE), performed a cultural resources reconnaissance survey of the existing HAMET LZ locations on Mauna Kea (LZ-4, LZ-5, LZ-6). The HAMET LZ locations are located approximately 8km north of PTA on the northwestern flank of Mauna Kea, below the summit at approximately 11,000 – 12,000 fasl.

2. The HAMET LZ locations were previously surveyed in October and December 2003 (Godby and Head 2003a, Godby and Head 2003b). The previous efforts investigated only the 15m x 15m footprint of the LZs while the current investigation included a 100m area from the center of the LZs as the Area of Potential Effect (APE). The APE was established to account for rotor wash created by helicopters. The previous surveys did not identify any cultural resources within the 15m x 15m footprints of LZ4 and LZ-5. LZ-6 was designated LZ5a in the previous survey and a rock mound was identified approximately 50m south of the LZ (Godby and Head 2003b). The project area, APE, and results of the current survey are depicted in Figure 1. This report follows the order in which the LZs were visited.

3. Mr. Crowell, Ms. Kerr, and Ms. Cordy surveyed the APE at LZ-5 which is located on the top of an unnamed *puʻu* at 235019E, 2194049N. Two stacked rock features were identified near LZ-5 and were termed Rock Mound 1 and Rock Mound 2.

4. Rock Mound 1 is located between the southern edge of a large crater and the southern crest of the *puʻu* and overlooks the saddle region of Hawaiʻi Island. Rock Mound 1 is located approximately 144m south-southwest from LZ-5 and is just outside of the APE at 234950E, 2193928N. Rock Mound 1 is a pyramidal shaped stacked rock mound constructed in 5-7 courses of large and medium sized pieces of locally available rock with smaller rock and cobble infill. The area around the feature appears to have been cleared, ostensibly due the construction of Rock Mound 1.The feature measures approximately 2.65m x 1.75 m x 1.25m and is oriented roughly east-west. The feature is somewhat formally constructed with the rocks tightly placed and infilling with smaller rocks. Some of the rocks have tumbled from the top and the sides of the feature and lie immediately adjacent at the base (Figure 2).

Enclosure 4

5. Rock Mound 2is located between the northern edge of a large crater and the northern crest of the *pu'u*. T-022411-02 is located within the APE, approximately 82m east-southeast from LZ-5 and 181m northeast from Rock Mound 1 at 235099E, 2194029N. The feature is pyramidal shaped stacked rock mound constructed in 5-7 courses of large and medium sized pieces of locally available rock with some smaller rock infill, but less infilling than present at Rock Mound 1. Additionally, Rock Mound 2 has a more rectangular and less pyramidal shape than Rock Mound 1, but is wider at the base than at the top. The feature displays somewhat formal construction characteristics, with tightly placed rocks and some evidence of a faced profile on the north side of the feature. The area around the feature shows evidence of clearing due to the construction of the mound. Rock Mound 2 measures approximately 2.55m x 1.67 x 1.12m and is oriented roughly east-west. A few of the rocks have tumbled from the sides and the top of the feature and lie immediately adjacent at the base (Figure 3-Figure 4).

6. Mr. Crowell, Ms. Kerr, and Ms. Cordy next surveyed the APE at LZ-6 which is located on the top of another unnamed *pu'u* located approximately 1023m southeast of LZ-5 at 235702E, 2193975N. One stacked rock feature was identified near LZ-6 and was termed Rock Mound 3. This feature was previously identified in Godby and Head (2003b) and described as a rock mound constructed with local cobbles and boulders with faced sides on the north and the east. The current survey identified Rock Mound 3 located within the APE, approximately 56m east-southeast from LZ-6 at 235709E, 2193881N. The feature is a pyramidal shaped stacked rock mound constructed in 6-8 courses of large and medium pieces of locally available rock with smaller rock and cobble infill. Rock Mound 3 is fairly formally constructed with tightly placed rocks and infilling. The faced profiles discussed in the previous survey were not readily apparent to the current survey team. Rock Mound 2 displayed a more clearly faced profile on the north elevation than any possible facing observed at Rock Mound 3. The area around the feature was cleared during the construction of the mound. Rock Mound 3 is approximately 2.13m x 1.37m x 1.35m and is oriented roughly north south. Rock Mound 1 and Rock Mound 2 are clearly visible from Rock Mound 3 (Figure 5 - Figure 6).

7. Mr. Crowell, Ms. Kerr, and Ms. Cordy final survey area was the APE at LZ-4 which is located on a relatively flat area approximately 687m east of LZ-5 and 481 m north-northwest of LZ-6 at 235702E, 2193975N. One small, single course diamond shaped rock alignment feature was identified near LZ-4 and was termed Rock Alignment 1. Rock Alignment 1is located within the APE, approximately 97m south from LZ-4 at 235954E, 2193517N. The feature is constructed of small and medium pieces of locally available rock with some cobble infilling. Rock Alignment 1 does not display formal construction characteristics, with the rocks simply sitting on top of the ground without being tightly placed or imbedded in the soil. Rock Alignment 1 is approximately 1.63m x 1.11m x .021m and is oriented roughly northwest-southeast (Figure 7 - Figure 8).

David M. Crowell
Cultural Resources Program Manger
Environmental Office, PTA

Godby, William and James Head

2003 Trip Report for the Archaeological Survey of Proposed Helicopter Landing Areas (LZ-5, LZ-5a, and LZ-6) for High Altitude Training from December 8, 2003 to December 12, 2003. On File at PTA.

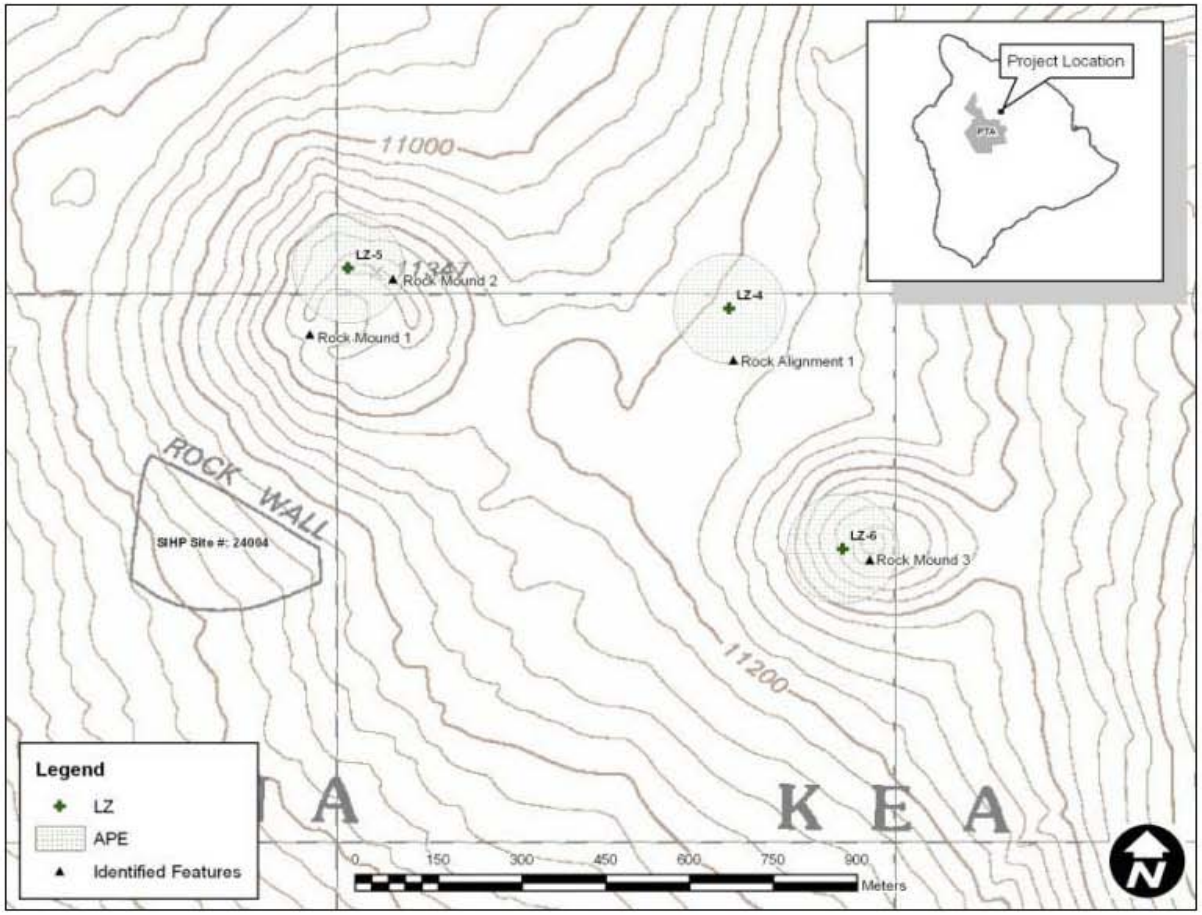


Figure 1. Location of LZs, APE, and identified cultural resources

Figure 2. Rock Mound 1 near LZ5, looking south

Figure 3. Rock Mound 2 near LZ5, looking south

Figure 4. View from top of Rock Mound 2 to Rock Mound 1 near LZ5, looking south

Figure 5. Rock Mound 3 near LZ 6, looking west

Figure 6. Rock Mound 3 near LZ6 with view of Rock Mounds 1 and 2 near LZ5, looking west

Figure 7. Rock Alignment 1 near LZ4, looking east

Figure 8. Rock Alignment 1 near LZ4, looking west-southwest

IMPC-HI-PWE **24 March 2011**

MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological Monitoring of Rock Mounds near Landing Zones 5 and 6 (LZ-5 and LZ-6) of the High Altitude Mountainous Environmental Training (HAMET) LZ's on Mauna Kea, [TMK (3) 4-4-015:001, Kaʻohe Ahupuaʻa, Hāmākua District, Hawaiʻi Island.

1. On March 24, 2011 , Mr. David Crowell and Ms. Kehaulani S. Kerr, Cultural Resources Program Manager and Cultural Resources Specialist at Pōhakuloa Training Area (PTA), performed monitoring of the rock mounds (Rock Mounds 1-3) identified near LZ-5 and LZ-6 HAMET locations on Mauna Kea. The LZ-5 and LZ-6 HAMET locations are located approximately 8km north of PTA on the northwestern flank of Mauna Kea, below the summit at approximately 11,000 – 12,000 fasl.

2. The rock mounds at LZ-5 and LZ-6 HAMET locations were previously identified in December 2003 (Godby and Head 2003) and February 2011 (Crowell 2011). The project area, APE, and results of the 2011 (Crowell) survey are depicted in Figure 1. Rock Alignment 1 near LZ-4 was not identified for monitoring. Monitoring of Rock Mound 1 and 2 near LZ-5 and Rock Mound 3 near LZ-6 was performed on March 24, 2011 during a break in the U.S. Army Combat Aviation Brigade (CAB) training that used the HAMET LZ's from March 21 – April 1, 2011. The monitoring is being performed to ascertain whether the HAMET training has any potential effects on the rock mounds. Follow up monitoring of the Rock Mounds will also be performed on April 4, 2011 at the conclusion of CAB training.

3. Monitoring consisted of a visual inspection of each rock mound and the immediate vicinity around each mound. Locations of photographs from the 02/24/11 survey were identified (Figure 2, Figure 7, and Figure 12) and new photographs were taken from those locations to document any potential effects to the mounds. Additional photographs were taken of the remaining profiles of each rock mound in order to more fully document the mounds and to provide additional baseline data from which monitoring of potential effects may be performed.

4. Mr. Crowell and Ms. Kerr began archaeological monitoring at Rock Mound 1 near LZ-5. Rock Mound 1 was observed to be partially collapsed during the February 24, 2011 survey with several rocks having tumbled from the mound especially on the north, west, and south profiles. On March 24, 2011 no additional tumbled rocks or collapse of the mound was observed and it appeared to be intact from the previous visit with no adverse effects from the HAMET training (Figure 2 - Figure 3). The east, south, and west profiles were also photographed (Figure 4 - Figure 6) for comparison purposes.

Enclosure 5

5. Rock Mound 2 near LZ-5 was the next location that was monitored. During the February 24, 2011 survey Rock Mound 2 was observed as being partially collapsed, with some rocks that had tumbled from the north and west profiles, but not as extensively as Rock Mound 1. On March 24, 2011 no additional tumbled rocks or collapse of the mound was observed and it appeared to be intact from the previous visit with no adverse effects from the HAMET training (Figure 7 - Figure 8). The east, south, and west profiles were also photographed (Figure 9 - Figure 11) for comparison purposes.

6. Rock Mound 3 near LZ-6 was the final location that was monitored. During the February 24, 2011 survey Rock Mound 3 was observed as being slightly collapsed, with some rocks that had tumbled from the south profile. On March 24, 2011 no additional tumbled rocks or collapse of the mound was observed and it appeared to be intact from the previous visit with no adverse effects from the HAMET training (Figure 12 - Figure 13). The south, west, and north profiles were also photographed (Figure 14 - Figure 16) for comparison purposes.

David M. Crowell
Cultural Resources Program Manger
Environmental Office, PTA

References

Godby, William and James Head

2003 Trip Report for the Archaeological Survey of Proposed Helicopter Landing Areas (LZ-5, LZ-5a, and LZ-6) for High Altitude Training from December 8, 2003 to December 12, 2003. On File at PTA.

Crowell, David M.

2011 Cultural Resources Reconnaissance Survey of Existing High Altitude Mountainous Environmental Training (HAMET) Landing Zones (LZ) on Mauna Kea, [TMK (3) 4-4-015:001, Ka'ohe Ahupua'a, Hāmākua District, Hawai'i Island. On File at PTA

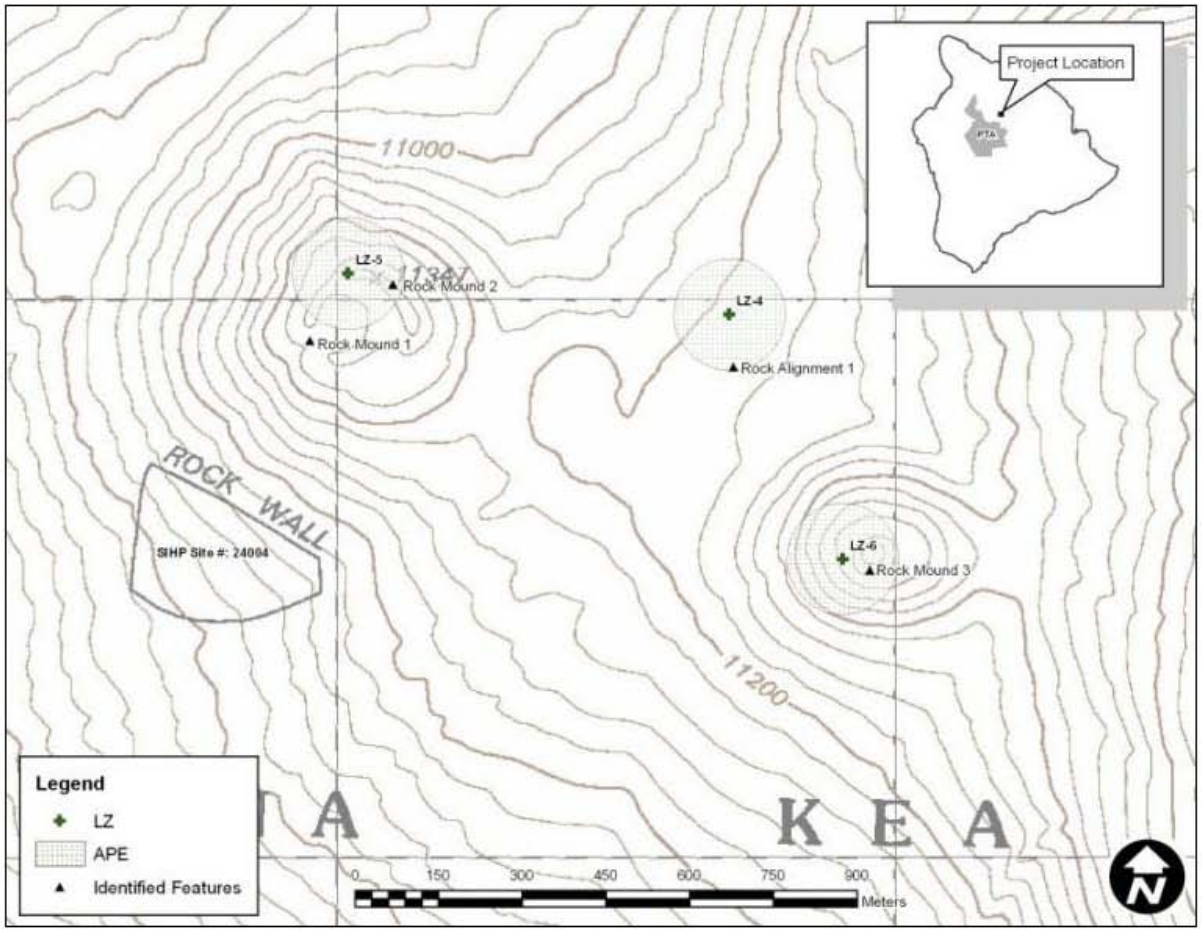


Figure 1. Location of LZs, APE, and identified cultural resources

Figure 2. Rock Mound 1 near LZ-5, looking south, photo taken on 02/24/11

Figure 3. Rock Mound 1 near LZ-5, looking south, photo taken on 03/24/11

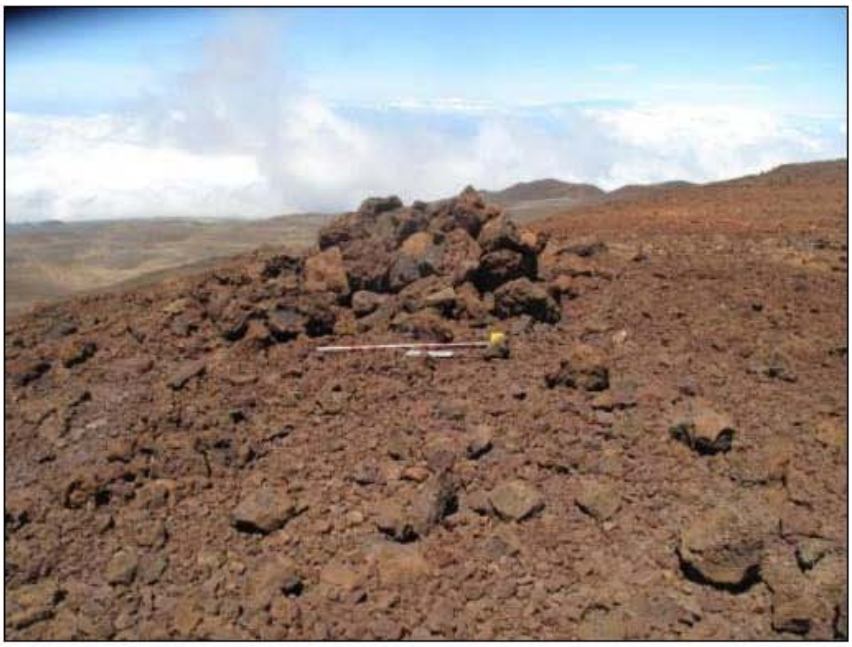


Figure 4. Rock Mound 1 near LZ5, looking west, photo taken on 03/24/11

Figure 5. Rock Mound 1 near LZ5, looking north, photo taken on 03/24/11

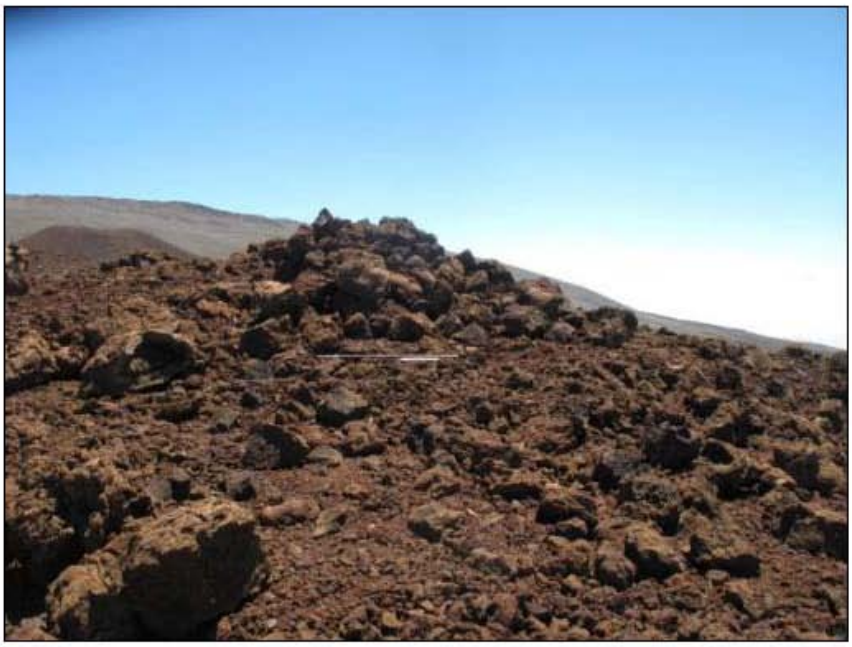


Figure 6. Rock Mound 1 near LZ5, looking east, photo taken on 03/24/11

Figure 7. Rock Mound 2 near LZ5, looking south, photo taken on 02/24/11

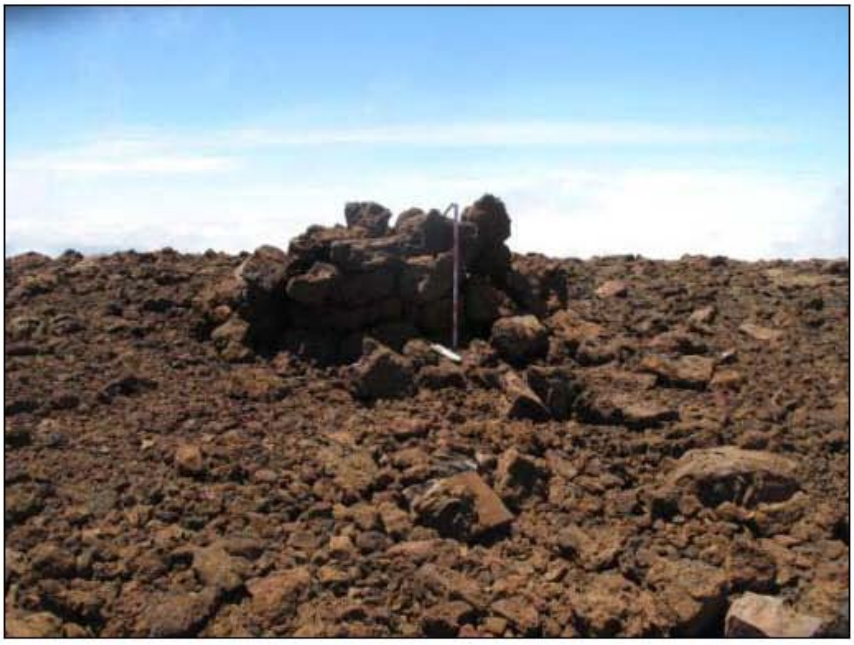


Figure 8. Rock Mound 2 near LZ5, looking south, photo taken on 03/24/11

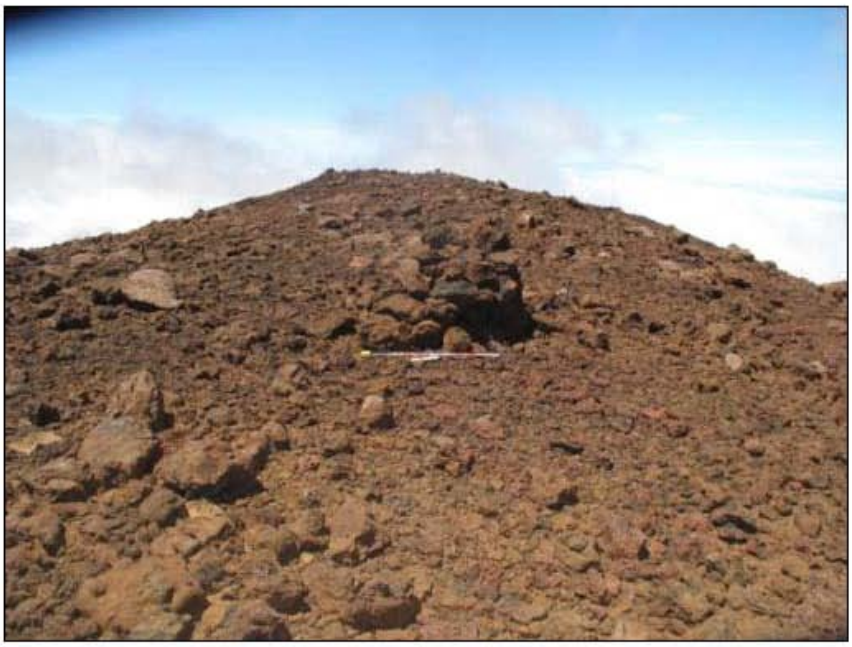


Figure 9. Rock Mound 2 near LZ5, looking west, photo taken on 03/24/11

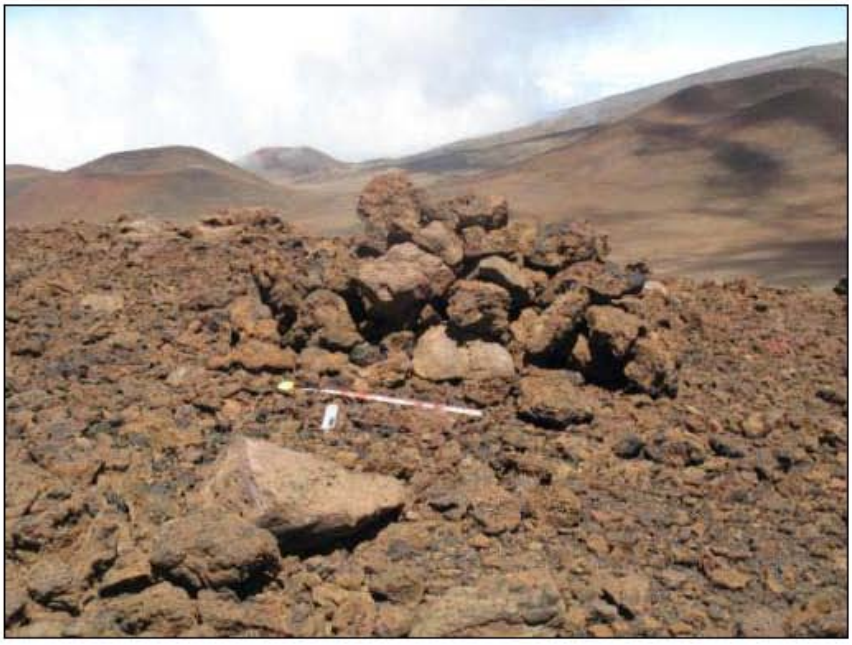


Figure 10. Rock Mound 2 near LZ-5, looking north, photo taken on 03/24/11

Figure 11. Rock Mound 2 near LZ5, looking east, photo taken on 03/24/11

Figure 12. Rock Mound 3 near LZ-6, looking west, photo taken on 02/24/11

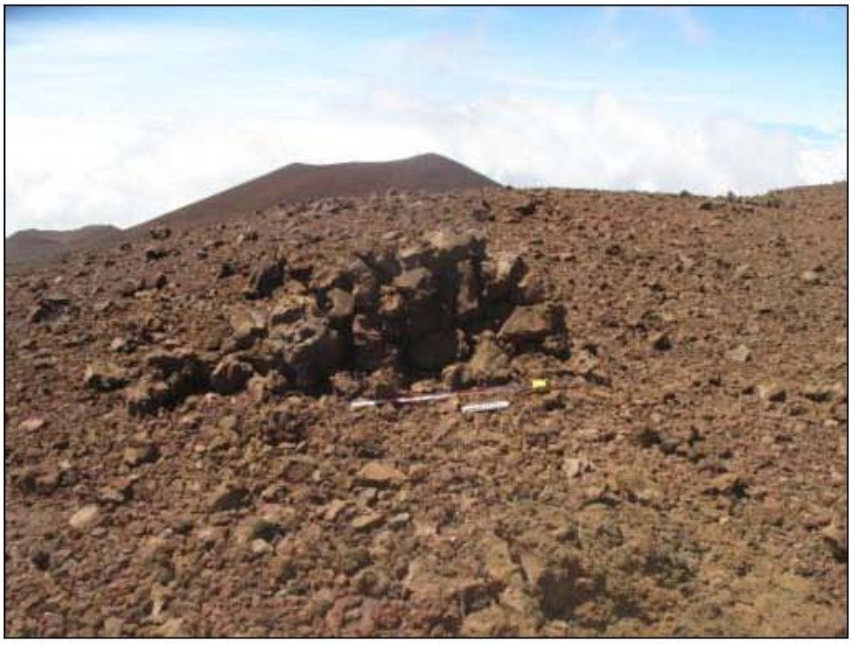


Figure 13. Rock Mound 3 near LZ-6, looking west, photo taken on 03/24/11

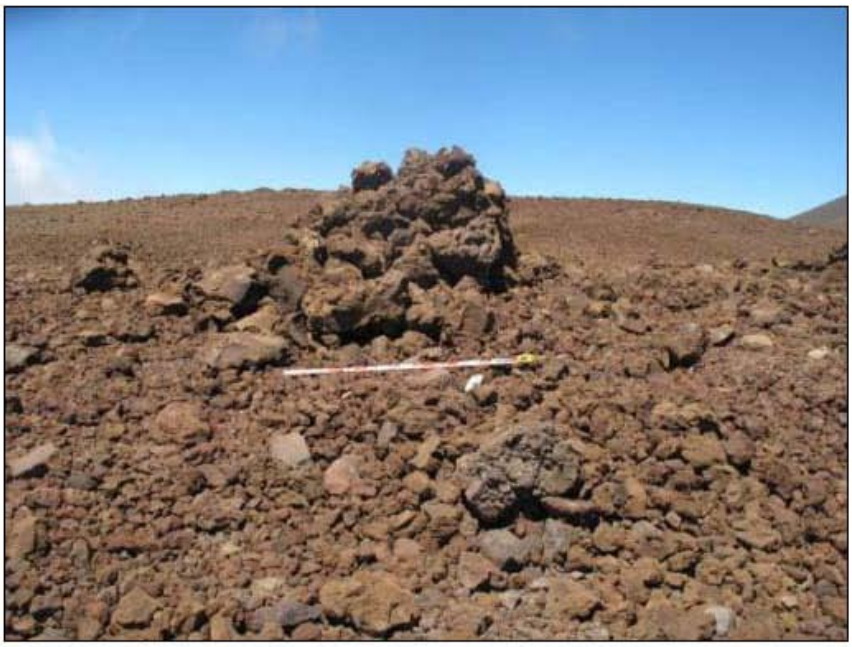


Figure 14. Rock Mound 3 near LZ-6, looking north, photo taken on 03/24/11

Figure 15. Rock Mound 3 near LZ-6, looking east, photo taken on 03/24/11

Figure 16. Rock Mound 3 near LZ-6, looking south, photo taken on 03/24/11

IMPC-HI-PWE **04 April 2011**

MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological Monitoring of Rock Mounds near Landing Zones 5 and 6 (LZ-5 and LZ-6) of the High Altitude Mountainous Environmental Training (HAMET) LZ's on Mauna Kea, [TMK (3) 4-4-015:001, Kaʻohe Ahupuaʻa, Hāmākua District, Hawaiʻi Island.

1. On April 4, 2011 , Mr. David Crowell and Ms. Kehaulani S. Kerr, Cultural Resources Program Manager and Cultural Resources Specialist at Pōhakuloa Training Area (PTA), performed monitoring of the rock mounds (Rock Mounds 1-3) identified near LZ-5 and LZ-6 HAMET locations on Mauna Kea. The LZ-5 and LZ-6 HAMET locations are located approximately 8km north of PTA on the northwestern flank of Mauna Kea, below the summit at approximately 11,000 – 12,000 fasl.

2. The rock mounds at LZ-5 and LZ-6 HAMET locations were previously identified in December 2003 (Godby and Head 2003) and February 2011 (Crowell 2011). The project area, APE, and results of the 2011 (Crowell) survey are depicted in Figure 1. Rock Alignment 1 near LZ-4 was not identified for monitoring. Monitoring of Rock Mound 1 and 2 near LZ-5 and Rock Mound 3 near LZ-6 was performed on March 24, 2011 during a break in the U.S. Army Combat Aviation Brigade (CAB) training episode using the HAMET LZ's. The monitoring is being performed to ascertain whether the HAMET training has any potential effects on the rock mounds. Follow up monitoring of the Rock Mounds was also performed on April 4, 2011 at the conclusion of CAB training.

3. Monitoring consisted of a visual inspection of each rock mound and the immediate vicinity around each mound. Locations of photographs from the February 24, 2011 survey were identified (Figure 2, Figure 11, and Figure 18) and new photographs were taken from those locations to document any potential effects to the mounds. Additional photographs were taken of the remaining profiles of each rock mound in order to more fully document the mounds and to provide additional baseline data from which monitoring of potential effects may be performed.

4. Mr. Crowell and Ms. Kerr began archaeological monitoring at Rock Mound 1 near LZ-5. Rock Mound 1 was observed to be partially collapsed during the February 24, 2011 survey with several rocks having tumbled from the mound especially on the north, west, and south profiles. On April 4, 2011 no additional tumbled rocks or collapse of the mound was observed and it appeared to be intact from the previous visit with no adverse effects from the HAMET training (Figure 2 -Figure 4). The east, south, and west profiles were also photographed (Figure 5 - Figure 10) and compared with the photographs from the March 24, 2011 monitoring episode. No adverse effects were observed on any side of Rock Mound 1.

Enclosure 6

5. Rock Mound 2 near LZ-5 was the next location that was monitored. During the February 24, 2011 survey Rock Mound 2 was observed as being partially collapsed, with some rocks that had tumbled from the north and west profiles, but not as extensively as Rock Mound 1. On April 4, 2011 no additional tumbled rocks or collapse of the mound was observed and it appeared to be intact from the previous visit with no adverse effects from the HAMET training (Figure 11 - Figure 13). The east, south, and west profiles were also photographed (Figure 14 - Figure 17) and compared with the photographs from the March 24, 2011 monitoring episode. No adverse effects were observed on any side of Rock Mound 2.

6. Rock Mound 3 near LZ-6 was the final location that was monitored. During the February 24, 2011 survey Rock Mound 3 was observed as being slightly collapsed, with some rocks that had tumbled from the south profile. On April 4, 2011 no additional tumbled rocks or collapse of the mound was observed and it appeared to be intact from the previous visit with no adverse effects from the HAMET training (Figure 18 - Figure 20). The south, west, and north profiles were also photographed (Figure 21- Figure 26) and compared with the photographs from the March 24, 2011 monitoring episode. No adverse effects were observed on any side of Rock Mound 3.

David M. Crowell
Cultural Resources Program Manger
Environmental Office, PTA

References

Godby, William and James Head

2003 Trip Report for the Archaeological Survey of Proposed Helicopter Landing Areas (LZ-5, LZ-5a, and LZ-6) for High Altitude Training from December 8, 2003 to December 12, 2003. On File at PTA.

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2011 Cultural Resources Reconnaissance Survey of Existing High Altitude Mountainous Environmental Training (HAMET) Landing Zones (LZ) on Mauna Kea, [TMK (3) 4-4-015:001, Ka'ohe Ahupua'a, Hāmākua District, Hawai'i Island. On File at PTA

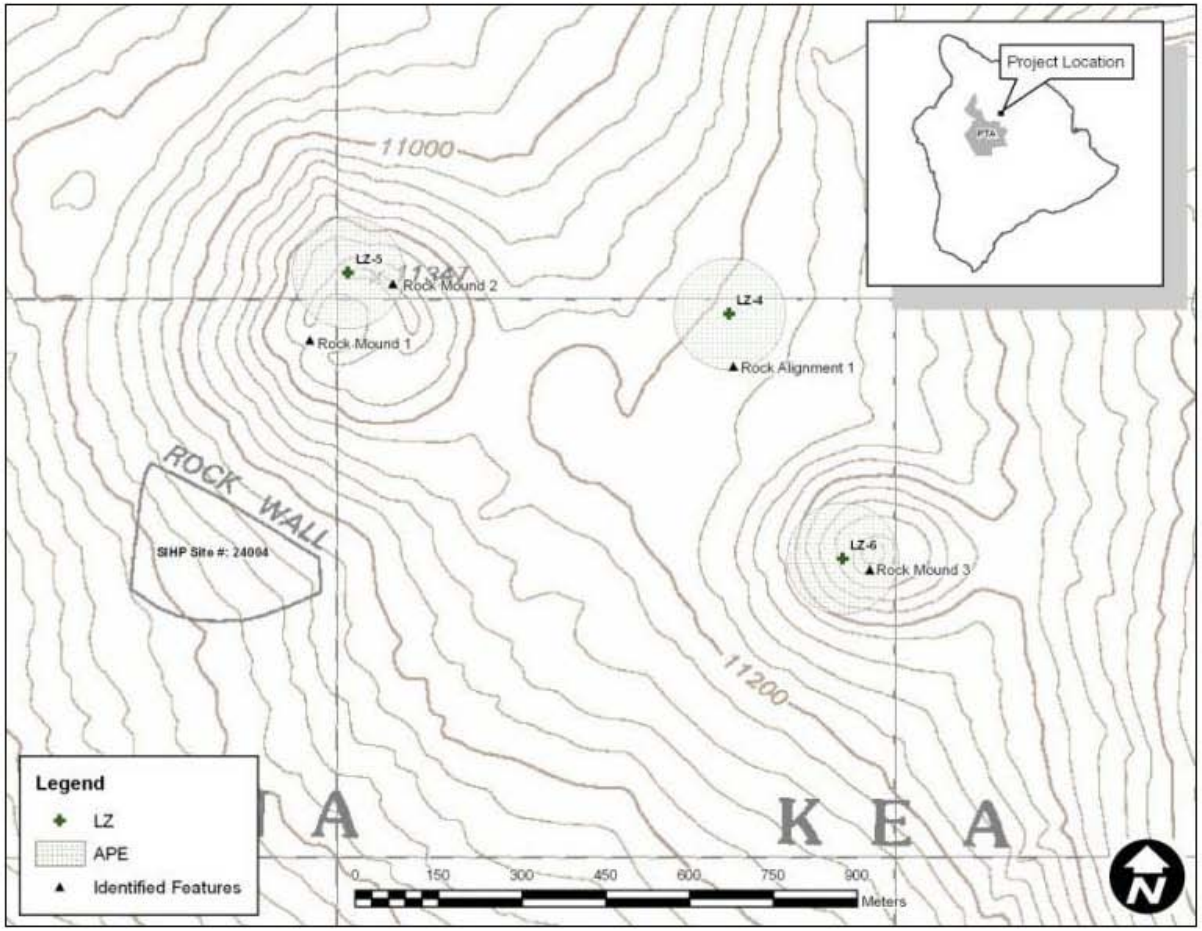

Figure 1. Location of LZs, APE, and identified cultural resources

Figure 2. Rock Mound 1 near LZ-5, looking south, photo taken on 02/24/11

Figure 3. Rock Mound 1 near LZ-5, looking south, photo taken on 03/24/11

Figure 4. Rock Mound 1 near LZ-5, looking south, photo taken on 04/04/11

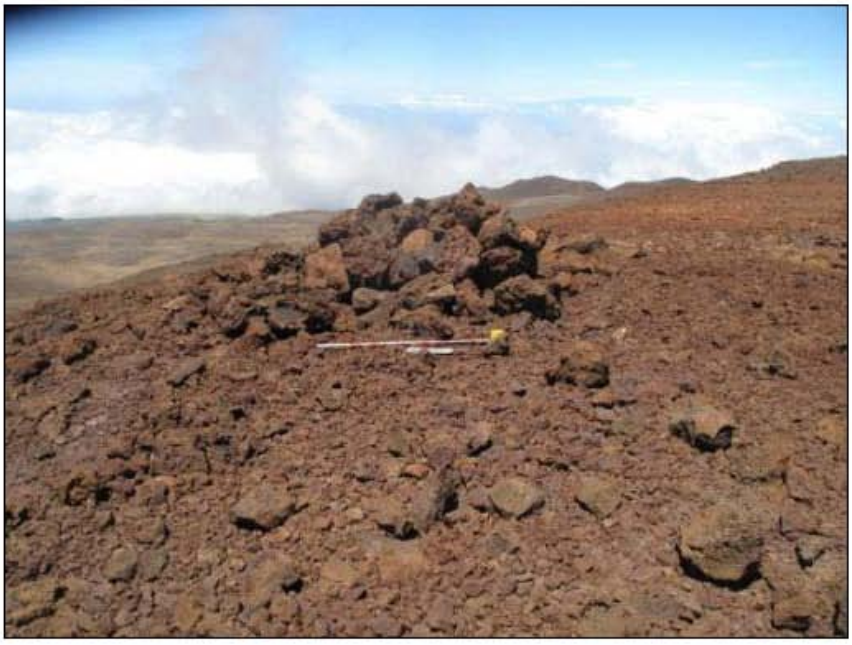

Figure 5. Rock Mound 1 near LZ5, looking west, photo taken on 03/24/11

Figure 6. Rock Mound 1 near LZ-5, looking west, photo taken on 04/04/11

Figure 7. Rock Mound 1 near LZ5, looking north, photo taken on 03/24/11

Figure 8. Rock Mound 1 near LZ-5, looking north, photo taken on 04/04/11

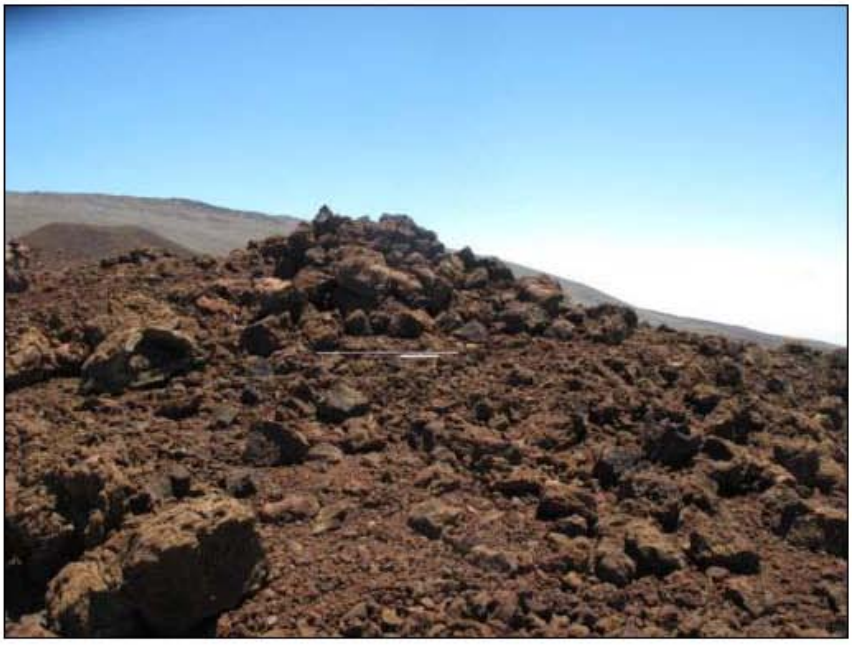

Figure 9. Rock Mound 1 near LZ5, looking east, photo taken on 03/24/11

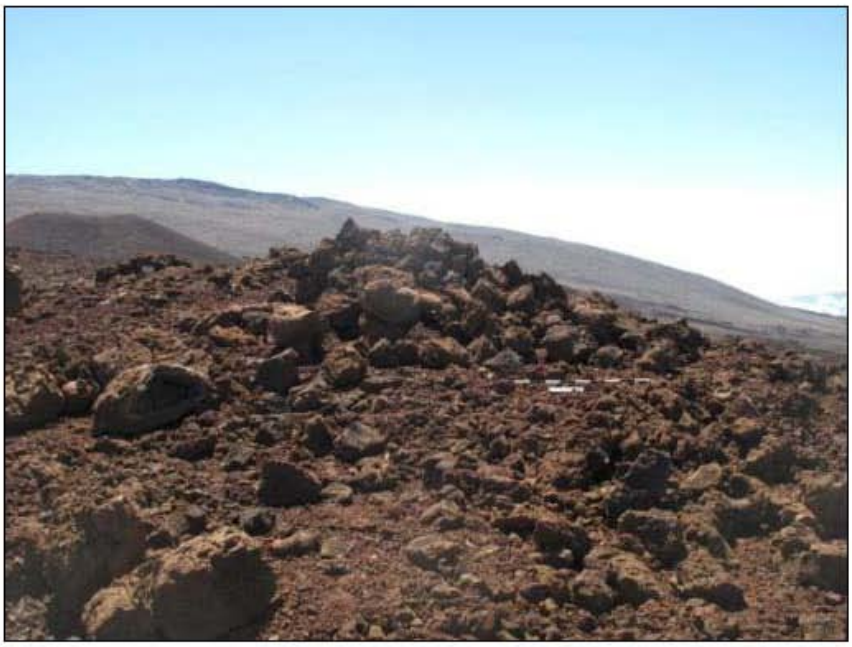

Figure 10. Rock Mound 1 near LZ-5, looking east, photo taken on 04/04/11

Figure 11. Rock Mound 2 near LZ5, looking south, photo taken on 02/24/11

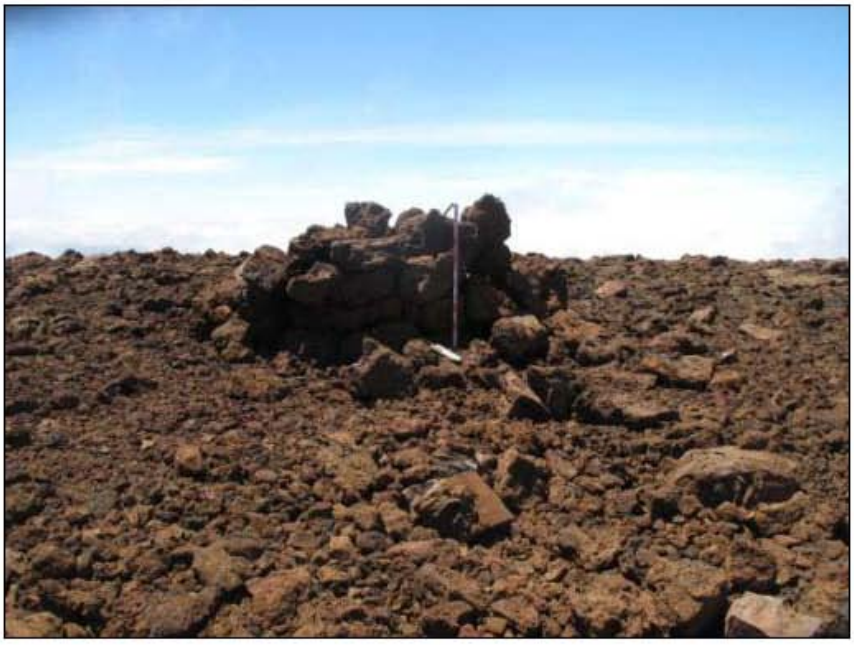

Figure 12. Rock Mound 2 near LZ5, looking south, photo taken on 03/24/11

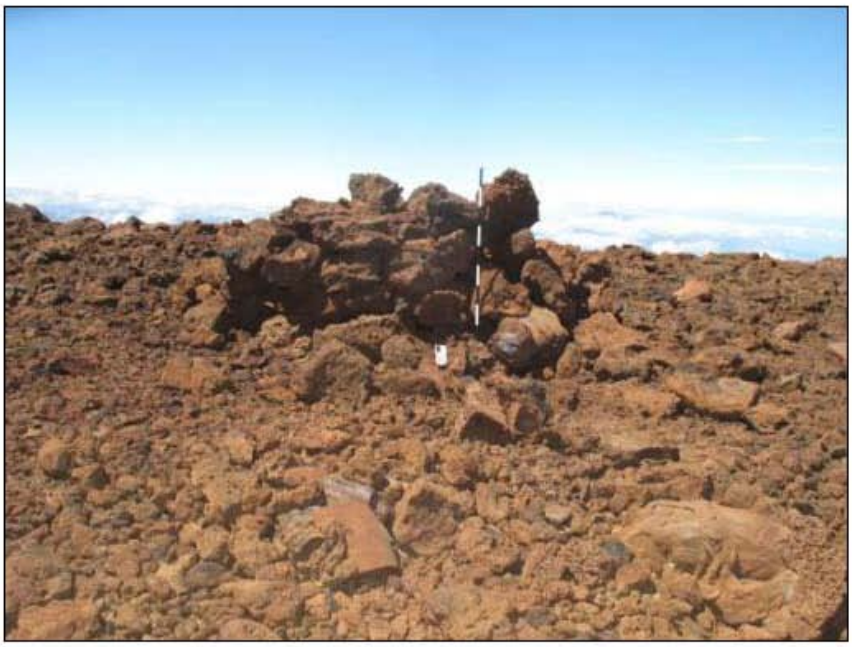

Figure 13. Rock Mound 2 near LZ5, looking south, photo taken on 04/04/11

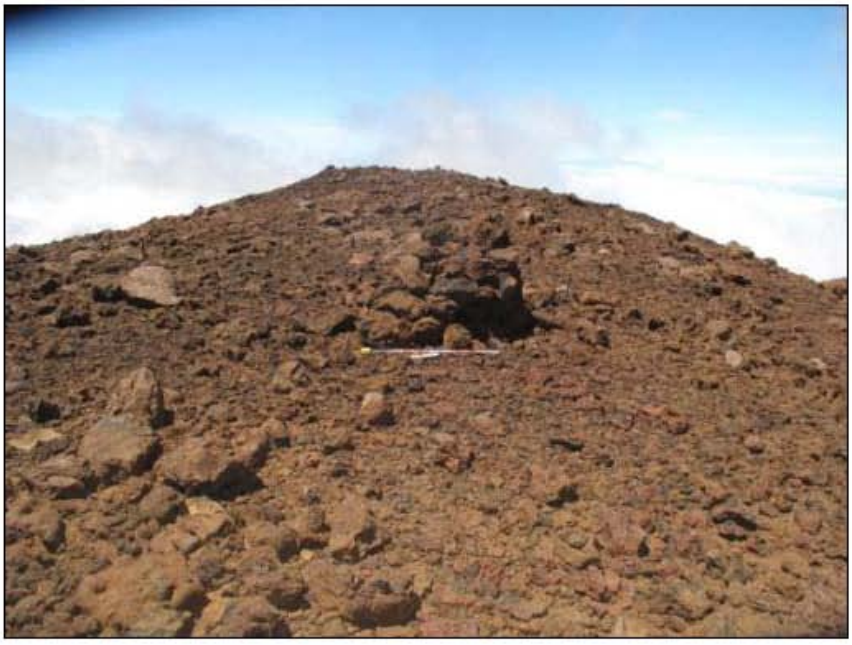

Figure 14. Rock Mound 2 near LZ5, looking west, photo taken on 03/24/11

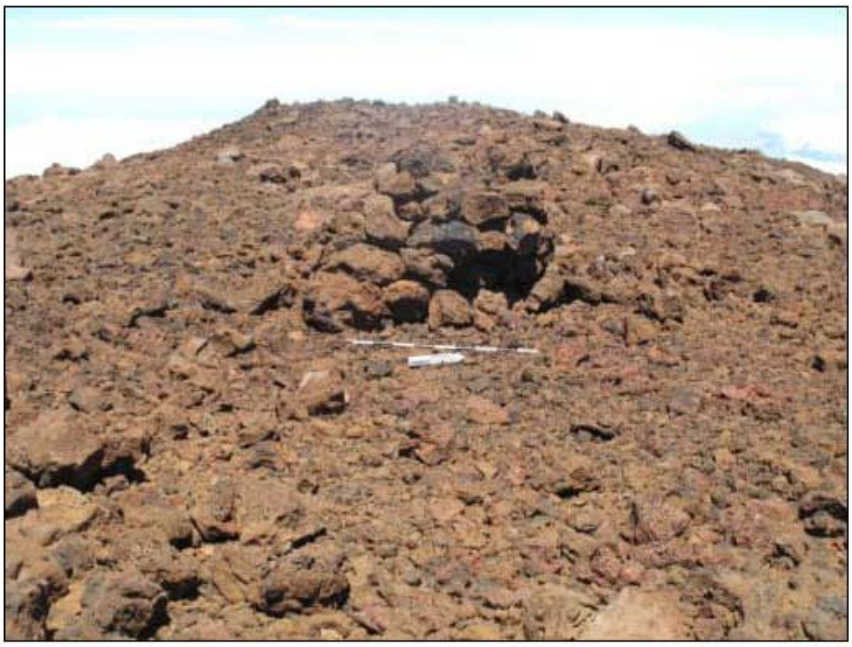

Figure 15. Rock Mound 2 near LZ5, looking west, photo taken on 04/04/11

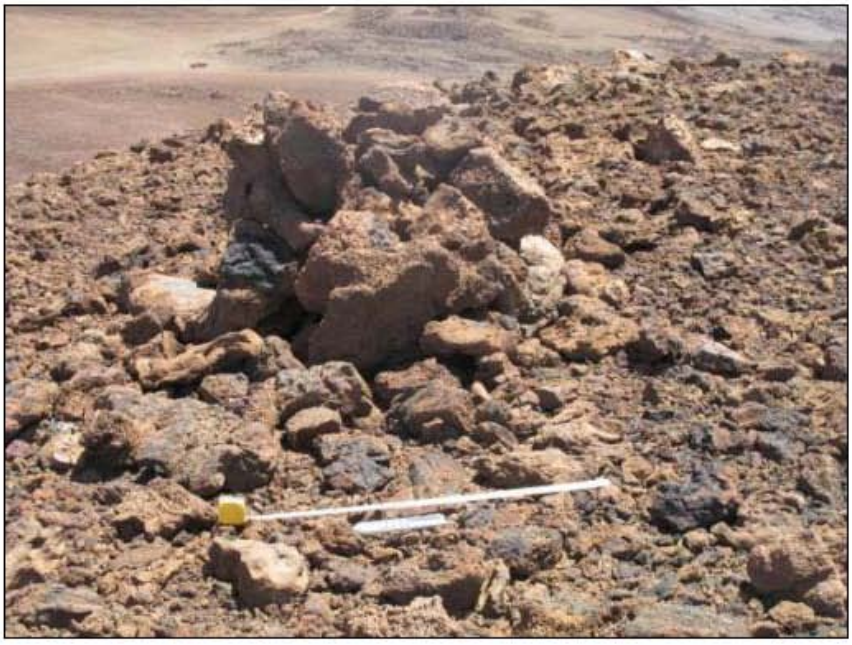

Figure 16. Rock Mound 2 near LZ5, looking east, photo taken on 03/24/11

Figure 17. Rock Mound 2 near LZ5, looking east, photo taken on 04/04/11

Figure 18. Rock Mound 3 near LZ-6, looking west, photo taken on 02/24/11

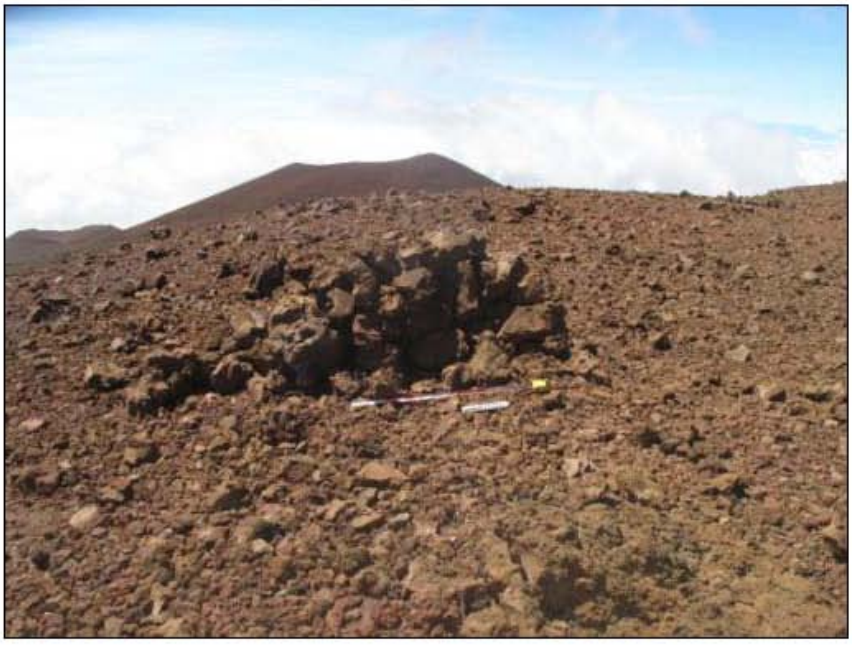

Figure 19. Rock Mound 3 near LZ-6, looking west, photo taken on 03/24/11

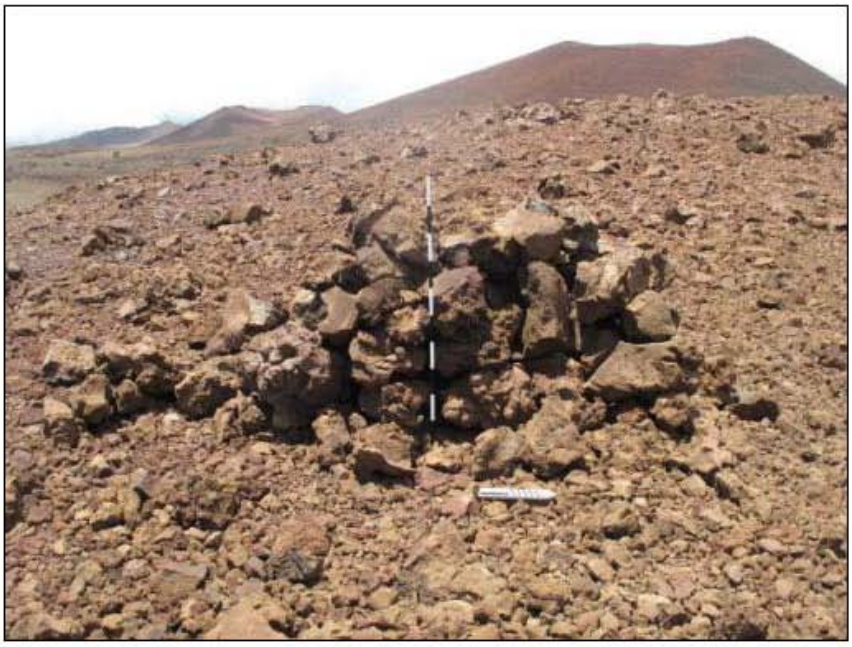

Figure 20. Rock Mound 3 near LZ-6, looking west, photo taken on 04/04/11

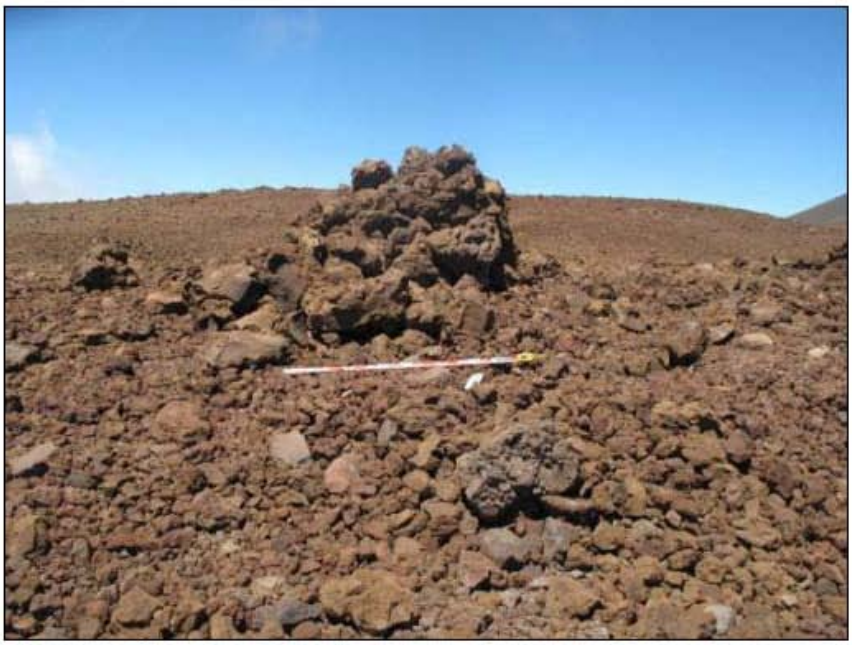

Figure 21. Rock Mound 3 near LZ-6, looking north, photo taken on 03/24/11

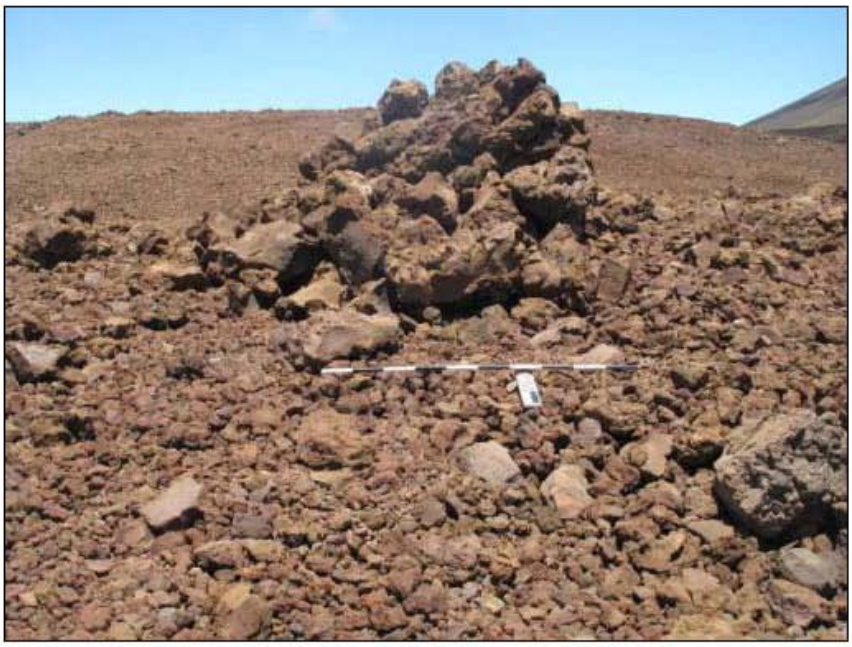

Figure 22. Rock Mound 3 near LZ-6, looking north, photo taken on 04/04/11

Figure 23. Rock Mound 3 near LZ-6, looking east, photo taken on 03/24/11

Figure 24. Rock Mound 3 near LZ-6, looking east, photo taken on 04/04/11

Figure 25. Rock Mound 3 near LZ-6, looking south, photo taken on 03/24/11

Figure 26. Rock Mound 3 near LZ-6, looking south, photo taken on 04/04/11

IMPC-HI-PWE **22 March 2011**

MEMORANDUM FOR THE RECORD

SUBJECT: Cultural Resources Reconnaissance Survey for noise monitor placements on Mauna Kea, [TMK (3) 4-4-015:001 & TMK (3) 4-4-015:09] Ka'ohe Ahupua'a, Hāmākua District, Hawai'i Island.

1. On March 19th & 20th, 2011, Mr. David Crowell and Ms. Kehaulani Kerr, Cultural Resources Program Manager and Cultural Resources Specialist at Pōhakuloa Training Area (PTA), conducted a cultural resources reconnaissance survey of six locations on Mauna Kea to monitor the noise associated with the high altitude training at the existing HAMET LZ locations on Mauna Kea (LZ-4, LZ-5, LZ-6). The HAMET LZ locations are located approximately 8km north of PTA on the northwestern flank of Mauna Kea, below the summit at approximately 11,000 – 12,000 feet above sea level (fasl). The noise monitors (1-3) covers approximately 850 *hectares* and is located to the northwest of the cantonment area at PTA. The noise monitors (4-6) covers approximately 150 *hectares* and is located to the western side of the summit on Mauna Kea (figure 1).

2. The HAMET LZ locations were previously surveyed in October and December 2003 (Godby and Head 2003a, Godby and Head 2003b). The previous efforts investigated only the 15m x 15m footprint of the LZs while the current investigation included a 100m area from the center of the LZs as the Area of Potential Effect (APE). On February 24th, 2010, PTA cultural resources (CR) staff preformed the cultural resources reconnaissance survey for the existing HAMET LZ locations on Mauna Kea. On March 19th, 2011, Mr. Crowell and Ms. Kerr joined Don Weir (Ranger- Office of Mauna Kea Management), David Lodman and Jim Jackson (Portage, Inc.) at the visitor center and proceeded to the summit of Mauna Kea to install noise monitors (4-6). The noise control study will collect scientific data that shows if the archaeological sites in the area will be impacted by the high altitude training as well as study the impacts from recreational uses by the visiting public and hunters. On March 20th, 2010, Mr. Crowell and Ms. Kerr along with the contractors from Portage Inc. installed noise monitors (1-3). The noise monitors (1-3) located in Ka'ohe Game Management Area have been strategically place within the critical *Palila* habitat to study the effect of noise pollution to their environment.

3. Noise monitor #1 is located 470m north of Saddle road at the approximate elevation of 6000 fasl (0228474E, 2189226N) to the north side of saddle road. No archaeological sites were found within the area (figure 2).

Enclosure 7

4. Noise Monitor # 2 1 is located about 200m to the north of Pu'uokauha at the approximate elevation of 8000 fasl (0231310E, 2191370N). No archaeological sites were found within the area. Mr. Crowell and Ms. Kerr discovered three Palila during the placement of the noise monitor this day. Upon returning to the cantonment area at PTA, the natural resources section at PTA was notified of the discovery (figure 3).

5. Noise monitor #3 is located about 1250m west of Pu'unanaha at the approximate elevation of 7800 fasl (0230060E, 2196229N). No archaeological sites were discovered within the area (figure 4).

6. Noise monitor #4 is located within the Astronomy Precinct and was placed between the Subaru telescope and W.M Keck I at the approximate elevation of 13550 fasl (0240706E, 2194085N). There were no newly discovered archaeological sites within the area as Mr. Crowell and Ms. Kerr surveyed the area before the noise monitor was installed (figure 5).

7. Noise monitor #5 is located about 100m south of the Mauna Kea Ice Age Natural Area Reserve (NAR) also adjacent to *Pu'upōhaku* at the approximate elevation of 13,000 fasl (0239084E, 2193631N). There were no newly discovered archaeological sites with the area before the noise monitor was installed (figure 6).

8. Noise monitor #6 is located about 170m northeast of Lake Waiau at the approximate elevation of 13020 fasl (0240628E, 219669N). No newly discovered archaeological sites were found within the area (figure 7).

9. The project location is outside of the boundary of PTA. The Ka'ohe Game Management Area issued a permit to allow the environmental division at PTA, USAG-HI access to the area for the noise control study.

Kehaulani Kerr
Cultural Resource Specialist
Environmental Office, PTA

Godby, William and James Head

2003 Trip Report for the Archaeological Survey of Proposed Helicopter Landing Areas (LZ-5, LZ-5a, and LZ-6) for High Altitude Training from December 8, 2003 to December 12, 2003. On File at PTA.

Pacific Consulting Services, Inc.

2010 Office of Mauna Kea Management: Final Report. *Archaeological Inventory Survey of the Mauna Kea Science Reserve,* v. I.

Pacific Consulting Services, Inc.

2010 Office of Mauna Kea Management: Final Report. *Archaeological Inventory Survey of the Mauna Kea Science Reserve,* v. II.

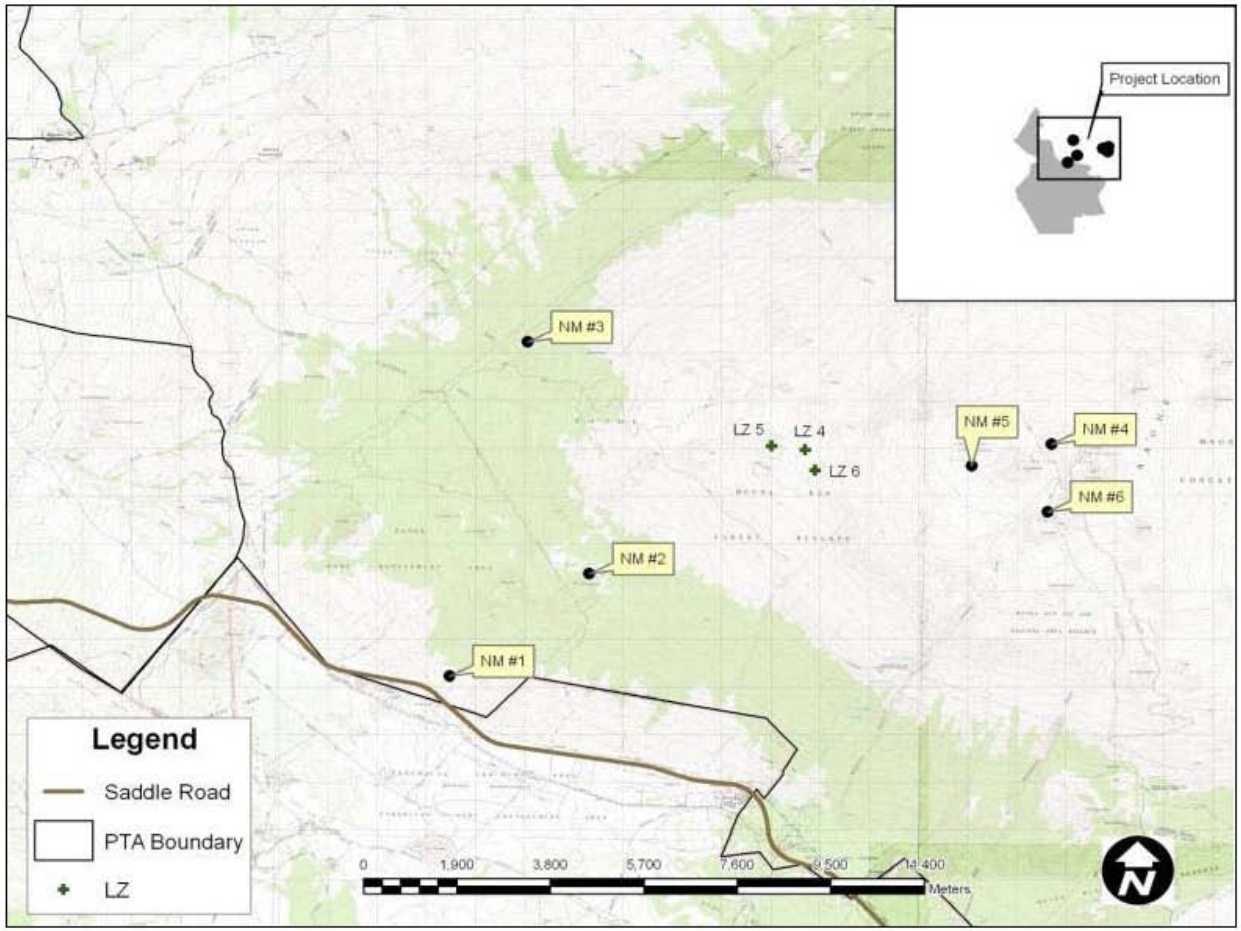

Figure 1. Location of noise monitors

Figure 2. Noise monitor #1

Figure 3. Noise monitor #2

Figure 4. Noise monitor #3

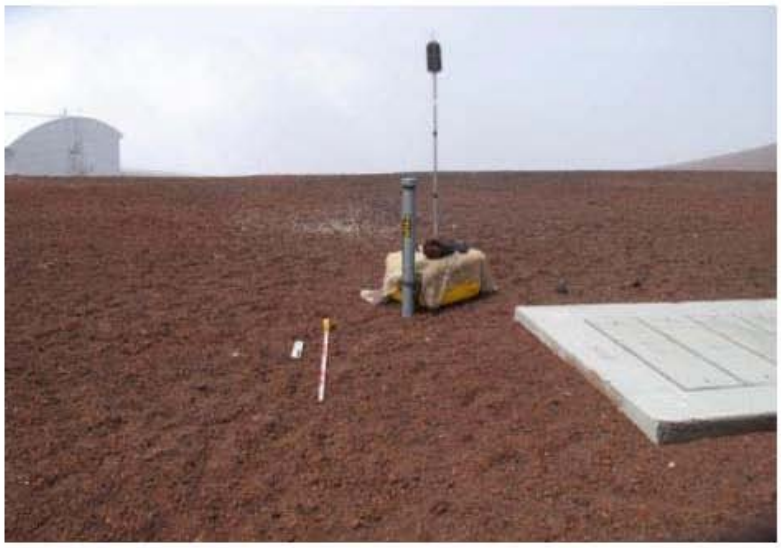

Figure 5. Noise monitor #4

Figure 6. Noise monitor #5

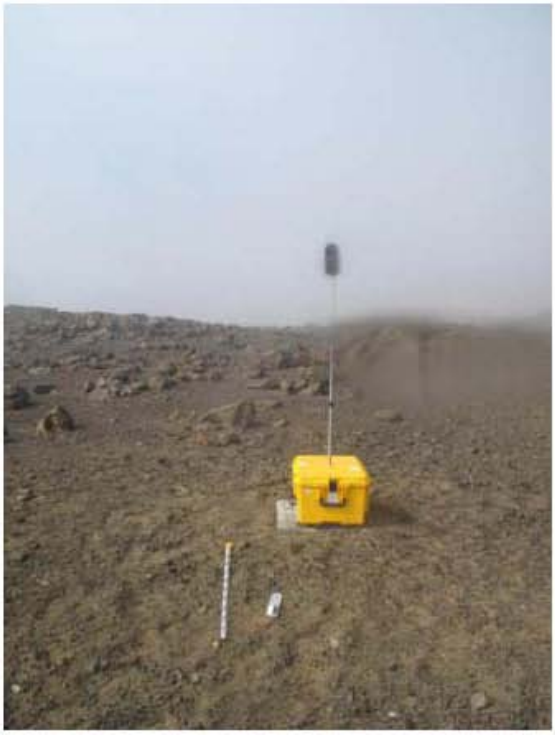

Figure 7. Noise monitor #6

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United States Department of the Interior

NATIONAL PARK SERVICE
Pacific West Region
300 Ala Moana Boulevard, Box 50165
Room 6-226
Honolulu, Hawaii 96850-0053

IN REPLY REFER TO
H4217

November 8, 2010

Department of the Army
U.S. Army Installation Management Command, Pacific Region
Headquarters, United States Army Garrison, Hawaii
Office of the Commander
851 Wright Avenue, Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5000

Attention: Dr. Julie M.E. Taomia
PTA Archeologist

RE: Section 106 consultation, proposed use of 6 previously disturbed, high elevation helicopter landing zones in the vicinity of the Pohakuloa Training Area (PTA), Island of Hawaii, for training operations.

Dear Dr. Taomia:

We are in receipt of your request for Section 106 consultation regarding the above-referenced undertaking. We understand that these areas are already used by State and private helicopters and will be used in future sporadic training sessions involving landings and takeoffs with no ground altering activities in the helicopter landing zone sites. We acknowledge that PTA cultural resource staff have visited and surveyed the proposed sites and no historic properties were identified in the immediate vicinity.

The National Park Service concurs with the determination that no historic properties will be affected by this project but are concerned with potential noise issues and overflights or flight paths that may affect protected properties and cultural landscapes. We note the proximity of the Mauna Kea landing zones in relation to the Mauna Kea Ice Age Natural Area Reserve and the Mauna Kea National Natural Landmark and the close proximity of the Mauna Loa landing sites to the Kipuka Ainahou Nene Sanctuary.

If you need additional information, please do not hesitate to contact me at (808)541-2693 ext. 723 or by email at Frank_Hays@nps.gov

Sincerely,

Frank Hays
Pacific Area Director

cc: Elaine Jackson-Retondo, NPS, PWR-Oakland
Mark Rudo, NPS, PWR-Oakland

TAKE PRIDE® IN AMERICA

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 2 0 2010

Office of the Commander

Ms. Laura H. Thielen
State Historic Preservation Officer
Chairperson
Department of Land and Natural Resources Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, HI 96707

Dear Ms. Thielen:

On behalf of the Commander of the US Army Garrison, Hawaii, I am writing to begin consultation under Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 CFR Part 800) on a project proposed on Hawaii State land in the vicinity of the Pōhakuloa Training Area (PTA) in Hawai'i County, Island of Hawai'i. There are two proposed project locations, the first within the ahupua'a of Humu'ula, district of North Hilo (TMK: (3) 3-8-001:001), and the second is within the ahupua'a of Ka'ohe, district of Hāmākua (TMK: (3) 4-4-015:001). Please see Enclosure 1 for a list of all consulting parties.

I have determined that this project constitutes an undertaking. The purpose of this undertaking is to utilize six Helicopter Landing Zones (HLZs) in order to conduct high-altitude helicopter training operations. Three of the HLZs are located on Mauna Loa, those in Humu'ula Ahupua'a, and three are on Mauna Kea, in Ka'ohe Ahupua'a. The area of potential effect (APE) consists of three discrete, discontinuous locations on each mountain (six total) that have been bulldozed previously, creating relatively open, level areas (see Enclosure 2). These areas are used by State and private helicopters. In addition, the locations on Mauna Loa are located on the historic 1899 lava flow. Training at the sites will consist of multiple helicopter landings and takeoffs. Of necessity, this helicopter activity will be constrained to the established level areas, as the surrounding terrain, made up of barren lava, is too rugged to accommodate helicopter landing. No ground altering activities will be conducted at the HLZ sites. PTA cultural resource staff have visited and surveyed the proposed HLZ sites and no historic properties were identified (Enclosure 3). Training will take place at these sites sporadically from this time forward.

I have determined that no historic properties will be affected by this project. Pursuant to Section 106 of the National Historic Preservation Act of 1966 as amended and 36 CFR Section 800.2(c), we are seeking your concurrence on this determination. If there is no response to this letter from your office after 35 days of the date of this letter we will assume that you concur with the determinations made herein and the proposed measures for avoidance and the project shall proceed, in accordance with 36 CFR § 800.3(c)(4). Should you require additional information about this project, the point of contact is Dr. Julie M. E. Taomia, PTA Archeologist, at telephone number (808) 969-1966.

Sincerely,

Robert Eastwood

Robert Eastwood
Director of Public Works

Enclosures

Ms. Laura H. Thielen
Chairperson
Department of Land and Natural Resources
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, HI 96707

Mr. Clyde Namuo
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, HI 96813

Ms. Lukela Ruddle
Office of Hawaiian Affairs
162-A Baker Avenue
Hilo, HI 96720

Ms. Ruby McDonald
Office of Hawaiian Affairs
75-5706 Hanama Place, Suite 107
Kailua-Kona, HI 96740

Mr. Jonathan Jarvis
Pacific West Region
National Park Service
1111 Jackson Street, Suite 700
Oakland, CA 94607-4807

Mr. Frank Hays
PWRO Honolulu
National Park Service
300 Ala Moana Boulevard
Honolulu, HI 96850

Mr. Edward Halealoha Ayau
Hui Malama I Na Kupuna O Hawai'i Nei
622 Wainaku Avenue
Hilo, HI 96720

Kahu Charles Maxwell
Hui Malama I Na Kupuna O Hawai'i Nei
157 'Ale'a Place
Pukalani, HI 96768

Mr. Kimo Lee
Hawaii Island Burial Council
State Historic Preservation Division
40 Pookela Street Unit C-5
Hilo, HI 96720

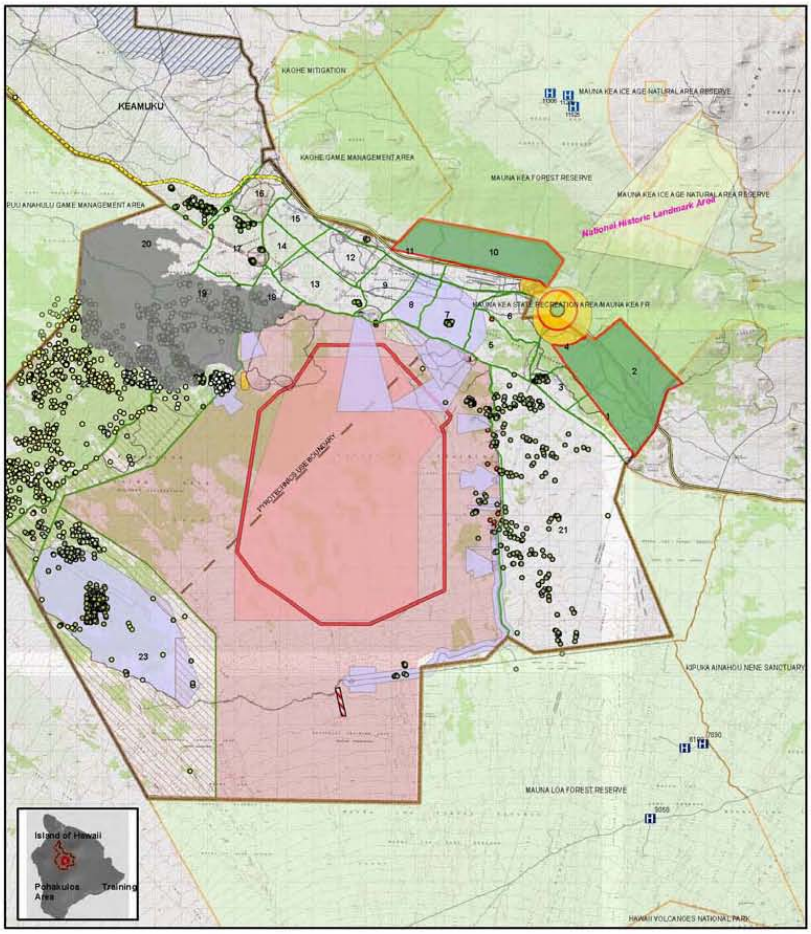
Ms. Ruby McDonald
Hawaii Island Council of Hawaiian Civic Clubs
P.O. Box 85
Kailua-Kona, HI 96745

Ms. Elaine Jackson-Retondo
Pacific West Region
National Park Service
1111 Jackson Street, Suite 700
Oakland, CA 94607-4807

Pohakuloa Cultural Advisory Committee Attendees
Bi-Montly Meetings held at PTA Headquarters

Enclosure 1

25TH COMBAT AVIATION BRIGADE: HIGH-ALTITUDE ARMY AVIATION TRAINING



LEGEND:

- Mauna Kea HAAT LZs
- Mauna Loa HAAT LZs
- National Historic Landmark
- DLNR Reserves

Critical_Habitat
AREA
- PAULA CRITICAL HABITAT
- ENVIRONMENTAL PROTECTED HABITAT

CurrentPlantLocations
NAME
- Asplenium peruvianum
- Haplostachys haplostachya
- Hedyotis coriacea
- Isodendrion hosakiae
- Melanthera venosa
- Neraudia ovata
- Portulaca sclerocarpa
- Schiedea hawaiiensis
- Silene hawaiiensis
- Silene lanceolata
- Solanum incompletum
- Spermolepis hawaiiensis
- Stenogyne angustifolia
- Tetramolopium arenarium
- Tetramolopium sp. 1
- Vigna o-wahuensis
- Zanthoxylum hawaiiense

- MPRC BUFFER

LABEL
- MAUNA KEA STATE PARK
- STATE PARK BUFFER
- BUFFER
- Roads
- NEW SADDLE ROAD
- SADDLE_RD_POWIANAKO
- DRAFT W7 ALIGN ALTERNATIVES
- RESERVATION BOUNDARY
- Bradshaw Army Airfield
- PTA Buildings Cantonement
- TRAINING AREA BOUNDARY
- Existing Ranges
- Training Areas
- TARGET AIRFIELD
- PYROTECHNIC LINE
- IMPACT AREA
- ICMBoundry
- Aerial Bombing Box

Hydrology
FTYPE
- AQUEDUCT
- STREAM
- FireBuffer

NOTE:
The 25th Combat Aviation Brigade (25th CAB) has a requirement to train pilots for high-altitude missions according to emergent high-altitude training doctrine and in preparation for deployment in support of Operation Enduring Freedom (Afghanistan). Shown here are the proposed high-altitude landing zones planned for use by 25th CAB 2011 training rotation. These LZs have been previously utilized by DOD.

DATE: 16 SEPTEMBER 2010

CREATED BY: RDH

SCALE: 1:120,000

SCALE BAR:

3,700 1,850 0 3,700
Meters

13,000 6,500 0 13,000
Feet

Enclosure 2

View of the location of a proposed landing zone, Mauna Loa.

View of a proposed landing zone, Mauna Loa (same location as previous photo).

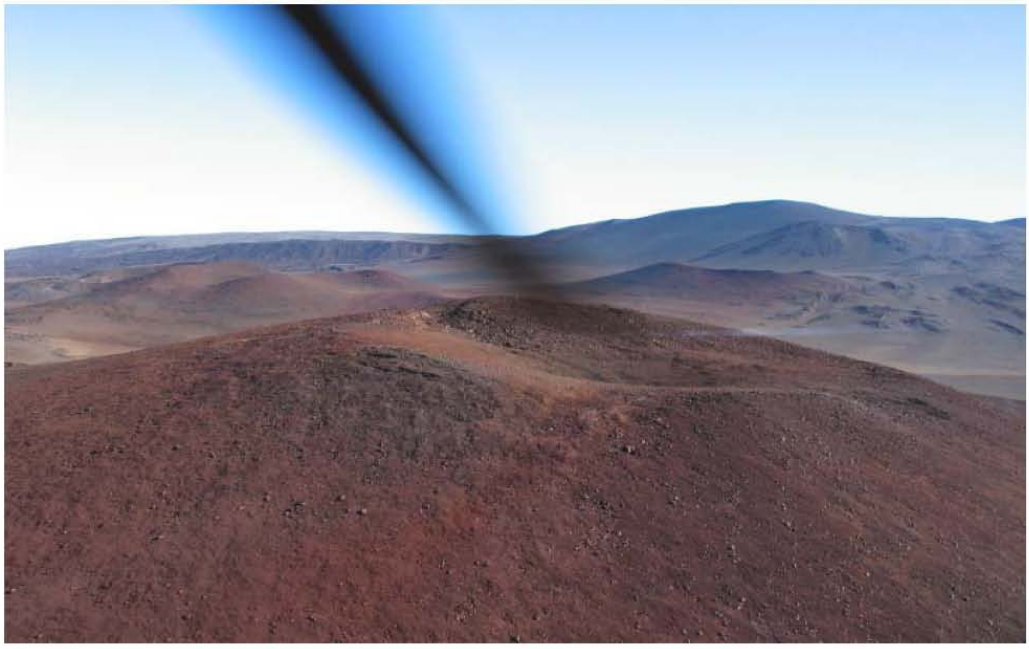
Enclosure 3

View of the location of a proposed landing zone, Mauna Loa.

View of the location of a proposed landing zone, Mauna Loa (same location as previous photo).

View of the location of a proposed landing zone, Mauna Loa.

View of the location of a proposed landing zone, Mauna Loa (same location as previous photo).



View of the location of a proposed landing zone, Mauna Kea.

View of the location of a proposed landing zone, Mauna Kea.

View of the location of a proposed landing zone, Mauna Kea.

View of the location of a proposed landing zone, Mauna Kea (same location as previous photo)

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Appendix E

Aircraft for Use in High-Altitude Mountainous Environment Training

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Appendix E

Aircraft for Use in High-Altitude Mountainous Environment Training

C-1. UH-60L BLACK HAWK

Since October 1989, Sikorsky has been producing the UH-60L Black Hawk helicopter with 24% more power than the UH-60A model. The T700-GE-701C turbine engines enable the UH-60L to take advantage of the new 3,400 shp improved durability main gearbox (Global Security 2010a).

The UH-60L was further modified with Seahawk® flight control components and an increase in tail rotor pitch. These modifications allow the aircraft to take full advantage of available engine power while extending the flight control component fatigue lives in excess of 5,000 hours.

As an example of the benefits of this upgrade, a modified UH-60L Black Hawk is capable of airlifting a 9,000-lb (4,082-kg) external payload, 60 nautical miles under hot day conditions, an increase of 3,000 lb (1,360 kg) over the UH-60A model.

In response to the growing weights of external loads such as weaponized M1036 High Mobility Multipurpose Wheeled Vehicles (HMMWV), the U.S. Army increased the external hook capacity to 9,000 lb (4,082 kg) for a gross weight of 23,500 lb (10,433 kg). This improvement, for example, allows organic UH-60L aviation resources to more closely match the lift requirements within the Light Infantry Divisions.

The world's most advanced twin-turbine military helicopter, the UH-60L is powered by twin General Electric T700-GE-701C turboshafts rated 1,890 shp each, plus the 3,400 shp Improved Durability Gearbox and heavy-duty flight controls developed for the naval S-70B Seahawk. It is cleared to 22,000 lb (9,979 kg) gross weight and can carry 9,000 lb (4,082 kg) external loads. New wide-chord composite main rotor blades and further engine upgrades are available for future performance requirements.

An External Stores Support System (ESSS), consisting of removable four-station pylons, multiplies Black Hawk roles. With the ESSS, the UH-60L can carry additional fuel tanks for extended range in self-deployment up to 1,150 nautical miles. For anti-armor missions, it can carry 16 Hellfire missiles on the pylons or a variety of other ordnance, including guns and rockets.

C-2. UH-60A BLACK HAWK

The UH-60A Black Hawk is the primary division-level transport helicopter, providing dramatic improvements in troop capacity and cargo-lift capability compared to the UH-1 Series "Huey" it replaces. The UH-60A, with a crew of three, can lift an entire 11-man fully-equipped infantry squad in most weather conditions. It can be configured to carry four litters, by removing eight troop seats, in the medical evacuation role (Global Security 2010).

Both the pilot and co-pilot are provided with armor-protective seats. Protective armor on the Black Hawk can withstand hits from 23-mm shells. The Black Hawk has a cargo hook for external lift missions. The Black Hawk has provisions for door mounting of two M60D 7.62-mm machine guns on the M144 armament subsystem and can disperse chaff and infrared jamming flares using the M130 general-purpose dispenser. The Black Hawk has a composite titanium and fiberglass four-bladed main rotor, is powered by two General Electric T700-GE-700 1622 shp turboshaft engines, and has a speed of 163 mph (142 knots).

The UH-60, first flown in October 1974, was developed as result of the Utility Tactical Transport Aircraft System (UTTAS) program. The UTTAS was designed for troop transport, command and control, medical evacuation, and reconnaissance, to replace the UH-1 Series "Huey" in the combat assault role. In August 1972, the U.S. Army selected the Sikorsky (Model S-70) YUH-60A and the Boeing Vertol (Model 237) YUH-61A (1974) as competitors in the UTTAS program. The Boeing Vertol YUH-61A had a four-bladed composite rotor, was powered by the same General Electric T700 engine as the Sikorsky YUH-60A, and could carry 11 troops. In December 1976, Sikorsky won the competition to produce the UH-60A, subsequently named the Black Hawk.

Elements of the U.S. Army Aviation UH-60A/L Black Hawk helicopter fleet began reaching their service life goal of 25 years in 2002. In order for the fleet to remain operationally effective through the time period 2025–2030, the aircraft will need to go through an inspection, refurbishment, and modernization process that will validate the structural integrity of the airframe, incorporate improvements in subsystems so as to reduce maintenance requirements, and modernize the mission equipment and avionics to the levels compatible with Force XXI and Army After Next (AAN) demands.

A Service Life Extension Program (SLEP) for the UH-60 began in Fiscal Year 1999. The UH-60 modernization program identifies material requirements to effectively address known operational deficiencies to ensure the Black Hawk is equipped and capable of meeting battlefield requirements through the 2025–2030 timeframe. Primary modernization areas for consideration are increased lift, advanced avionics (digital communications and navigation suites), enhanced aircraft survivability equipment (ASE), increased reliability and maintainability (R&M), airframe SLEP, and reduced operations and support (O&S) costs. Suspense date for the approved Operational Requirements Document (ORD) was December 1998.

C-3. CH-47D/F CHINOOK OVERVIEW

The Chinook is a multi-mission, heavy-lift transport helicopter. Its primary mission is to move troops, artillery, ammunition, fuel, water, barrier materials, supplies, and equipment on the battlefield. Its secondary missions include medical evacuation, disaster relief, search and rescue, aircraft recovery, fire fighting, parachute drops, heavy construction, and civil development. Chinook helicopters were introduced in 1962 as the CH-47 Chinook, and models A, B and C were deployed in Vietnam.

As the product of a modernization program, which included refurbishing existing CH-47s, the first CH-47Ds were delivered in 1982 and were produced until 1994. A central element in the Gulf War, they continue to be the standard for the U.S. Army in the global campaign against terrorism. Since its introduction, 1,179 Chinooks have been built (Boeing 2010).

C-3.1 CH-47F Chinook

To extend the service life of the CH-47 beyond 2030, Boeing developed the CH-47F in the mid-1990s and began production in 2003. Boeing is conducting major cost reduction initiatives, which improve manufacturing processes and affordability (Boeing 2010).

The program features improvement aimed at reducing operating and support costs; improving reliability, availability, and maintainability (RAM); and providing digital battlefield compatibility in communications and navigation. The program included modernization of 394 existing CH-47Ds and production of 17 new helicopters. The CH-47F Chinooks possess the following capabilities and characteristics:

- Improved airframe structure to reduce vibration effects
- Structural enhancements in the cockpit, cabin, aft section, pylon, and ramp – flexible paint system with corrosion preventive compounds
- Integrated cockpit control system – Common Aviation Architecture System
- Improved electrical, avionics, and communication systems
- Improved Avionics with Digital Advanced Flight Control System – situational awareness and improved digital map display
- More powerful engines with digital fuel controls – two turbine engine hubs, each with a Textron Lycoming T55-L714 engine and each with 4,900 shp
- A maximum payload capacity of 21,500 lb (9,752 kg) (based on U.S. Army requirements for the CH-47F)

- An operating range up to 329 nautical miles
- Modularized hydraulics and triple cargo hooks
- Composite, manual-folding, tandem-rotor blades with three blades per hub.

C-3.2 CH-47D and Cargo Helicopter Airframe Procurement Support (CHAPS)

Currently, the U.S. Army and international countries operate more than 600 CH-47D Chinooks. This model will be operated and supported through 2018 by the U.S. Army and Boeing until the CH-47F is in full production. The CHAPS program provides for the sale of flight-ready CH-47D Chinooks under "Exchange and Sales" regulations. Under this program, select D-Model Chinooks from the U.S. Army fleet are available to military users and service organizations worldwide, providing them affordable aircraft fully capable and easily upgradable to include any future system provided in the CH-47D. CHAPS provides countries affordable alternatives to more advanced aircraft and enables users to support military operations, medical and disaster relief, search and rescue, fire fighting, and civil support with reliable, cost-efficient helicopters (Boeing 2010). Chinook CH-47Ds possess the following capabilities and characteristics:

- Two turbine engine hubs, each with a Textron Lycoming T55-L714 engine
- Heavy payload capable
- Fully supportable and upgradable.

C-4. KIOWA OVERVIEW

Developed from the civil Bell Model 206A Jet Ranger helicopter, the U.S. Army's OH-58 Kiowa served extensively in Vietnam in the light observation and scout roles. The OH-58 Kiowa was built in significant numbers for military service and remains in widespread use within the U.S. Army in upgraded OH-58C form. The Kiowa also serves as a trainer with the U.S. Navy as the TH-57 Sea Ranger and with the U.S. Army as the TH-67A Creek (Military Today 2011).

C-5. OH-58C KIOWA RECONNAISSANCE HELICOPTER

The OH-58C is an upgrade from the OH-58A model helicopter. The OH-58C is a single-engine, double-bladed helicopter much like the OH-58D. The Bell OH-58 is a versatile all-metal, light-observation helicopter used for observation, scout, and command and control in the U.S. and overseas military forces. It appears similar to the civilian series of the Bell 206 Jet Ranger but is fitted with a 420 SHP T63-A-720 engine and is equipped with the Black Hole infrared (IR) signature-suppression system and low-glare flat plate windshields, and it is night-vision-goggle compatible. It has a single two-bladed, semi-rigid, teetering main rotor and an anti-torque tail rotor (Flight Research 2011).

The cockpit provides side-by-side seating for a crew of two, seats for two passengers in the rear compartment, and has provisions for an XM-27E1, 7.62-mm, mini-gun armament system. In addition, the FRI OH-58C has an advanced instrumentation system specifically developed for recording performance and flying qualities data (Flight Research 2011).

C-6. OH-58D KIOWA WARRIOR RECONNAISSANCE/ ATTACK HELICOPTER

The Armed OH-58D Kiowa Warrior, in service with the U.S. Army, is supplied by Bell Helicopter Textron of Fort Worth, Texas. Around 375 Kiowas are in service, and the single-engine, four-bladed armed reconnaissance helicopter has been deployed in support of U.S. armed forces around the world, including Haiti, Somalia, and the Gulf of Arabia (Desert Storm and Desert Shield). In 2002, Kiowas were deployed as part of NATO's SFOR forces in Bosnia, and, in 2003, 120 Kiowas were deployed in support of Operation Iraqi Freedom (Army-Technology 2010).

Two Kiowas can be transported in a C-130 aircraft. For air transportation, the vertical tail fin pivots, the main rotor blades and the horizontal stabilizer are folded, and the mast mounted sight, the IFF antenna, and the lower wire cutter are removed. The landing gear can kneel to decrease the height.

C-4.1 Cockpit

The Kiowa was the first U.S. Army helicopter to have an all-glass cockpit. The cockpit is supplied by Sperry Flight Systems and is equipped with a multiple target tracking/moving target indicator, an ANVIS (Aviation Night Vision System) Display Symbology System, and a helmet-mounted display. The primary multi-function displays provide situation information, communications control, and the mast-mounted sight video. A video recorder stores television and thermal imagery from the mission and allows playback in the cockpit.

C-4.2 Weapons

The OH-58D is equipped with two universal quick change weapons pylons. Each pylon can be armed with two Hellfire missiles, seven Hydra 70 rockets, two air-to-air Stinger missiles, or one .50-caliber fixed-forward machine gun.

Mission processors control the suite of mission subsystems via a Military Standard 1553B bus. An onboard computer provides laser ranging and target location within 10 m.

C-4.3 Countermeasures

The countermeasures suite includes an AN/ALQ-144 infrared jammer, radar warning receivers against pulsed and continuous wave radars, and a laser warning detector.

C-4.4 Fire Control and Observation

The distinctive Mast Mounted Sight (MMS) from Boeing, situated above the rotor blades, enables the Kiowa Warrior to operate by day and night and to engage the enemy at the maximum range of the weapon systems and with minimum exposure of the helicopter. The mast-mounted sight contains a suite of sensors that includes a high-resolution television camera for long-range target detection; a thermal imaging sensor for navigation, target acquisition, and designation; a laser rangefinder/designator for target location and guidance of the Hellfire missiles and designation for Copperhead artillery rounds; and a boresight assembly that provides in-flight sensor alignment. The laser rangefinder/designator is also employed for handoff to an AH-1 Cobra helicopter for TOW missile engagements.

DRS Technologies was responsible for the contract for the sensor suite and, in February 2005, was awarded a contract to upgrade the thermal imaging system on the MMS. The Thermal Imaging Systems Upgrade (TISU) provides enhanced target detection and range.

C-4.5 Navigation and Communications

The U.S. Army OH-58D is equipped with an attitude heading reference system (AHRS) from Litton and an integrated global positioning system and inertial navigation system, GPS/INS. A data-loading module allows the pre-mission storing of navigation waypoint data and radio frequencies.

The mission equipment includes an Improved Data Modem for Digital Battlefield Communications (IDMDBC). The communications system is based on the Have-Quick UHF and SINCGARS FM anti-jam radio.

C-4.6 Engine

The OH-58D Helicopter is equipped with a Model 250 485-kW turbine engine from Rolls-Royce. The transmission has a transient power level of 475 kW. The engine and transmission system have been upgraded to provide high-performance levels in high temperature and extreme environments.

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Appendix F

Memorandums for the Record

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IMPC-HI-PS 18 April 2011

MEMORANDUM FOR RECORD

SUBJECT: Aerial surveys for fugitive dust and vegetation impacts at Mauna Kea LZs to support HAMET Environmental Assessment

Aerial surveys were conducted at Mauna Kea landing zones LZ 4, LZ 5 and LZ 6 on 18 April 2011, by Peter Peshut, PhD, to assess the generation of fugitive dust and potential impacts to vegetation as a result of HAMET operations.

Mauna Kea LZs are on State of Hawaii land in the Mauna Kea Forest Reserve. Landing zone geographic coordinates are given in Table 1. Landing zones are shown graphically in Figure 1. Each Mauna Kea LZ is an undisturbed natural lava area approximately 100 x 100 ft.

Table 1. Landing Zone Geographic Coordinates

Landing Zone	Latitude (N)	Longitude (W)	Elevation (ft)
Mauna Kea LZ4	19° 49' 26.24"	155° 31' 23.51"	11,208
Mauna Kea LZ5	19° 49' 28.31"	155° 31' 47.00"	11,324
Mauna Kea LZ6	19° 49' 12.11"	155° 31' 16.31"	11,539

In the field, a UH-60 Blackhawk helicopter from Bradshaw Army Airfield transited to and from the Mauna Kea LZs along established flight paths (see HAMET EA, April 2011). At each LZ the aircraft hovered for 1 minute at ~10 ft above the LZ geographic coordinate. After hover, the aircraft departed the LZ and observations were made along a circular flight path ~300 ft from the LZ center, at elevation ~100 ft above ground level.

The effect of rotorwash (helicopter generated winds) is a function of distance from the aircraft. Vertically, rotorwash effect height = 1.5x rotor diameter (P. Mansoor, CW4, personal communication, 2011). For the UH-60 Blackhawk, rotorwash is first felt at the

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ground surface when the aircraft is ~80 feet overhead. Horizontally, at hover, rotorwash from the UH-60 Blackhawk diminishes to ambient wind conditions at ~140 ft from the aircraft. The horizontal effect of UH-60 rotorwash was measured under controlled conditions at Bradshaw Army Airfield as an aircraft hovered ~10 ft above the runway surface (P. Peshut, personal observations, 31 March 2011).

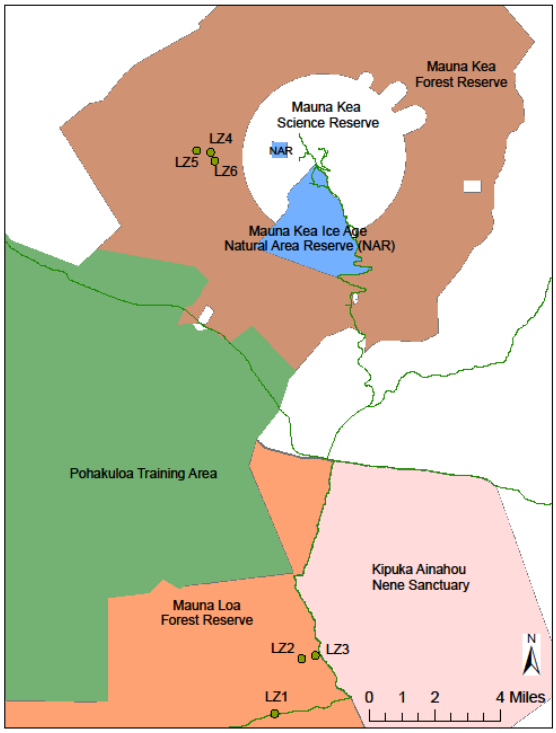

Figure 1. Mauna Kea and Mauna Loa Landing Zones

For all Mauna Kea LZs, there were no impacts to vegetation during helicopter approach, hover, or departure from the LZs. Mauna Kea LZ 5 and LZ 6 are devoid of vegetation within ~150 ft of the LZ center. For Mauna Kea LZ 4, vegetation within 150 ft of the LZ center is limited to sparse clumps of distressed grasses of ~4 inches diameter, widely spaced at ~50-100 ft. See Peshut and Evans MFR 30 March 2011 for a description of vegetation at Mauna Kea LZs.

No fugitive dust was observed at any Mauna Kea LZ during aircraft approach, hover, or departure from the LZs (Figure 2 – Figure 10). Substrate at the Mauna Kea LZs consists of lava pieces ½-6 inches, with little or no entrained fine-grained material. See Peshut and Evans MFR 30 March 2011 for a description of substrate at Mauna Kea LZs.

Figure 2. Aerial Observation Mauna Kea LZ 4 - Approach

Figure 3. Aerial Observation Mauna Kea LZ 4 - Hover

Figure 4. Aerial Observation Mauna Kea LZ 4 - Departure

Figure 5. Aerial Observation Mauna Kea LZ 5 - Approach

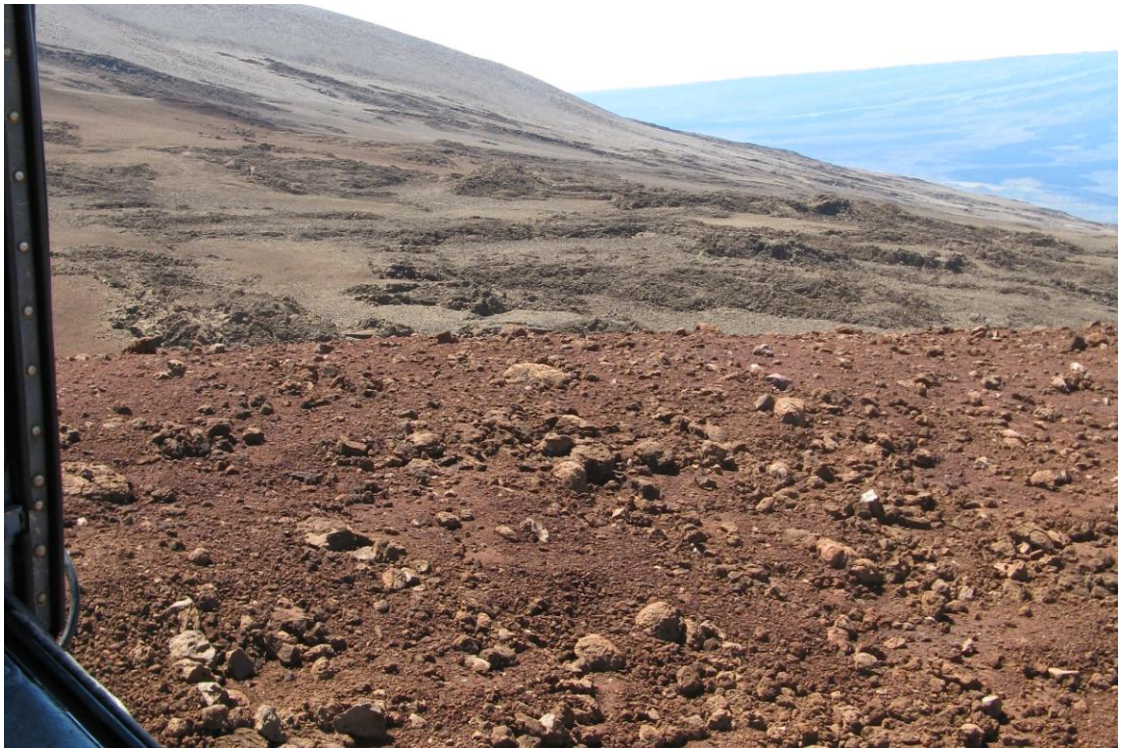

Figure 6. Aerial Observation Mauna Kea LZ 5 - Hover

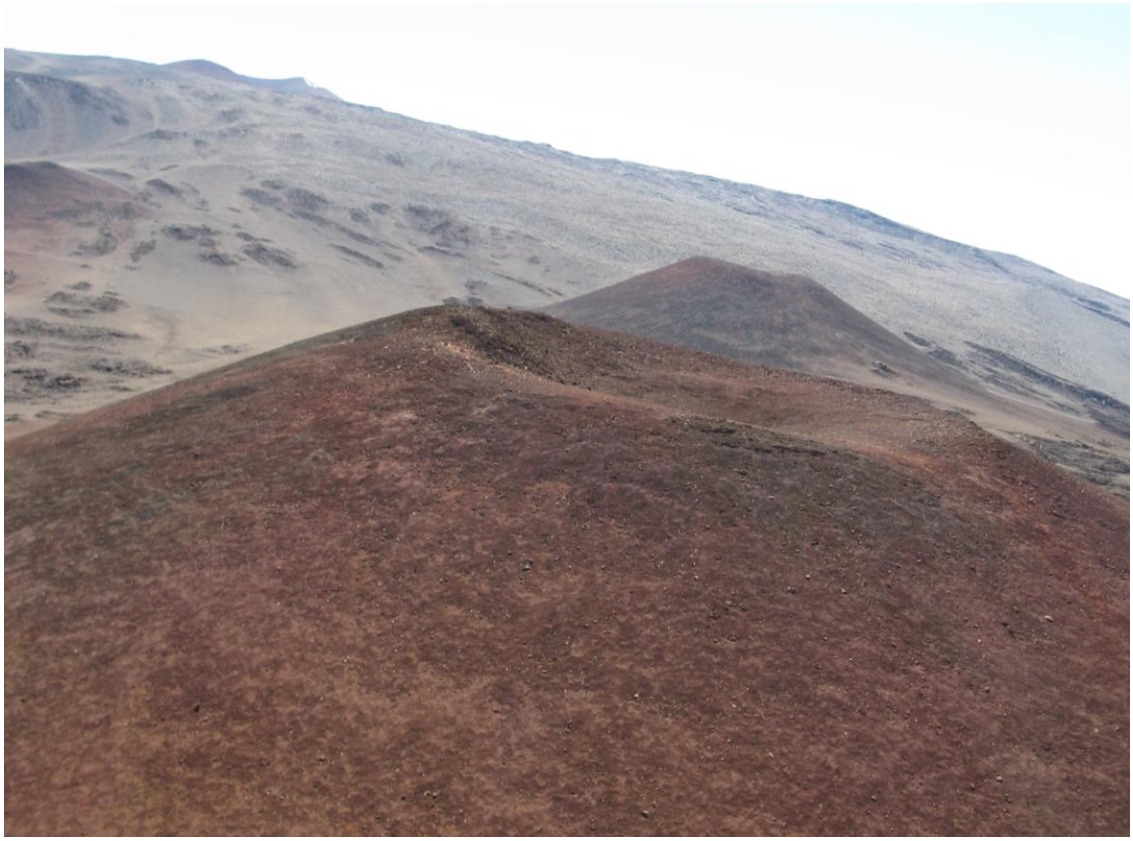

Figure 7. Aerial Observation Mauna Kea LZ 5 - Departure

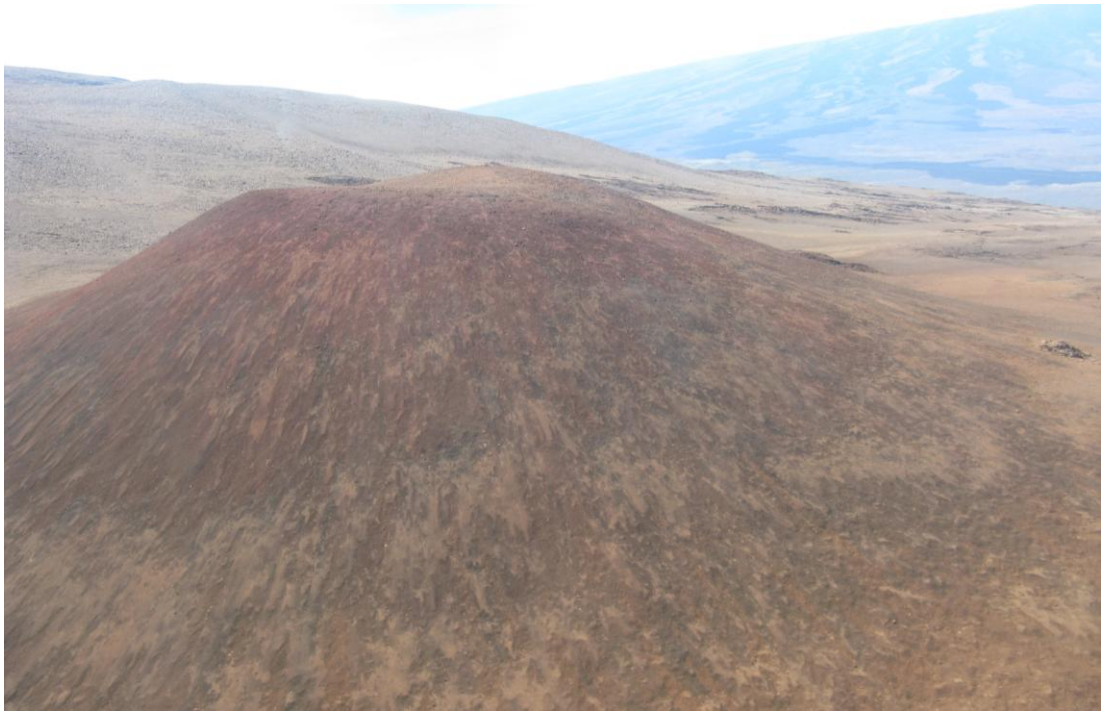

Figure 8. Aerial Observation Mauna Kea LZ 6 - Approach

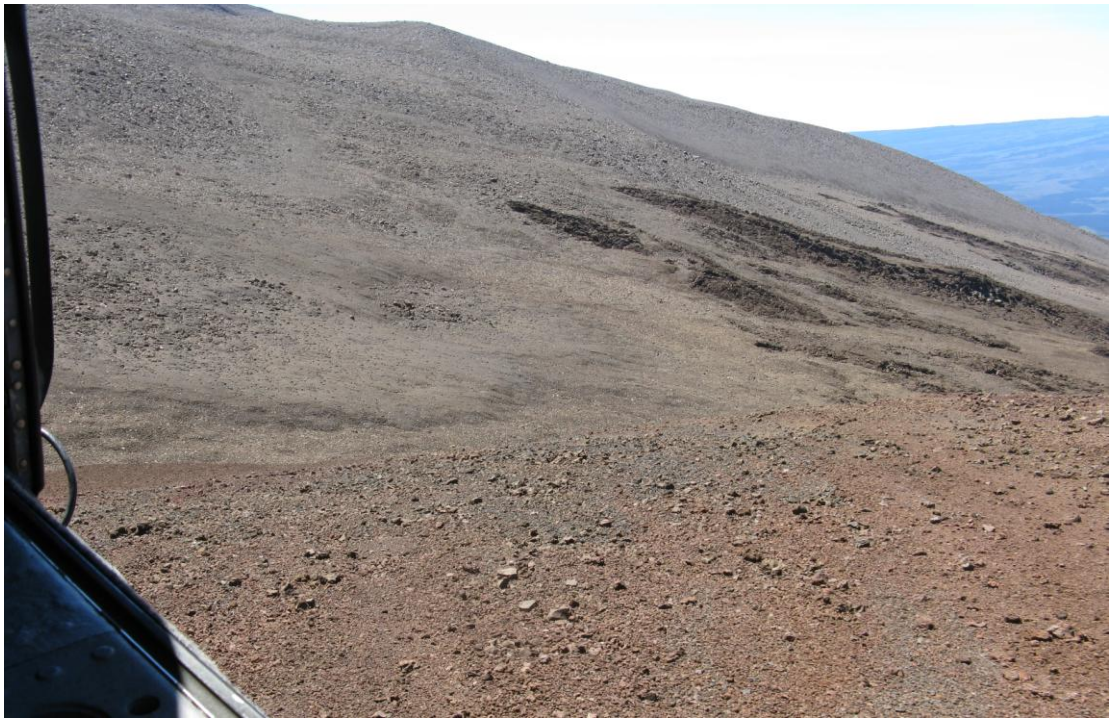

Figure 9. Aerial Observation Mauna Kea LZ 6 - Hover

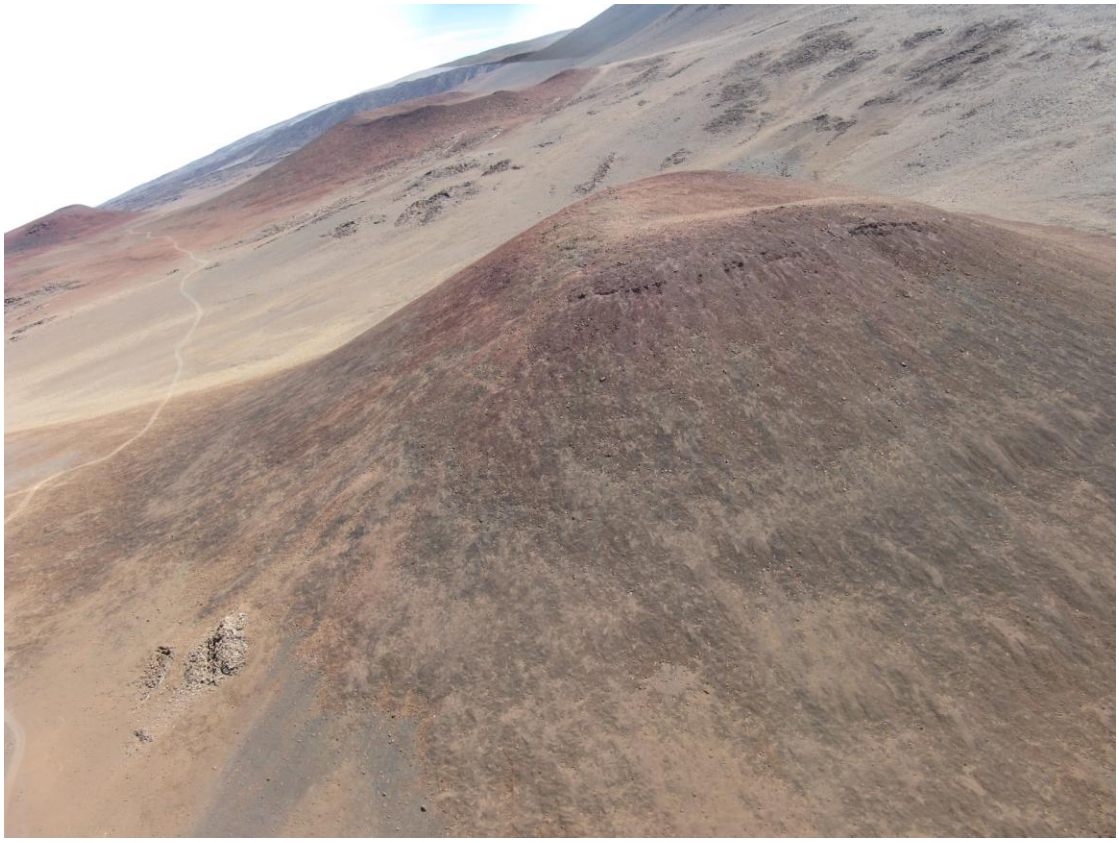

Figure 10. Aerial Observation Mauna Kea LZ 6 - Departure

Point of contact to further discuss aerial surveys for fugitive dust and vegetation impacts at Mauna Kea LZs is Peter Peshut, 808-969-1966, peter.peshut@us.army.mil.

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IMPC-HI-PS

MEMORANDUM FOR RECORD 20 June 2011

SUBJECT: ESA-7(c) Determination of No Effect for High-Altitude Mountainous Environment Training (HAMET) at Mauna Kea and Mauna Loa, Hawaii Island

The US Army developed the HAMET program to prepare pilots for successful combat operations as part of Operation Enduring Freedom in Afghanistan (US Army, 2009). HAMET involves three phases: 1) academic and simulator training; 2) basic qualification, and; 3) tactical operations exercises. HAMET is essential pilot training because high altitudes and mountainous terrain produce aerodynamic and atmospheric effects on rotary-wing aircraft that differ from effects at lower altitudes and over moderate terrain. Conditions at high altitudes may include high winds, extreme turbulence, low air density, and unpredictable air stability. These conditions can significantly affect engine performance and handling characteristics of rotary-wing aircraft (US Army, 2011). Army helicopter pilots need to understand and experience the challenges of flight planning and aircraft operations at high altitudes in order to be competent for missions in mountainous environments such as Afghanistan.

In preparation for deployment to theatre of operation and to satisfy compulsory aviation training requirements, the 25th Combat Aviation Brigade stationed at Wheeler Army Airfield, Hawaii, proposes to provide HAMET for helicopter aviators at landing zones (LZs) on Mauna Kea and Mauna Loa, Hawaii. The proposed action sustains Department of Army and Department of Defense training requirements and meets HAMET Phase 3 objectives. Aviators and crews will train on aircraft internal to the 25th Combat Aviation Brigade, Hawaii.

The US Army has developed Action Alternatives and a No Action Alternative to evaluate the proposed HAMET Action, as described in the HAMET Environmental Assessment (US Army, 2011). The No Action Alternative serves as a benchmark against which the proposed alternatives can be evaluated. Since the proposed action is to conduct HAMET Phase 3 tactical operations exercises, the purpose of the Action will not be achieved if the No Action Alternative is selected (US Army, 2011).

Action Alternatives 1-3 involve the execution of HAMET flights between Bradshaw Army Airfield at Pohakuloa Training Area and six landing zones selected on Mauna Kea

and Mauna Loa. These six LZs were chosen based on training-appropriate characteristics and safety considerations. The selected LZs meet the criteria for HAMET objectives and are suitable for use without further modification.

Biological resources within the HAMET project area include vegetation and wildlife. Potential impacts to vegetation (including palila critical habitat) include habitat disturbance, including habitat loss from wildland fire, temporary localized impacts from dust and wind generated from helicopter rotorwash, and the spread of invasive plant species. Potential impacts to wildlife are noise disturbance, habitat disturbance, including habitat loss from wildland fire, the spread of invasive ant species, and direct impact with aircraft.

Biological surveys were conducted for each LZ to determine the reasonable likelihood that potential impacts will occur to biological resources as a result of HAMET operations. A Memorandum For Record that describes findings for each survey was prepared for the file record. Based on findings, there is no reasonable likelihood that HAMET operations will have a sustained detrimental effect on biological resources of the Mauna Kea and Mauna Loa LZs. Surveys results and conclusions are summarized briefly below.

Botanical surveys were conducted 23 February 2011 at Mauna Loa LZ 1, LZ 2 and LZ 3, and 24 February 2011 at Mauna Kea LZ 4, LZ 5 and LZ 6, to determine the presence of federally-listed plant species and to assess overall vegetation in the general vicinities of the LZs (see Peshut and Evans Memorandum For Record 30 March 2011). Survey areas for each LZ included a square ~650 ft (200 m) on each side centered on the geographic coordinate of respective LZs.

No federally-listed or candidate plant species were located at any of the LZs or within any LZ survey area. In general, vegetation at the LZs is extremely sparse or absent, and is limited to a few common native or introduced species. HAMET operations will produce little or no dust at LZs, and the highly localized and short duration winds generated from aircraft rotorwash are not likely to permanently impact the sparse and stressed vegetation that occur at LZs (see Peshut Memorandum For Record 18 April 2011).

There are no effects to vegetation from human foot traffic at any LZ because there is no disembarkation of personnel during HAMET operations.

The impact to biological resources from wildland fire generated from a helicopter crash at an LZ is negligible because of the extremely sparse vegetation around the LZs, which provides a low density fuel load and limits the spread of fire.

The impact to biological resources from wildland fire generated from a helicopter crash along a flight path to an LZ (including over palila critical habitat) during HAMET

operations, is considered negligible. For the military, hundreds of helicopter flights and thousands of hours of flight time are logged at Pohakuloa each year. Moreover, commercial helicopters plying the tourist trade on Hawaii Island transit palila critical habitat regularly throughout the year, with no restrictions on flight paths or elevation. At a larger scale, thousands of commercial flights for public and private travel cross population centers and biologically sensitive areas daily, across the globe. Aircraft crashes are phenomenally rare given the numbers of aircraft and flight hours logged worldwide. It is reasonable to suggest that the potential for a helicopter crash from HAMET operations is extremely low. The likelihood of a helicopter crash during HAMET operations was not considered tenable.

Surveys to assess potential available treeland roosting habitat and potential foraging habitat for the federally-listed Hawaiian Hoary Bat were conducted 02 March 2011 at Mauna Loa LZ 1, LZ 2 and LZ 3, and 03 March 2011 at Mauna Kea LZ 4, LZ 5 and LZ 6, to determine the potential for bat presence in the general vicinities of the LZs (see Peshut and Doratt Memorandum For Record 04 April 2011). Survey areas for each LZ included a square ~650 ft (200 m) on each side centered on the geographic coordinate of respective LZs, similar to the survey area for the botanical surveys. Botanical survey data was used to augment the assessment of potential bat habitat.

As described for the botanical surveys, in general, vegetation at the LZs is extremely sparse or absent, and is limited to common native or introduced species. The Mauna Kea LZs are essentially devoid of vegetation and provide no habitat that could reasonably be considered as potential roosting or foraging habitat for the Hawaiian Hoary Bat. Vegetation at the Mauna Loa LZs is also extremely sparse, and there is no vegetation greater than 3 ft (1 m) in height within any of the Mauna Loa LZ survey areas. Overall, the LZs do not provide potential roosting or foraging habitat for the Hawaiian Hoary Bat.

Bat presence within the LZ areas is expected to be limited to rare and infrequent transiting bats, and bat density in the LZ areas is expected to be extremely low. Airstrike of bats is therefore considered to be unlikely. The potential for a helicopter collision with the Hawaiian Hoary Bat is unlikely because the bats are solitary, are only active from sunset to sunrise, only roost in trees in forested areas, and are not expected to depend upon the habitat around the LZs for resources. If transiting bats are present during HAMET operations, bats are expected to vacate the immediate vicinities of the aircraft and the LZ.

Preliminary and final surveys to assess the presence of the candidate species *Nysius wekiuicola* (Wekiu bug) and the presence of invasive ant species were conducted 02 March 2011 at Mauna Kea LZ 4, LZ 5 and LZ 6, on 03 March 2011 at Mauna Loa LZ 1, LZ 2 and LZ 3, on 31 May 2011 at Mauna Loa LZ 1, LZ 2 and LZ3, on 06 June 2011 at Mauna Kea LZ 4, LZ 5and LZ 6, and on 08 June 2011 at Mauna Kea LZ 5 and LZ 6. See

Peshut and Doratt Memorandum For Record 04 April 2011, and Peshut and Doratt Memorandum For Record 20 June 2011. Surveys for Wekiu and ants covered a period of several months to account for the seasonal behavior of these species. It was determined that Mauna Kea LZ 4 does not present viable habitat for the Wekiu bug, and this LZ was not subject to a final survey to confirm the presence or absence of the bug. The Wekiu bug is not known to inhabit Mauna Loa LZs. Mauna Loa LZs were surveyed for invasive ant species only. Survey areas for each LZ included a circle of ~650 ft (200 m) radius centered on the geographic coordinate of respective Mauna Kea LZs. No Wekiu bug or ants were found at any LZ during any survey.

Preliminary and final surveys to determine bird presence and habitat use in the general vicinities of the LZs (including listed and candidate petrel species) were conducted 02 March 2011 at Mauna Loa LZ 1, LZ 2 and LZ 3, on 03 March 2011 at Mauna Kea LZ 4, LZ 5 and LZ 6, and on 25-26 May 2011 and 06-07 June 2011 at all Mauna Kea and Mauna Loa LZs. Surveys for petrels covered a period of several months to account for the seasonal behavior of these species. See Peshut and Schnell Memorandum For Record 04 April 2011, and Peshut and Schnell Memorandum For Record 10 June 2011. Survey areas for each LZ included a circle of 2000 ft (610 m) radius centered on the geographic coordinate of respective LZs, corresponding to the 80 dB noise contour for helicopter operations at LZs.

Several bird species protected under the Migratory Bird Treaty Act were identified at the LZs, as were game bird species not protected under federal law. Overall densities of these birds within the survey areas were extremely low. These bird species are expected to vacate the immediate vicinities of the aircraft and LZs if present during HAMET operations.

The Hawaiian Goose (Nene) is known to frequent the regions within several miles of the Mauna Loa LZs, but geese densities are expected to be extremely low in the areas of LZs, and if present geese are expected to vacate the immediate vicinities of aircraft and LZs during HAMET operations. An air collision with the Nene is unlikely. The island-wide population of nene is ~500, of which only ~200 are known to transit Pohakuloa between population centers in Hakalau (east) and Puuanahulu (west). Nene do not spend a significant portion of their time in the air, and do not typically fly at night. Nene spend most of their time on the ground, loafing, feeding, sleeping, or tending nests. Nene are not expected to be present in the vicinities of the Mauna Kea LZs.

There was no evidence of habitat use or colony activity by the listed and candidate species of Dark-rumped Petrel and Band-rumped Petrel. Although the region of the Mauna Loa LZs is thought to be part of the flyway used by petrels transiting the saddle region to colonies in Hawaii Volcanoes National Park, petrel presence in the flyway is

indeterminable. Like other birds, petrels are expected to vacate the immediate vicinities of the aircraft and LZs if present during HAMET operations.

Collision with palila is highly unlikely because aircraft will maintain an altitude of at least 2000 feet above ground level when flying over critical habitat.

The spread of invasive species within the project area will be reduced by inspecting and cleaning the exterior of the HAMET aircraft at the Bradshaw Army Air Field prior to training flights.

The impact to biological resources due to noise is considered negligible. HAMET operations will produce ~10 minutes of noise disturbance per LZ per landing event, with the highest noise levels ~100 dB within ~100 ft of the geographic center of the LZ.

The impact to biological resources due to wind generated by helicopter rotorwash is considered negligible. HAMET operations will produce <2 minutes of wind disturbance per LZ per landing event, with the highest wind velocities within ~50 ft of the geographic center of the LZ, and falling off to ambient wind conditions ~140 ft from the aircraft, which is within the LZ perimeter.

The US Army will implement the following mitigation measures for HAMET operations:

- Helicopters will maintain an altitude of at least 2000 feet above ground level when flying over palila critical habitat;
- Helicopters will be inspected for invasive arthropod and plant species prior to each mission, and cleaning protocols will be followed if invasive species are identified;
- Firefighting resources will be on stand-by while HAMET operations are conducted and transportation will be available for firefighting personnel;
- All pilots will be briefed on the mitigation requirements prior to HAMET missions.

Based on field surveys and supporting documents, the US Army has determined that the HAMET operations will have no appreciable effect on federally-listed species or federally-designated critical habitat, and no effect on biological resources, within the project area.

This assessment and supporting documents satisfy US Army responsibilities under Section 7(c) of the Endangered Species Act at this time. The US Army will continue to remain aware of any change in the status of these species or critical habitat, and will be prepared to re-evaluate potential project impacts if necessary.

Point of contact to discuss this no effect determination is Peter Peshut, 808-969-1966, peter.peshut@us.army.mil.

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IMPC-HI-PS 04 April 2011

MEMORANDUM FOR RECORD

SUBJECT: Hawaiian Hoary Bat Surveys for HAMET Environmental Assessment

Surveys to assess potential available treeland roosting habitat and potential foraging habitat for the federally listed Hawaiian hoary bat (ope'ape'a, *Lasiurus cinereus semotus*) were conducted on 02 March 2011 at Mauna Loa landing zones LZ 1, LZ 2 and LZ 3, and on 03 March 2011 at Mauna Kea landing zones LZ 4, LZ 5 and LZ 6, by Rogelio Doratt, MSc. Doratt surveys for bat habitat were coincidental with arthropod surveys at these LZs. Observations for bat habitat were also made during the botanical surveys of 23 and 24 February 2011 (see Evans and Peshut MFR 30 March 2011), and during avifauna surveys of 02 and 03 March 2011 (see Schnell and Peshut MFR 04 April 2011). Surveys were conducted to determine the potential for bat presence in the general vicinity of the proposed LZs. The purpose of the surveys was to support the Environmental Assessment for High Altitude Mountainous Environmental Training (HAMET) that is proposed as an enduring training requirement for the Combat Aviation Brigade of the US Army 25th Infantry Division, Hawaii.

Mauna Kea LZs are on State of Hawaii land in the Mauna Kea Forest Reserve. Mauna Loa LZs are on State of Hawaii land in the Mauna Loa Forest Reserve. Landing zone geographic coordinates are given in Table 1. Landing zones are shown graphically in Figure 1. Each LZ is a graded or natural lava area approximately 30 x 30 m.

Table 1. Landing Zone Geographic Coordinates

Landing Zone	Latitude (N)	Longitude (W)	Elevation (ft)
Mauna Loa LZ1	19° 36' 05.64"	155° 28' 14.64"	7889
Mauna Loa LZ2	19° 36' 00.48"	155° 28' 37.74"	8049
Mauna Loa LZ3	19° 34' 32.10"	155° 29' 21.78"	8955
Mauna Kea LZ4	19° 49' 26.24"	155° 31' 23.51"	11,208
Mauna Kea LZ5	19° 49' 28.31"	155° 31' 47.00"	11,324
Mauna Kea LZ6	19° 49' 12.11"	155° 31' 16.31"	11,539

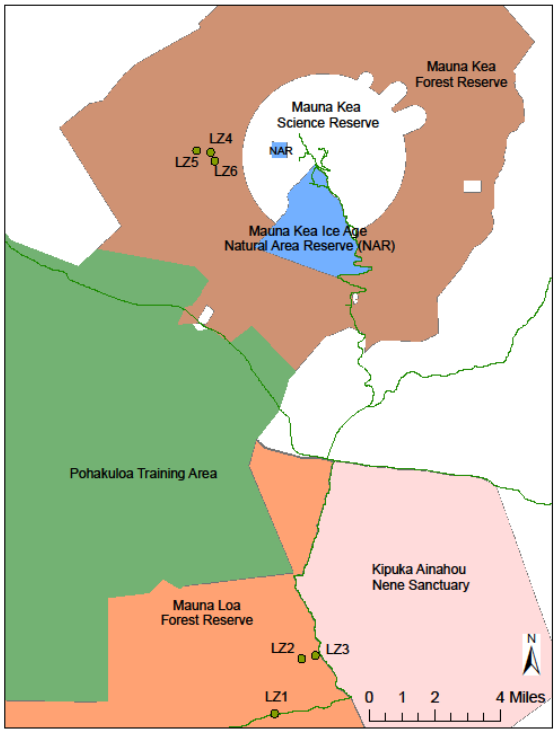

Figure 1. Mauna Kea and Mauna Loa HAMET Landing Zones

The bat habitat survey area for each LZ included a square 200 m on each side, centered on the geographic coordinates of respective LZs, as described for the arthropod and botanical surveys. Additional bat habitat survey area for each LZ was coincidental with avifauna surveys, and was a circle of 610 m (2000 ft) radius centered on the geographic coordinates of respective LZs, as described for the avifauna surveys.

Potential impacts to Hawaiian hoary bats as a result of HAMET operations are limited to noise and airstrike. Noise and airstrike potential were evaluated based on the expected presence of bats within the region of the LZs during HAMET activities. The potential for bat presence was evaluated based on available treeland roosting habitat and foraging habitat in the vicinities of the LZs.

Because of LZ elevations (see Table 1) and the complete absence or extremely low density of vegetation found within all LZ surveyed areas, bat presence is expected to be rare and bat density is expected to be extremely low in LZ areas during HAMET operations.

Hawaiian hoary bats are more frequently associated with roosting and foraging within forest structure rather than open habitat (kepler and Scott, 1990; Jacobs, 1994). Work conducted by the US Geological Survey (Biological Resources Division) indicates that bats are widely distributed throughout Hawaii Island in habitats with tree cover, including native and non-native forests, agricultural areas, and even some semi-urban areas (F. Bonaccorso, personal communication, 2006; Uyehara and Wiles, 2009). Hawaiian bats are insectivorous and nocturnal foragers, feeding in flight at elevations up to ~500 feet above ground level (Jacobs, 1996). Since insect density is generally associated with vegetation density, and given bat preference for roosting in forested habitat, it is reasonable to assume that bat roosting and foraging activity are greater in vegetated habitat than in open habitat dominated by barren lava. Jacobs (1994) observed that of 81 bats studied, 44% were observed foraging in native vegetation (ohia lowland forest) and 25% were observed foraging in either exotic vegetation or mixed vegetation. This supports the proposition that bats are more often associated with vegetated habitat at lower elevations, rather than open barren lava habitat at higher elevations.

Most recorded observations for bats are between sea level and 7,500 feet (Kepler and Scott, 1990; Jacobs, 1994; US FWS, 1998). Although bats have been recorded at elevations as high as 13,200 feet (Tomich, 1974), these must be considered as extremely rare and exceptional events.

For the surveyed areas of the Mauna Kea LZs there was no vegetation of height greater than 3 feet. The Mauna Kea LZs and surrounding areas are devoid of vegetation except for occasional widely-spaced grass clumps and small ferns and plants that grow in the lee of rocks. Therefore, there is no potential available treeland roosting habitat for bats in the vicinity of the Mauna Kea LZs. The density of insects at the Mauna Kea LZs is expected to be extremely low because of the elevation and sparse vegetation, and it is therefore extremely unlikely that the Mauna Kea LZs provide even marginal foraging habitat for bats.

The surveyed areas for the Mauna Loa LZs are located on largely barren substrate composed of ~55% aa and ~45% pahoehoe lava types. Approximately 62% of the substrate is less than 750 years old and with very little vegetative cover. Shrub cover is sparse (~10%) with very few shrubs greater than 3 feet in height. Trees greater than 3 feet in height are extremely rare in the region of the Mauna Loa LZs. Therefore, there is very little potential available treeland roosting habitat for bats in the vicinity of the Mauna Loa LZs. The density of insects at the Mauna Loa LZs is expected to be low because of the sparse vegetation, and it is therefore unlikely that the Mauna Loa LZs provide favorable foraging habitat for bats.

Given the lack of preferred roosting habitat among all LZ areas, daytime presence of roosting bats at any LZ is considered to be improbable, and therefore no daytime noise impact on bats is expected for any LZ. Foraging bats in transit across LZs is possible during nighttime hours, although this is extremely unlikely for the Mauna Kea LZs. For the Mauna Loa LZs, it is impossible to estimate the frequency of nighttime transits without extensive surveys. However, given the elevations (> 7500 feet) and the expanses of barren lava in the region of the Mauna Loa LZs, the number of transiting bats is expected to be very low. Moreover, nighttime training constitutes only a small part of the HAMET operations.

Airstrike as a result of HAMET operations was not considered to be of concern for Hawaiian hoary bats. Most HAMET activities are scheduled for daylight hours when bats are roosting in the forested areas of the island. Moreover, airstrikes are extremely rare for military aircraft in Hawaii overall, with only two airstrikes documented between 2001-2010 for all Army aircraft flights in the state of Hawaii (Peter Mansoor, CW4, personal communication, 2011).

Surveys and the literature support that the presence of Hawaiian hoary bats in significant numbers is unlikely for proposed HAMET operational areas. Extremely low density of bats during nighttime operations, or complete absence of bats during daytime operations, is to be reasonably expected for all LZs. The potential for noise or airstrike impacts on bats as a result of HAMET activities is therefore considered to be minimal.

Contact Peter Peshut, 808-969-1966, peter.peshut@us.army.mil, to discuss this matter further.

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IMPC-HI-PS 04 April 2011

MEMORANDUM FOR RECORD

SUBJECT: Wekiu Bug and Invasive Ant Surveys for HAMET Environmental Assessment

Surveys for the Mauna Kea endemic Wekiu bug *(Nysius wekiuicola)* and invasive ants were conducted on 02 March 2011 at Mauna Kea landing zones LZ 4, LZ 5 and LZ 6, by Rogelio Doratt, MSc, and Jesse Eiben, PhD (candidate). The purpose of the surveys was to support the Environmental Assessment for High Altitude Mountainous Environmental Training (HAMET) that is proposed as an enduring training requirement for the Combat Aviation Brigade of the US Army 25th Infantry Division, Hawaii.

The Wekiu bug is a small, wingless, scavenger insect known only from the summit region of Mauna Kea, Hawaii (11,500 - 13,792 ft, Figure 1). In 1999, the Wekiu bug was listed by the US Fish and Wildlife Service as a candidate species; i.e., potential to be listed for protection under the Endangered Species Act, depending on further scientific evidence that shows that protection under federal statute is necessary to reduce the potential for extinction.

Wekiu bugs reside on loose cinder cones comprised of tephra rocks (fragmental material produced by a volcanic eruption) that have a high proportion of interstitial space. Wekiu bugs emerge to the ground surface during the day to feed on dying or dead insects carried by winds from lower elevations (Ashlock and Gagné, 1983; Howarth, 1987; Eiben and Rubinoff, 2010). Since 2002, Wekiu bug surveys have been conducted on the summit of Mauna Kea, primarily in the Mauna Kea Science Reserve and the Mauna Kea Ice Age Natural Area Reserve (Englund et al., 2002; Porter and Englund, 2006; University of Hawaii, 2009). Surveys at Mauna Kea LZs were conducted to assess if the distribution of the Wekiu bug includes these areas that are considered potential Wekiu bug habitat, i.e., loose cinder cones at elevations ~11,500 ft).

Potential impacts to the Wekiu bug as a result of HAMET operations on Mauna Kea are disturbance of habitat and the introduction of invasive ant species.

Mauna Kea LZs are on State of Hawaii land in the Mauna Kea Forest Reserve. Landing zone geographic coordinates are given in Table 1. Landing zone locations in relation to known and potential Wekiu bug habitat are shown in Figure 1. Each Mauna Kea LZ is an undisturbed natural lava area approximately 100 x 100 ft.

Table 1. Landing Zone Geographic Coordinates

Landing Zone	Latitude (N)	Longitude (W)	Elevation (ft)
Mauna Kea LZ4	19° 49' 26.24"	155° 31' 23.51"	11,208
Mauna Kea LZ5	19° 49' 28.31"	155° 31' 47.00"	11,324
Mauna Kea LZ6	19° 49' 12.11"	155° 31' 16.31"	11,539

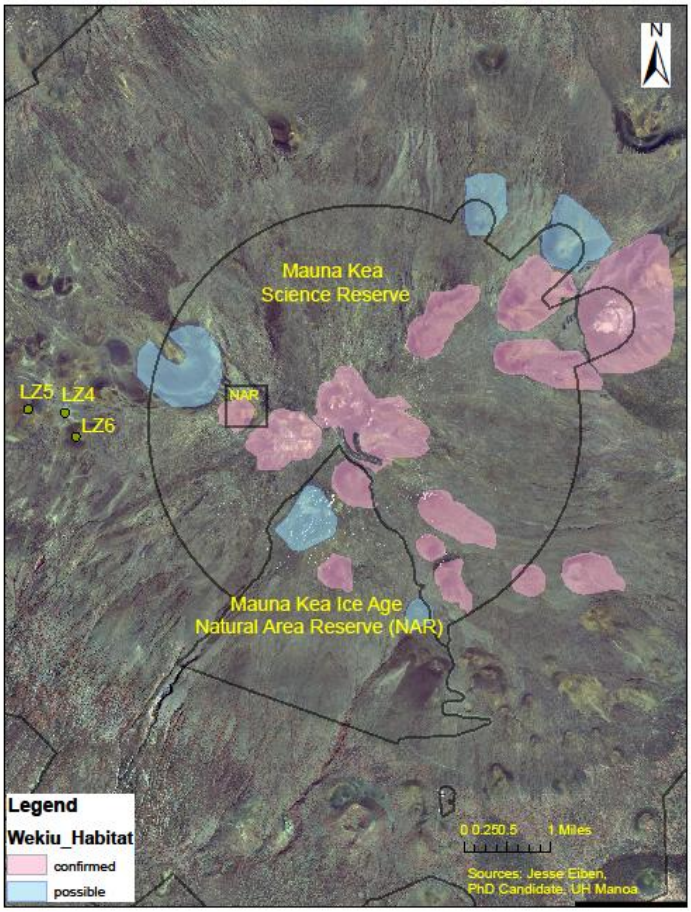

Figure 1. Mauna Kea HAMET landing zones and confirmed and possible Wekiu bug habitat.

The introduction and the establishment of invasive insect predators and competitors, especially ants, are a concern for Hawaii's native biota. World wide, ants are recognized as a major cause of native species extinctions. This is especially important for Hawaii, where native biota evolved in the absence of native ant species (Cole et al., 1992; Gillespie and Reimer, 1993; Krushelnycky and Gillespie, 2008). Predator ants could potentially decimate Wekiu bug populations on Mauna Kea due to direct predation or indirectly due to competition for wind-borne detritus. As an example, on Haleakala, Maui, the distribution of Argentine ants (*Linepithema humile*) has nearly reached the 10,500 ft summit, and has drastically altered the species assemblages of insect fauna there (Krushelnycky and Gillespie 2008). Therefore, surveying for ants at Mauna Kea LZs is considered to be an appropriate tool to assess the likelihood of Wekiu bug presence. If ants are present, then Wekiu bugs would almost certainly not be present, due to aggressive competition and predation by the ants.

For the invasive ants survey, the survey area included a circle of 100 m radius, centered on the geographic coordinates of respective LZs (Figures 2 and 3), similar to that described for the botanical surveys (see Evans and Peshut MFR 30 March 2011).

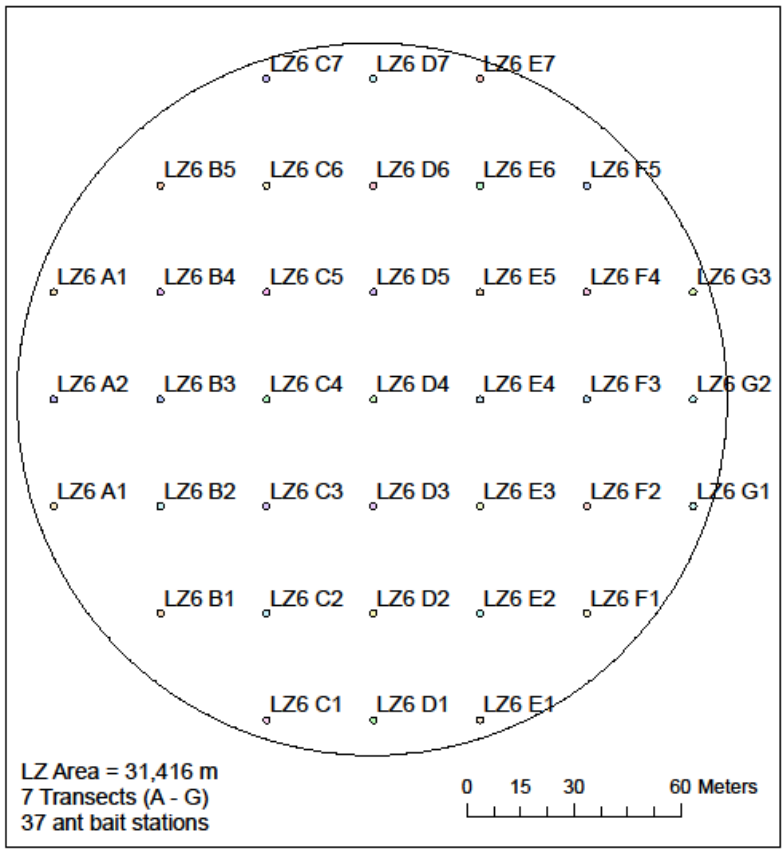

Figure 2. Schematic diagram of Mauna Kea LZ 6 ant bait station design.

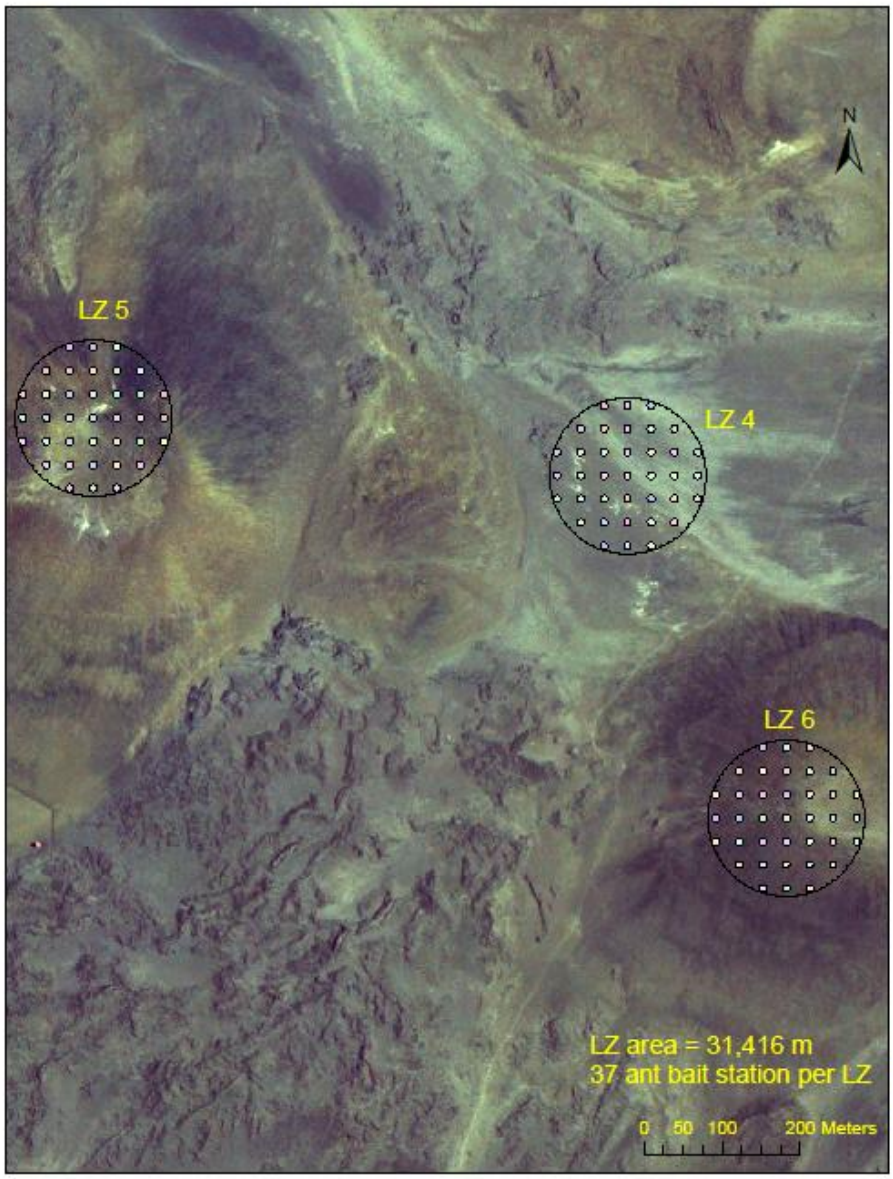

Figure 3. Overall Mauna Kea landing zones and ant bait station locations.

Each LZ survey had an area of 31,416 m^2 (~8 acres) with 37 ant bait stations. Bait stations were placed 30 m apart in 7 parallel transects at 30 m apart. A total of 111 ant bait stations were deployed at the Mauna Kea LZs. Bait stations were constructed of 40 ml polystyrene clear vials (8 cm x 2.8 cm), and filled with a 1:1 mixture of corn syrup and tuna (~1 teaspoon each), and ~1/2 teaspoon of peanut butter smeared inside the side of the vial (Photo 1). Bait stations were inspected and collected between 1-3½ hours after deployment.

Photo 1. Ant bait station at Mauna Kea LZ6- E4.

No ants were found in ant bait stations during the survey period. At this time, these results are considered indicative, but not conclusive. The short duration of the surveys, and the late-winter season and associated cold temperatures, are factors that may have limited surveyors' ability to determine ant presence. Extended duration surveys will be conducted in the April-June time frame in an attempt to confidently determine the presence or absence of invasive ant species at the Mauna Kea LZs.

Since ant presence or absence is used as a potential indicator of Wekiu bug presence or absence, the status of ants at Mauna Kea LZs is not a direct factor for assessing impacts from HAMET operations. The ant surveys do, however, provide a baseline for further study. Importation of ants to the Mauna Kea LZs as a result of HAMET operations is to be avoided. Aircraft inspection and cleaning protocols are in place, and must be implemented prior to missions. Ant survey baseline data will be useful to provide assurances that protocols are adhered to.

For the Wekiu bug, Eiben indicates that the survey period and season allow for only indicative interpretations of results. A conclusive determination of Wekiu bug presence or absence at the Mauna Kea LZs will be pursued via extended duration surveys in the April-June time frame (see Appendix A). However, Eiben states that the summits of the cinder cones at LZ 5 and LZ 6 do not appear to be preferable Wekiu bug habitat, even if the bugs were eventually found on other areas of the cinder cones that are more favorable habitat. Eiben states further that LZ4 is not likely to be Wekiu bug habitat due

to the flat terrain and ash/dust characteristics of the substrate. Moreover, it must be noted that the elevations of the Mauna Kea LZs are at or below the known elevation range of the Wekiu bug.

At this time, the Pohakuloa Natural Resources Office has determined that surveys for invasive ants and the Wekiu bug indicate that HAMET operations are likely to have little or no negative consequences to Wekiu bug populations in the regions of the Mauna Kea LZs. Results from surveys planned for the April-June time frame will be used to refine this assessment of the status of the Wekiu bug and ants in the region of the proposed LZs.

Contact Peter Peshut, 808-969-1966, peter.peshut@us.army.mil, for clarifications or to discuss this matter further.

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Appendix A

Results of the Proposed HAMET Site Evaluation for the Wekiu Bug (*Nysius wekiuicola*): March 2, 2011

Jesse Eiben

SUMMARY

The wekiu bug (*Nysius wekiuicola* Ashlock and Gagné) is a small, wingless, scavenger lygaeid bug found only in the summit region of Mauna Kea, Hawaii. This insect is a candidate for listing under the Endangered Species Act. A small survey was conducted to look for wekiu bug activity and broadly assess if the area is possibly habitable to the wekiu bug in the area proposed for HAMET Army helicopter training and landing zones. No wekiu bugs were found during the 3-4 hour field survey. The entire cinder cone habitats of the Landing Zones (LZ) are consistent with wekiu bug habitats at similar elevations on the northeast and east slopes of Mauna Kea. The actual proposed locations of the helicopter touch down areas (subset of the cinder cones) are not consistent with high quality wekiu bugs habitat. The trapping effort was minimal and is insufficient to assess the presence or absence of wekiu bugs at any of the cinder cones or near the LZs. Additionally, the wekiu bug is quite rare during the winter months, and the populations do not appear to increase or become detectable until late March. This small study should be used to gauge the likelihood of high quality habitat and inform direct effects on wekiu bugs by the proposed helicopter activity.

Methods:

A 3-4 hour sampling regime on March 2, 2011 with the use of 20 baited attractant live traps designed for monitoring the presence and absence of the wekiu bug, was used to inform part of the biological assessment of proposed sites for an Army high elevation helicopter landing site on Mauna Kea, Hawaii. A total of 20 traps in 10 locations across an elevation and aspect gradient around the highest elevation cinder cone proposed as a landing site (LZ-6) were placed and inspected 3-4 hours after initial placement (Figure 1, 2). A live pitfall trap design very similar to those described by Englund et al. (2002) and Pacific Analytics (2006) was used to attract wekiu bugs. The modifications in design are as follows. Two 10oz clear plastic cups were used for each trap. The upper cup was punctured with one small hole in the bottom center through which a small absorbent wick made of tissue (Kimtech Science) was pushed. A small amount of water was poured into the bottom of the lower reservoir cup. The attractant shrimp paste was placed in the upper cup contacting the wick, on a few small pieces of rock in the cup, smeared on the side of the cup, and on a cap rock. The traps were dug into the available ground substrate attempting to achieve a depth where moisture was present in the ash layer. The lip of the cup was not necessarily placed flush with ash layer, and there was no wire mesh surround to provide structure

surrounding the cups. This cup design has been successful for attracting and capturing wekiu bugs from 2007-2010 (Eiben and Rubinoff 2010). All 10 sites selected for sampling used a pair of traps within 5 meters of each other in different microhabitat types (ex. large rock jumble vs. ash layer near the surface) to attempt to sample the true diversity of the habitat.
Additionally, a 20 minute baited site observation period was used to assess wekiu bug activity. Shrimp paste was placed on the surface of approximately 20 rocks within one square meter. This site was monitored visually for 20 minutes for wekiu bug activity. Finally, temperatures were recorded by data loggers (HOBO by Onset Cor., type U12-008) every 10 minutes in the substrate microhabitat (the substrate surface, below the surface (~7cm below), and at the top of the ash/dust layer (~30cm)) during the survey time period to compare to published accounts of wekiu bug thermal preferences in their confirmed habitat range.

Discussion and Conclusion:
The two cinder cones proposed as helicopter landing sites (LZ-5 and LZ-6) do appear structurally and ecologically similar to cinder cones that host confirmed wekiu bug populations (Photos 1, 2 and 3). The slopes are steep, with many contiguous area of cinder rock tephra at least eight inches deep before the dust/ash layer of the substrate is reached. The cinder cones are also nearly devoid in plant life except for at least 3 species of lichen, one species of moss, and some grasses and ferns at the base of the cinder cones. There were also live and dead prey items identical to what is found in confirmed wekiu bug habitats. The prey items that were easily identified during this survey without collection were, labybird beetles, scarab beetles, carabid beetles, large blow flies, other *Nysius* seed bugs (*Nysius palor*), small fungus gnats, and braconid wasps (Photo 4). The temperature variability recorded showed a microhabitat temperature change from the sun illuminated surface to the shaded deep ash layer, through which the wekiu bug can not dig deeper. Additionally, a temperature probe was used to observe the direct temperature of rock surface, and the maximum temperature obtained was 40.4 ºC (104.8 ºF). The total available temperatures available for thermoregulation was consistent with the temperatures recorded in wekiu bug habited cinder cones during this 4 hour recording span (Eiben and Rubinoff 2010). Broadly, the cinder cones in this study were consistent with wekiu bug habitat. The lowest recorded elevation of a wekiu bug is 11,400ft (Figure 3). If the LZ cinder cones in this study are inhabited by wekiu bugs, we expect the densities to be low, and perhaps ephemeral, as has been shown at lower elevations in the east and northeast cinder cones on Mauna Kea.

The sampling regime used in this study was insufficient to definitively assess the presence or absence of wekiu bugs. Wekiu bugs have often been captured in greater numbers during late March, April and May than during the summer, fall and winter (Eiben and Rubinoff 2010). The short sampling period (hours) in this study may have not been enough time for wekiu bugs to find the shrimp paste baited traps from any distance. Also, because of the comparative rarity of

wekiu bugs in the winter and at lower elevations than the summit proper, a much greater effort would be necessary to declare the wekiu bug absent from any location on Mauna Kea.

The type of substrate found directly at the proposed landing zones at the summit of both cinder cones (LZ-5, LZ-6) does not appear to be prime wekiu bug habitat even if the bugs were to found on the cinder cones as a whole. The rocks at the summits of the cinder cones are large and closely packed, resembling the type of dense and solid rock that emerged as magma underneath glaciers, with ash visible at the surface between these dense angular rocks. That type of rock arrangement has been repeatedly demonstrated as not hosting wekiu bug populations (Photo 5). The type of loose cinder 20-30cm deep that wekiu bugs prefer is found on the slopes and at the base of the cinder cones (Photo 5). LZ-4 is found in a flat ash/dust region between cones, and it is not likely wekiu bug habitat. Wekiu bugs have very rarely (only at extremely low numbers in the 1980s) been found in the glacial till areas between cinder cones on the east side of Mauna Kea.

The only arthropod positively identified as an endemic resident of Mauna Kea was the as yet undescribed wolf spider, *Lycosa* sp. One living individual was observed near the summit of the east side of the LZ-6 cinder cone. Multiple molted exoskeletons were found while placing wekiu bug traps (Photo 7).

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Figure 1. Overview of all proposed Mauna Kea helicopter landing zones and wekiu bug sampling

Figure 2. Overview map of Wekiu bug sampling locations on LZ-6 cinder cone

Figure 3: Overview of Mauna Kea summit showing proposed HAMET LZ (4-6) (green) and confirmed cinder cones with wekiu bugs (blue)

Table 1. Temperatures recorded in 20cm deep cinder on the west slope of the LZ-6 cinder cone near trap WB 1(A+B)

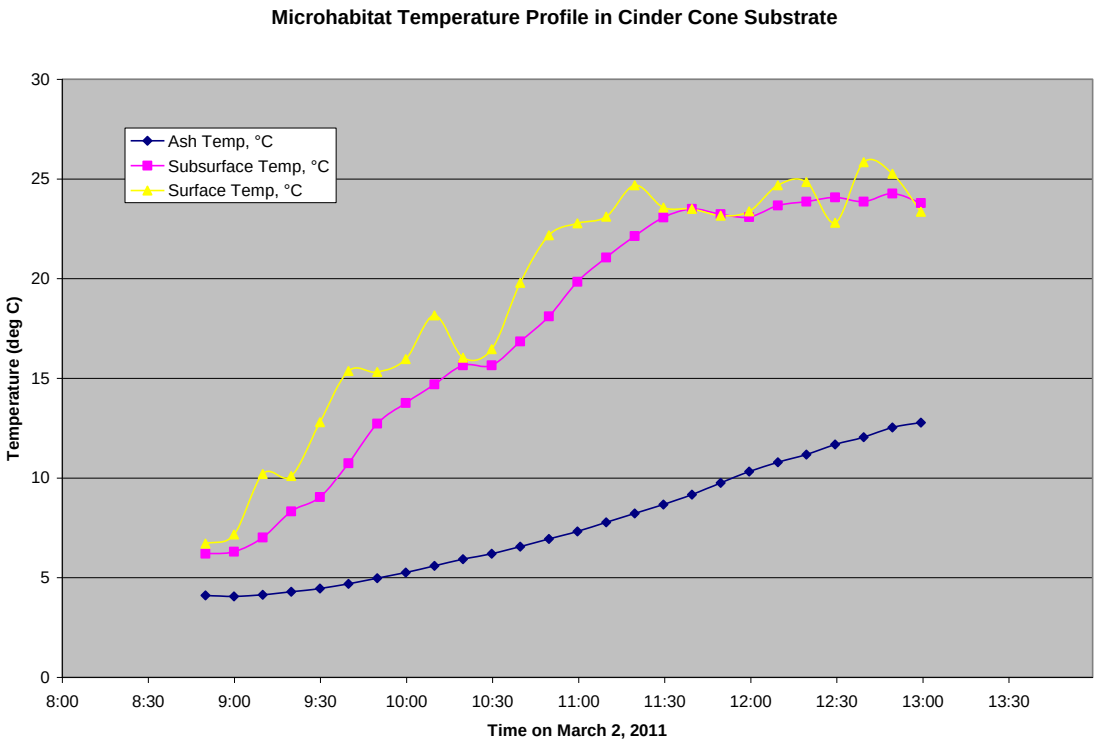

Photo 1: West slope of cinder cone at LZ-6. The substrate is very similar to wekiu bug habitat in its structure, depth and composition at a similar elevation on the east side of Mauna Kea (~11,400ft)

Photo 2: East slopes of cinder cone at LZ-5. The substrate is very similar to wekiu bug habitat in its structure, depth and composition at a similar elevation on the east side of Mauna Kea (~11,400ft)

Photo 3: Low elevation Wekiu bug habitat on the east slop of Mauna Kea (at VLBA dish telescope, ~11,400ft)

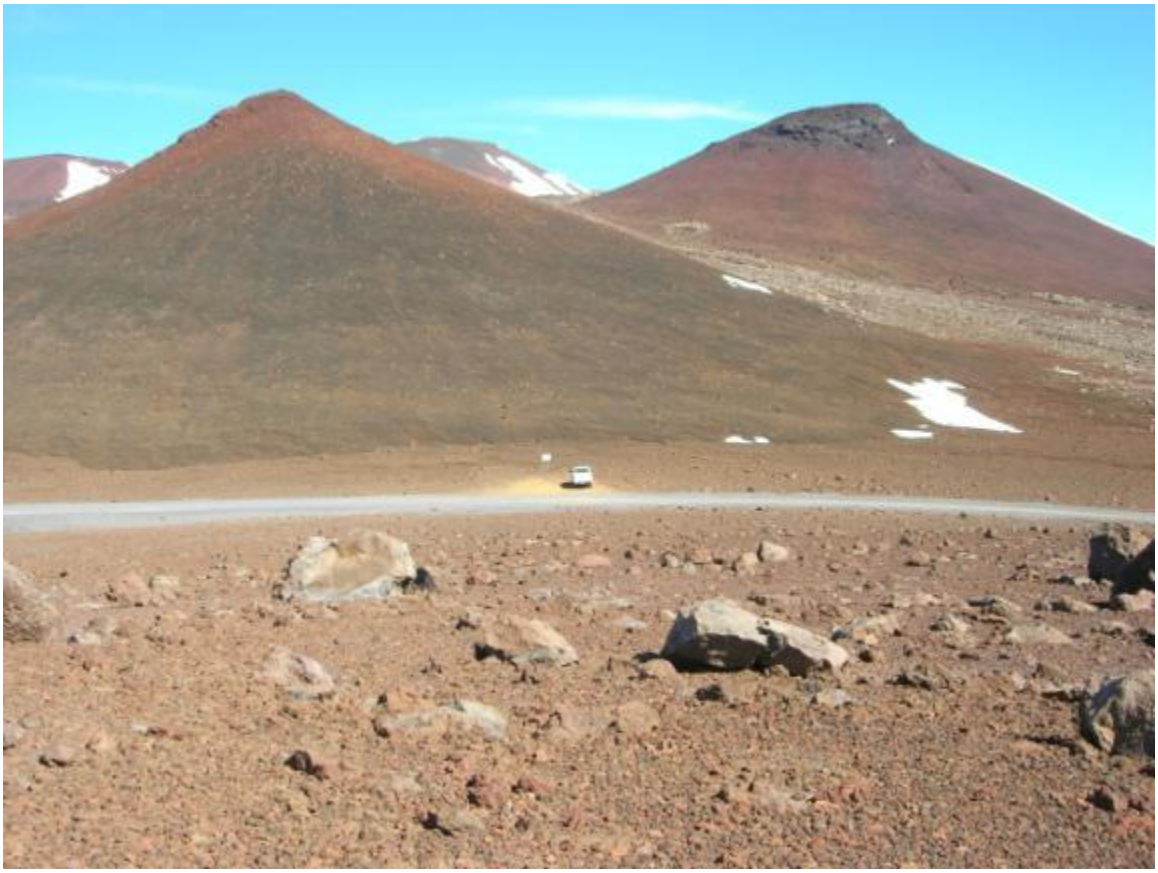

Photo 4: Dead or moribund potential wekiu bug prey items. Pictured- Left, ladybird beetle. Right, *Nysius palor*

Photo 5: Top- LZ-6 cinder cone summit rocks and visible ash. Bottom- LZ-6 cinder cone east slope rocks.

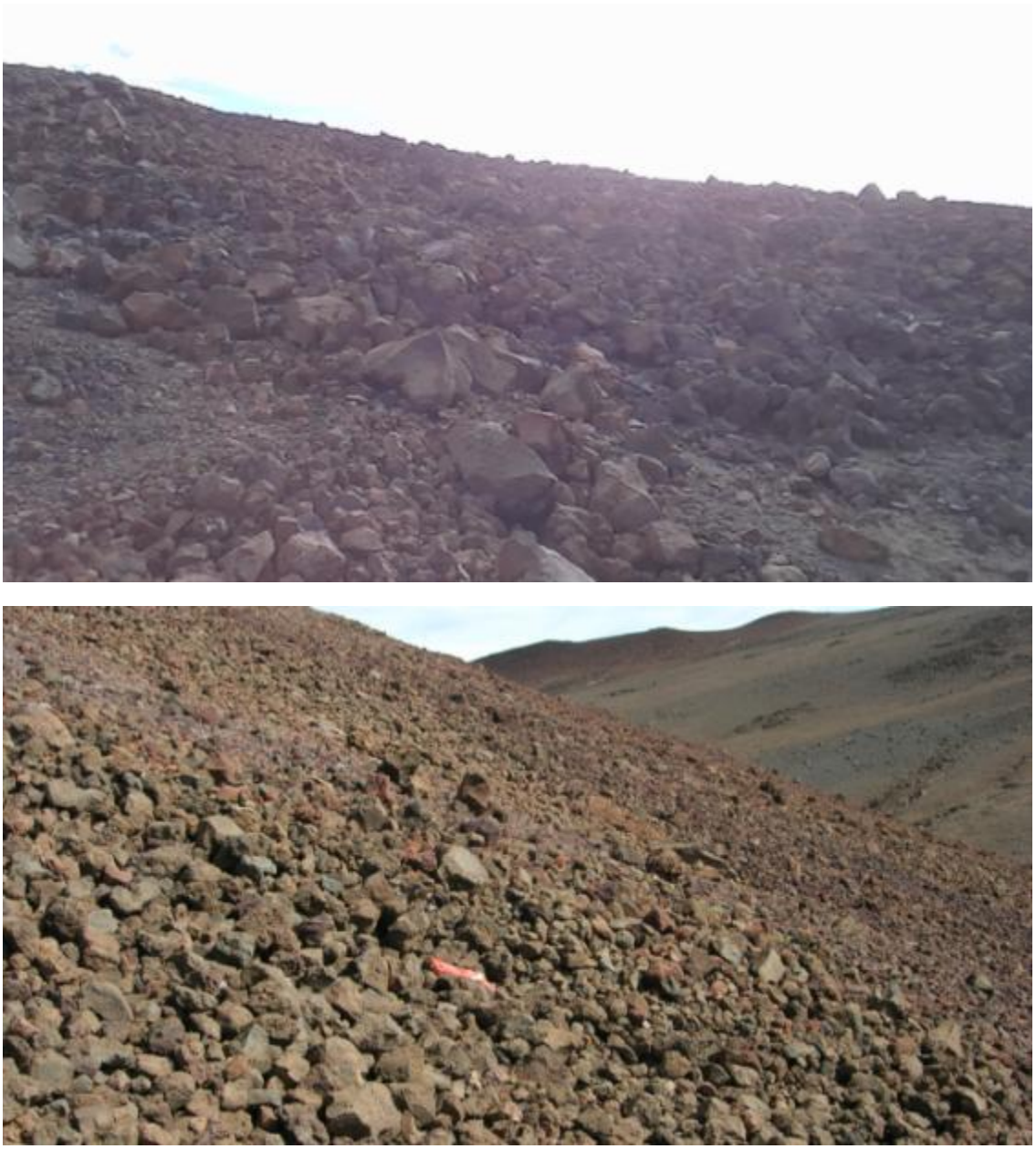

Photo 6: Endemic Mauna Kea wolf spider (*Lycosa* sp.) molted exoskeleton

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IMPC-HI-PS 10 June 2011

MEMORANDUM FOR RECORD

SUBJECT: Wekiu Bug and Invasive Ant Surveys for HAMET Environmental Assessment

Follow-up surveys to the preliminary 02 March 2011 surveys for the Mauna Kea endemic *Nysius wekiuicola* (Wekiu bug) were conducted on 08 June 2011 at Mauna Kea landing zones LZ 5 and LZ 6, by Rogelio Doratt, MSc and Jesse Eiben, PhD (candidate). Mauna Kea LZ 4 does not present a favorable Wekiu bug habitat and therefore it was not surveyed for the bug. Wekiu bugs are known to occur only in the summit areas of Mauna Kea, therefore no survey were conducted for the Mauna Loa LZs (Ashlock and Gagné 1983, Howarth 1987, and Eiben and Rubinoff 2010).

Preliminary surveys for invasive ant species were conducted on 02 March 2011 at Mauna Kea LZ 4, LZ 5 and LZ 6 by Doratt, Martha Kawasaki, BSc, Sarah Knox BSc, and Lena Schnell, BA, and on 03 March 2011 at Mauna Loa LZ 1, LZ 2 and LZ 3 by Doratt, Schnell, Kawasaki, Joseph Kern, BSc, and Daniel Brown, MSc. Follow-up surveys for invasive ants were conducted on 31 May 2011 at Mauna Loa LZ 1, LZ 2 and LZ 3 by Doratt, Springer Kaye, MSc, and Kahea Nihipali, and on 06 June 2011 at Mauna Kea LZ 4, LZ 5 and LZ 6 by Doratt, Kawasaki, and David Dukevares.

The purpose of these surveys was to support the Environmental Assessment for High Altitude Mountainous Environment Training (HAMET) that is proposed as an enduring training requirement for the Combat Aviation Brigade of the US Army 25th Infantry Division, Hawaii.

The importance of surveying for the Wekiu bug and invasive ants at the Mauna Kea and Mauna Loa LZs is presented in detail in previous correspondence (see Peshut and Doratt Memorandum For Record 04 April 2011). Disturbance of habitat and the introduction of invasive ant species are potential impacts to the Wekiu bug as a result of HAMET operations on Mauna Kea. The spread of invasive ant species is widely recognized as a serious concern for many ecological systems, especially isolated pacific islands such as Hawaii that host a great number of endemic species that are not adapted to predatory arthropods (Cole et al. 1992, Gillespie and Reimer 1993, Krushelnycky and Gillespie 2008).

Mauna Kea LZs are on State of Hawaii land in the Mauna Kea Forest Reserve. Landing zone locations in relation to known and potential Wekiu bug habitat are shown in Figure 1. Each Mauna Kea LZ is an undisturbed natural lava area approximately 150 x 150 ft. Mauna Loa LZs are on State of Hawaii land in the Mauna Loa Forest Reserve. Each Mauna Loa LZ is a previously disturbed area of graded crushed lava approximately 150 x 150 ft. All landing zones are shown in Figure 2. Landing zone geographic coordinates and elevations are given in Table 1.

Table 1. Landing Zone Geographic Coordinates

Landing Zone	Latitude (N)	Longitude (W)	Elevation (ft)
Mauna Loa LZ1	19° 36' 05.64"	155° 28' 14.64"	7889
Mauna Loa LZ2	19° 36' 00.48"	155° 28' 37.74"	8049
Mauna Loa LZ3	19° 34' 32.10"	155° 29' 21.78"	8955
Mauna Kea LZ4	19° 49' 26.24"	155° 31' 23.51"	11,208
Mauna Kea LZ5	19° 49' 28.31"	155° 31' 47.00"	11,324
Mauna Kea LZ6	19° 49' 12.11"	155° 31' 16.31"	11,539

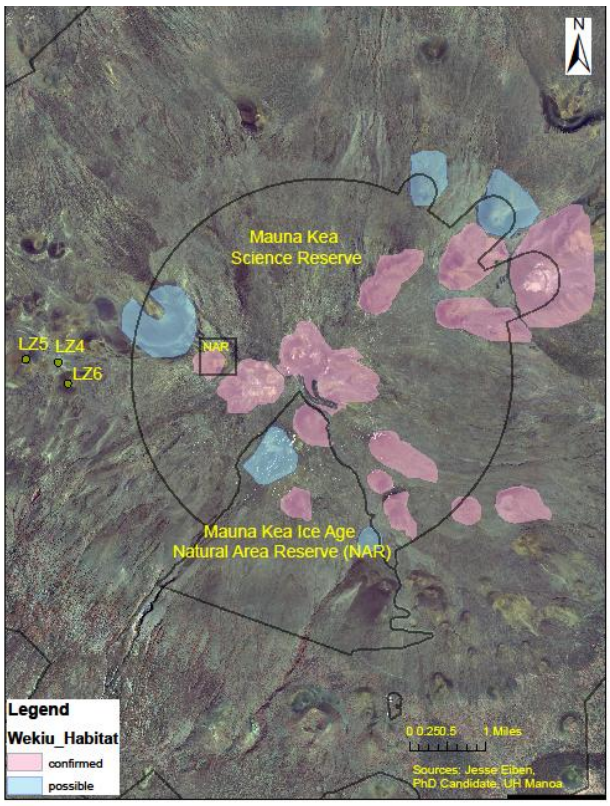

Figure 1. Mauna Kea HAMET LZs and confirmed and possible Wekiu bug habitat.

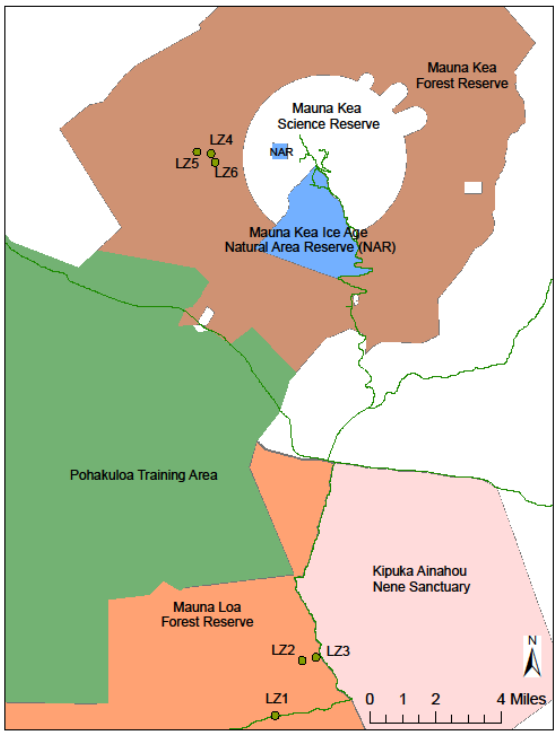

Figure 2. Mauna Kea and Mauna Loa HAMET Landing Zones

Wekiu bug survey methods and findings are presented in Appendix A.

For the invasive ants survey, the survey area for each LZ included a circle of 100 m radius, centered on the geographic coordinates of respective LZs (Figures 3-5), similar to that described for the botanical surveys (see Peshut and Evans Memorandum For Record 30 March 2011).

Each LZ survey included an area of 31,416 m^2 (~8 acres) with 37 ant bait stations per LZ. Bait stations were placed 30 m apart in 7 parallel transects at 30 m apart. A total of 111 ant bait stations were deployed for each LZ. Bait stations were constructed of 40 ml polystyrene clear vials (8 cm x 2.8 cm), and filled with a 1:1 mixture of corn syrup and tuna (~1 teaspoon each), and ~1/2 teaspoon of peanut butter smeared inside the side of the vial (Photo 1). Bait stations were inspected and collected between 1-2½ hours after deployment. Argentine ants, the target survey species, are known to forage extensively at temperatures between 12.5-30^o C (Markin, 1970). Temperatures for Mauna Loa surveys were ~17-20^o C. See Appendix A for Mauna Kea temperatures.

For all LZs of Mauna Kea and Mauna Loa, no ants were found in bait stations during the survey period. Based on the preliminary and final surveys, these results are considered conclusive that no ant species occur at the proposed LZs.

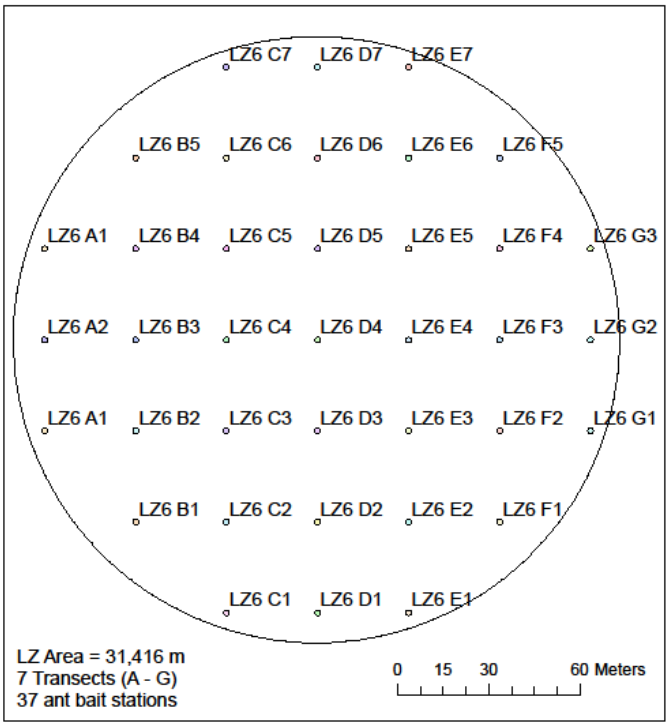

Figure 3. Schematic diagram of Mauna Kea LZ 6 ant bait station design.

Figure 4. Mauna Kea landing zones and ant bait station locations.

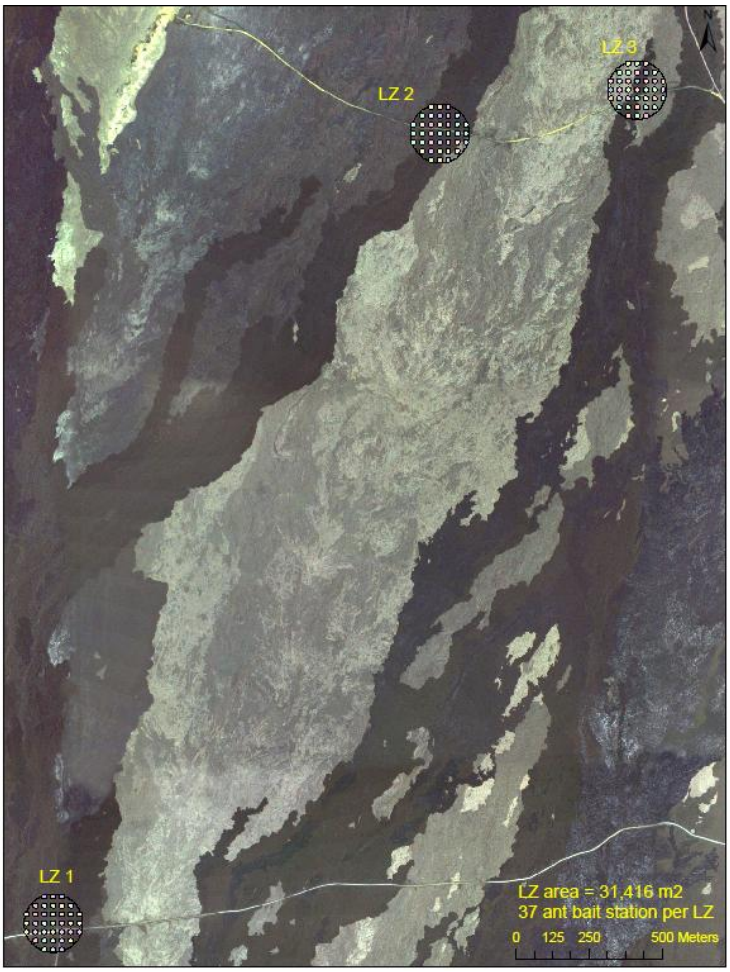

Figure 5. Mauna Loa landing zones and ant bait station locations.

Photo 1. Ant bait station at Mauna Kea LZ6- E4.

At this time, the Pohakuloa Natural Resources Office has determined that surveys for invasive ants and the Wekiu bug indicate that HAMET operations are likely to have no negative consequences to Wekiu bug populations in the regions of the Mauna Kea LZs. Furthermore, inspection and cleaning protocols proposed for helicopters during HAMET operations will limit the potential for distribution of invasive ants to Mauna Kea and Mauna Loa LZs.

Contact Peter Peshut, 808-969-1966, peter.peshut@us.army.mil, for clarifications or to discuss this matter further.

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Appendix A

Results of the Proposed HAMET Site Evaluation for the Wekiu Bug (*Nysius wekiuicola*): June 8, 2011

Prepared for Pohakuloa Training Area Wildlife Team (Rogelio Doratt)

Prepared by:
Jesse Eiben, M.S.

SUMMARY

The wekiu bug (*Nysius wekiuicola* Ashlock and Gagné) is a small, wingless, scavenger lygaeid bug found only in the summit region of Mauna Kea, Hawaii. This insect is a candidate for listing under the Endangered Species Act. This report details a second survey to look for wekiu bug activity and broadly assess if the area is possibly habitable to the wekiu bug in the area proposed for HAMET Army helicopter training and landing zones. No wekiu bugs were found during this second 3-4 hour field survey (other survey conducted in March, 2011). The entire cinder cone habitats of the Landing Zones (LZ) are consistent with wekiu bug habitats at similar elevations on the northeast and east slopes of Mauna Kea. However, wekiu bugs do not appear to be distributed as widely on the west side of Mauna Kea, and their presence below 12,000ft is doubtful, and this survey supports that. The actual proposed locations of the helicopter touch down training areas (subset of the cinder cones, at the summits) are not consistent with high quality wekiu bug habitat. Our June wekiu bug trapping effort was sufficient to assess wekiu bug activity in the vicinity of traps, and no wekiu bugs were trapped or observed. The direct impact on wekiu bug populations on Mauna Kea from helicopter use of the landing zones (LZ-5 and LZ-6, specifically) would be insignificant and could not cause negative population level consequences to the species.

Methods:
A 3-4 hour sampling regime on June 8, 2011 with the use of 22 baited attractant live traps designed for monitoring the presence and absence of the wekiu bug, was used to inform part of the biological assessment of proposed sites for an Army high elevation helicopter landing site on Mauna Kea, Hawaii. A total of 22 traps in 22 locations across an elevation and aspect gradient around the cinder cones proposed as a landing site (LZ-5 and LZ-6) were placed and inspected 2-3 hours after initial placement (Figure 1, 2). A live pitfall trap design very similar to

those described by Englund et al. (2002) and Pacific Analytics (2006) was used to attract wekiu bugs. The modifications in design are as follows. One 10oz clear plastic cup was used for each trap, as the traps were not in place long enough to necessitate a water source for any potential wekiu bug captures. The attractant shrimp paste was placed on a few small pieces of rock in the cup, smeared on the side of the cup, and on a cap rock. The traps were dug into the available ground substrate attempting to achieve a depth where moisture was present in the ash layer and to stabilize the cup. The lip of the cup was not necessarily placed flush with ash layer, and there was no wire mesh surround to provide structure surrounding the cups. This cup design has been successful for attracting and capturing wekiu bugs from 2007-2011 (Eiben and Rubinoff 2010). All 22 sites selected for sampling were selected to include a loose assortment of different sized cinder tephra rocks as preferred by wekiu bugs where they are found in other areas of Mauna Kea. Additionally, a 30 minute baited site observation period was used to assess wekiu bug activity. Shrimp paste was placed on the surface of approximately 10 rocks within one square meter. This site was monitored visually for 30 minutes for wekiu bug activity. Finally, temperatures were recorded by data loggers (HOBO by Onset Cor., type U12-008) every 10 minutes in the substrate microhabitat (the substrate surface, below the surface (~7cm below), and at the top of the ash/dust layer (~30cm)) during the survey time period to compare to published accounts of wekiu bug thermal preferences in their confirmed habitat range (Figure 3).

Discussion and Conclusion:

No wekiu bugs were found during this survey. The two cinder cones proposed as helicopter landing sites (LZ-5 and LZ-6) do appear structurally and ecologically similar to cinder cones that host confirmed wekiu bug populations (Photos 1, 2 and 3). The slopes are steep, with many contiguous area of cinder rock tephra at least eight inches deep before the dust/ash layer of the substrate is reached. The cinder cones are also nearly devoid in plant life except for at least 3 species of lichen, one species of moss, and some grasses and ferns at the base of the cinder cones. There were also live and dead prey items identical to what is found in confirmed wekiu bug habitats. The prey items that were easily identified during this survey without collection were, labybird beetles (Coccinellidae), large blow flies (Calliphoridae), other *Nysius* seed bugs (*Nysius palor*, Lygaeidae), large amounts of small fungus gnats (Sciaridae) (Photo 4), and braconid wasps (Braconidae). The temperature variability recorded showed a microhabitat temperature change from the sun illuminated surface to the shaded deep ash layer, through which the wekiu bug can not dig deeper (Figure 3). Additionally, a temperature probe was used to observe the direct temperature

of rock surface, and the maximum temperature obtained was 36.2 ºC. The total available temperatures available for thermoregulation was consistent with the temperatures recorded in wekiu bug habited cinder cones during this 4 hour recording span (Eiben and Rubinoff 2010). Broadly, the cinder cones in this study were consistent with wekiu bug habitat, but wekiu bugs are unlikely to be found here due to recorded absence of wekiu bugs below 12,000ft on the west side of Mauna Kea. The lowest recorded elevation of a wekiu bug is 11,400ft on the east side of Mauna Kea (Figure 2). If the LZ cinder cones in this study are inhabited by wekiu bugs, which is unlikely, we expect the densities to be low, and perhaps ephemeral, as has been shown at lower elevations in the east and northeast cinder cones on Mauna Kea. Therefore, any impact from helicopter rotor wash or physical helicopter touch down on the cinder cone summits on the species would be insignificant.

The sampling regime used in this study was sufficient to definitively assess the presence or absence of wekiu bugs in the vicinity of traps. In areas where wekiu bugs are present, and during times when the temperature in the substrate is above ~15ºC (Figure 3), wekiu bugs are readily observed (by experienced observers). Wekiu bugs have been captured in their known habitats above ~12,000ft on Mauna Kea since April 30th, 2011 (personal observation, and personal communication with Bishop Museum personnel June 5-9), so wekiu bugs would have been active if they were present. As with any rare animal, in areas with extremely low density it may be impossible to definitively indicate its absence from a locality. However, in this case, it is unlikely that wekiu bugs are present, and even if they were present, the proposed helicopter training would not affect the population.

The type of substrate found directly at the proposed landing zones at the summit of both cinder cones (LZ-5, LZ-6) does not appear to be prime wekiu bug habitat even if the bugs were to found on the cinder cones as a whole. The rocks at the summits of the cinder cones are large and closely packed, resembling the type of dense and solid rock that emerged as magma underneath glaciers, with ash visible at the surface between these dense angular rocks. Other areas that have smaller rock tephra are also compacted, since there is no steep slope to allow the gravity induced loose rock size sorting that creates wekiu bug preferred habitat. That type of rock arrangement has been repeatedly demonstrated as not hosting wekiu bug populations. The type of loose cinder 20-30cm deep that wekiu bugs prefer is found on the slopes and at the base of the cinder cones (Photo 2 and 3). LZ-4 is found in a flat ash/dust region between cones, and it is not likely wekiu bug habitat. Wekiu bugs have very rarely (only at extremely low

numbers in the 1980s) been found in the glacial till areas similar to LZ-4 substrate between cinder cones on the east and west sides of Mauna Kea.

The only two arthropods positively identified as an endemic resident of Mauna Kea was the as yet undescribed wolf spider, *Lycosa* sp. (Photo 4), and one specimen of an *Agrotis* sp., moth. These species are widely distributed on all substrate types in the alpine stone desert from ~11,000ft-13,796ft on Mauna Kea.

I do not see any direct significant impact on wekiu bugs or other resident arthropods from helicopter landing activity in the proposed landing zones (LZ-4, LZ-5, LZ-6). The only possible threat to resident arthropods in the proposed landing zones could be ecosystem change from introducing new weeds or arthropods (notably ants). This potential threat is easily mitigated with simple cleanliness standards for crew and equipment with vehicle washing or brushing off any debris from other landing zones.

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Figure 1. Overview of all proposed Mauna Kea helicopter landing zones and wekiu bug sampling

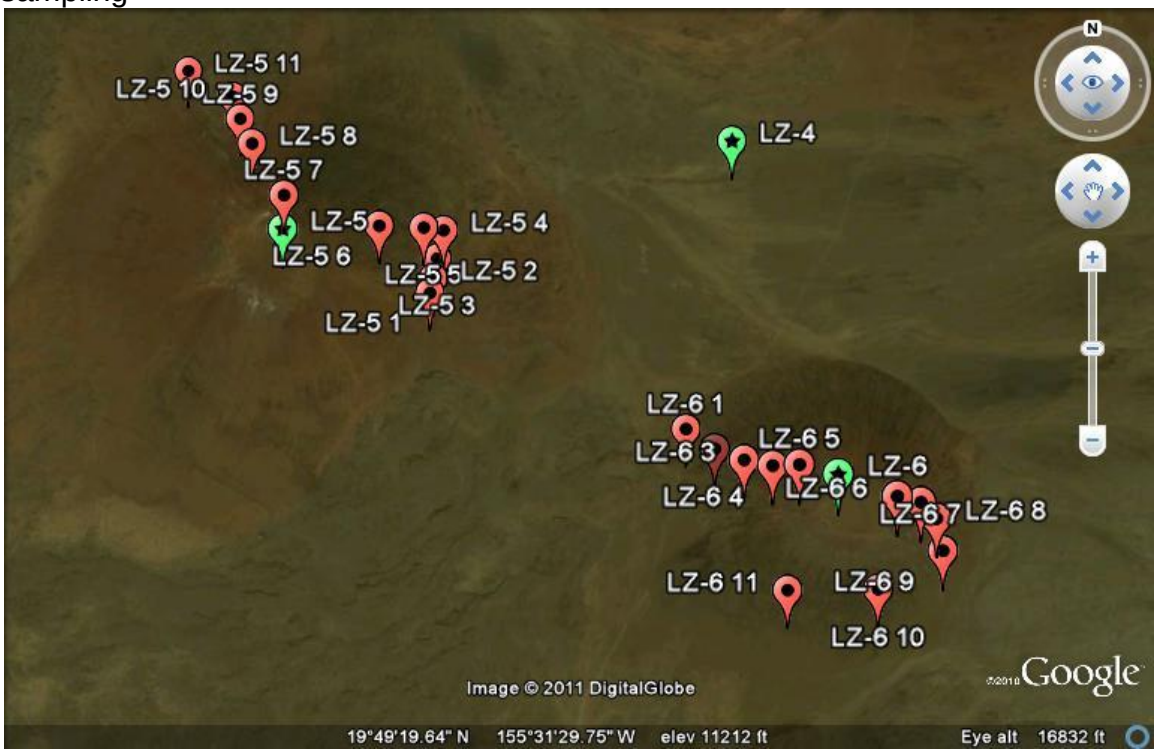

Figure 2: Overview of Mauna Kea summit showing proposed HAMET LZ (4-6) (green) and confirmed cinder cones with wekiu bugs (blue)

Figure 3. Temperatures recorded in 20cm deep cinder on the west slope of the LZ-6 cinder cone near trap LZ-6 2

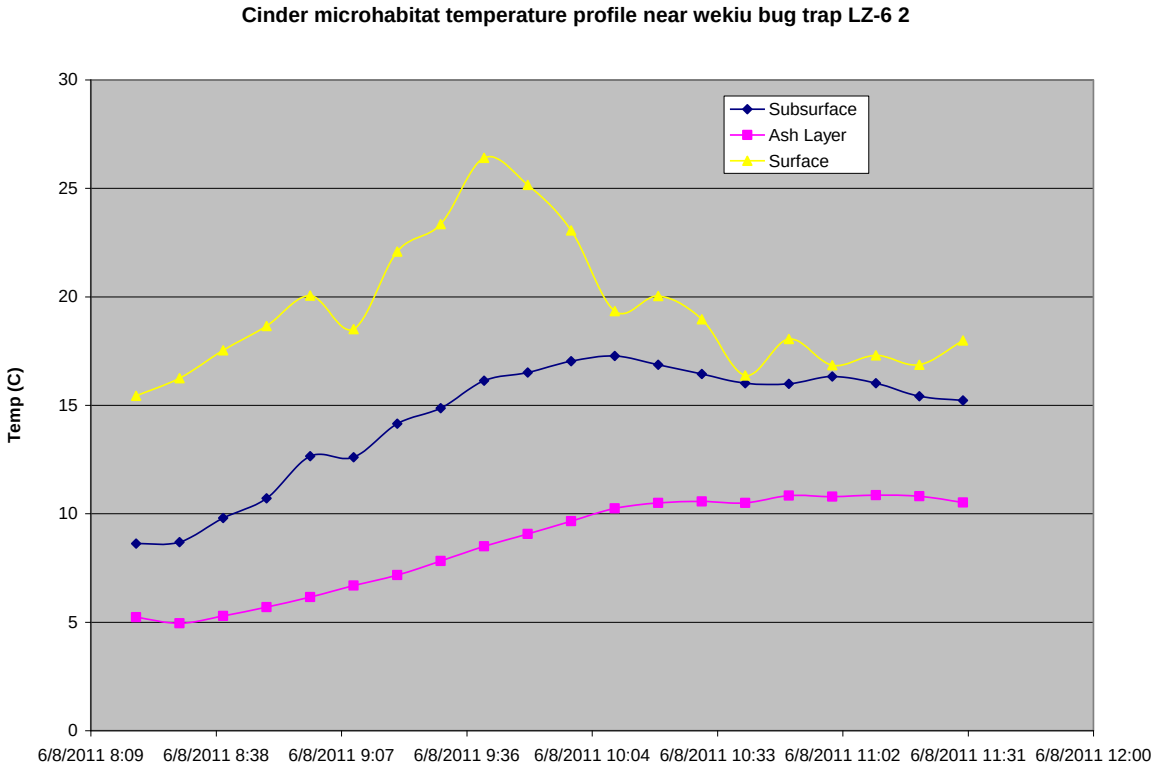

Photo 1: West slope of cinder cone at LZ-6. The substrate is very similar to wekiu bug habitat in its structure, depth and composition at a similar elevation on the east side of Mauna Kea (~11,400ft), but is likely too low in elevation on the west side of Mauna Kea to support wekiu bugs

Photo 2: East slopes of cinder cone at LZ-5. The substrate is very similar to wekiu bug habitat in its structure, depth and composition at a similar elevation on the east side of Mauna Kea (~11,400ft), but is likely too low in elevation on the west side of Mauna Kea to support wekiu bugs

Photo 3: Low elevation Wekiu bug habitat on the east slope of Mauna Kea (at VLBA dish telescope, ~11,400ft) *not near HAMET LZ, comparison only

Photo 4: *Lycosa* sp. and Sciaridae flies (very small, flies are visible behind the spider abdomen in the cup) found in a wekiu bug trap

DEPARTMENT OF THE ARMY
HEADQUARTERS,
UNITED STATES ARMY GARRISON
PŌHAKULOA
PO BOX 4607
HILO, HAWAII 96720-0607

IMPC-HI-PS 30 March 2011

MEMORANDUM FOR RECORD

SUBJECT: Botanical Surveys for HAMET Environmental Assessment

Botanical surveys were conducted 23 February 2011 at Mauna Loa landing zones LZ 1, LZ 2 and LZ 3, and 24 February 2011 at Mauna Kea landing zones LZ 4, LZ 5 and LZ6, by Steven Evans, MSc, and Lena Schnell, BA. Surveys were conducted to determine the presence of federally listed plant species and to assess overall vegetation in the general vicinity of the LZs. The purpose of the surveys was to support the Environmental Assessment for High Altitude Mountainous Environmental Training (HAMET) that is proposed as an enduring training requirement for the Combat Aviation Brigade of the US Army 25th Infantry Division, Hawaii.

Mauna Kea LZs are on State of Hawaii land in the Mauna Kea Forest Reserve. Mauna Loa LZs are on State of Hawaii land in the Mauna Loa Forest Reserve. Landing zone geographic coordinates are given in Table 1. Landing zones are shown graphically in Figure 1. Each LZ is a graded or natural lava area approximately 30 x 30 m.

Table 1. Landing Zone Geographic Coordinates

Landing Zone	Latitude (N)	Longitude (W)	Elevation (ft)
Mauna Loa LZ1	19° 36’ 05.64”	155° 28’ 14.64”	7889
Mauna Loa LZ2	19° 36’ 00.48”	155° 28’ 37.74”	8049
Mauna Loa LZ3	19° 34’ 32.10”	155° 29’ 21.78”	8955
Mauna Kea LZ4	19° 49’ 26.24”	155° 31’ 23.51”	11,208
Mauna Kea LZ5	19° 49’ 28.31”	155° 31’ 47.00”	11,324
Mauna Kea LZ6	19° 49’ 12.11”	155° 31’ 16.31”	11,539

The survey area for each LZ was selected as a square, 200 m on each side, centered on the geographic coordinates of respective LZs. Survey area dimensions were based on the height and distance of aircraft from the LZ center, along an anticipated line of

aircraft approach, where aircraft rotorwash begins to affect the ground surface. Rotorwash effect height = 1.5x rotor diameter (Peter Mansoor, CW4, personal communication, 2011). For the largest aircraft (worst-case scenario), the CH-47 Chinook, the rotorwash is first felt at the ground surface when the aircraft is 90 feet above ground level (AGL). For HAMET operations, CH-47 aviators will approach LZs so that aircraft will reach 90 feet AGL at 100 m from the LZ center. Thus, vegetation on the ground will not experience rotorwash until the CH-47 aircraft is 100 m from the LZ center. All other aircraft potentially used for HAMET have rotorwash effects that are less than the CH-47 Chinook. For the UH-60 Blackhawk, rotorwash is first felt at ground level when the aircraft is ~80 feet above the ground surface. For the OH-58 Kiowa, rotorwash is not experienced at ground level until the aircraft is ~50 feet above the ground surface. Therefore, a botanical survey area out to 100 m from the LZ center encompassed all areas where vegetation was expected to experience helicopter rotorwash.

For each LZ survey area, GIS software was used to establish a series of 200 m transects spaced 10 m apart, with navigational waypoints established at the ends of each transect. Transect spacing of 10 m is standard practice for botanical surveys at Pohakuloa Training Area, and is based on terrain, vegetation density, and visibility.

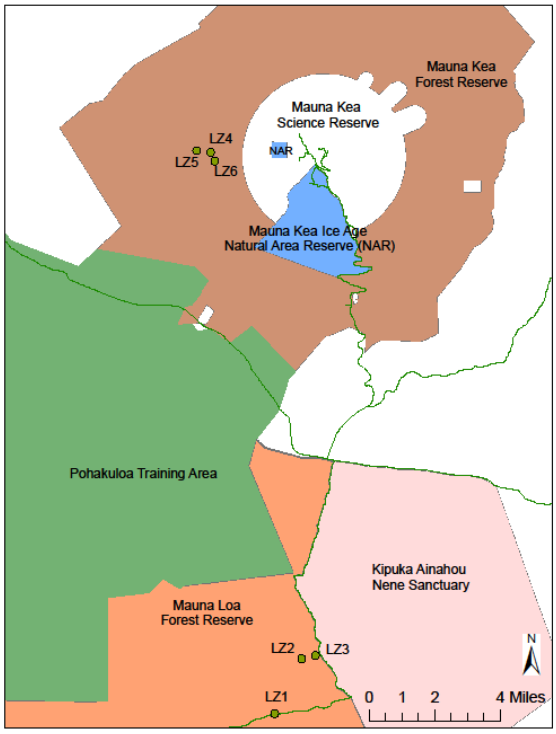

Figure 1. Mauna Kea and Mauna Loa HAMET Landing Zones

In the field it was found that the sparse to absent vegetation at the HAMET LZs did not necessitate surveyor spacing of 10 m. Therefore, surveyors were spaced 20 m apart, i.e., along every other transect, inclusive of transects on the edge of the survey areas. For all survey days, for all LZs, field conditions were suitable for conducting surveys and visibility was extremely good.

Mauna Loa LZ 1 is a previously disturbed area adjacent to the paved Mauna Loa Observatory Road. LZ 1 consists of crushed lava pieces (½-4 inch) with no visible entrained fine-grained material (Figure 2). The substrate surrounding LZ 1 is barren a‘a lava from the 1899 Mauna Loa flow. No plants were found at LZ 1 or within the LZ 1 survey area (Figure 3).

Figure 2. LZ 1 – Material Size

Figure 3. LZ 1 - Surrounding Substrate and Lack of Vegetation

Mauna Loa LZ 2 is a previously disturbed area adjacent to an unimproved spur road off the Mauna Loa Observatory Road. LZ 2 consists of crushed lava pieces (½-3 inch) with no visible entrained fine-grained material (Figure 4). The substrate surrounding LZ 2 is a‘a lava from the 1899 Mauna Loa flow (Figure 5). Bulldozer trails and disturbed areas are found within the LZ 2 survey area. No plants were found at LZ 2. Overall vegetation density in the LZ 2 survey area was extremely low, with mostly bare ground (Figure 5). Plant species found within the LZ 2 survey area were limited to:

Coprosma ernoidioides – common native
Leptecophyla tameiameiae – common native
Polypodium pellucidum – common native
Vaccinium reticulatum – common native

Figure 4. LZ 2 – Material Size

Figure 5. LZ 2 - Surrounding Substrate and Vegetation

Mauna Loa LZ 3 is a previously disturbed area adjacent to an unimproved spur road off the Mauna Loa Observatory Road. LZ 3 consists of crushed lava pieces (½-3 inch) with no visible entrained fine-grained material (Figure 6). The substrate surrounding LZ 3 is a‘a lava from the 1899 Mauna Loa flow and prehistoric pahoehoe lava flows (Figure 7).

There were no plants present within LZ 3. Similar to other Mauna Loa LZs, the overall density of vegetation within the LZ 3 survey area is extremely low, with mostly bare ground (Figure 7). Plant species found within the LZ 3 survey area were limited to:

Aspleinium adianthum-nigrum– common native
Aspleinium trichomanes subsp. *densum* – common native
Carex wahuensis – common native
Coprosma ernoidioides – common native
Dodonaea viscosa – common native
Dubautia ciliolata subsp. *ciliolata* – common native
Leptecophyla tameiameiae – common native
Pelea ternifolia – common native
Polypodium pellucidum – common native
Senecio madagascariensis – introduced
Tetramolopium humile – common native
Trisetum glomeratum – common native
Vaccinium reticulatum – common native
Wikstroemia phillyreifolia – common native

Figure 6. LZ 3 – Material Size

Figure 7. LZ 3 - Surrounding Substrate and Vegetation

Mauna Kea LZ 4 is located on a saddle between two cinder cones on which LZ 5 and LZ 6 are located. LZ 4 consists of undisturbed native substrate (½-3 inch) with a moderate amount of entrained fine-grained material (Figure 8). The surrounding substrate for LZ 4 consists of rocky cinder soil and a few rocky outcrops. There is evidence that the substrate is constantly reworked by the natural forces of wind, rain, ice, and snow. Similar to other LZs, the overall density of vegetation within the LZ 4 survey area is extremely low, with mostly bare ground (Figure 9). Plant species found within the LZ 4 survey area were limited to:

Asplenium adianthum-nigrum – common native
Pelea ternifolia – common native
Picris hieracioides – introduced
Verbascum thapsus – introduced

Figure 8. LZ 4 – Material Size

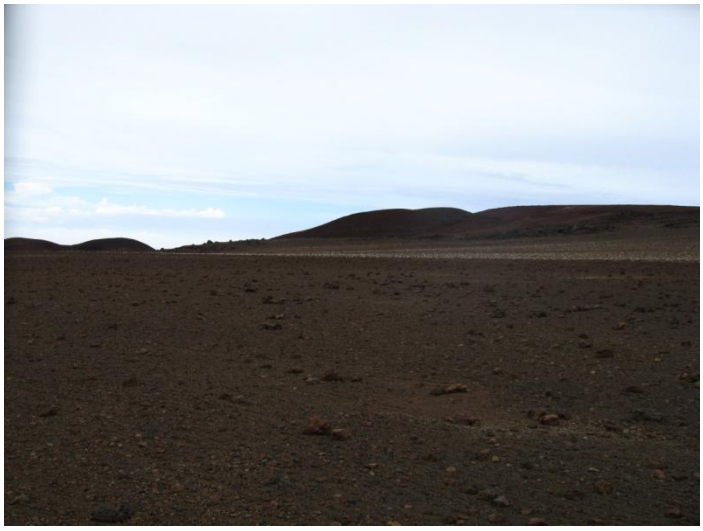

Figure 9. LZ 4 - Surrounding Substrate and Vegetation

Mauna Kea LZ 5 is located on the summit of a cinder cone ~800 m west of LZ 4 and consists of undisturbed native material (½-6 inch) with little to no entrained fine-grained material (Figure 10). The survey area of LZ 5 consists of loose cinder, rocks, and rocky outcrops. The only species present within the LZ 5 survey area was:

Trisetum glomeratum – common native

Plant density at LZ 5 is extremely low to absent, with mostly barren lava (Figure 11).

Figure 10. LZ 5 – Material Size

Figure 11. LZ 5 - Surrounding Substrate and Vegetation

Mauna Kea LZ 6 is located on the summit of a cinder cone ~500 m south of LZ 4 and consists of undisturbed native lava (½-6 inch) with little or no entrained fine-grained material, and some hard pan (Figure 12). Overall, the survey area consists of loose cinder, rocks, and rocky outcrops. Vegetation density at LZ 6 is extremely low to absent, with mostly barren lava substrate (Figure 13). Species within the LZ 6 survey area were limited to:

Pelea ternifolia – common native
Trisetum glomeratum– common native

Figure 12. LZ 6 – Material Size

Figure 13. LZ 6 - Surrounding Substrate and Vegetation

No federally listed or candidate species were located at any of the LZs or within any LZ survey area for any of the proposed HAMET sites. To corroborate these findings, records from the Hawaii Natural Heritage Program indicate that there are no rare or protected plant species recorded within any of the Mauna Kea and Mauna Loa LZ survey areas (R. Kam, personal communication, 2011).

The nearest threatened and endangered species to the Mauna Kea LZs is the federally-listed Mauna Kea Silversword (*Argyroxiphium sandwicense* subsp. *sandwicense*) located approximately 2600 m west of the Mauna Kea LZs. These plants are well beyond the range of effects from HAMET operations. On Mauna Loa, endangered species occur on Pu'u Huluhulu (outplanted) located ~8000 m from the LZs, and at Pohakuloa Training Area 21, ~6000 m from the LZs. These plants on Mauna Loa are well beyond the range of effects produced from HAMET operations.

Wind generated from helicopter approaches and landings at LZs is not considered to be of concern for vegetation. Helicopter rotorwash velocities at ground level are within the range of typical wind conditions on Mauna Kea and Mauna Loa. According to records, average wind speeds at the Mauna Loa Observatory range from 11-45 mph, with gusts to ~54 mph (A. Colton, personal communication, 2011). On Mauna Kea, average wind speed is ~57 mph (Carrasco and Sarazin, 2003), with a maximum recorded wind speed of 126 mph (Bely, 1987).

Rotorwash velocity from the OH-58 Kiowa at lift-off is up to 56 mph at a distance of 20 feet from the aircraft (Leese and Knight, 1974). This diminishes to less than the speed of prevailing winds at LZs at ~40 feet from the aircraft. The CH-47 Chinook generates a rotorwash velocity of up to 127 mph at lift-off at a distance of 50 feet from the aircraft (Leese and Knight, 1974), but this diminishes to the speed of prevailing winds at LZs at

a distance of ~160 feet from the aircraft. Technical information for UH-60 Blackhawk rotorwash was not found, but it is reasonable to expect that rotorwash for this aircraft will diminish to the speed of prevailing winds at a distance somewhere between where the smaller OH-58 and the larger CH-47 winds diminish to prevailing wind speeds.

Rotorwash wind speeds in the immediate vicinity of HAMET aircraft are generally within the range of Category 1 (weak) hurricane conditions, which is described as having minimal damage potential for vegetation (Simpson, 1974). Although rotorwash winds can exceed 100 mph in close proximity to aircraft during landings and takeoffs, the duration of these winds will be short and winds will be highly localized.

Because of the complete absence or extremely low density of vegetation found at the LZs, the minimal amount of fine material within the LZ substrate available to generate dust, and the highly localized and short duration of the action, it is not expected that HAMET operations will have any long-term impacts to vegetation at LZs. It is anticipated that the impacts to common and introduced vegetation from HAMET operations will not exceed impacts from natural conditions on Mauna Kea and Mauna Loa.

Contact Peter Peshut, 808-969-1966, peter.peshut@us.army.mil, to discuss this matter further.

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Pohakuloa Training Area

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MEMORANDUM FOR RECORD

SUBJECT: Hawaiian Avifauna Surveys for HAMET Environmental Assessment

Surveys to assess potential impacts to avifauna (bird) species that are protected under the Endangered Species Act and the Migratory Bird Treaty Act were conducted on 02 March 2011 at Mauna Loa landing zones LZ 1, LZ 2 and LZ 3, and on 03 March 2011 at Mauna Kea landing zones LZ 4, LZ 5 and LZ 6, by Lena Schnell, BA, Daniel Brown, MSc, Sarah Knox, BSc, Joseph Kern, BSc and Bridget Frederick, BSc. Surveys were conducted to determine bird presence and habitat use in the general vicinity of the proposed LZs. Surveys were conducted to support the Environmental Assessment for High Altitude Mountainous Environmental Training (HAMET) that is proposed as an enduring training requirement for the Combat Aviation Brigade of the US Army 25th Infantry Division, Hawaii.

Mauna Kea LZs are on State of Hawaii land in the Mauna Kea Forest Reserve, in the vicinity of the Mauna Kea Science Reserve. Mauna Loa LZs are on State of Hawaii land in the Mauna Loa Forest Reserve, adjacent to the Kipuka Ainahou Nene Sanctuary. Approximately 20% of the Mauna Loa LZ3 survey area is within the sanctuary. Landing zone geographic coordinates are given in Table 1. Landing zone locations are shown graphically in Figure 1. Each LZ is a graded or undisturbed lava area approximately 100 x 100 ft.

Table 1. Landing Zone Geographic Coordinates

Landing Zone	Latitude (N)	Longitude (W)	Elevation (ft)
Mauna Loa LZ1	19° 36’ 05.64”	155° 28’ 14.64”	7889
Mauna Loa LZ2	19° 36’ 00.48”	155° 28’ 37.74”	8049
Mauna Loa LZ3	19° 34’ 32.10”	155° 29’ 21.78”	8955
Mauna Kea LZ4	19° 49’ 26.24”	155° 31’ 23.51”	11,208
Mauna Kea LZ5	19° 49’ 28.31”	155° 31’ 47.00”	11,324
Mauna Kea LZ6	19° 49’ 12.11”	155° 31’ 16.31”	11,539

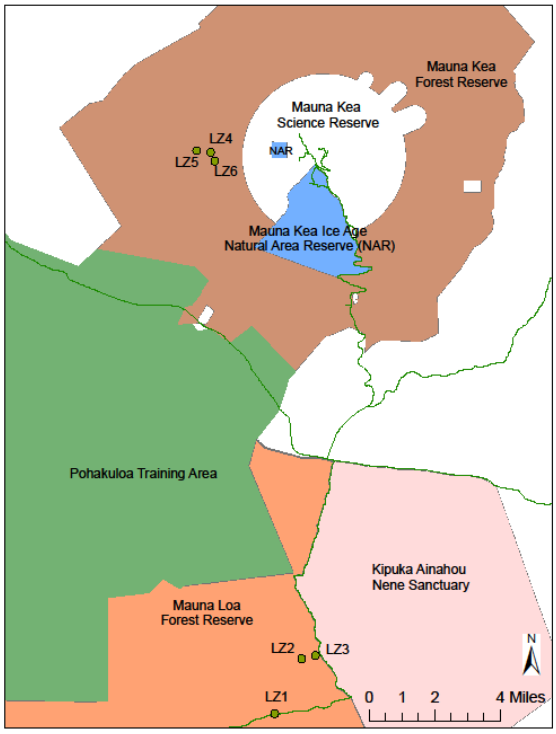

Figure 1. Mauna Loa and Mauna Kea HAMET Landing Zones.

Currently, Combat Aviation Brigade training is conducted for ~4500 man-hours of training annually in the Saddle region of Hawaii Island. HAMET operations are expected to increase training man-hours by approximately 30%.

Potential impacts to Hawaiian avifauna as a result of HAMET operations are limited to disturbance from noise, and airstrikes. Noise and airstrike potential were evaluated based on the expected presence of birds within the LZ survey areas during HAMET operations.

Airstrike as a result of HAMET operations was not considered to be of concern for Hawaiian avifauna. Most HAMET activities are scheduled for daylight hours when helicopters are visible as well as audible to birds. Avifauna in the vicinity of Mauna Kea LZs during nighttime operations is not anticipated. Avifauna in the vicinity of Mauna Loa LZs during nighttime operations is expected to be minimal. Bird airstrikes are extremely rare for military aircraft in Hawaii overall, with only two airstrikes documented between 2001-2010 for all Army aircraft flights in the state of Hawaii (Peter Mansoor, CW4, personal communication, 2011). Moreover, helicopters are typically slow-moving at the elevations of the LZs proposed for HAMET operations, due to unpredictable air mass

stability and decreased air density, which affect aircraft performance (Frank Tate, COL, personal communication, 2011).

Artificial light sources as a result of HAMET operations were not considered to be of concern for Hawaiian avifauna. Starlight may be important for seabird navigation towards the sea from a land mass, and bright artificial light sources are known to be hazardous to fledging Petrels (Simons and Hodges, 1988). Young birds may be confused by artificial light sources when navigating to sea for the first time. On Kauai Island, seabirds, including Petrels, are known to crash into artificial lights and become grounded, where they are subject to predation. In an area with little human development such as the Saddle region of Hawaii Island, artificial lights may pose a hazard to Petrels. Artificial light sources will not be placed at the LZs, as this is not consistent with realistic combat conditions (Frank Tate, COL, personal communication, 2011). Therefore, no impacts to seabirds from artificial light sources will occur.

The potential for noise disturbance was raised as a concern during the first public comment period for the HAMET Environmental Assessment (Dec 2010 – Jan 2011). The US Fish and Wildlife Service suggested that wildlife within the 60 dB noise contour might be negatively impacted by helicopter operations. A basis for using the 60 dB contour could not be justified from a review of the relevant scientific literature. Bowels and Wisdom (2005) indicated that a 60 dB (A) rule (hourly A-weighted L_{eq}) for birds was originally established to prevent masking of species-typical songs. They concluded that there is little evidence to support the effectiveness of the 60 dB rule for all noise-related impacts, and recommended that there should be further research prior to the 60 dB (A) rule becoming widely used for NEPA consultations.

Numerous studies on noise impacts to wildlife, including over flights from military aircraft such as helicopters, have been conducted in past decades. Although results cannot generally be applied across species, studies demonstrate that various species, from wading birds to raptors, co-exist with loud noises (see Appendix A). Although there is debate in the literature as to the effects from noise on the fitness of birds, many studies focus only on behavioral responses, which may not indicate physiological responses or animal fitness. The literature supports that many bird species live, breed, and raise young in areas with sound levels well over 80 dB. Birds may flush from nests when sound levels are high (generally > 80-100 dB), but generally return to their nests within minutes after the disturbance abates. Also, many studies indicate that birds habituate (display decreasing responses) to loud noises. An annotated bibliography on avifauna and noise is presented in Appendix A.

Although it is recognized that exceptions are possible among individual species, the 80 dB contour was selected as the reasonable noise level threshold of concern for disturbance of bird species for the purposes of this survey, based on the literature.

The survey area for each proposed HAMET LZ included a circle of radius 2000 feet, centered on the geographic coordinates of respective LZs. The radius of LZ survey areas was selected based on a noise contour of 80 dB for the CH-47 Chinook, the loudest aircraft proposed for HAMET operations (Table 2). The survey area for each LZ encompassed ~290 acres.

Table 2. Noise levels for HAMET helicopters[a].

	Decibels (dB (A))		
Slant Distance (ft)	CH-47 (Chinook)	UH-60 (Black Hawk)	OH-58 (Kiowa)
200	98	91	89
500	89	83	81
1,000	83	76	74
2,000	77	69	67

[a]Source: US Army (2010)

The Mauna Loa LZs and surveyed areas are located on young barren lava. Substrate composition varies within the survey areas, with ~55% aa and ~45% pahoehoe lava types. Approximately 62% of the lava within the survey areas is less than 750 years old, and has very little vegetation cover. The remaining 38% of the lava is greater than 1500 years old, and supports small stature native shrubs, several of which produce berries that provide food resources to many native bird species (Table 3). Shrub cover is sparse (≤ 10%), with most shrubs less than 3 feet in height, and confined to cracks in the lava where soil and organic matter have accumulated. Very few trees or shrubs greater than 3 feet tall are present within the survey areas of the Mauna Loa LZs.

Table 3. Berry-producing shrubs within Mauna Loa LZ survey areas.

Species	Common Name
Coprosma ernoidioides	Kukaenene
Leptecophyla tameiameiae	Pukiawe
Vaccinium reticulatum	Ohelo

Mauna Kea LZ 5 and LZ 6 are located on the summits of barren cinder cones. Mauna Kea LZ 4 is on flat terrain between LZ 5 and LZ 6, and consists of barren, rocky soil. The Mauna Kea LZs and surrounding area are essentially devoid of vegetation. Vegetation at these LZs is limited to occasional widely spaced grass clumps and a few small ferns and plants growing in the lees of rocks. There are little or no food resources for birds within the Mauna Kea LZ survey areas.

The principal Hawaiian bird species that were selected for surveys were based on species' status under the Endangered Species Act (ESA) and the Migratory Bird Treaty Act (MBTA). Upland game birds were also considered during avifauna surveys, even though these birds are not protected under federal law. Game birds are important to the local hunting community, and therefore constitute an important component of the biological resources of the HAMET operational area.

Hawaiian Petrel (*Pterodroma sandwichensis*) – Endangered (ESA)

The Mauna Loa LZs are located on the northeast slope of Mauna Loa, ~4 miles from known Petrel colonies in Hawaii Volcanoes National Park. Limited investigations suggest that Petrels use the Saddle region as a flyway from the west coast to the colonies along the Mauna Loa northeast rift zone in the park (Cooper et al., 1995).

The Mauna Kea LZs are located at high altitude, and do not appear to contain likely Petrel habitat. Mauna Kea LZ 5 and LZ 6 are located on the rim of cinder cones with extremely loose cinders which are not suitable for excavating burrows. Mauna Kea LZ 4 is a flat and exposed area with no slope in which to excavate burrows. Within the survey areas for all these LZs, however, there is some (minimal) potential Petrel habitat where a few rocky outcrops provide crevices, cracks and soil for excavating burrows.

The Hawaiian Petrel was once common in the Saddle region of Hawaii Island, as evidenced by the abundance of bones found in archaeological middens of ancient Hawaiians. Petrels nest only on the main Hawaiian Islands, with extant colonies on Maui, Hawaii, Kauai, Lanai and possibly Molokai. On Hawaii Island, existing colonies are found between 8200-9200 ft on Mauna Loa. Vegetation associated with Petrel colonies includes pukiawe (*Leptecophyla tameiameiae*), kukaenene (*Coprosma ernodeoides*), ohelo (*Vaccinium reticulatum*), and kupaoa (*Dubautia menziesii*), with vegetation cover usually <10% (Simmons and Hodges, 1998).

In colonies, birds use openings in the lava as burrows to raise their young. Breeding pairs visit their burrows briefly in February to initiate breeding season. Pairs then depart the colonies to feed at sea, usually by March, and return to the colony in late April or early May to lay eggs. Both parents assist with incubating and rearing. Young Petrels fledge from the colonies in October or November. Non-breeding birds also visit the

colony from May to August. Non-breeding birds call almost continuously within the colony during this period and are the portion of the population easiest to detect. It is assumed that healthy functional colonies will contain a non-breeding component. Surveys therefore typically focus on detecting calls from non-breeding birds from May to August.

Results presented below are considered substantially indicative at this time, although preliminary. Because surveys were conducted in March during a period of expected Petrel absence from the island, it was not possible to determine conclusively if the habitats investigated within the LZ surveyed areas support Petrel colonies. Surveys for all Mauna Loa and Mauna Kea LZs will be conducted again between May and August when non-breeding birds are expected to be present if there are extant colonies in the LZ survey areas. Suitable habitat within each LZ survey area will be surveyed a minimum of four times during the May-August period to maximize the potential for detecting Petrels. Trained observers will begin listening for Petrel calls at sampling sites 10 minutes prior to sundown and will remain until 9:30 pm. In addition, a recording system may be deployed to continuously record sound data.

Results from the preliminary March Petrel surveys are discussed below.

For the Mauna Loa LZs, habitat within the surveyed areas was examined for evidence of Petrel use. While each 100 x 100 ft LZ is located on barren aa lava, unsuitable for petrel colonies, each LZ survey area contained portions of suitable colony habitat. Specific to potential impact from rotorwash, a positive identification of potential petrel habitat was made within ~325 ft of Mauna Loa LZ 3 (the distance at which rotorwash from the largest aircraft will first be felt at ground level; see Peshut and Evans MFR 30 March 2011). If this area is eventually found to be occupied by petrels, helicopter rotrowash could potentially impact Petrels on the ground or flying over the area. It is assumed that birds would vacate the area as the helicopter approaches the LZ and then return once the disturbance is past.

HAMET operations will produce ~10 minutes of disturbance per LZ landing event. Helicopter noise and rotorwash may be attenuated within Petrel burrows. At Haleakala National Park it was found that the majority of Petrel burrows were more than 2 m deep and less than 10% were less than 1 m (Simons, 1985). In addition, Petrel nest chambers cannot typically be viewed from the entrance usually due to a bend in the burrow tunnel (Hu, 1996). Although burrow depth and configuration are not documented for Petrel colonies on Mauna Loa in Hawaii Volcanoes National Park, it is assumed that Petrels overall choose similar burrow characteristics. Petrels in burrows are therefore expected to be at last 1 m underground and around a tunnel bend. Thus, it is improbable that rotorwash will significantly impact Petrels within burrows. Similarly,

noise impacts to Petrels in burrows will be attenuated by overlying soil and rock. In support of this proposition, noise restrictions in Haleakala National Park limit construction noise levels at burrows within 80 m of a construction site to 83 dB (A), measured at five feet from the sound source during the Petrel incubation period (April-July). If Petrel burrows are found within a 325 ft radius of Mauna Loa LZ 3, similar restrictions may be necessary for HAMET operations.

For Mauna Kea LZs, Banko (1980a) summarizes Petrel occurrence on Mauna Kea from historic records, and from results from surveys conducted mostly on the eastern and southeastern flanks of the mountain between 1968 and 1970. Although a few birds were detected, Banko (1980a) did not locate any active colonies on Mauna Kea. No published surveys were found for the southwest slope of Mauna Kea where the HAMET LZs are located, but mummified Petrel remains are known from a cinder cone (puunanaha) that is down slope and within ~2½ miles of these LZs at ~8000 ft elevation. Petrel remains are also known from the south slope of Mauna Kea at a human habitation site above 11,000 ft. It is known that the Hawaiian Petrel was a preferred food of ancient Hawaiians, and given the elevation, it is possible that the Petrel remains at the 11,000 ft elevation were from human origin. In comparison, extant Petrel burrows are recorded as high as 9,976 ft in Haleakala National Park (Maui).

Potential Petrel habitat was found within ~325 ft of Mauna Kea LZ 5 where a rocky outcrop in the central bowl of the cinder cone could provide habitat for excavating burrows. If this area is occupied by Petrel, the impacts from helicopter rotorwash could potentially impact Petrel on the ground or flying over the area. It is highly unlikely, however, that Petrel occupy the HAMET LZ survey areas on Mauna Kea. Conclusive surveys during the May-August time frame will provide for a final determination.

As mitigation for the unlikely event that Petrels will have colonies in the vicinity of LZs, the Combat Aviation Brigade has indicated that the use of any LZ will be suspended for a period to be defined by the Pohakuloa Natural Resources Office, if the presence of a Petrel colony at or within the vicinity of any LZ is verified.

Band-Rumped Storm-Petrel (*Oceanodroma castro*) – Candidate (ESA)

Band-Rumped Storm-Petrels have habitat requirements and breeding season similar to the Hawaiian Petrel (Slotterback, 2002). Adult Storm-Petrels are believed to nest in burrows at high elevations, and lay eggs between May and June, with nestlings fledging in October. This species is found on the Hawaiian Islands only during breeding season. On Hawaii Island, Band-Rumped Storm-Petrels are often heard calling in or near Hawaiian Petrel colonies.

Band-Rumped Storm-Petrels are documented using habitat in the Saddle region (Pohakuloa Natural Resources Office, unpublished data). Birds were recorded a few nights in 2008, 2009 and 2010 between May and August at Puu Koli in southeastern PTA, ~4½ miles from the proposed HAMET LZs on Mauna Loa. At this time it is unclear how the birds are using this area. It can be assumed that Storm-Petrels use the Saddle region as a flyway to nesting habitat on the northeast rift zone on Mauna Loa, within the Hawaii Volcanoes National Park. Storm-Petrels are documented within the Hawaiian Petrel colonies in the National Park, and also at Red Hill cabin along the Mauna Loa summit access trail at ~10,000 ft elevation.

Potential impacts from HAMET training to Band-Rumped Storm-petrels will be similar to those described for the Hawaiian Petrel.

Because habitat assessments were conducted in March when Band-Rumped Storm-Petrels are expected to be at sea, it was not possible to determine if the habitat is currently used by these birds. Additional investigations will be conducted between May and August when non-breeding birds are present in colonies, and will follow protocols established for the Hawaiian Petrel surveys.

Newell's Shearwater (*Puffinus newelli*) – Endangered (ESA)

Newell's Shearwaters are colonial nesters coming ashore at night (Ainley et al., 1997). Colonies are often located at high elevations in remote areas with native vegetation on slopes of 65 degrees or greater. Breeding season begins in April, when birds prepare burrow sites. Birds then depart in late April and return in June to lay a single egg. Both parents incubate the egg. Most of the young fledge by November.

HAMET operations on Mauna Kea and Mauna Loa will not affect Newell's Shearwaters. On Hawaii Island, Newell's Shearwater colonies are limited to the Puna District (~25 miles southeast of Pohakuloa), the Hamakua coast (~25 miles northeast of Pohakuloa) and Waipio Valley (~20 miles northwest of Pohakuloa). No Newell's Shearwater colonies are known in the subalpine or alpine areas of Hawaii Island. Since Newell's Shearwater colonies are located near the coasts, inland flights through the Saddle region are probably rare and extremely unlikely during HAMET operations.

Hawaiian Goose (*Branta sandvicensis*) – Endangered (ESA)

The Hawaiian Goose (Nene) has adapted generally to a terrestrial life and does not require wetlands habitat (US FWS, 2004). Although Nene are known to occupy sites with open water, they seem to prefer grasslands, shrublands and dryland forests (Banko et al., 1999). There are an estimated 500 Nene on Hawaii Island. Breeding populations are located on the east (Hakalau) and west (Puu Waawaa) sides of the island, with

breeding season primarily from October through March. After breeding, Nene assemble into family groups during flocking season, from April through September.

During flocking season birds make intra-island flights and congregate in summer flocking areas. Little is known about flocking movements and locations where birds spend the flocking season are poorly known as well. Nene are documented in the Mauna Loa Forest Reserve within ~1½ miles of the Mauna Loa LZs. Nene also use portions of the Kipuka Ainahou Nene Sanctuary within ~4 miles from the Mauna Loa LZs. Data indicate that Nene sometimes use the sanctuary area for roosting. The Pohakuloa Natural Resources Office has documented Nene at PTA in Training Area 21, ~3½-5 miles from the Mauna Loa LZs. Nene are known to use these PTA locations for occasional roosting, as well.

Although surveys did not detect Nene or Nene sign (droppings) at any LZ, it is reasonable to assume that geese have some undetermined presence in the sparsely vegetated habitat within the Mauna Loa LZ survey areas. Nene are known to exploit open pahoehoe lava flows that contain pukiawe (*Leptecophyla tameiameiae*), kukaenene (*Coprosma ernodeoides*), ohelo (*Vaccinium reticulatum*), and kupaoa (*Dubautia menziesii*), such as occur in the Mauna Loa LZ survey areas.

HAMET training is not expected to adversely affect Nene at any LZ. It is improbable that Nene occupy any sites within the Mauna Kea LZ survey areas. For the Mauna Loa LZ areas, near the Kipuka Ainahou sanctuary and PTA, geese are expected to be habituated to noise. Although some studies indicate geese are sensitive to helicopter noise (Ward et al., 1999), Nene are routinely found during flocking season in noisy habitats such as edges of highways (Saddle Road, Hawaii), airport runways (Kauai), and live-fire ranges (Pohakuloa). Noise levels from proposed HAMET operations are not expected to exceed 80 dB (A) in more than 0.2% of Kipuka Ainahou (Figure 2), and are expected to remain below 70 dB (A) in over 90% of Kipuka Ainahou during HAMET exercises. As an example of Nene habituation to noise, Nene at Pohakuloa are already exposed to noise from routine Combat Aviation Brigade and other helicopter exercises. In addition, under certain conditions, Nene within PTA and Keamuku Maneuver Area may be less than 50 ft from detonations, including grenades, mortars, artillery shells, tube-launched wire-guided missiles, bombs, fire suppression and training related helicopters, and loud voices (US FWS, 2008).

It is assumed that Nene near the LZs will depart the area as a helicopter approaches the LZ if noise levels become too high. This is based on guidance issued to the Army regarding Nene at Pohakuloa Range 01 by the US FWS: "…when noise is too loud or disruptive, the Nene will leave the premises or if they are habituated to the noise, then they are not losing any metabolic resources" (US FWS, 2008).

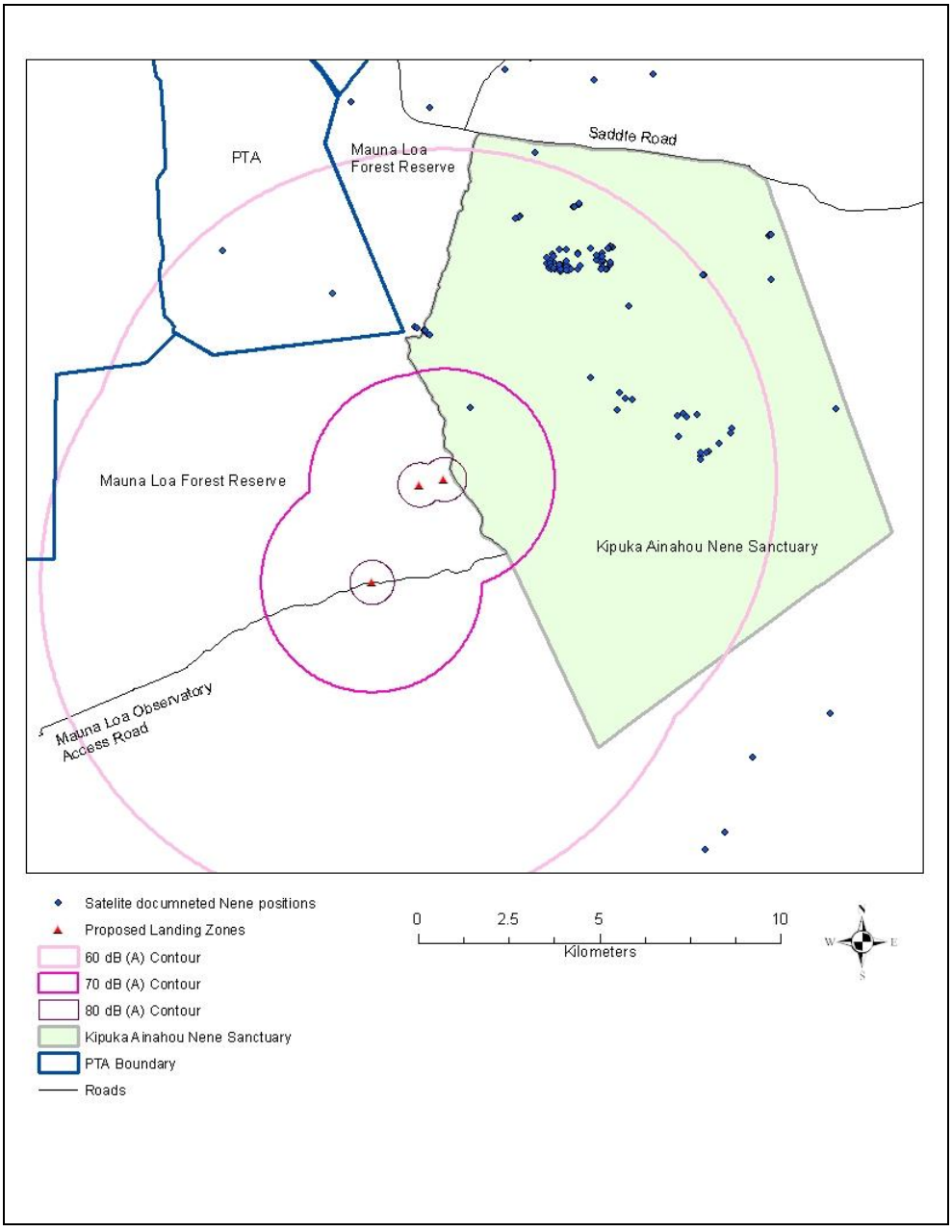

Figure 2. Documented Nene positions in the vicinity of Mauna Loa LZs.

Hawaiian Hawk, Io (*Buteo solitarius*) – Endangered (ESA)

The Hawaiian Hawk (Io) is widely distributed on Hawaii Island and is occasionally sighted on other Islands. Io breed solely on Hawaii Island and lay eggs from March to June which hatch from May to July (Clarkson and Laniawe, 2000). Young birds fledge from July to September. Io feed on rodents, insects, small birds, and some game birds.

These hawks use both native and altered habitats and are increasingly found within urban areas such as Hilo.

HAMET operations at the LZs on Mauna Loa and Mauna Kea are not likely to affect Io. No Io were seen during field surveys at any LZ. Sighting records indicate that there is a gap in the hawk's range, in the region between Mauna Kea and Mauna Loa, from Puu Huluhulu and PTA on the east, westward to Puu Waawaa (Banko, 1980b). This gap encompasses all proposed HAMET LZs. Io population density for LZs on Mauna Loa and Mauna Kea is therefore expected to be zero (Klavitter, 2000).

Palila (*Loxioides bailleui*) – Endangered (ESA)

Palila are currently found on the western and northwestern slopes of Mauna Kea in the mamane (*Chrysophylla sophora*) and naio (*Myoporum sandvicensis*) forests. Palila are specialized foragers, consuming the green seed pods of the mamane, which is the main component of their diet. Palila breed between March and August where the female usually lays two eggs (Banko et al., 2002). Both parents help tend the brood. Palila have been documented at treeline on Mauna Kea (~10,000 ft) and it is possible they will range across all elevations where mamane trees are found (Scott et al., 1984). A few trees grow in clusters above the main forest as treeline elevations are reached. The nearest mamane trees to the Mauna Kea LZs are more than 3000 ft distant. At 2000 ft from an LZ, expected sound level of a CH-47 is 77 dB (A).

No Palila were detected during surveys at the Mauna Kea LZs. Palila breed at lower elevations in the mamane dominated forest (Banko, et al., 2001) and are not expected to nest in the sparse trees at 3000 ft from the LZs. Also, if noise levels exceed comfort levels for Palila, it is assumed the birds will vacate the area temporarily and return after the disturbance. HAMET operations at Mauna Kea LZs are not expected to adversely affect Palila.

Akiapolaau (*Hemignathus munroi*) – Endangered (ESA)

The Akiapolaau is endemic to Hawaii Island and was once widely distributed on the island, but today is restricted to four fragmented populations in Kau, Hamakua, Kona, and Mauna Kea (Pratt et al., 2001). Akiapolaau consume wood boring insect by pecking open holes with its short stout lower bill and extracting the insect with its long upper beak. The birds also feed on Ohia (*Metrosideros polymorpha*) sap from holes they drill in the trees. The breeding season appears to be extended over the year and young have a long dependency period.

HAMET operations are not expected to affect Akiapolaau. No Akiapolaau were detected during surveys at any LZs. The Akiapolaau have been seen in the past five years on the western slope of Mauna Kea in the mamane forest, but the numbers of

birds appears to be low in the region of Mauna Kea proposed for training. Akiapolaau are not expected to forage or nest in the sparse trees at 3000 ft from the LZs. Also, if noise levels exceed comfort levels for Akiapolaau, it is assumed the birds will vacate the area temporarily and return after the disturbance.

For MBTA species, surveys were designed to determine the presence of MBTA listed species within the 2000 ft survey area for the proposed LZs. Transects spaced at 500 m were systematically placed to cover the maximum area inside the survey areas. Survey stations were located at 150 m intervals along each transect. The survey counting method is based on the US Fish and Wildlife Service Hawaiian Forest Bird Variable Circular-Plot (VCP) method (Reynolds et al., 1980; Scott et al., 1986). Using this method, one observer conducts counts at each station along a single transect. Each station is monitored for six minutes during a 4.5 hour sampling period (0630-1100). Every bird detected is recorded by detection type (aural, visual, or combined) and the horizontal distance from the station to the bird (Reynolds et al., 1980). Weather conditions, wind speed and cloud cover are also noted. Counts are not conducted on days when the weather is not within established guidelines.

For each Mauna Kea LZ a total of three transects with 54 stations were surveyed. Counts took place between 09:00 am and 11:15 am. Two House Finch were detected, one during and one after the count period. Both birds were not using the habitat, but only flying over the area. Because of the limitations on food resources on Mauna Kea in the vicinity of the LZs, it is assumed that the birds were transiting over the mountain between forested areas.

On Mauna Loa a total of five transects with 42 stations were surveyed. Counts took place between 08:00 am and 11:00 am. Results are summarized in Table 4.

Table 4. MBTA bird survey results

Common Name	Species	Quantity	Origin	Status
Apapane	*Himatione sanguinea*	32	Endemic	MBTA-Protected
Omao	*Myadestes obscurus*	40	Endemic	MBTA-Protected
House Finch	*Carpodacua mexicanus*	3	Introduced	MBTA-Protected

Of the 42 stations surveyed, Apapane, Oamo, and House Finch were present at 13 (31% occurrence), 25 (60% occurrence) and 3 (<1% occurrence) stations, respectively. The mean number of Apapane, Oamo and House Finch detected per station was 0.76,

0.95 and 0.70, respectively. Birds were detected more often at lower elevations within the survey areas for LZ 2 and LZ 3, than within the higher elevation survey area for LZ1.

Omao (*Myadestes obscurus*) – Protected (MBTA)

Omao, the most common of Hawaii's thrush species, is endemic to Hawaii Island, with an estimated population of 170,000 individuals (Scott et al., 1986). Populations are found in the Hamakua-Puna (eastern) and Kau (southern) regions of the island. A separate population exists in alpine scrub on Mauna Loa. Omao eat insects and fruits from many native plants. In the Mauna Loa scrub, Omao perch on elevated rocks ("sentry rocks") within their territories. Sentry rocks are recognizable by green growth as a result excreted wastes from perched birds. These sentry rocks are easy to spot and are good indicators of areas used by Omao. Omao likely maintain year-round core areas where they feed, roost and nest within larger home ranges (Wakelee and Fancy, 1999). In the alpine scrub, Omao will nest on the ground in lava formations and in lava tubes. Breeding activity occurs almost year-round, with a peak of nesting in April to July. The female incubates the eggs alone and spends on average ~40 minutes/hour on the nests with recesses averaging ~6½ minutes.

Mauna Loa survey results show Omao are widely distributed within the LZ survey areas. The majority of the birds were detected in LZ 2 and LZ 3 survey areas (36 out of 40 detections). Many sentry rocks are present within LZ 2 and LZ 3 survey areas, and indicate frequent use of the area by Omao.

HAMET operations are not expected to negatively impact the island-wide Omao population. Although comparisons between how species respond to noise cannot be directly related, many studies indicate incubating birds will tolerate high levels of noise before flushing from nests and quickly return once the noise has abated. Omao females routinely leave the nest to forage for up to 6.5 minutes at a time. HAMET operations are expected to last up to 10 minutes per helicopter landing. It is expected that females will return to nests once noise levels have abated.

HAMET operations could potentially impact individual and breeding pairs of Omao within the vicinity of an LZ if nests are located within a 325 ft radius of the LZ geographic coordinate. As discussed for the Botanical surveys (see Evans and Peshut MFR 30 March 2011) rotorwash from the largest aircraft (CH-47 Chinook) will first be felt on the ground when the aircraft is ~325 ft from the LZ center. At Mauna Loa LZ 3, potential Omao habitat exists within ~325 ft of the LZ where rotorwash could affect birds and nesting females. It is expected that non-nesting individuals within the survey area of the LZ will vacate the area temporarily during the disturbance and return after the operations.

There is no known information on the effects of helicopter rotorwash on nests, or nesting birds. For HAMET operations, rotorwash effects at near-ground level will be greatest at the center of LZs, and will diminish to ambient or near-ambient conditions at ~150 ft horizontally when helicopters are near touchdown or at take-off at the ground surface.

As mitigation, the Combat Aviation Brigade has indicated that the use of the LZ will be suspended for a period to be defined by the Natural Resources Office, if the presence of nesting Omao within 325 ft of LZ 3 is verified.

Although efforts to reduce or eliminate impacts to known Omao nesting sites will be conscientiously pursued by the Combat Aviation Brigade, there is always the potential for accidents. US congress has amended the MBTA to provide for the accidental death of MBTA species due to military training (Stump Act and Defense Reauthorization Act). Therefore, there is no regulatory liability in the unlikely event of the accidental death of nesting Omao at LZ 3.

Apapane (*Himatione sanguinea*) – Protected (MBTA)

Apapane are the most common of the Hawaiian Honeycreepers and are found on all major islands, but are rare on Lanai and Molokai. Apapane main food source is nectar from the Ohia (*Metrosideros polymorpha*) blossom, but this species also feeds on fruits and insects. The population on Hawaii Island is estimated at over one million (Scott et al., 1986). Breeding season is year-round with a nesting peak between February and June. Males feed females away from the nest requiring short incubation recesses. Nests inside lava tubes are documented and Apapane sometimes use old Omao nest material and nest sites in Hakalau National Wildlife Refuge (Fancy and Ralph, 1997).

Mauna Loa survey results indicate Apapane are well distributed within the surveyed areas for LZ 2 and LZ 3. No Apapane were recorded within the LZ 1 survey area. Apapane appear to be most associated with barren aa flows within the survey areas. During surveys, paired birds patrolled sections of aa while singing, indicating breeding territory defense. Apapane only defend territories during breeding season. Information regarding Apapane breeding in alpine scrub on Mauna Loa was not available.

HAMET operations are not expected to negatively impact the Apapane on Hawaii Island. However, HAMET operations could potentially impact individual Apapane within the surveyed areas. Although comparisons between how species respond to noise cannot be directly related, many studies indicate incubating birds will tolerate high levels of noise before flushing from nests and quickly return once the noise has abated. Apapane females routinely leave the nest during incubation to feed. Since HAMET operations are expected to last up to 10 minutes per helicopter landing, it is expected

that females will return to nests once noise levels have abated, with no negative consequences to nesting success.

At Mauna Loa LZ 2 and LZ 3, potential Apapane habitat exists within ~325 ft of the LZ where rotorwash could affect birds and nesting females. It is expected that non-nesting individuals within the buffer and ~325 ft of the LZs will vacate the area temporarily during the disturbance and return after the operations. For nesting birds, the situation for Apapane is similar to that for Omao (see above), and similar mitigation and considerations apply.

House Finch (*Carpodacua mexicanus*) – Protected (MBTA)

House Finch were first introduced to the Hawaiian Islands in the late 1800's and were common on all the major islands by the early 1900's. Fruit, seeds, buds and nectar comprise the House Finch's diet. Eggs are typically laid between late March and July and females may have more than one brood in a season (Hill, 1993). The birds nest in a variety of vegetation, natural features and man-made structures. Males only defend an area around the nest (to ~60 m) and pairs can nest in close proximity at preferred sites. House Finches are considered common, but population numbers for Hawaii are not known.

HAMET operations are not expected to negatively impact the House Finch population on Hawaii Island. Five individuals were detected during surveys among all the proposed LZs. The two individuals encountered on Mauna Kea were flying over the LZs and not using the habitat, as described previously. It is assumed that birds encountering aircraft and elevated noise levels will avoid the area temporarily. HAMET operations could potentially impact individual and breeding House Finch within the survey areas. Although comparisons between how species respond to noise cannot be directly related, many studies indicate that incubating birds will tolerate high levels of noise before flushing from nests and quickly return once the noise has abated. House Finch eggs are reportedly very cold tolerant and can tolerate low temperatures and hours-long gaps in incubation, and it is therefore expected that if individuals vacate the area temporarily during the disturbance, there will be no negative impacts to nesting success.

MBTA protected species that may occur in the LZ survey areas, but which were not detected during surveys, are discussed below.

Hawaii Amakihi (*Hemignathus virens*) – Protected (MBTA)

Hawaii Amakihi is the most commonly detected species at Pohakuloa Training Area and is also abundant throughout Hawaii Island with an estimated population of 870,000 (Scott et al., 1986). Hawaii Amakihi are small greenish-yellow birds feeding on fruits,

nectar and insects and are reported from low elevations in Puna (southeast) to high elevation alpine scrub. Hawaii Amakihi breed almost year-round with a breeding peak from March to May (Lindsey at al., 1998). Pairs establish home ranges and defend territories during breeding season. Territory size is dependent on vegetation type and reported sizes range from ~1-3 acres in open wooded edge habitat.

HAMET operations are not expected to negatively impact the Hawaii Amakihi population on Hawaii Island. Hawaii Amakihi were not detected during LZ buffer surveys, although this species is known to occupy habitat within 1 to 2 miles of the Mauna Kea and Mauna Loa LZs. Hawaii Amakihi are usually conspicuous when present in the environment. It is therefore unlikely that surveyors missed birds. It is probable Hawaii Amakihi use the habitat on Mauna Loa occasionally to forage. There are little or no food resources within the Mauna Kea survey areas, but birds may use the area as a flyway. If birds are present during HAMET operations, it is expected that individuals within the survey areas will vacate the area temporarily during high levels of noise and return after the noise has abated.

Northern Mockingbird (*Mimus ployglottus*) – Protected (MBTA)

Northern Mockingbirds were introduced to the Hawaiian Islands in 1920. On Hawaii Island, Northern Mockingbirds have been recorded from the western slope of Mauna Kea and in the Saddle region. Pairs defend year-round territories and breeding season is from March to August (Derrickson and Breitwisch, 1992). Northern Mockingbirds are omnivorous and consume insects, other invertebrates, fruits and occasionally small vertebrates.

HAMET operations are not expected to negatively impact the Northern Mockingbird population on Hawaii Island. Northern Mockingbirds were not detected during LZ surveys, although this species is known to occupy habitat within 1 to 2 miles of the Mauna Kea and Mauna Loa LZs. It is probable Northern Mockingbirds use the habitat on Mauna Loa occasionally to forage. There are little or no food resources within the Mauna Kea survey areas, but birds may use the area as a flyway. During HAMET operations, it is expected that individuals within the buffer will vacate the area temporarily during high levels of noise and return after the noise has abated.

Sky Lark (*Alauda arvensis*) – Protected (MBTA)

The Sky Lark was introduced to Hawaii from New Zealand populations in 1865 and is found on all the main islands except for Kauai. Sky Larks nest in open habitats with short grass cover and feed on insects. Sky Larks have been recorded on the western slope of Mauna Kea and from the Saddle region. Pairs maintain a territory during breeding season and may use the same territory for many years (Campbell et al.,

1997). Territory size is dependent on habitat, food resources and population density. In Hawaii, territorial singing begins in mid-October and ends by June.

HAMET operations are not expected to negatively impact the Sky Lark population on Hawaii Island. Sky Larks were not detected during LZ surveys, although this species is known to occupy habitat within 1 to 2 miles of the Mauna Kea and Mauna Loa LZs. Sky Larks are usually conspicuous between October and June when breeding; therefore it is unlikely that surveyors missed birds. Also, there is no breeding habitat for Sky Larks within the Mauna Loa and Mauna Kea LZ survey areas. It is probable that Sky Larks use the habitat on Mauna Loa occasionally to forage. There are little or no food resources within the Mauna Kea LZ survey areas, but birds may use the area as a flyway. During HAMET operations it is expected that individuals will vacate the area temporarily during high levels of noise and return after the noise has abated.

Pacific Golden-Plover (*Pluvialis fulva*) – Protected (MBTA)

The Pacific Golden-Plover is mostly a seasonal resident of the Hawaiian Islands and can be found during the winter months. Pacific Golden-Plovers from Hawaii return to Alaska to breed during summer months, but some individuals, mostly first-year birds, over-summer in Hawaii instead of migrating (Johnson and Connors, 2010). While in Hawaii, the Pacific Golden-Plover occupies a wide variety of habitats including mountain slopes up to 10,000 ft. Birds defend territories in Hawaii and may return annually to the same territory. Their diet consists of invertebrates, but they may also consume leaves and flowers.

HAMET operations are not likely to negatively impact Pacific Golden-Plover populations on Hawaii Island. Surveyors did not detect any individuals, but it is probable the birds use LZ areas occasionally. Pacific Golden-Plovers are commonly observed along Saddle Road (Highway 200) within a few miles of the LZ sites. It is assumed Pacific Golden-Plovers will vacate the area temporarily during HAMET operations if noise levels become too high, and then return once the noise has abated.

Barn Owl (*Tyto alba*) – Protected (MBTA)

Barn Owls are wide-spread and cosmopolitan, and are found throughout the Americas, Europe, and in parts of Africa and Asia (Marti et al., 2005). Barn Owls were first introduced to Hawaii in 1958 to control rodent populations in agricultural fields. Mice are the main prey of the Barn Owl in Hawaii, but these owls have been documented depredating seabirds as well (Pyle and Pyle, 2009). While Barn Owls prefer low elevation open habitats, birds are reported up to ~8200 ft on Hawaii Island and over 12,800 ft in South America. Barn Owls nest in cavities such as holes on the steep sides of cinder quarries in the Saddle region. Breeding courtship begins in January with eggs laid about a month later. Young usually fledge by mid-summer.

HAMET operations are not likely to impact the Barn Owl population on Hawaii Island. No Barn Owl nests were discovered within the expected rotorwash area (325 ft radius from LZ center) at either Mauna Loa or Mauna Kea, where noise level will be greatest (≥ 89 dB). Barn Owls have good hearing between 1-7 KHz and are able to discriminate well between frequencies within this range (Beason, 2004); therefore, loud, low frequency noise within this range may affect owls. In Oregon, nesting Mexican Spotted Owls (*Strix occidentalis lucida*) did not flush when helicopter (aircraft type unreported) noise levels were ≥ 92 dB (Delany et al., 1999). About 20% of Mexican Spotted Owls flushed when helicopters were ~200 ft distant. Although direct correlations between how Mexican Spotted Owls and Hawaiian Barn Owls respond to noise cannot be inferred, the study suggested that owl species may not be as sensitive to loud, low frequency noise, as once believed. Barn Owls may use the survey areas on Mauna Kea and Mauna Loa to forage, but it is assumed birds will temporarily vacate the area while noise levels are high and return to the area once noise levels have abated.

Hawaiian Short-Eared Owl (*Asio flammeus sandwichensis*) – Protected (MBTA)

The Hawaiian Short-Eared Owl, or Pueo, are active during the day and occupy a variety of forested habitats, but are most common in grassland habitat where rodents and the occasional bird are hunted. Pueo rely on acoustical clues to find prey, but can hunt by sight as well (Wiggins et al., 2006). No reliable population estimate is available, but the population reportedly cycles between high and low numbers, although the cause is not understood (Pyle and Pyle, 2009). Little information is available about the distribution of Pueo on Hawaii Island. Pueo are documented on the slopes of Mauna Kea and in the Saddle region. Pueo nest on the ground, usually in grass cover. Nests have been found year-round, but little is known about Pueo breeding ecology in Hawaii.

HAMET operations are not likely to impact the Pueo population on Hawaii Island. There is no suitable cover for Pueo to construct nests within the LZ survey areas for any of the LZs. Therefore, breeding within the LZ survey areas is highly unlikely. Pueo may use the LZ survey areas on Mauna Kea and Mauna Loa to forage, but it is assumed that birds will temporarily vacate the area while noise levels are high and return to the area once noise levels have abated.

Upland Game Birds – Not Protected

The public is permitted to hunt game birds in both the Mauna Kea and Mauna Loa Forest Reserves during an established season, which is usually between the months of November and January. Many species of game bird are present on Hawaii Island and several species are known to frequent high elevation scrub or barren habitats (Schwartz and Schwartz, 1966) (Table 5).

Table 5. Game bird species expected at high elevations in Mauna Kea and Mauna Loa Forest Reserves.

Species	Common Name
Callipepla californica	Califoinia Quail
Alectoris chukar	Chukar
Francolinus francolinus	Black Francolin
Francolinus pondicerianus	Gray Francolin
Francolinus erckelli	Erckel's Francolin
Phasianus colchicus	Ring-Necked Pheasant
Meleagris gallopavo	Wild Turkey

During surveys for all proposed LZs, no game birds were detected, but game bird droppings were present within all the survey areas, which indicates some level of habitat use. The sparse rocky habitat at the Mauna Kea LZ offers few food resources and may primarily be used as a movement corridor and/or roosting area by game birds. Although native shrubs offer food resources in the survey areas for the Mauna Loa LZs, the plants offer little cover and the area is probably used as a movement corridor and/or roosting area, only.

HAMET operations are not expected to negatively impact game bird populations on Hawaii Island. Due to the lack of cover for breeding at any of the LZ locations, it is unlikely training will impact bird reproduction. It is assumed that birds using the area for forage, movement, or roosting will temporarily vacate the area if noise levels become too high and return once the noise has abated.

Please contact Peter Peshut, 808-969-1966, peter.peshut@us.army.mil, for further discussions on HAMET operations and potential impacts to Hawaiian avifauna.

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Citation	Abstract	Species	Distance	DB	Response
Aubrey, F. and D. Hunsaker. 1997, Effects of fixed-wing military aircraft noise on California gnatcatcher reproduction. The Journal of the Acoustical Society of America 102, 3177.	To test the assumption that high levels of aircraft noise impede bird reproduction, noise analyzers were placed for 1 week in the nesting territory of each of 39 California gnatcatcher pairs on Naval Air Station Miramar. The 1-week average sound levels (7DL) recorded in those nesting territories were then related to the number of nest attempts; number of eggs laid; number of chicks hatched; number of chicks fledged; and number of eggs, chicks, and fledglings per nest attempt. Nest attempts and eggs laid have weak negative correlations (p=0.14 and 0.28) with 7DL. That is, the birds may tend to build fewer nests and lay fewer eggs in noisier areas, which is consistent with the common observation that bird nesting is more easily disturbed before eggs are laid than after. None of the other indicators is correlated with sound levels. Once a nest is established, with eggs in it, military aircraft noise has no detectable influence on reproductive performance. Gnatcatchers reproduced in places where 1 HL exceeds 80 dB for several hours every day. If fixed-wing aircraft noise impedes California gnatcatcher reproduction, it is overwhelmed by such factors as disturbance, predation, weather, edge effects, and differences in quality of habitat.	Gnatcatcher		1 HL exceeds 80 dB	Military aircraft noise has no detectable influence on reproductive performance.
Beason R.C. Through a bird's eye—exploring avian sensory perception [Internet]. Sandusky, OH, USDA Wildlife Services National Wildlife Research Center Ohio Field Station. [updated 2004 June, cited 2010 March]. Available from: http://www.aphis.usda.gov/wildlife_damage/nwrc/publications/03pubs/beason031.pdf	For too many birds their environment includes airfields and aircraft. Knowing avian sensory abilities, researchers can design experiments and develop new devices and techniques to deter birds from aircraft on and away from airfields. How birds perceive the world about them determines many choices, including foraging, predator avoidance, and flight. Most experiments to investigate the sensory abilities of birds have been developed and analyzed using only human sensory capabilities, which often differ markedly from those of birds. My objective is to review and synthesize what is known and what is unknown about avian sensory capabilities. Compared with humans, birds can distinguish more colors and detect ultraviolet and polarized light directly. Their range of auditory sensitivity is narrower than humans but some species can hear sounds at least as high pitched as humans. Their chemical	General			

Citation	Abstract	Species	Distance	DB	Response
	sensitivity is similar to humans in most cases but varies seasonally and can approach that of rodents. Avian vestibular sensitivity appears to be similar to other vertebrates but has received little investigation. There is a great deal we do not know about avian sensory perception that we need to know to make aircraft more obvious to birds and improve the effectiveness of dispersal techniques for individual species of birds.				
Black, B. B., M.W. Collopy, H.F. Percival, A.A Tiller and P.G. Bohall. 1984. Effects of low level military training flights on wading bird colonies in Florida. Florida Coop. Fish and Wild1. Research Unit, School of Forest Research and Conservation, University of Florida. Tech. Rept. No.7.	During 1983 and 1984 the effect of low level military training flights on the establishment, size and reproductive success of wading bird colonies was studied in Florida. Based on the indirect evidence of colony distributions and turnover rates in relation to military areas (training routes designated to 500 feet or less above ground level and military operations areas), there was no demonstrated effect of military activity on wading bird colony establishment or size on a statewide basis. Colony distributions were random with respect to military areas and turnover rates were within 2% when military and non-military areas were compared. Colony distributions and turnover rates, however, were related to the amount and type (estuarine or freshwater) of wetland, respectively. During two breeding seasons the behavioral responses and reproductive success of selected species were monitored in a non-habituated treatment colony (military overflights) and a control colony (no overflights). Breeding wading birds responded to F-16 overflights at 420 knots indicated airspeed, 82-84% maximum rpm, 500 feet above ground level and sound levels ranging from 55-100 dBA by exhibiting no response, looking up or changing position (usually to an alert posture): no productivity limiting responses were observed. High-nesting Great Egrets responded more than other species, nestling Great Egrets and Cattle Egrets responded significantly ($p < .05$) more intensely than adults of their respective species, and adults responded less during incubation and late chick-rearing than at other times. In addition, no differences in adult attendance, aggressive interactions or chick feeding rates	Wading Birds	500 AGL	55-100	Breeding wading birds responded to F-16 overflights at 420 knots indicated airspeed, 82-84% maximum rpm, 500 feet above ground level and sound levels ranging from 55-100 dBA by exhibiting no response, looking up or changing position (usually to an alert posture): no productivity limiting responses were observed.

Citation	Abstract	Species	Distance	DB	Response
	were observed to result from F-16 overflights. No evidence of habituation to overflights was noted. Humans entering the colony or airboats approaching the colony vicinity elicited the most severe responses (flushing and panic flights) observed at both sites. Since relatively little coastal military activity occurs at low levels (~500 ft) and only one Brown Pelican colony (5-6% of the breeding population) was located in such an area, the reproductive success of five, more "exposed" study species (Great Egrets, Snowy Egrets, Tricolored Herons, Little Blue Herons, Cattle Egrets) nesting in interior freshwater colonies was studied. Reproductive activity including such factors as nest success, nestling survival, nestling mortality, and nesting chronology was independent of F-16 overflights but related to ecological factors including colony location, colony characteristics and climatology. The responses to and effects of F-16 overflights, as reported here, should not be considered representative of military aircraft at lower altitudes or greater noise levels.				
Bowels, A.E. and S. Wisdom. 2005. The 60-dB rule for birds: An example of the application of a weighting function in environmental impact mitigation. The Journal of the Acoustical Society of America 118, 2018.	Over the last decade U.S. Fish and Wildlife Service managers in California have required millions of dollars in added expenditure for NEPA consultation, mitigation barriers, and project delays to reduce the effects of noise from construction activities on endangered passerine birds when the hourly A-weighted Leq is expected to exceed 60 dB. The rule was originally intended to prevent masking of species-typical songs of endangered birds such as the Coastal California Gnatcatcher. However, no research is available to demonstrate the effectiveness of the rule for any noise-related impact. Although A-weighting is probably a conservative estimator of bird exposure in the range from 125 Hz to 8 kHz, it may underestimate exposure at very low frequencies. Its utility as a weighting function has not been tested against other possible weighting procedures, such as use of the species-typical auditory threshold function. Additionally, where sources are intense but intermittent, Leq is unlikely to be a useful metric.	CA Gnatcatcher		60-dB rule	The rule was originally intended to prevent masking of species-typical songs of endangered birds such as the Coastal California Gnatcatcher. However, no research is available to demonstrate the effectiveness of the rule for any noise-related impact. These issues should receive more technical scrutiny before the 60-dB rule becomes entrenched in law.

Citation	Abstract	Species	Distance	DB	Response
	These issues should receive more technical scrutiny before the 60-dB rule becomes entrenched in law. It is in widespread use for NEPA consultations, and is already being extended to other species, including large mammals.				
Brown, A.L. 1990. Measuring the effects of aircraft in sea birds. Environmental Internacional 16, 587-592.	This paper reports on a procedure which exposes sea birds to acoustic stimuli simulating aircraft overflights, and is one of the first experiments to attempts to quantify the responses of birds in the wild to noise. The experiment, conducted in Australia's Great Barrier Reef, involved presentation of pre-recorded aircraft noise , which peak overflights levels of 65 dB(A) to 95 dB(A), to nesting sea bird colonies. Sea bird responses were videotaped and these tapes were subsequently analyzed by scoring the behavioral response of each bird in the colony. Results if a trial of this experimental procedure for one species, the Crested Tern (*Sterna bergii*), indicate that the maximum responses observed, preparing to fly or flying off, were restricted to exposures greater, than 85 dB (A). A scanning behavior involving head-turning was the minimum response and this, or a more intense response, was observed in nearly all birds at all levels of exposure. However an intermediate response, an alert behavior, demonstrated a strong positive relationship with increasing exposure. While the experiment had provided good control on simulated aircraft noise levels, preliminary observations of response of the colonies to balloon overflights suggests that visual stimulus is likely to be an important component of aircraft noise disturbance.	Sea birds, Crested Tern		65 dB(A) to 95 dB(A)	Results if a trial of this experimental procedure for one species, the Crested Tern (*Sterna bergii*), indicate that the maximum responses observed, preparing to fly or flying off, were restricted to exposures greater, than 85 dB(A).
Brown, B.T., C. Powels, W.A. Russell, G.D. Therres and J.J. Pottie. 1999. The influence of weapons-testing noise on bald eagle behavior. Journal of Raptor Research 33 227-232.	Minor/No Impacts We studied the influence of weapons-testing noise on bald eagle (*Haliaeetus leucocephalus*) behavior at the Aberdeen Proving Ground (APG); Maryland, in 1995. Our objectives were to document and compare eagle behavior at times with and without weapons-testing noise, determine if the frequency of behavior after noise increased with increasing sound levels and compare nest success and productivity on APG with that of adjacent areas of Maryland. Most roosting (72.7%) and nesting (92.7%) eagles showed no	Bald Eagle	.5-4KM	110 dBP (unweighted peak)	non activity behaviors when noise levels were < 110 dBP (unweighted Peak) and > 110 dBP for either roosting or nesting eagles.

Citation	Abstract	Species	Distance	DB	Response
	activity (i.e., perched motionless) in the 2-sec interval following weapons-testing noise. The most frequent activity following noise was a head turn, exhibited by 18.2% of roosting and 0.7% of nesting eagles; other eagle activities following noise (e.g., body movement, vocalization and flight) were rare at both roosts (9.1%) and nests (6.6%). Frequency of activity after noise differed between adults and juveniles at nests, but did not differ between adults and immatures at roosts. Activity after noise occurred significantly more in roosting than nesting eagles. For roosting eagles, frequency of activity after noise was similar to activity at times without noise. Frequency of no activity versus activity after noise did not vary at sound intensity levels >or= 110 and < 110 dBP for either nesting or roosting eagles. Nest success and productivity on APG did not differ from nest success and productivity in adjacent counties of Maryland from 1990-95, suggesting that weapons-testing noise did not influence eagle reproduction at the population level.				
Bunnell, F.L., D. Dunbar, L. Koza and G. Ryder. 1981. Colonial Waterbirds 4, 2-11.	Acknowledging the declining status of the single colony, the White Pelican was designated as "Endangered" within the British Columbia Endangered Species Act in March 1980. During the eight years for which we have detailed records the major factors contributing to the decline of the pelican appeared to be disturbance by humans (low flying aircraft) and coyote predation. Both factors can dramatically reduce survivorship of young and overall productivity of the colony. This paper discusses those factors and examines their potential impact over longer periods by using a simple simulation model.	White Pelican			Disturbance, whether natural or human induced, dramatically alters these measures of productivity or survivorship. Effects of low-flying aircraft appear less disturbing to other colonial waterbird species than to White Pelicans.
Burger, J. 1983. Jet Aircraft and Bird Strikes: Why More Birds Are Being Hit. Environmental Pollution (Series A) 30,143-152.	The noise levels of departing and landing aircraft were examined as a function of type of aircraft at J.F. Kennedy International Airport in New York. In general, the wide-bodied aircraft (Boeing 747, L1011, DC10) were significantly quieter than the old-type, narrow-bodied aircraft (Boeing 707, 727). Noise levels varied when approaching planes were different distances from the test site. Noise levels did not rise significantly higher than pre-departure levels	General	600 m	≤85 dB (scale not reported)	Bird species are present at run ways where ambient noise levels averages 86.5 and 66 dB. When planes take off noise levels climb to over 100 dB.

Citation	Abstract	Species	Distance	DB	Response
	until the planes were 600m and 800 m from the test site, and the planes traversed this distance in an averages of 9-14 s. For landing planes, the narrow-bodies planes were significantly louder than the wide-bodied planes at touchdown, only 600 m from the test site. Wide-bodied planes had significantly more bird strikes than the narrow-bodied aircraft. These results indicate that birds have less warning of an approaching wide-bodied aircraft than they have for a narrow-bodied aircraft. The bird's behavior of facing and flying into the wind (the same direction as the airplane is moving) increases the perception and decreases the flight speed of the bird, and increases the risk of a bird strike (particularly for the wide-bodied aircraft).				No analysis of bird behavior response to the noise.
Conomy, J.T., J. Collazo, and W.J. Fleming. 1993. Effects of aircraft noise on time-activity budgets of wintering black ducks. Acoustic Society of America, 125th Meeting, Ottawa.	The primary goal of this study was to determine if the time-activity budget (TAB) of wintering black ducks (*Anas rubripes*) was significantly altered by military aircraft noise at the U. S. Marine Corps target range in Piney Island, North Carolina. Sound levels were measured concurrently with behavioral observations. Over a sampling period of 81 days, exceedances >80 dB occurred on 289 occasions, the mean duration of exceedances was 5.09 s, and the mean sound pressure was 85.7 dB. Black ducks spent between 0.2% and 0.5% of their time reacting to aircraft. Correspondingly, the energetic costs of these reactions were low. TABs of black ducks in the high noise environment of Piney Island were within the expected range of those in low noise environments based on published literature. In a follow-up study, captive black ducks were subjected to simulated jet noise at levels approximately those recorded in the field. Measured levels of reactions to noise stimuli indicated that ducks habituated within 1 day. These results suggest that low reaction levels recorded in the field reflect the species' habituation capabilities to some kinds of disturbance. [Work supported by USMC and USAF.]	Black Duck	Not reported	>80dB (scale not reported)	Energetic costs of responding to aircraft noise were low. Results suggest that low reaction levels recorded in the field reflect the species' habituation capabilities to some kinds of disturbance.

Citation	Abstract	Species	Distance	DB	Response
Conomy, J.T., J.A. Collazo, J.A. Dubovsky and W.J. Fleming. 1998. Dabbling Duck Behavior and Aircraft Activity in Coastal North Carolina. Journal of Wildlife Management 62, 1127-1134.	Requests to increase military aircraft activity in some training facilities in the United States have prompted the need to determine if waterfowl and other wildlife are adversely affected by aircraft disturbance. We quantified behavioral responses of wintering American black ducks (*Anas rubripes*), American wigeon (*A. americana*), gadwall (*A. strepera*), and American green-winged teal (*A. crecca carolinensis*) exposed to low-level flying military aircrafts at Piney and Cedar islands, North Carolina, in 1991 and 1992. Waterfowl spent ltoreq1.4% of their time responding to aircraft, which included flying, swimming, and alert behaviors. Mean duration of responses by species ranged from 10 to 40 sec. Costs to each species were deemed low because disruptions represented a low percentage of their time-activity budgets, only a small proportion of birds reacted to disturbance (13/672; 2%), and the likelihood of resuming the activity disrupted by an aircraft disturbance event was high (64%). Recorded levels of aircraft disturbance (i.e.,x = 85.1 dBA) were not adversely affecting the time-activity budgets of selected waterfowl species wintering at Piney and Cedar islands	Dabbling Duck		85 dB (A)	Recorded levels of aircraft disturbance (N=311) (i.e., x = 85.1 dBA) were not adversely affecting the time-activity budgets of selected waterfowl species wintering at Piney and Cedar islands.
Conomy, J.T., J.A. Collazo, J.A. Dubovsky and W.J. Fleming.1998. Do Black Ducks and Wood Ducks Habituate to Aircraft Disturbance? Journal of Wildlife Management 62, 1135-1142.	Requests to increase military aircraft activity in some training facilities in the United States have raised the need to determine if waterfowl and other wildlife are adversely affected by aircraft disturbance. We hypothesized that habituation was a possible proximate factor influencing the low proportion of free-ranging ducks reacting to military aircraft activities in a training range in coastal North Carolina during winters 1991 and 1992. To test this hypothesis, we subjected captive, wild-strain American black ducks (*Anas rubripes*) and wood ducks (*Aix sponsa*) to actual and simulated activities of jet aircraft. In the first experiment, we placed black ducks in an enclosure near the center of aircraft activities on Piney Island, a military aircraft target range in coastal North Carolina. The proportion of times black ducks reacted (e.g., alert posture, fleeing response) to visual and auditory aircraft activity decreased from 38 to 6% during the first 17 days of confinement. Response rates remained	Black and Wood Ducks			With continued exposure of aircraft noise, black ducks may become habituated. However, wood ducks did not exhibit the same pattern of response, suggesting that the ability of waterfowl to habituate to aircraft noise may be species specific.

Citation	Abstract	Species	Distance	DB	Response
	stable at 5.8% thereafter. In the second experiment, black ducks and wood ducks were exposed to 6 different recordings of jet noise. The proportion of times black ducks reacted to noise decreased ($P < 0.05$) from first day of exposure (25%) to last (i.e., day 4; 8%). Except for a 2% difference in comfort, we detected no differences ($P > 0.05$) in time-activity budgets of black ducks between pre-exposure to noise and 24 hr after first exposure. Unlike black ducks, wood duck responses to jet noise did riot decrease uniformly among experimental groups following initial exposure to noise ($P = 0.01$). We conclude that initial exposure to aircraft noise elicits behavioral responses from black ducks and wood ducks. With continued exposure of aircraft noise, black ducks may become habituated. However, wood ducks did not exhibit the same pattern of response, suggesting that the ability of waterfowl to habituate to aircraft noise may be species specific.				
Delaney D.K., L.L. Pater, T.J. Hayden, L.L. Swindell, T.A. Beaty, L.D. Carlile and W.E. Spadgenske. 2000. Assessment of training noise impacts on the red-cockaded woodpecker: 1999 results. U.S. Army Corps of Engineers, Engineer Research and Development Center.	Because military noise management has traditionally focused on minimizing human annoyance, loud training activities have often been relocated to sparsely populated areas where wildlife species reside. This has led to increased conflicts between training activity and conservation of threatened and endangered species. Increasing importance has been placed on determining how noise affects these species. This study to determine the effects of certain kinds of training noise on the endangered Red-cockaded Woodpecker (RCW). This research shows that the basic technical approach to data gathering and analysis is appropriate and effective. Preliminary data suggest that measured levels of military training noise did not affect RCW nesting success and productivity. The RCW flushed infrequently and returned to their nests quickly.	Red-cockaded Woodpecker			Preliminary data suggest that measured levels of military training noise did not affect RCW nesting success and productivity. The RCW flushed infrequently and returned to their nests quickly.
Delaney, D.K., L.L. Pater, R.H. Melton, B.A. MacAllister, R.J. Dooling, R. Lohr, B.F. Brittan-Powe, L.L. Swindell, T.A. Beaty, L.D. Carlile, and E.W. Spadgenske. 2002. SERDP Project CS-1083.	Assessed the effects of military training noise on red-cockaded woodpeckers. Disturbed and undisturbed nest sites did not differ significantly in the number of eggs, number of nestlings, or number of young fledged. 7 of 25 nesting attempts at disturbed sites were second attempts; none of the 16 nesting attempts at	Red-cockaded Woodpecker, Raptors, Gallinaceous	30 m 30-60 m	102 dB 105 dB (A) 95 dB (A)	83 helicopter passes during 45 data sessions at 19 RCW clusters failed to elicit a flush response, at distances as low as 30m and sound

Citation	Abstract	Species	Distance	DB	Response
	undisturbed sites were second attempts (n. s., p>.05). Noise recorded in cavities was up to 15 dB louder (at 250 Hz) than levels recorded at the base of the same tree. No flushes at SEL noise levels below 87 dBA or beyond 1800m for large caliber noise. No flush when small arms were >1000m or SEL less than 63 dBA.83 helicopter passes during 45 data sessions at 19 RCW clusters failed to elicit a flush response, at distances as low as 30m and sound levels of 102 dB unweighted. Studies that have examined the effects of aircraft activity on nesting birds (e.g., Platt 1977; Windsor 1977; Ellis 1981; Anderson et al. 1989; Delaney et al. 1999) have often noted a slight but insignificant decrease in nesting success and productivity for disturbed versus undisturbed nests. Anderson et al. (1989) reported that two of 29 Red-tailed Hawk nests were abandoned after being flushed by helicopter flights, compared with zero of 12 control nests. Ellis et al. (1991) found only one of 19 Prairie Falcon (*Falco mexicanus*) nests were abandoned when exposed to frequent low-altitude jet flights during the nesting season (no control sites used). Platt (1977) reported similar rates with only one of 11 Gyrfalcon (*F. rusticolus*) nests failing (reportedly due to snow damage), compared with zero of 12 control nests. Of the six Peregrine Falcon (*F. peregrinus*) nests exposed to helicopter flights, only one was abandoned (also apparently due to inclement weather) compared with zero of three control sites (Windsor 1977). Snyder et al. (1978) reported that Snail Kites (*Rostrhamus sociabilis*) did not flush even when noise levels were up to 105 decibels, A-weighted (dBA) from commercial jet traffic. This result was qualified by the fact that test birds were living near airports and may have habituated to the noise. Edwards et al. (1979) found a dose-response relationship for flush responses of several species of gallinaceous birds when approach distances were between 30 and 60 m and noise levels approximated 95 dBA. Brown et al. (1999) reported no difference in the frequency of Bald Eagle activity and non activity behaviors when noise levels were < 110 dBP (unweighted Peak) and > 110 dBP for either roosting or				levels of 102 dB unweighted Snyder et al. (1978) reported that Snail Kites (Rostrhamus sociabilis) did not flush even when noise levels were up to 105 decibels, A-weighted (dBA) from commercial jet traffic. Edwards et al. (1979) found a dose-response relationship for flush responses of several species of gallinaceous birds when approach distances were between 30 and 60 m and noise levels approximated 95 dBA.

Citation	Abstract	Species	Distance	DB	Response
	nesting eagles. Delaney et al. (1999) reported that Mexican Spotted Owls did not flush during the nesting season when the Sound Exposure Level (SEL) for helicopters was ≤ 102 owl-weighted, dBO (≤ 92 dBA) and the Equivalent Average Sound Level (LEQ) for chain saws was ≤ 59 dBO (≤ 46 dBA). Delaney et al. (2000, 2001) and Pater et al. (1999) developed noise response thresholds for RCWs based on a number of military noise sources. Their preliminary results show that woodpeckers do not flush during the nesting season when the SEL for artillery simulators are < 89 dB, unweighted (< 84 dBA); .50-caliber blank fire was < 82 dB, unweighted (< 72 dBA); military helicopter overflights were < 102 dB, unweighted (< 85 dBA); small-caliber live fire events were < 79 dB, un-weighted (< 77 dBA); large-caliber live fire events were < 103 dB, unweighted (< 85 dBA); and grenade simulators were < 91 dB, unweighted (< 84 dBA).				
Delaney, D.K., T.G. Grubb, P. Beier, L.L. Pater and M.H. Reiser. 1999. Effects of helicopter noise on Mexican spotted owls. Journal of Wildlife Management 63, 60-76.	Military helicopter training over the Lincoln National Forest (LNF) in south central New Mexico has been severely limited to protect nesting Mexican spotted owls (*Strix occidentalis lucida*). To evaluate nesting and nonnesting spotted owl responses to helicopter noise, we measured flush frequency, flush distance. alert behavior, response duration, prey delivery rates, female trips from the nest, and nest attentiveness during manipulated and nonmanipulated periods, 1995-96. Chain saws were included in our manipulations to increase experimental options and to facilitate comparative results. We analyzed stimulus events by measuring noise levels as unweighted one-third-octave hand levels, applying frequency weighting to the resultant spectra, and calculating the sound exposure level for total sound energy (SEL) and the 0.5-sec equivalent maximum energy level (LEQ max 0.5-sec) for helicopters, and the 10-sec equivalent average energy, level (LEQ avg. 10-sec) for chain saws. An owl-weighting (dBO) curve was estimated to emphasize the middle frequency range where strigiform owls have the highest hearing sensitivity. Manipulated and nonmanipulated nest sites did not differ in	Mexican Spotted Owl	105 m	105 dBO (Owl)	We recorded no spotted owl flushes when noise stimuli were >105 m away. Spotted owls returned to predisturbance behavior within 10-15 min after a stimulus event.

Citation	Abstract	Species	Distance	DB	Response
	reproductive success (P = 0.59) or the number of young fledged (P = 0.12). As stimulus distance decreased, spotted owl flush frequency increased, regardless of stimulus type or season. We recorded no spotted owl flushes when noise stimuli were >105 m away. Spotted owls returned to predisturbance behavior within 10-15 min after a stimulus event. All adult flushes during the nesting season occurred after juveniles had left the nest. Spotted owl flush rates in response to helicopters did not differ between nonnesting (13.3%) and nesting seasons (13.6%; P = 0.34). Spotted owls did not flush when the SEL noise level for helicopters was ltoreq102 dBO (92 dBA) and the LEQ level for chain saws was ltoreq59 dBO (46 dBA). Chain saws were more disturbing to spotted owls than helicopter flights at comparable distances. Our data indicate a 105-m buffer zone for helicopter overflights on the LNF would minimize spotted owl flush response and any potential effects on nesting activity.				
Dooling R.J., A. Lauer, M. Dent and I. Noirot. 2005. The problem of frequency weighting functions and standards for birds. The Journal of the Acoustical Society of America 118, 2018.	Frequency weighting functions in humans are widely used as a single-figure guess to assess noise problems and aid in making decisions with regard to noise limitations when no other data exist. However, this use of frequency weightings invariably results in a loss of precision in assessing the likelihood of a sound to produce hearing damage or sound annoyance. There is a growing interest in developing frequency weighting functions in animals presumably to assist in judging the risk of hearing damage, interference with acoustic communication, or habitat suitability. Laboratory studies reveal many parallels between humans and animals on a variety of psychoacoustic measures, such as equal loudness contours. However, differences between humans and animals on specific tests argue against using standards developed for humans to gauge the effect of noise on animals. Here we review data which show this same problem exists among birds. That is, the differences in the effects of noise among bird species can be as large as the differences between humans and birds. These results suggest that whereas frequency weighting functions and acoustic standards for a specific	General Hearing			These results suggest that whereas frequency weighting functions and acoustic standards for a specific species might be useful, generalizing across species is likely not practical.

Citation	Abstract	Species	Distance	DB	Response
	species might be useful, generalizing across species is likely not practical.				
Dooling R.J., B.M. Ryals and K. Manabe. 1997. Recovery of hearing and vocal behavior after hair-cell regeneration. Psychology 94, 14206-14210.	Postmitotic hair-cell regeneration in the inner ear of birds provides an opportunity to study the effect of renewed auditory input on auditory perception, vocal production, and vocal learning in a vertebrate. We used behavioral conditioning to test both perception and vocal production in a small Australian parrot, the budgerigar. Results show that both auditory perception and vocal production are disrupted when hair cells are damaged or lost but that these behaviors return to near normal over time. Precision in vocal production completely recovers well before recovery of full auditory function. These results may have particular relevance for understanding the relation between hearing loss and human speech production especially where there is consideration of an auditory prosthetic device. The present results show, at least for a bird, that even limited recovery of auditory input soon after deafening can support full recovery of vocal precision.	General hearing			The present results show, at least for a bird, that even limited recovery of auditory input soon after deafening can support full recovery of vocal precision.
Dooling, R.J. 2002. Avian Hearing and the Avoidance of Wind Turbines. National Renewable Energy Lab. Technical Report NREL/TP-500-30844.	This report provides a complete summary of what is known about basic hearing capabilities in birds in relation to the characteristics of noise generated by wind turbines. It is a review of existing data on bird hearing with some preliminary estimates of environmental noise and wind turbine noise at Altamont Pass, California, in the summer of 1999. It is intended as a resource in future discussions of the role that hearing might play in bird avoidance of turbines. The main body of this report describes hearing measurement in birds, the effects of noise on hearing, and the relationship between avian hearing and the general noise levels around wind turbines. The main body is followed by four appendices. Appendix A is a table organized by species which provides a comprehensive bibliography of the literature on hearing in the quiet (audiograms) in birds, followed by Appendix B which provides plots of the audiograms from 49 species of birds that have been tested to date. Similarly, a bibliography of the literature on how birds hear in noise is given in a table in Appendix C, with corresponding	General Hearing			The main body of this report describes hearing measurement in birds, the effects of noise on hearing, and the relationship between avian hearing and the general noise levels around wind turbines. When hearing is defined as the softest sound that can be heard at different frequencies, birds on average hear less well than many mammals, including humans. Birds hear best between about 1 and 5 kHz.

Citation	Abstract	Species	Distance	DB	Response
	plots of masked auditory thresholds in Appendix D. There are a number of long-standing myths about what birds can or cannot hear. One myth is that birds hear better at high frequencies than do humans or other mammals. Another myth is that birds have exceptionally acute hearing. A considerable amount of work over the past 50 years has repeatedly shown that neither of these notions is true. When hearing is defined as the softest sound that can be heard at different frequencies, birds on average hear less well than many mammals, including humans. Birds hear best between about 1 and 5 kHz. Acoustic deterrents or "scarecrow" devices are not generally effective because birds habituate to them and eventually ignore them completely. Devices that purport to use sound frequencies outside the hearing range of humans are most certainly inaudible to birds as well because birds have a narrower range of hearing than humans do. A review of the literature on how well birds can hear in noisy (windy) conditions suggests that birds cannot hear the noise from wind turbine blades as well as humans can. In practical terms, a human with normal hearing can probably hear a wind turbine blade twice as far away as can the average bird.				
Dooling, R.J., M.L Dent, M.R. Leek and O. Gleich. 2001. Masking by harmonic complexes in birds: behavioral thresholds and cochlear responses. Hearing Research 152 (2001), 159-172.	Thresholds for pure tones embedded in harmonic complexes were measured behaviorally and physiologically for three species of birds, and physiologically in gerbils. The harmonic maskers were generated using the Schroeder-phase algorithm, characterized by monotonically increasing or decreasing phase across frequency. Previous work has shown that these stimuli produce large differences in masking in humans but not budgerigars. In this study, we show that for two additional species of birds, the patterns of masking were similar to those shown for budgerigars, with masking differing only slightly for the two Schroeder-phase waveforms, and in the opposite direction from that demonstrated in humans. Amounts of masking among species corresponded qualitatively to differences in their	General Masking			The patterns of masking were similar to those shown for budgerigars, with masking differing only slightly for the two Schroeder-phase waveforms, and in the opposite direction from that demonstrated in humans.

Citation	Abstract	Species	Distance	DB	Response
	critical ratios. Evoked potential measurements in birds and gerbils indicated responses that were consistent with the behaviorally measured thresholds in birds and humans. Results are interpreted in light of differences in frequency selectivity and cochlear temporal processing across species.				
Goudie, R.I. 2006. Multivariate behavioural response of harlequin ducks to aircraft disturbance in Labrador. Environmental Conservation 33, 28-35.	The effects of low-level aircraft over-flights on behaviour of harlequin ducks (*Histrionicus histrionicus*) breeding in central Labrador were quantified during 2000–2002. The Canadian Department of National Defense supports a low-level training programme in the 130 000 km2 Military Training Area of Labrador involving military jets. The Institute for Environmental Monitoring and Research (IEMR) undertakes scientific research into environmental impacts of low-level military jet over-flights. A suite of 17 behavioural categories of paired male and female harlequin ducks was modeled, and a canonical variable representing alert behaviour, inactivity on the water and decreased inactivity out of water in response to over-flights represented 73.1% of the variance in the data cluster and provided marked separation of disturbed and undisturbed groups. Behavioural responses of harlequin ducks to military jets were 23 times stronger than their responses to floatplanes, helicopters and military cargo planes, and the significant interaction of aircraft type and noise indicated that noise may be the primary stressor affecting behaviour. A quadratic response of the canonical variable to noise generated from aircraft during standardized 30-minute observation periods was defined. The multivariate analyses were more robust because they indicated covariance in behavioural categories associated with disturbance that was not originally detected in univariate analyses, suggesting the importance of integrating behaviours other than overt responses. The significant effects of military jet over-flights on harlequin duck behaviour emphasize the need to evaluate potential population consequences of aircraft disturbance.	Harlequin Duck			Behavioural responses of harlequin ducks to military jets were 23 times stronger than their responses to floatplanes, helicopters and military cargo planes, and the significant interaction of aircraft type and noise indicated that noise may be the primary stressor affecting behaviour.

Citation	Abstract	Species	Distance	DB	Response
Goudie, R.I. and I.L. Jones. 2004. Dose-response relationships of harlequin duck behavior to noise from low-level military jet over-flights in central Labrador. Environmental Conservation 31,289-298.	Concern for the lack of field studies on the effects of low-level military jet over-flights on wildlife resulted in directed research in the Military Training Area of Labrador, 1999--2002. At Fig River, a tributary of the Lower Churchill River, a before-after-control-impact (BACI) study design quantified effects of aircraft overflights on behavior of individual harlequin ducks (*Histrionicus histrionicus*) in the 130 000km2 Military Training Area of central Labrador. Noise generated from low-level passes (30--100m above ground level) by military jets was sudden in onset and high in amplitude (>100 dBA), substantially above background sound levels both at Fig Lake outlet (40--50 dBA) and rapid sections of Fig River (60--70 dBA). Harlequin ducks reacted to noise from military jets with alert behavior, showing a positive dose-response that especially intensified when noise exceeded 80 dBA. Residual effects, in other words, deviations from normal behavior patterns after initial responses, were decreased courtship behavior for up to 1.5 h after, and increased agonistic behavior for up to 2 h after military jet over-flights. Direct behavioral responses to military jet over-flights were of short duration (generally <1 min), and were unlikely to affect critical behaviors such as feeding and resting in the overall time-activity budgets of breeding pairs. However, the presence of residual effects on behavior implied whole-body stress responses that were potentially more serious; these require further study because they are potentially more detrimental than immediate responses, and may not be detected in studies that focus on readily observed overt responses. A dose-response curve relating particular behaviors of harlequin ducks to associated noise of over-flights could be a valuable conservation tool for the research and mitigation of environmental impacts of aircraft and other noise.	Harlequin Ducks	30-100 m (AGL)	>100 dB (A)	Harlequin ducks reacted to noise from military jets with alert behavior, showing a positive dose-response that especially intensified when noise exceeded 80 dBA. Direct behavioral responses to military jet over-flights were of short duration (generally <1 min), and were unlikely to affect critical behaviours such as feeding and resting in the overall time-activity budgets of breeding pairs.
Grubb, T.G., and W.W. Bowerman. 1997. Variations in breeding bald eagle response to jets, light planes, and helicopters. Journal of Raptor Research 31 213-222.	We analyzed 3122 observations of military jets, light planes and helicopters for three levels of response (none, alert, flight) by breeding Bald Eagles (*Haliaeetusl eucocephaluast*) 13 occupied nests in Arizona and six in Michigan, 1983-85 and 1989-90, respectively. Helicopters	Bald Eagles	600 meters		Distance from eagle to aircraft, duration of overflight and number of aircraft and/or passes were the most important

Citation	Abstract	Species	Distance	DB	Response
	elicited the greatest frequency of response (47%), followed by jets (31%) and light planes (26%). Frequency of response (23-61%) and frequency of flight (2-13%) both increased through the nesting season from February to June. Distance from eagle to aircraft, duration of overflight and number of aircraft and/or passes were the most important characteristics influencing eagle responses to pooled and individual aircraft types. Classification tree (CART) models for individual aircraft types provide dichotomous keys of distance and secondary variables affecting associated response rates, and should facilitate evaluating aircraft-Specific impacts. Our analyses indicate a categorical exclusion of aircraft within 600 m of nest sites would limit Bald Eagle response frequency to 19%.				characteristics influencing eagle responses to pooled and individual aircraft types. Our analyses indicate a categorical exclusion of aircraft within 600 m of nest sites would limit Bald Eagle response frequency to 19%.
Harms, C.A., W. J. Fleming and M.K. Stoskopf. 1997, A technique for dorsal subcutaneous implantation of heart rate biotelemetry transmitters in black ducks: Application in an aircraft noise response study. Condor 99, 231-237.	A technique for heart rate biotelemetry transmitter implantation was developed to monitor heart rate fluctuations of Black Ducks (*Anas rubripes*) in response to simulated aircraft noise in a large outdoor enclosure. A dorsal subcutaneous approach, with subcutaneous tunneling of lead wires, was employed for placement of the 32 g transmitters. A base-apex lead configuration, with leads anchored at the dorsal cervico-thoracic junction and the caudal keel, yielded the maximal ECG wave-form deflection for triggering the transmitter. Heart rates of six Black Ducks (three in each of two separate trials) were monitored for 3 days pre-noise to establish a baseline, and then for 4 days of simulated aircraft noise. The noise stimulus replicated an FB-111 military jet, and was played 48 times per day at a peak volume of 110 dB. Daily mean heart rates, used as indicators of metabolic rates, did not increase in response to noise. Recognizable acute heart rate increases corresponding with a noise event occurred with increased frequency during the first day of noise presentation, but on subsequent days the responses did not differ significantly from baseline. Acute heart rate responses to aircraft noise diminished rapidly, indicating the ability of Black Ducks to habituate to the auditory component of low altitude aircraft overflights.	Black Duck		110 dB	Acute heart rate responses to aircraft noise diminished rapidly, indicating the ability of Black Ducks to habituate to the auditory component of low altitude aircraft overflights.

Citation	Abstract	Species	Distance	DB	Response
Hunsaker, D., J. Rice, and J. Kern. 2007. The effects of helicopter noise on the reproductive success of the coastal California gnatcatcher. Journal of Acoustic Society of America 122, 3058.	Our laboratory conducted a five-year study on the potential effects of helicopter noise on the reproductive success of the coastal California gnatcatcher (*Polioptila californica californica)* on Marine Corps Air Station Miramar (MCAS Miramar) in Southern California. Seven-hundred twenty-one nests were monitored for reproductive success, predation, noise levels, and habitat quality. An array of Larson-Davis sound level meters was used to monitor habitat on MCAS Miramar for a total of 6,176 days during 620 runs at 328 locations. Most sites were exposed to noise in excess of 60 dB(A) SPL for less than 5% of the monitoring period, but some nests experienced levels in excess of 70 dB(A) for more than 20% of the time. Statistical models of nest success, nest site selection, and number of fledges per pair showed that the factors best predicting reproductive success were measures of suitable nesting habitat, not noise levels. Helicopter and other noise sources did not affect the reproductive success of gnatcatchers. (Supported by the Marine Corps Air Bases Western Area and the Naval Facilities Engineering Command, SW.)	CA Gnatcatcher		60-70 dB(A)	Statistical models of nest success, nest site selection, and number of fledges per pair showed that the factors best predicting reproductive success were measures of suitable nesting habitat, not noise levels. Helicopter and other noise sources did not affect the reproductive success of gnatcatchers.
Larkin, L.P., L.L. Pater and D.J. Tazik. 1996. Effects of Military Noise on Wildlife: A Literature Review. USACERL Technical Report 96/21, 1-107.	Although there are published reviews of bioacoustics, effects of general noise on animals including wildlife, and effects of military fixed wing aircraft on domestic animals and wildlife, much less research has been performed on the effects of other military noise on wildlife. Animals can be extraordinarily sensitive to sounds in some circumstances and quite insensitive to sounds in others circumstances. Noises generated by military equipment, having particular and, in some cases, unusual characteristics, cannot necessarily be assumed to have effects similar to noised generated by civilian activities. For these reasons, it is desiravle to better understand the effects of military noise on wildlife. Given knowledge of how military noise effects animals, the Army may assess the potential impacts of sound from their activities on local wildlife populations and act to minimize possible disturbances. A literature survey should address	General Literature Review	N/A	N/A	Rotary-wing aircraft (helicopter) noise consists of a complex mixture if continuous engine noise (usually turbine) and rapidly repeating impulse noise from the rotor blades, sometimes including nonlinear noise of rotor tips traveling near Mach 1.

Citation	Abstract	Species	Distance	DB	Response
	concerns of the public sector as to the effects of military noise on wildlife and to aid in designing future research in this area if desired.				
Manci, K.M., D.N. Gladwin, R. Villella and M.G. Cavendish. 1998. Effects of Aircraft Noise and Sonic Booms on Domestic Animals and Wildlife: A Literature Review. USFWS Service National Ecology Research Center NERC 98/29 AFESC TR, 88-14.	Although scientists have researched some effects of noise on animals. Many data gap still exist on the overall effects of aircraft noise on wildlife. In addition, perceived inadequate analysis of the effects of aircraft noise on wildlife by the general public has resulted in delays of flight operation expansions. An information base on the effects of aircraft noise and sonic booms on various animal species is necessary to assess potential impacts to wildlife populations from proposed military flight operations. This, in a joint U.S. Air Force/U.S. Fish and Wildlife Service effort, the National Ecology Research Center conducted a literature search of information pertaining to animal hearing and the effects of aircraft noise and sonic booms on domestic animals and wildlife. Information concerning other types of noise was also gathered to supplement the lack of knowledge ion the effects of aircraft noise. The literature is summarized in this report to provide an overview of current knowledge. No attempt was made to evaluate the appropriateness or adequacy or the scientific approach of each study. A brief overview if the physics of sound and aircraft noise and sonic boom characteristics also is included to familiarize the reader with the terminology and concepts of aircraft noise and sonic boom impact analysis.	General	N/A	N/A	
National Science Foundation. 2009. Final Environmental Impact Statement for the Advanced Technology Solar Telescope, Haleakala, Maui.	Impacts to Biological Resources Section 4.3. Do not consider noise impacts to Nene and HHB. Interesting noise levels for alpine conditions in section 3.10	Hawaiian Petrel, Hawaiian Goose, Hawaiian Hoary Bat, Band-rumped Storm Petrel	80 m to burrow	83 dB (A) 5 feet from noise source	Limitation on construction noise at burrows within 80 meters of construction activities to no louder than 83 dB (A) measured at 5 feet from the source during incubation periods (April 20th through July 15th). Limiting construction noise around sunrise and sunset.

Citation	Abstract	Species	Distance	DB	Response
Palmer, A.G., D.L. Nordmeyer and D.D. Roby. 2003. Effects of jet aircraft overflights on parental care of peregrine falcons. Wildlife Society Bulletin 31, 499-509.	Concerns voiced by resource managers caused us to examine the hypothesis that low-altitude jet aircraft overflights affect parental care by peregrine falcons. Specifically, we studied effects on nest attendance, time-activity budgets, and provisioning rates of peregrine falcons (*Falco peregrinus*) breeding along the Tanana River, Alaska in 1995, 1996, and 1997. We detected subtle effects of jet overflights on peregrine falcon parental behavior, but found no evidence that overall attendance patterns differed depending on exposure to overflights. Nest attendance and time-activity budgets of peregrine falcons during periods of overflights differed from those of peregrines at reference nests (nests rarely overflown). Differences depended on stage of the nesting cycle and gender. During the incubation and brooding stages of the nesting cycle, males attended the nest ledge less when overflights occurred than did males from reference nests. Females attended the nest ledge more during overflown periods compared to females from reference nests. Additionally, while females were still brooding nestlings, they were less likely to be absent from the nest area during periods when overflights occurred than females from reference nests. Although we found differences in nest attendance and time-activity budgets between overflown and reference nests, we did not observe differences between periods with overflights and periods without overflights at the same nests. Nor did we detect a relationship between nest attendance and the number of overflights occurring within a given time period, the cumulative number of above-threshold noise events at each nest, or the average sound-exposure level of overflights. Furthermore, we found no evidence that nestling provisioning rates were affected by overflights.	Peregrine Falcon		85 dB	We detected subtle effects of jet overflights on peregrine falcon parental behavior, but found no evidence that overall attendance patterns differed depending on exposure to overflights.
Pater, L.L., D.K. Delaney, T.J. Hayden, B. Lohr and R.J. Dooling. 1999. Assessment of training noise impacts on the red-cockaded woodpecker: Preliminary results. CERL Technical Report	This report presents preliminary results of a multiyear study to determine the effects of certain kinds of training noise on the endangered Red-cockaded Woodpecker (RCW). This research shows that the basic technical approach to data	Red-cockaded Woodpecker	60 meters	≤ 85 db (A)	RCWs did not flush when military helicopters were more than 60 m from nest sites and SEL noise levels were lower

Citation	Abstract	Species	Distance	DB	Response
(TR) 99/51, ADA 367234.	gathering and analysis is appropriate and effective. Preliminary data suggest that measured levels of military training noise did not affect RCW nesting success and productivity. The RCW flushed infrequently and returned to their nests quickly.				than 85 dB (A) (102 dB, unweighted; Appendix C, Table C3).
Perkins, J.L. 2006.Effects of Military Training Activity on Red-cockaded Woodpecker Demography and Behavior and New Territory Formation in the Cooperatively Breeding Red-cockaded Woodpecker. Master's Thesis Virginal Polytechnic Institute and State University.	The red-cockaded woodpecker (*Picoides borealis*) is a federally endangered species. As such, populations need to be increased in order to achieve recovery goals outlined by the U.S. Fish and Wildlife Service. My thesis is composed of two chapters that represent opposite sides of this issue. The first chapter investigates whether military training activity negatively affects red-cockaded woodpeckers. Military installations in the southeastern United States contain several of the largest remaining red-cockaded woodpecker populations. Six of the 15 installations harboring these birds are designated primary core populations; thus, population increases on these sites are critical to recovery of the species. However, restrictions on military training activity associated with red-cockaded woodpecker protection are a cause of concern on military installations that sometimes constrains management for population growth. Current restrictions are based on assumptions of potential impacts rather than scientific evidence, so we evaluated two different restriction regimes to test for training activity effects. The second chapter concerns how to induce populations to grow more rapidly through natural processes. As a cooperative breeder, red-cockaded woodpeckers preferentially compete for existing breeding positions and queue in the form of helping or floating to obtain a breeding vacancy, rather than create new territories. I used 20 years of demographic data collected as part of a long-term monitoring study of red-cockaded woodpeckers to investigate mechanisms that stimulate territory creation in this cooperatively breeding species.	Red-cockaded Woodpecker			More frequent disturbance from military training activity could have caused incubating birds in experimental clusters to flush from their nests, resulting in shorter mean incubation bout lengths than control clusters. However, this shorter incubation bout length did not translate into any effect at the demographic level, likely because experimental clusters compensated by Incubating a total amount of time similar to control clusters.

Citation	Abstract	Species	Distance	DB	Response
Radle, A.L. 2007. The Effect of Noise on Wildlife a Literature Review. University of Oregon, Environmental Studies Department. [updated March 2007, cited March 2011] Available from: http://interact.uoregon.edu /medialit/wfae/library/articles /radle_effect_noise_wildlife.pdf.	Noise pollution, as it effects humans, has been a recognized problem for decades, but the effect of noise on wildlife has only recently been considered a potential threat to animal health and long-term survival. Research into the effects of noise on wildlife, which has been growing rapidly since the 1970s, often presents conflicting results because of the variety of factors and variables that can effect and/or interfere with the determination of the actual effects that human-produced noise is having on any given creature. Both land and marine wildlife have been studied, especially in regards to noise in the National Parks System and the onslaught of human- made cacophony in the oceans from military, commercial and scientific endeavors.	General Literature Review			
Trimper, P.G., N.M. Standen, L.M. Lye, D. Lemon T.E. Chubbs and G.W. Humphries. 1998, Effects of Low-Level Jet Aircraft Noise on the Behavior of Nesting Osprey. The Journal of Applied Ecology 35, 122-130.	Nesting osprey (*Pandion haliaetus* L.) were exposed to controlled low-level CF-18 jet aircraft overflights along the Naskaupi River, Labrador, Canada, during 1995. Jet aircraft flew near five nests at distances ranging from 2.5 nautical miles (nm) to directly overhead at speeds of 400-440 knots. 2. Maximum noise levels (L1) and other noise metrics were influenced by many factors including topography, distance, altitude, wind speed and direction. 3. Based on 240 h of observations from blinds, we recorded osprey nest attendance and egg exposure during 139 individual overflights. Similar observations were completed at two control nests. Overflights as low as 30 m above ground occurred during incubation, nestling and prefledging only when observers were present. 4. Osprey behaviour did not differ significantly (P = 0.126) between pre- and post-overflight periods. Despite L1 values occasionally exceeding 100 decibels, adult osprey did not appear agitated or startled when overflown. 5. Osprey were attentive to and occasionally flushed from nests when float planes, other osprey or raptors entered territories, and when observers were entering or exiting blinds	Osprey		Median 89 dB at nest Range 66.3 to 95.5 dB	Despite L1 values occasionally exceeding 100 decibels, adult osprey did not appear agitated or startled when overflown.

Citation	Abstract	Species	Distance	DB	Response
U. S. Air Force, U. S. Army, and U. S. Department of the Navy. 1978. Environmental protection: Planning in the noise environment. Document Prepared under Air Force Contract No. F49642-74-90035.	This manual is a procedural tool designed to aid the creation of acceptable noise environments. It is written primarily for installation planners and other individuals concerned with the noise environment. It should be useful to persons involve with environmental assessments.	General			
U.S Fish and Wildlife. 2007. Biological Opinion for Maverick Airstar Landing Site in the Little Colorado River Gorge, Coconino County, Arizona. US Fish and Wildlife Service, Phoenix, AZ, Reference: AESO/SE 22410-2007-F-0352.	Biological Opinion for operating helicopters along the CO river. Has conservation measures and a take statement for harassment to Mexican Spotted Owls.	Mexican Spotted Owl	105 m	83 dB	Owls have more sensitive hearing than other birds (Bowles 1995). After reviewing the current status of the MSO, the environmental baseline for the action area, the effects of the proposed tourism helicopter landings and the cumulative effects; it is the FWS's biological opinion that tourism helicopter landings, as proposed, are not likely to jeopardize the continued existence of the MSO.
U.S. Fish and Wildlife Service. 2008. Biological Opinion of the U.S. Fish and Wildlife Service for Reinitiating of Formal Section 7 Consultation for Additional Species and new Training Actions at Pohakuloa Training Area, Hawaii. US Fish and Wildlife, Honolulu, HI, Reference: 2008-F-278.	Biological Opinion for Army live-fire training when Nene are in proximity to Range 1 at Pohakuloa Training Area.	Hawaiian Goose (Nene)	50 ft (15 m)		Nene within PTA and Keamuku Maneuver Area are permitted to be less than 50 ft (15 m) from detonations of demolitions, grenades, mortars, artillery, tube-launched wire-guided missiles, bombs, fire suppression and training related helicopters, and loud voices.

Citation	Abstract	Species	Distance	DB	Response
					When noise is too loud or disruptive, the nene will leave the premises or if they are habituated to the noise, then they are not losing any metabolic resources.
Ward D.H., R.A. Stehn and W.P. Erickson. 1999. Response of Fall-staging Brant and Canadian Geese to Aircraft Overflights in Southwestern Arizona. Journal of Wildlife Management 63, 373-381.	Because much of the information concerning disturbance of waterfowl by aircraft is anecdotal, we examined behavioral responses of Pacific brant (*Branta bernicla nigricans*) and Canada geese (*B. canadensis taverneri*) to experimental overflights during fall staging at Izembek Lagoon, Alaska. These data were used to develop predictive models of brant and Canada goose response to aircraft altitude, type, noise, and lateral distance from flocks. Overall, 75% of brant flocks and 9% of Canada goose flocks flew in response to overflights. Mean flight and alert responses of both species were greater for rotary-wing than for fixed-wing aircraft and for high-noise than for low-noise aircraft. Increased lateral distance between an aircraft and a flock was the most consistent predictive parameter associated with lower probability of a response by geese. Altitude was a less reliable predictor because of interaction effects with aircraft type and noise. Although mean response of brant and Canada geese generally was inversely proportional to aircraft altitude, greatest response occurred at intermediate (305-760 m) altitudes. At Izembek Lagoon and other areas where there are large concentrations of waterfowl, managers should consider lateral distance from the birds as the primary criterion for establishing local flight restrictions, especially for helicopters.	Brant and Canadian Geese	305-760 m altitude		Increased lateral distance between an aircraft and a flock was the most consistent predictive parameter associated with lower probability of a response by geese. Altitude was a less reliable predictor because of interaction effects with aircraft type and noise. Although mean response of brant and Canada geese generally was inversely proportional to aircraft altitude, greatest response occurred at intermediate (305-760 m) altitudes.

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IMPC-HI-PS 10 June 2011

MEMORANDUM FOR RECORD

SUBJECT: Hawaiian Petrel Surveys for HAMET Environmental Assessment

Surveys to assess the presence and habitat use of the Hawaiian dark-rumped petrel (*Pterodroma sandwichensis*) and the Hawaiian band-rumped petrel (*Oceanodroma castro*) were conducted on 25-26 May 2011 and 06-07 June 2011 at Mauna Loa landing zones LZ 1, LZ 2 and LZ 3, and at Mauna Kea landing zones LZ 4, LZ 5 and LZ 6, by Peter Peshut, PhD, Lena Schnell, BA, Rogelio Doratt, MSc, Daniel Brown, MSc, Sarah Knox, BSc, Bridget Frederick, BSc, and Martha Kawasaki, BSc. Surveys were conducted to determine petrel presence and habitat use in the general vicinity of the proposed LZs. Surveys were conducted as follow-up to preliminary surveys conducted in March 2011, to account for the seasonality of bird behavior (Simons, 1985; Slotterback, 2002). Surveys were conducted during four nights at each LZ between sundown and 9:00 pm encompassing Hawaiian petrel's peak calling period (Simons and Hodges, 1998).

Mauna Kea LZs are on State of Hawaii land in the Mauna Kea Forest Reserve, in the vicinity of the Mauna Kea Science Reserve. Mauna Loa LZs are on State of Hawaii land in the Mauna Loa Forest Reserve, adjacent to the Kipuka Ainahou Nene Sanctuary. Approximately 20% of the Mauna Loa LZ3 survey area is within the sanctuary. Landing zone geographic coordinates are given in Table 1. Landing zone locations are shown graphically in Figure 1. Each LZ is a graded or undisturbed lava area approximately 150 x 150 ft.

Table 1. Landing Zone Geographic Coordinates

Landing Zone	Latitude (N)	Longitude (W)	Elevation (ft)
Mauna Loa LZ1	19° 36' 05.64"	155° 28' 14.64"	7889
Mauna Loa LZ2	19° 36' 00.48"	155° 28' 37.74"	8049
Mauna Loa LZ3	19° 34' 32.10"	155° 29' 21.78"	8955
Mauna Kea LZ4	19° 49' 26.24"	155° 31' 23.51"	11,208
Mauna Kea LZ5	19° 49' 28.31"	155° 31' 47.00"	11,324
Mauna Kea LZ6	19° 49' 12.11"	155° 31' 16.31"	11,539

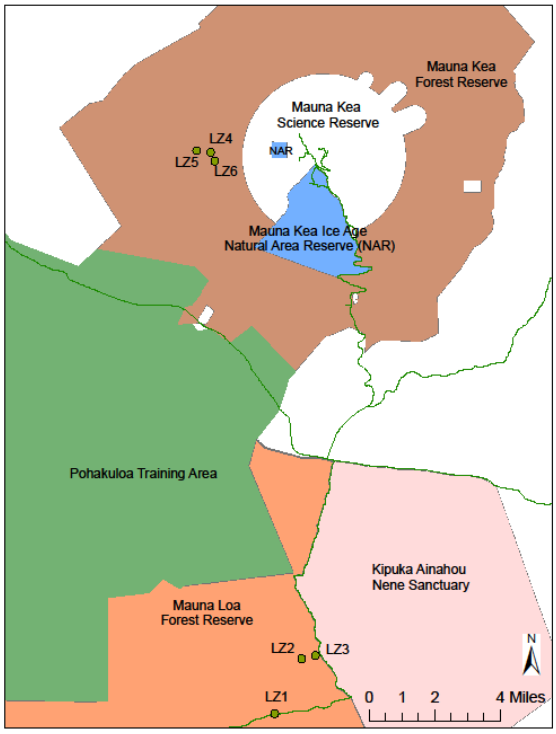

Figure 1. Mauna Kea and Mauna Loa HAMET Landing Zones.

Potential impacts to Hawaiian petrels as a result of HAMET operations are limited to disturbance from noise, and airstrikes. Noise and airstrike potential were evaluated based on the expected presence of petrels within the LZ survey areas during HAMET operations.

Airstrike as a result of HAMET operations is not considered to be of concern for Hawaiian petrels. Most HAMET activities are scheduled for daylight hours when helicopters are visible as well as audible to birds. Moreover, petrels that are transiting the saddle region are not expected to be in the vicinity of the LZs during daylight hours. Petrels in the vicinity of Mauna Kea LZs during nighttime operations are not anticipated, because of elevation. The expectation is that birds will transit the lower elevations of the saddle region, rather than the summits. Transiting petrels in the vicinity of Mauna Loa LZs during nighttime HAMET operations are expected to be minimal, because petrel density in the flyway is expected to be low (Cooper et al., 1996). As discussed in previous correspondence, bird airstrikes are extremely rare for military aircraft in Hawaii overall, with only two airstrikes documented between 2001-2010 for all Army aircraft flights in the state of Hawaii (Peter Mansoor, CW4, personal communication, 2011). Moreover, helicopters are typically slow-moving at the LZ elevations proposed for

HAMET, due to reduced aircraft performance (Frank Tate, COL, personal communication, 2011), which further reduces the likelihood of a bird airstrike.

Artificial light sources will not be placed at the LZs, as this is not consistent with realistic combat conditions (Frank Tate, COL, personal communication, 2011). Therefore, no impacts to seabirds from artificial light sources will occur.

Although it is recognized that exceptions are possible among individual species, the 80 dB contour was selected as the reasonable noise level threshold of concern for disturbance of bird species for the purposes of these surveys, based on a review of the literature (see Peshut and Schnell Memorandum For Record 04 April 2011). Given the expected low density of petrels within the survey areas, noise ≥80 dB will affect only an indeterminably small number of individuals.

No petrels were observed transiting the survey areas, and no petrel colonies were observed at any of the LZs during any survey period. Results are considered conclusive with respect to petrel colonies, and support the proposition that petrel occurrence in the saddle region flyway is infrequent.

Please contact Peter Peshut, 808-969-1966, peter.peshut@us.army.mil, for further discussions on HAMET operations and potential impacts to Hawaiian avifauna.

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Simons, T.R. and C.N. Hodges. 1988. Dark-rumped Petrel (*Pterodroma phaeopygia*), The Birds of North America Online (A. Poole, Ed). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/345doi:10.2173/bna.345.

Simons, T. R. 1985. Biology and Behavior of the Endangered Hawaiian Dark-rumped Petrel. The Condor 87, 229-245.

Slotterback, J.W. 2002. Band-rumped Storm-Petrel (*Oceanodroma castro*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://0-bna.birds.cornell.edu.catalog.library.colostate.edu/bna/species/673adoi:10.2173/bna.673.

Appendix G

Spatial Data References

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Appendix G

Spatial Data References

Table D-1 shows the data sources used to generate the maps and figures not otherwise referenced for the High-Altitude Mountainous Environment Training (HAMET) environmental assessment. The information is presented in alphabetical order according to map legend title.

Table D-1. Spatial data references for HAMET maps.

Legend Item	Data Source
N/A: 100-ft elevation contour	*Elevation Contours, 100 foot interval*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
N/A: 500-ft elevation contour	*Elevation Contours, 500 foot interval*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
N/A: Recreation polygons (Figures 3-20, 4-5, and 4-6)	*Reserves*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published March 4, 2011.
1-5 km proposed trail buffer	*Historic Sites Review of a Proposed Mauna Loa Trail System*, T. S. Dye & Colleagues, Archaeologists, Inc., Figure 2 (p. 10), March 25, 2005.
Access road	*TIGER Roads (2002)*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
Adze quarry (location marked with text label only)	*Mauna Kea Science Reserve Master Plan*, State of Hawai‘i Department of Land and Natural Resources Historic Preservation Division, Institute for Astronomy, University of Hawai‘i, Appendix F, Figure 1 (p. 2), March 2000.
Airport	*Geographic Place Names*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
‘Akiapola‘au habitat (bird)	*Bird Habitat (Version 2)*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Astronomy Precinct	*Mauna Kea Comprehensive Management Plan: UH Management Areas*, Figure 5-1 (p. 5-21), University of Hawai‘i, January 2009.
Bradshaw Army Airfield	*BradshawAirfield*, Pōhakuloa Training Area Integrated Training Area Management Geodatabase 2010, U. S. Army 25th CAB, as provided to Portage, Inc., on October 7, 2010.
Burned area (Summer 2010)	Mauna_Kea_33_Perimeter_082510.shp, U.S. Army 25th CAB, as provided to Portage, Inc., on October 21, 2010.
City or town	*Cities*, ESRI Data and Maps 10 [CD-ROM], Environmental Systems Research Institute, Redlands, CA, June 2010.
County of Hawai‘i General Plan District	*Judicial Districts*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published March 31, 2011.
Cultural feature	*Historic Sites Review of a Proposed Mauna Loa Trail System*, T. S. Dye & Colleagues, Archaeologists, Inc., Figures 2 and 3 (pp. 10-11), March 25, 2005.
Cultural feature identified during 2011 PTA survey	“Memorandum for the Record: Cultural Resources Reconnaissance Survey of Existing High Altitude Mountainous Environmental Training (HAMET) Landing Zones (LZ) on Mauna Kea, [TMK (3) 4-4-015:001], Ka‘ohe Ahupua‘a, Hāmākua District, Hawai‘i Island,” D. M. Crowell, Department of the Army, February 24, 2011.
Cultural site (large)	*Historic Sites Review of a Proposed Mauna Loa Trail System*, T. S. Dye & Colleagues, Archaeologists, Inc., Figures 2 and 3 (pp. 10-11), March 25, 2005.

Table D-1. (continued).

Legend Item	Data Source
Existing trail	*Historic Sites Review of a Proposed Mauna Loa Trail System,* T. S. Dye & Colleagues, Archaeologists, Inc., Figure 3 (p. 11), March 25, 2005.
Federal land	*Large Landowners,* Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Forest reserve	*Reserves,* Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published March 4, 2011.
Glider activity area	*Hawaiian Islands 83.tif,* Sectional Raster Aeronautical Chart of the Hawaiian Islands, Federal Aviation Administration (http://avn.faa.gov/index.asp?xml=aeronav/applications/VFR/chartlist_sect), 83rd Edition, effective 10/21/2010 to 05/05/2011.
Haleakalā National Park	*Reserves,* Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published March 4, 2011.
Haleakalā Wilderness	wilderness_1997.shp, National Park Service Natural Resource-GIS Data Server (http://nrdata.nps.gov, “hale” directory), as published April 13, 2011.
HAMET flight path, Alternative 2: Mauna Kea only	Kea_flightpaths_from_Army_07mar11.shp, Portage, Inc., HAMET Project Geodatabase, March 8, 2011. Coordinates for the flight paths and associated check points were provided to Portage, Inc., via e-mail by the U.S. Army 25th CAB on March 8, 2010.
HAMET flight path, Alternative 3: Mauna Loa only	Loa_flighpath_corrected_with_Army_email_07mar11.shp, Portage, Inc., HAMET Project Geodatabase, March 8, 2011. Coordinates for the flight paths and associated check points were provided to Portage, Inc., via e-mail by the U.S. Army 25th CAB on March 8, 2010.
HAMET flight path checkpoint	Kea_waypoints_from_Army_07mar11.shp & Loa_waypoints_corrected_with_Army_email_07mar11.shp, Portage, Inc., HAMET Project Geodatabase, March 8, 2011. Coordinates for the flight paths and associated check points were provided to Portage, Inc., via e-mail by the U.S. Army 25th CAB on March 8, 2010.
HAMET flight path, Preferred Alternative: Mauna Kea and Mauna Loa	Kea_flightpaths_from_Army_07mar11.shp & Loa_flighpath_corrected_with_Army_email_07mar11.shp, Portage, Inc., HAMET Project Geodatabase, March 8, 2011. Coordinates for the flight paths and associated check points were provided to Portage, Inc., via e-mail by the U.S. Army 25th CAB on March 8, 2010.
HAMET landing zone (proposed)	*MV-22 Site Evaluation Report for US Army Garrison Hawai‘i,* The Boeing Company; Department of the Navy, Figures 1-213, 1-218, 1-223 (pp. 1-325, 1-331, and 1-337), November 30, 2009. Coordinates for Mauna Kea landing zones were provided to Portage, Inc., via e-mail by the U.S. Army 25th CAB on October 14, 2010.
HAMET noise model (42 day, 18 night)	HAMET_NoiseContours_01apr11_60FPD_42day_18night.shp, Portage, Inc., HAMET Project Geodatabase, April 1, 2011. These data were exported from NMPlot, the output portion of the DoD’s NoiseMap modeling software, to ESRI ArcGIS format on April 1, 2011. Parameters used to develop noise contours included seven daytime and three nighttime flights to each of the six LZs per day, for a total of 42 daytime and 18 nighttime flights per day.
Hawai‘i Volcanoes National Park	havo_parkboundary.shp, National Park Service Natural Resource-GIS Data Server (http://nrdata.nps.gov, “havo” directory), as published March 15, 2011.

Table D-1. (continued).

Legend Item	Data Source
Hawai‘i Volcanoes Wilderness	HAVO_Wilderness.shp, National Park Service Natural Resource-GIS Data Server (http://nrdata.nps.gov, “havo” directory), as published March 15, 2011.
Highway	*Roads – Major (USGS)*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published March 14, 2011.
Historic District boundary	*Preliminary Draft Report: A Cultural Resources Management Plan for the University of Hawai‘i Management Areas on Mauna Kea, Ka‘ohe Ahupua‘a, Hāmākua District, Hawai‘i Island, State of Hawai‘i - A Sub-Plan for the Mauna Kea Comprehensive Management Plan*, Pacific Consulting Services, Inc.; Office of Mauna Kea Management, University of Hawai‘i at Hilo, Figure 2-4 (p. 2-32), July 2009.
Historic property	*Mauna Kea Comprehensive Management Plan: UH Management Areas*, Figure 5-1 (p. 5-21), University of Hawai‘i, January 2009.
‘Io habitat (bird)	*Bird Habitat (Version 2)*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Lake Waiau	LakeWaiau_fromDOQQ.shp, Portage, Inc., HAMET Project Geodatabase, interpreted from U.S. Army Corps of Engineers DOQQ, Mauna_Kea_SW, (Honolulu District, Technical Integration Group, 1/9/2002), October 20, 2010.
Land ownership	*Large Landowners*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Local road	*TIGER Roads (2002)*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
Mauna Kea Science Reserve	MK_Science_Reserve.shp, Office of Mauna Kea Management (University of Hawai‘i), as provided to Portage, Inc., on March 10, 2011.
Mauna Kea Visitor Center	MaunaKea_VisitorCenter.shp, Portage, Inc., HAMET Project Geodatabase, interpreted from Google Maps (TM) and mosaicked United States Department of Agriculture image, ortho_big_island (USDA-FSA Aerial Photography Field Office, 06/14/2004, http://hawaii.wr.usgs.gov/hawaii/data.html), March 22, 2011.
Mauna Loa Observatory	MaunaLoa_Observatory_Point.shp, Portage, Inc., HAMET Project Geodatabase, interpreted from Google Earth (TM), November 5, 2010.
Na Ala Hele Trail System	*Na Ala Hele Trails and Access System*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published March 1, 2011.
Natural reserve	MK_NAR1.shp, Office of Mauna Kea Management (University of Hawai‘i), as provided to Portage, Inc., on March 10, 2011.
Nēnē habitat (bird)	*Bird Habitat (Version 2)*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/); as published October 1, 2010.
Nēnē sanctuary	*Reserves*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published March 4, 2011.
Noise monitoring location	HAMET_FinalNoiseMonitoringLocsGPS_03212011.shp, Portage, Inc., HAMET Project Geodatabase, March 23, 2011. Noise monitoring locations were surveyed by Portage, Inc., personnel using a Trimble GeoXT GPS unit during field activities on 03/19/2011 through 03/21/2011.
NPS trail from TIGER Roads	*TIGER Roads (2002)*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010. Extracted based on interpretation of imagery from Google Earth (TM) and: trail.shp, National Park Service Natural Resource-GIS Data Server (http://nrdata.nps.gov, “havo/nrdata/water/baseline_wq/gis” directory), as published March 15, 2011.

Table D-1. (continued).

Legend Item	Data Source
Other cultural resource	*Mauna Kea Comprehensive Management Plan: UH Management Areas*, Figure 5-1 (p. 5-21), University of Hawai‘i, January 2009.
Other trail	*TIGER Roads (2002)*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
Palila critical habitat	*Critical Habitat*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Park or reserve	*Reserves*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published March 4, 2011. MK_NAR1.shp, Office of Mauna Kea Management (University of Hawai‘i), as provided to Portage, Inc., on March 10, 2011. (Used for Mauna Kea Ice Age Natural Area Reserve boundary only.)
Plant location	*All_listed_plants*, Pōhakuloa Training Area Integrated Training Area Management Geodatabase 2010, United States Army 25th CAB, as provided to Portage, Inc., on October 7, 2010. *Biological Assessment for Section 7 Consultation on High Altitude Aviation Training (HAATs) on Mauna Kea*, Hawai‘i Department of Public Works, Environmental Division, Aviation Brigade 25th Infantry Division Aviation, Figure 3 (p. 16), December 2007.
Pōhakuloa Training Area	*mil_restricted_access_area*, Pōhakuloa Training Area Integrated Training Area Management Geodatabase 2010, U.S. Army 25th CAB, as provided to Portage, Inc., on October 7, 2010.
Primary road	*TIGER Roads (2002)*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
Private land	*Large Landowners*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Proposed trail	*Historic Sites Review of a Proposed Mauna Loa Trail System*, T. S. Dye & Colleagues, Archaeologists, Inc., Figure 2 (p. 10), March 25, 2005.
Restricted air space	*RestrictedAirSpace*, Pōhakuloa Training Area Integrated Training Area Management Geodatabase 2010, U.S. Army 25th CAB, as provided to Portage, Inc., on October 7, 2010.
Saddle Road, new section	*Placemarks_line*, Portage, Inc., HAMET Project Geodatabase, interpreted from Google Earth (TM), March 14, 2011.
Secondary road	*TIGER Roads (2002)*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
Soil type	*Soils*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
State land	*Large Landowners*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
State land (Dept. of Hawaiian Homelands)	*Large Landowners*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Threatened and endangered plants	*Threatened and Endangered Plants*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
Traditional cultural property	*Mauna Kea Comprehensive Management Plan: UH Management Areas*; Figure 5-1 (p. 5-21), University of Hawai‘i, January 2009.
Trail (TIGER roads)	*TIGER Roads (2002)*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
Vehicular trail	*TIGER Roads (2002)*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.

Table D-1. (continued).

Legend Item	Data Source
Viewpoints	*Geographic Place Names*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Waiki‘i (settlement)	*Geographic Place Names*, Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.

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