

Appendix A
Section 7 Consultation

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DEPARTMENT OF THE ARMY
HEADQUARTERS,
UNITED STATES ARMY GARRISON
PŌHAKULOĀ
PO BOX 4607
HILO, HAWAII 96720-0607

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

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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. Survey 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 LZ 3, on 06 June 2011 at Mauna Kea LZ 4, LZ 5 and 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.



PETER J. PESHUT, PhD
Program Manager
Natural Resources Office
Pohakuloa Training Area

References

Peshut, P.J. 2011. Memorandum For Record 18 April. Aerial Surveys for Fugitive Dust and Vegetation Impacts at Mauna Kea LZs to Support HAMET Environmental Assessment. US Army Garrison Hawaii, Pohakuloa Training Area Natural Resources Office, 7 pp.

Peshut, P.J. and Doratt, R.E. 2011. Memorandum For Record 04 April. Hawaiian Hoary Bat Surveys for HAMET Environmental Assessment. US Army Garrison Hawaii, Pohakuloa Training Area Natural Resources Office, 5 pp.

Peshut, P.J. and Doratt, R.E. 2011. Memorandum For Record 04 April. Wekiu Bug and Invasive Ants Surveys for HAMET Environmental Assessment. US Army Garrison Hawaii, Pohakuloa Training Area Natural Resources Office, 20 pp.

Peshut, P.J. and Doratt, R.E. 2011. Memorandum For Record 10 June. Wekiu Bug and Invasive Ants Surveys for HAMET Environmental Assessment. US Army Garrison Hawaii, Pohakuloa Training Area Natural Resources Office, 18 pp.

Peshut, P.J. and Evans, S.A. 2011. Memorandum For Record 30 March. Botanical Surveys for HAMET Environmental Assessment. US Army Garrison Hawaii, Pohakuloa Training Area Natural Resources Office, 11 pp.

Peshut, P.J. and Schnell, L.D. 2011. Memorandum for Record 04 April. Hawaiian Avifauna Surveys for HAMET Environmental Assessment. US Army Garrison Hawaii, Pohakuloa Training Area Natural Resources Office, 47 pp.

Peshut, P.J. and Schnell, L.D. 2011. Memorandum for Record 10 June. Hawaiian Petrel Surveys for HAMET Environmental Assessment. US Army Garrison Hawaii, Pohakuloa Training Area Natural Resources Office, 4 pp.

US Army. 2009. Army Aviation High-Altitude Mountainous Environment 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 Environment Training (HAMET) for the 25th Combat Aviation Brigade.

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Appendix B
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 'a'a 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.

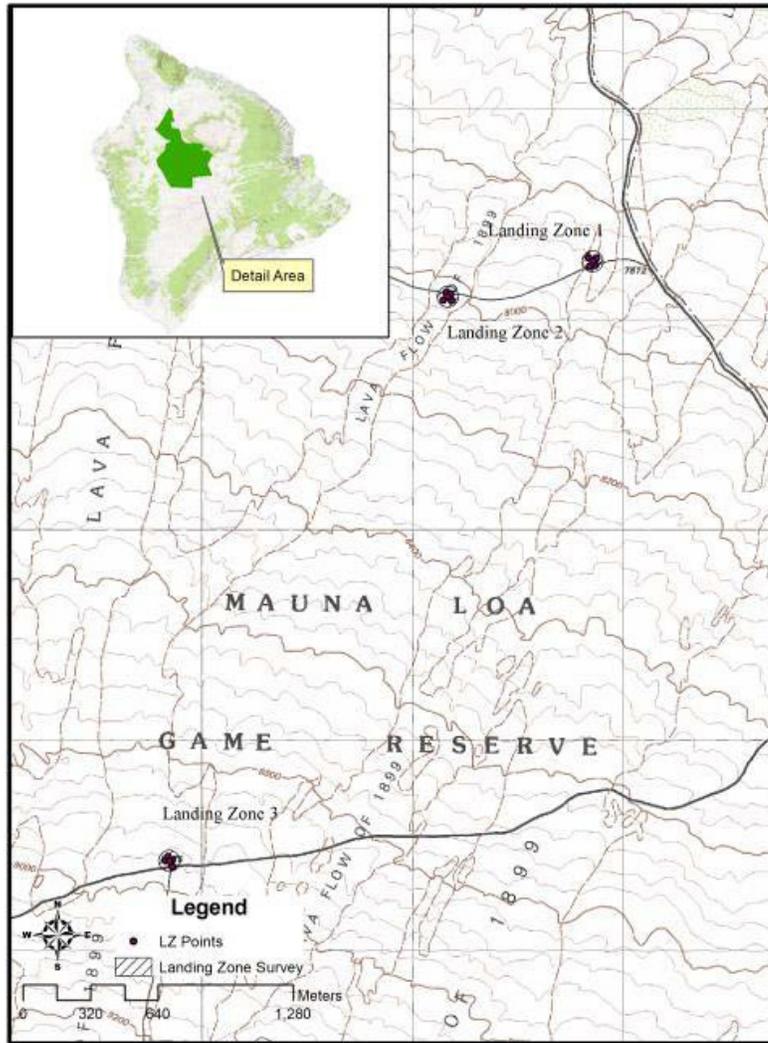
In sum, the concerns expressed by the SHPD have been addressed in this letter with regard to the Section 106 consultation. Concerns specific to NEPA are being addressed in the revised EA. The US Army Garrison Hawaii anticipates presenting the EA and the request to conduct training at these LZs to the 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,



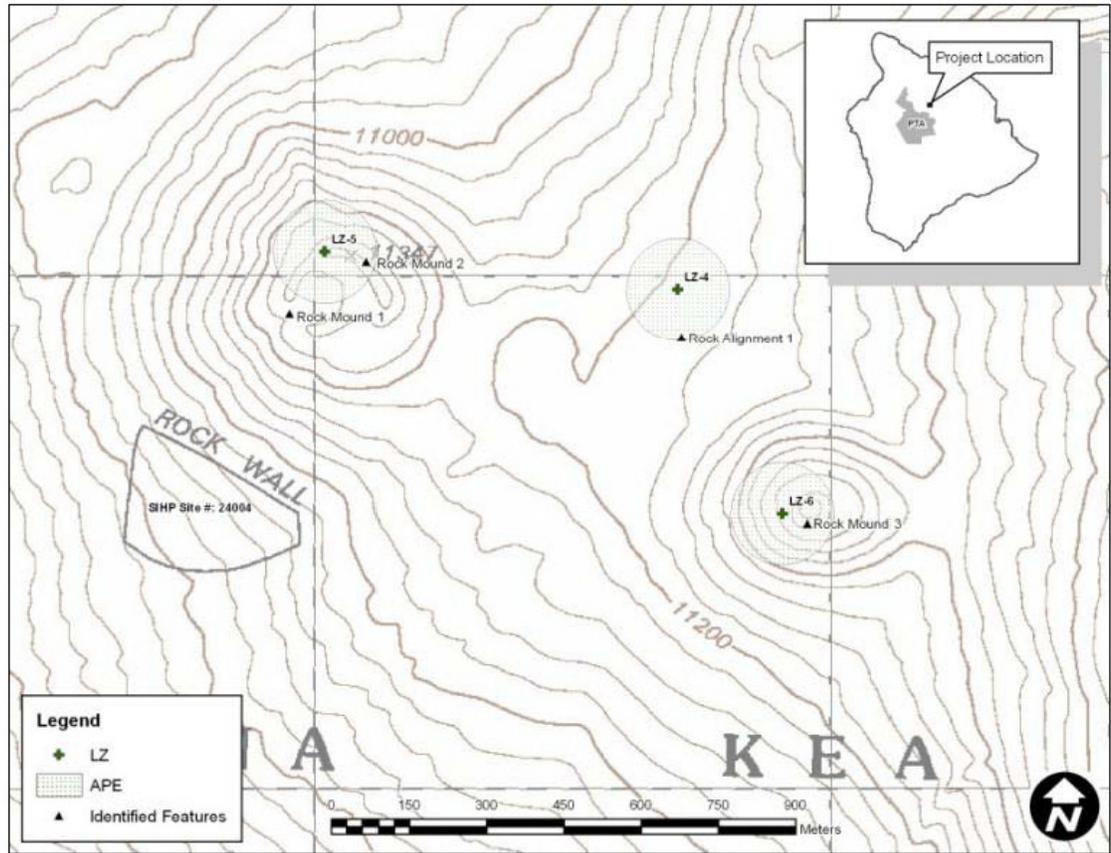
Douglas S. Mulbury
Colonel, US Army
Commanding

Enclosures

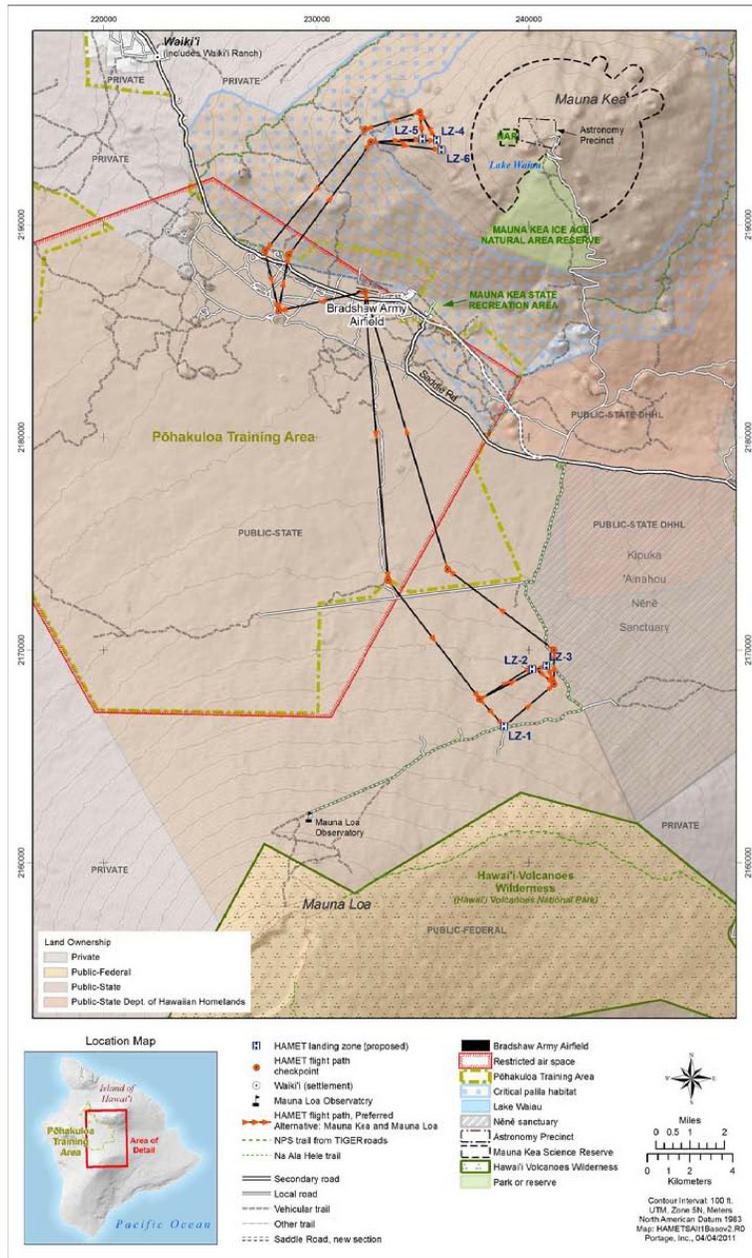


Mauna Loa APE

Enclosure 1



Mauna Kea APE



Flight paths for high altitude training

Enclosure 2

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

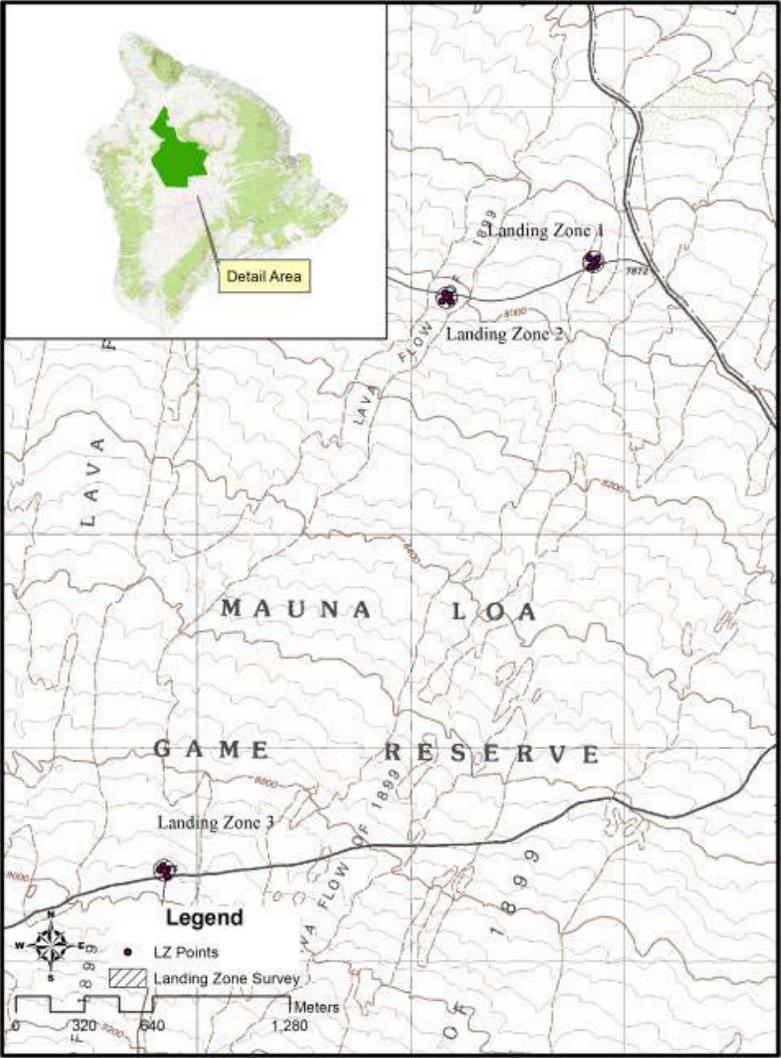


Figure 1. Overview of Mauna Loa Landing Zone locations

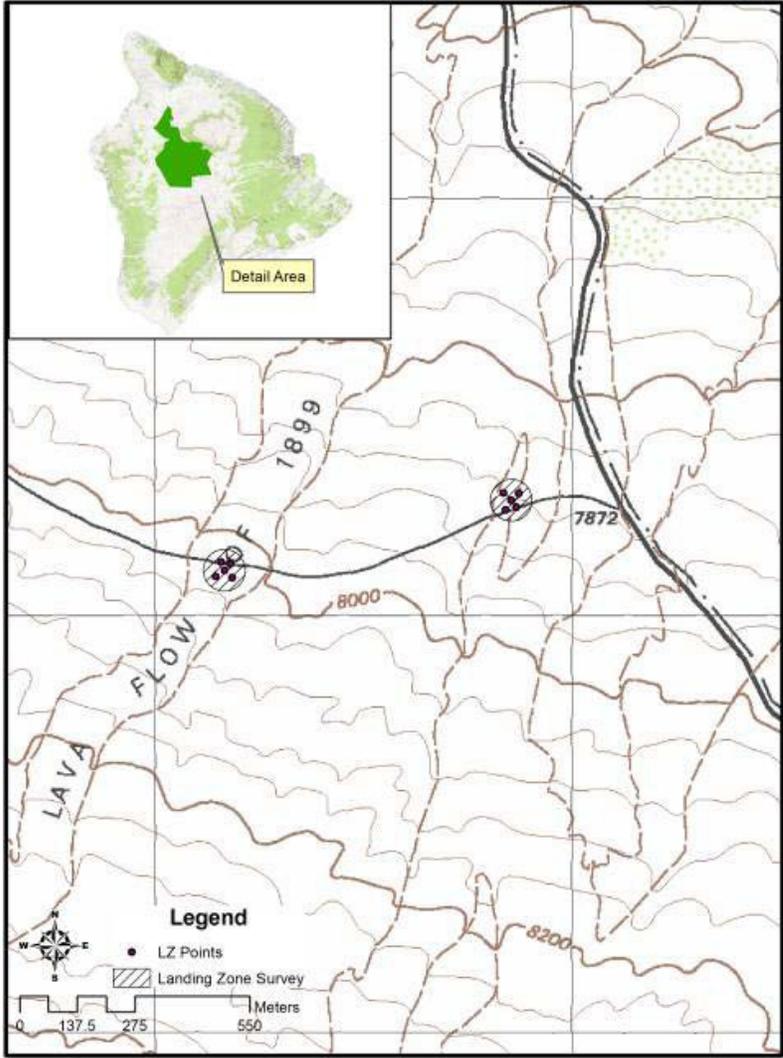


Figure 2. Detail of two lower level Mauna Loa Landing Zone Locations



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

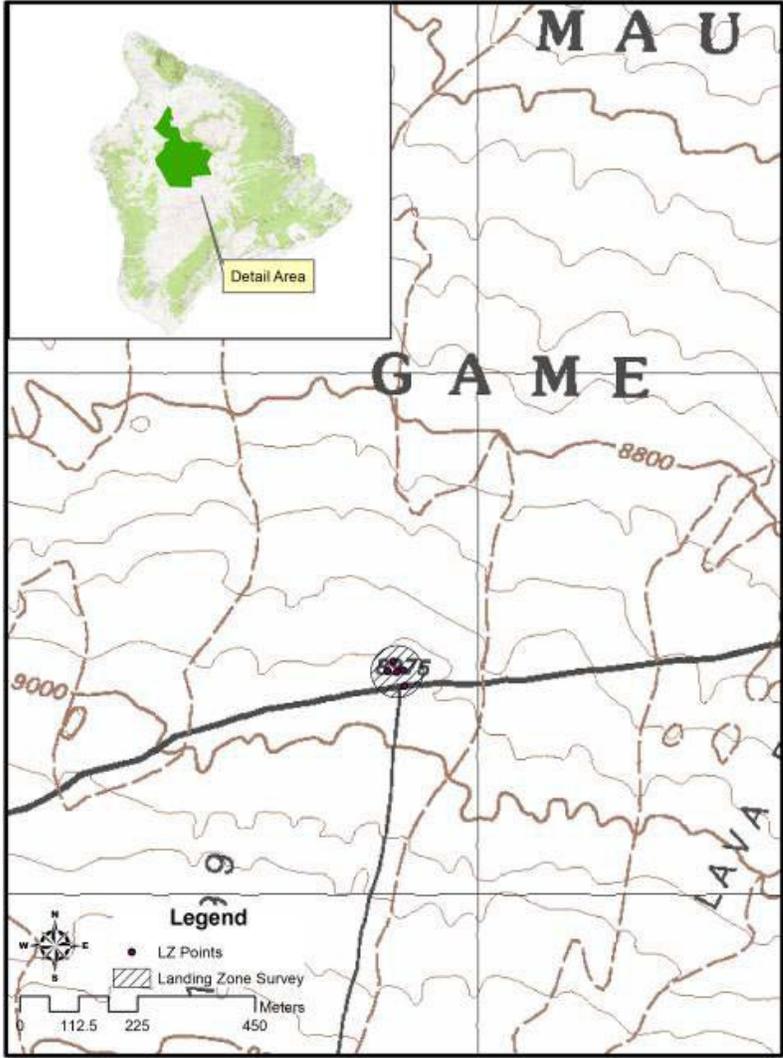


Figure 12. Detail location of LZ 3



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

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, Ka'ohe Ahupua'a, Hāmākua District, Hawai'i 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 ftasl.
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 *pu'u* 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 *pu'u* and overlooks the saddle region of Hawai'i 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 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 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 1 is 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.

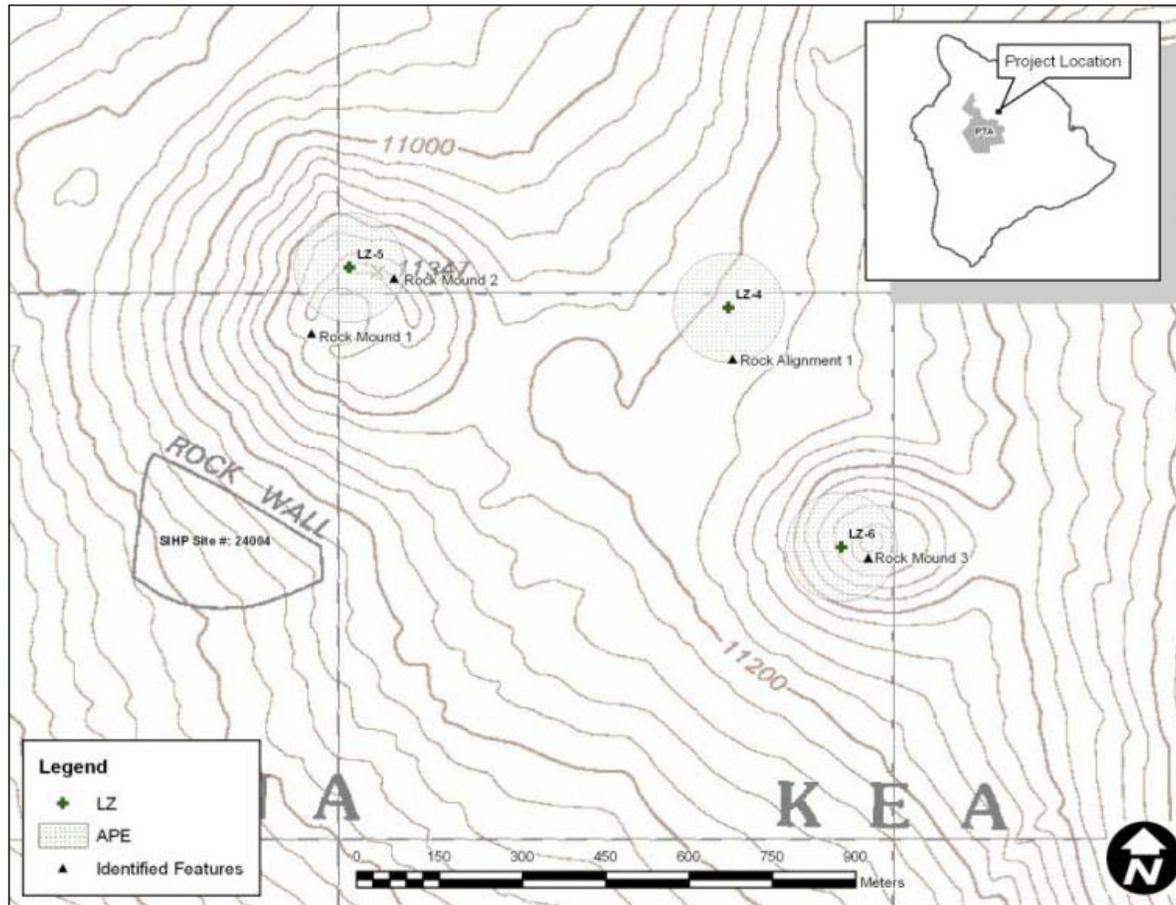


Figure 1. Location of LZs, APE, and identified cultural resources



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

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, Ka'ohe Ahupua'a, Hāmānua District, Hawai'i 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 feet.
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'ohē Ahupua'a, Hāmākua District, Hawai'i Island. On File at PTA

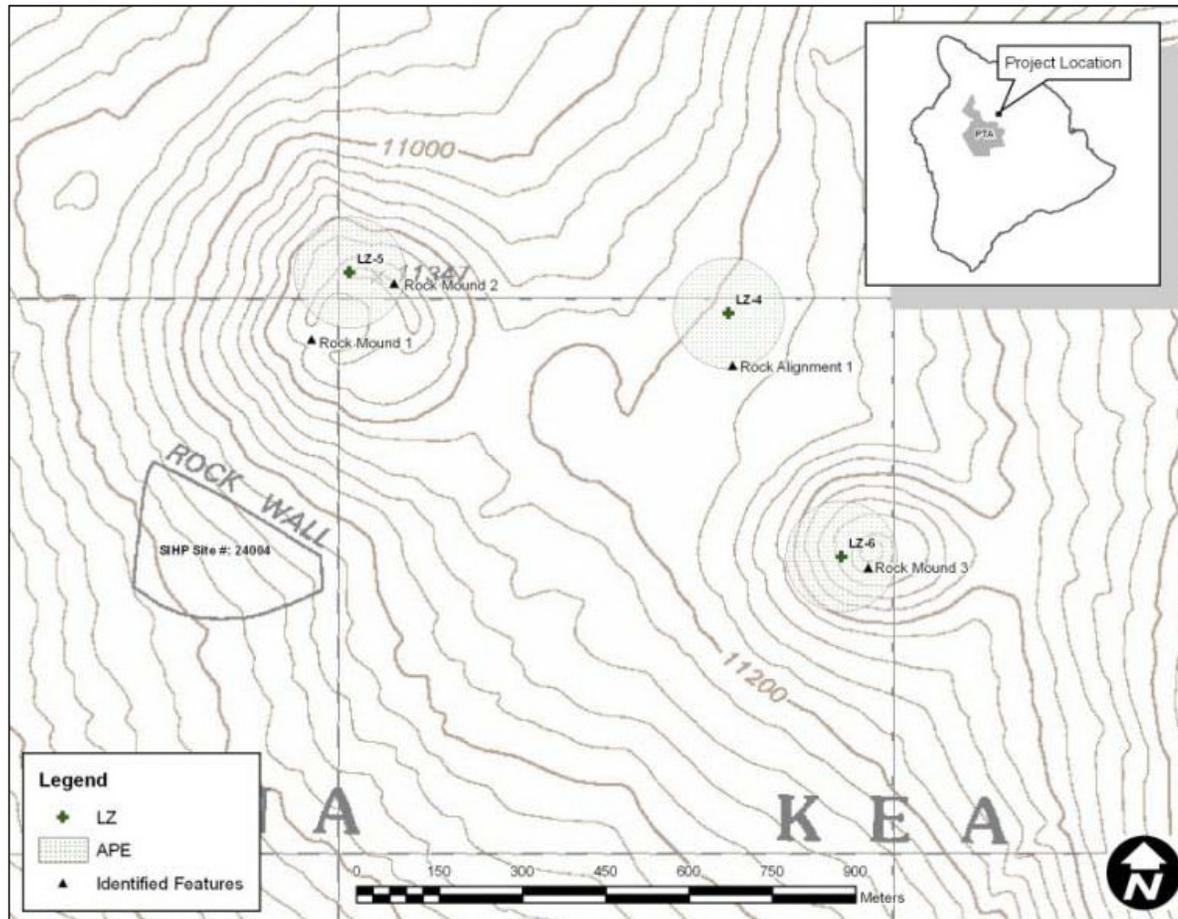


Figure 1. Location of LZs, APE, and identified cultural resources



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

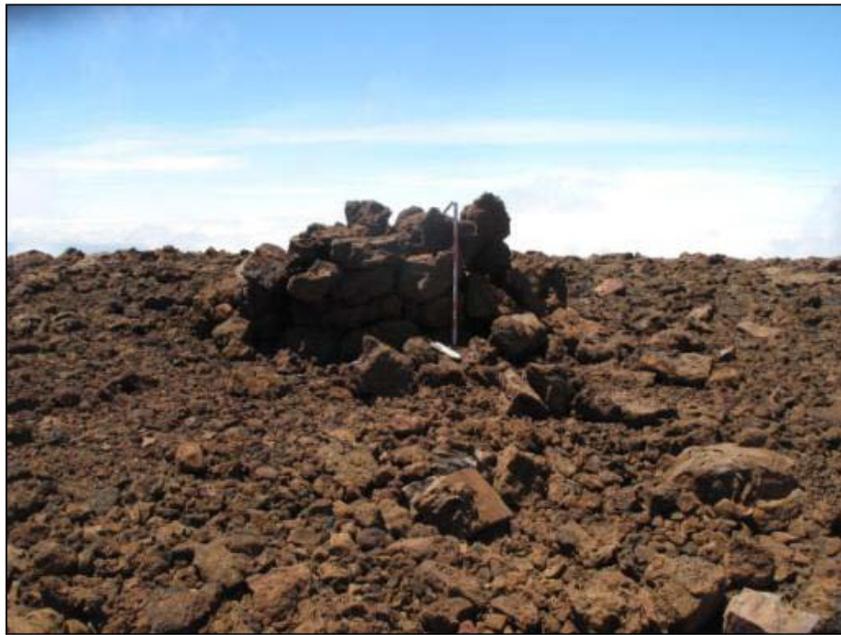


Figure 8. Rock Mound 2 near LZ5, looking south, photo taken on 03/24/11



Figure 9. Rock Mound 2 near LZ5, looking west, photo taken on 03/24/11

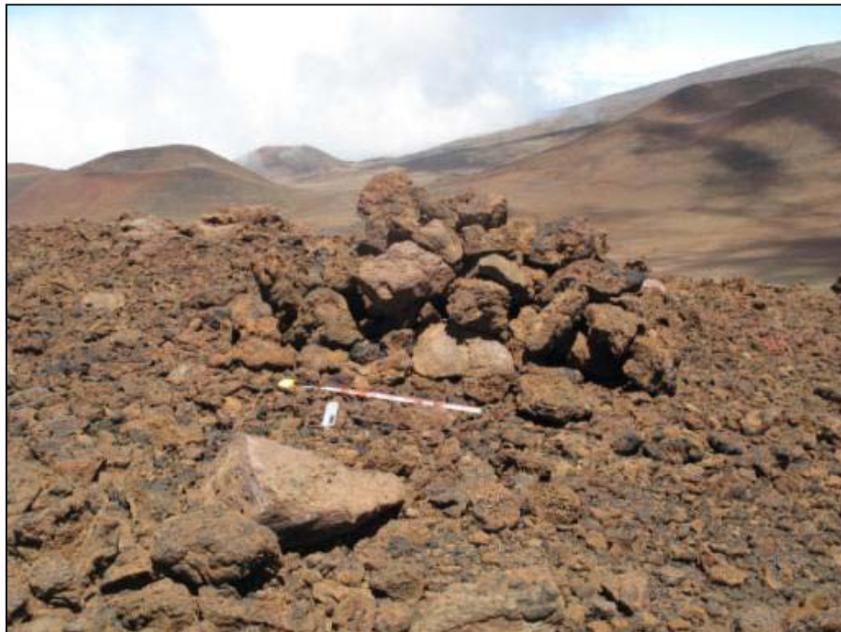


Figure 10. Rock Mound 2 near LZ-5, looking north, photo taken on 03/24/11



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

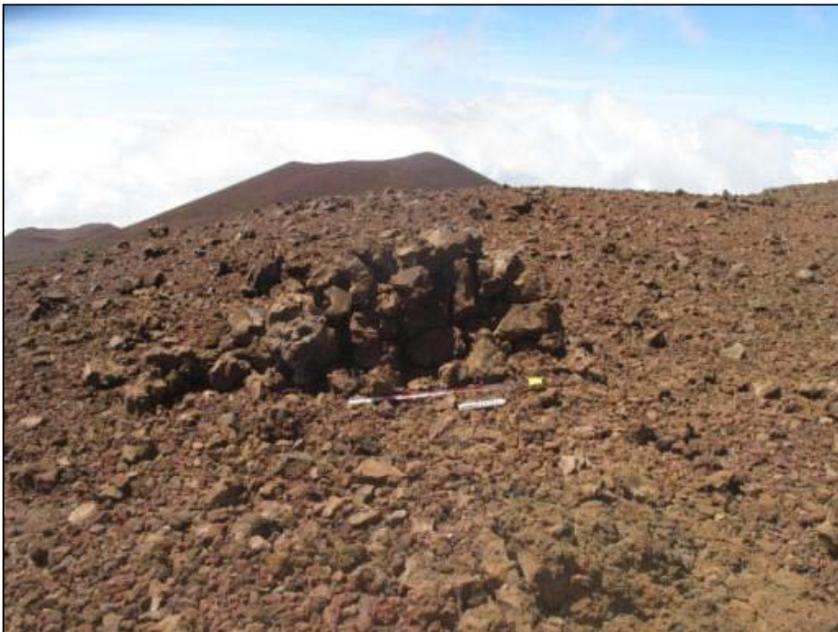


Figure 13. Rock Mound 3 near LZ-6, looking west, photo taken on 03/24/11



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

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, Ka'ohe Ahupua'a, Hāmākuā District, Hawai'i 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 feet.
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.

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'ohē Ahupua'a, Hāmākua District, Hawai'i Island. On File at PTA

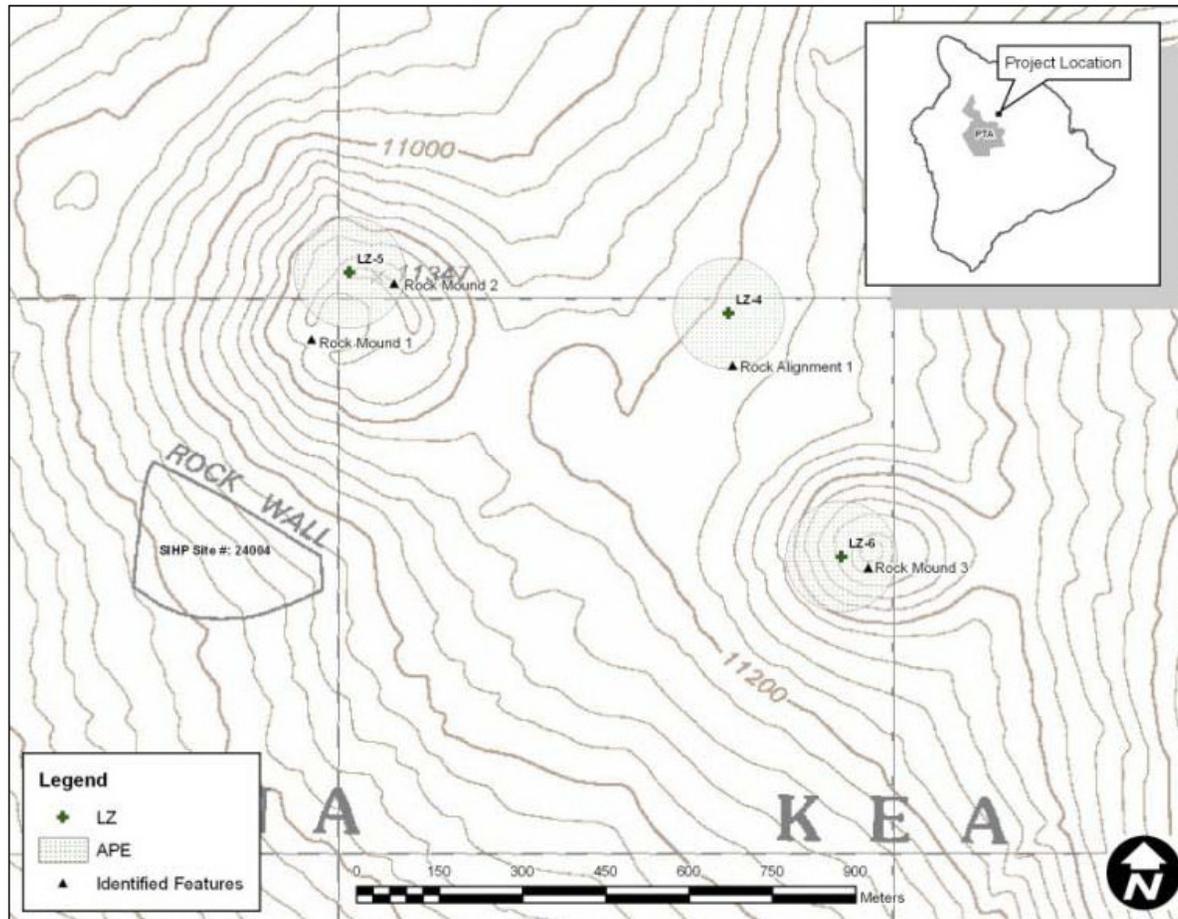


Figure 1. Location of LZs, APE, and identified cultural resources



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

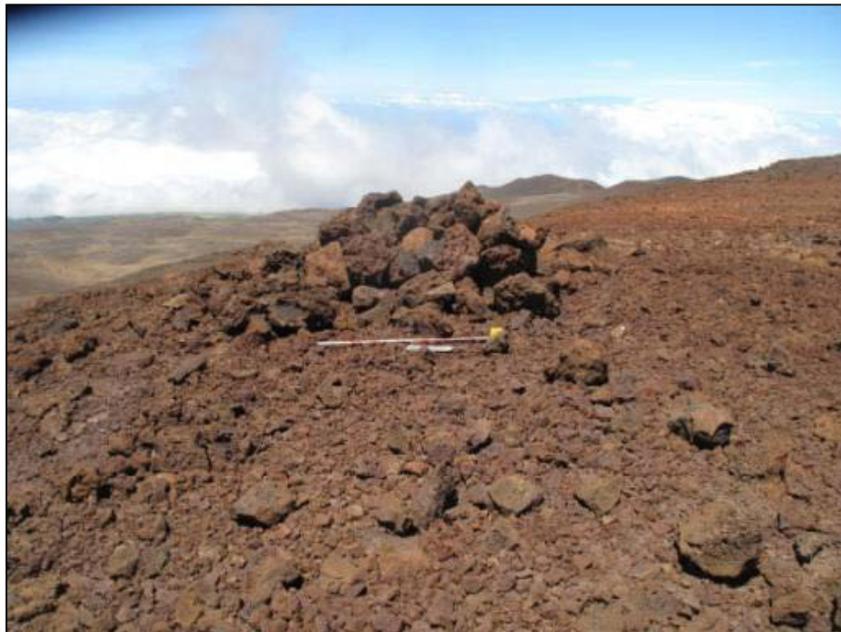


Figure 5. Rock Mound 1 near LZ5, looking west, photo taken on 03/24/11



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

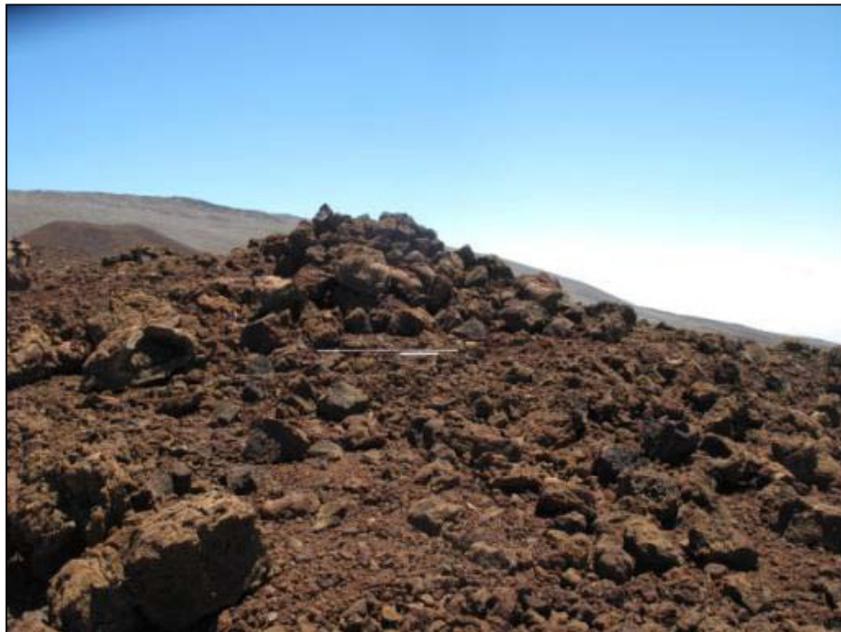


Figure 9. Rock Mound 1 near LZ5, looking east, photo taken on 03/24/11



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

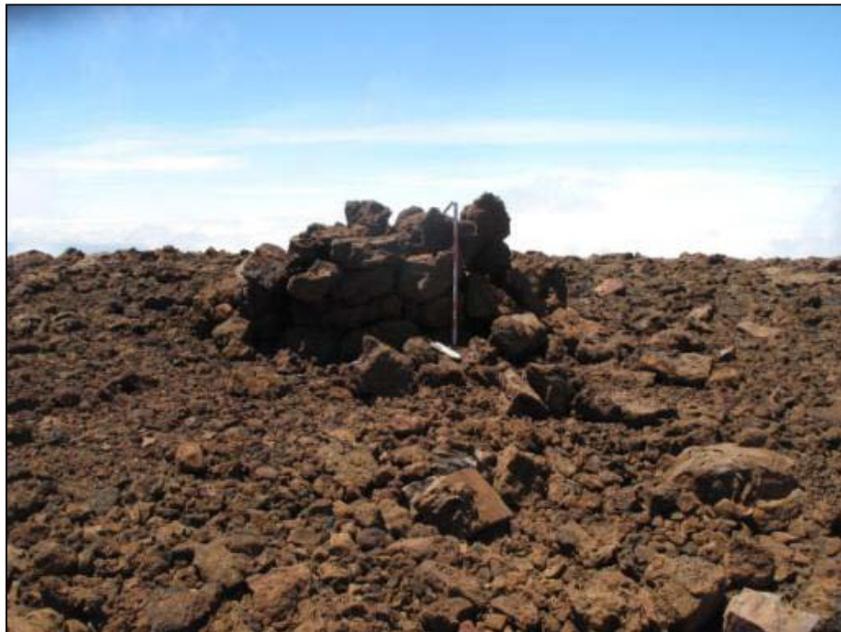


Figure 12. Rock Mound 2 near LZ5, looking south, photo taken on 03/24/11



Figure 13. Rock Mound 2 near LZ5, looking south, photo taken on 04/04/11

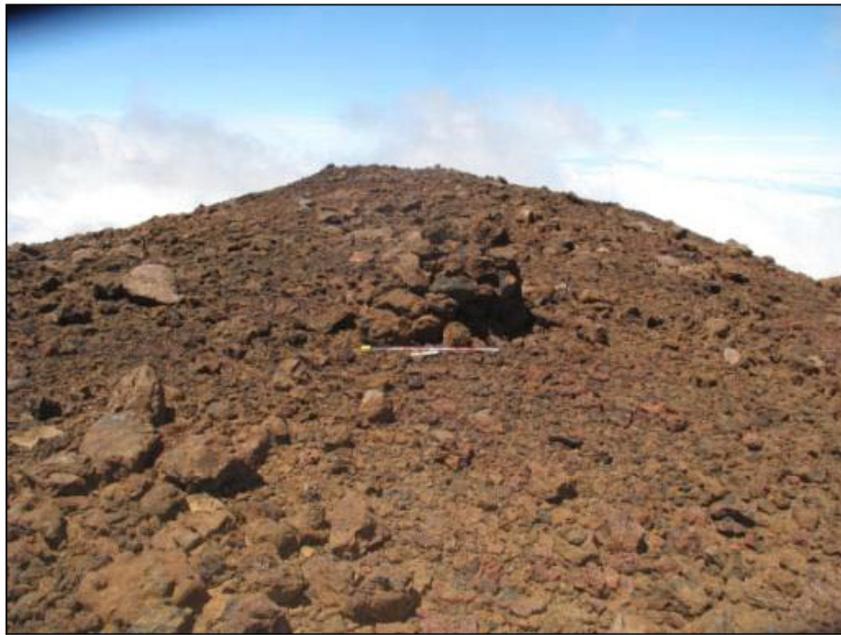


Figure 14. Rock Mound 2 near LZ5, looking west, photo taken on 03/24/11



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

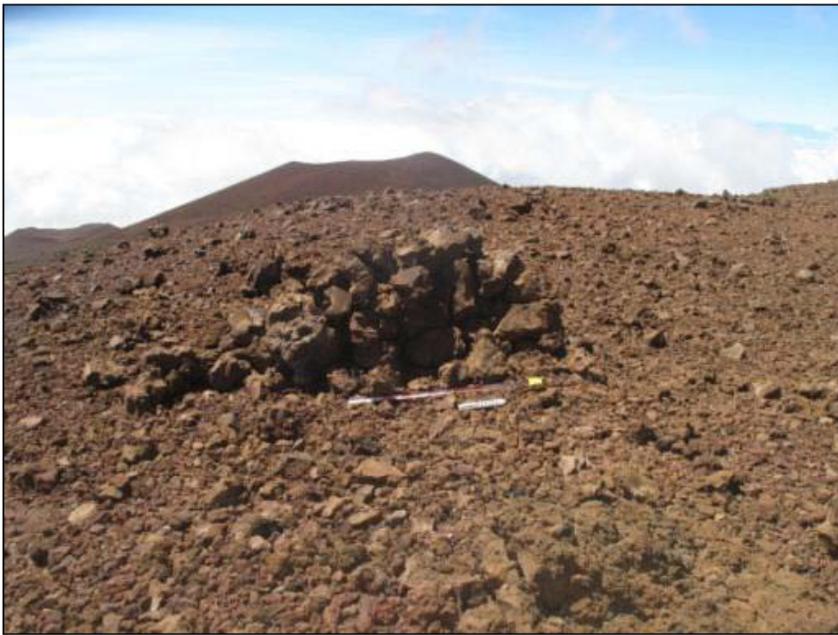


Figure 19. Rock Mound 3 near LZ-6, looking west, photo taken on 03/24/11



Figure 20. Rock Mound 3 near LZ-6, looking west, photo taken on 04/04/11

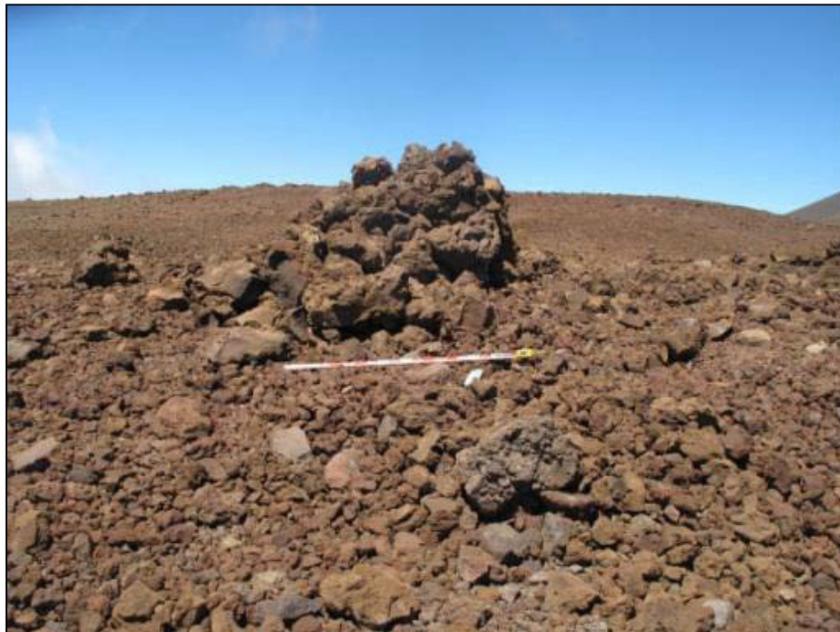


Figure 21. Rock Mound 3 near LZ-6, looking north, photo taken on 03/24/11



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

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'ōhe 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'ōhe 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.

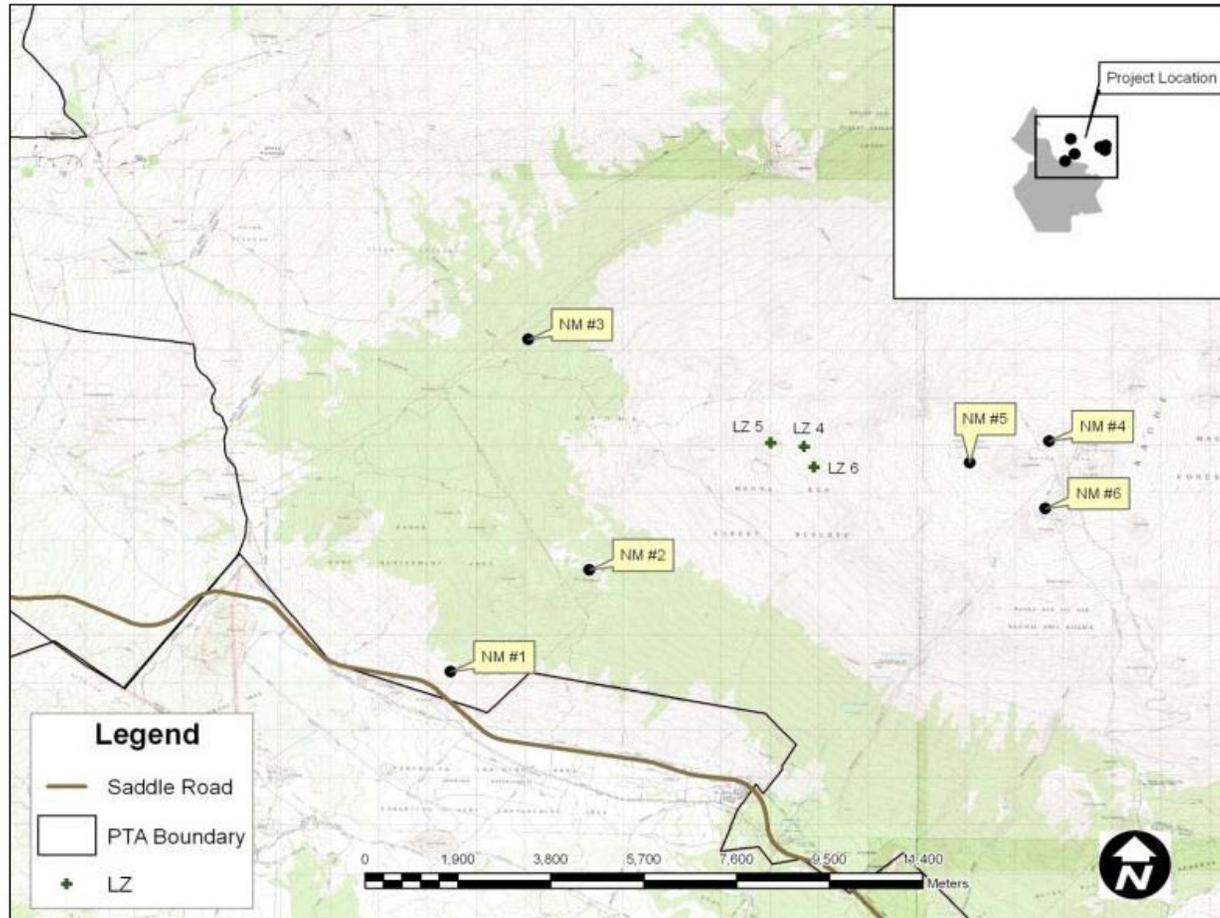


Figure 1. Location of noise monitors



Figure 2. Noise monitor #1



Figure 3. Noise monitor #2



Figure 4. Noise monitor #3

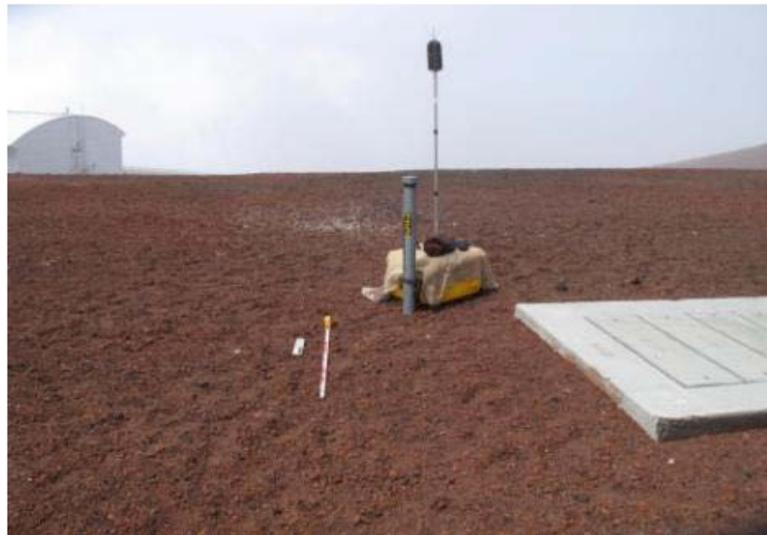


Figure 5. Noise monitor #4



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,

Handwritten signature of Frank Hays

Frank Hays
Pacific Area Director

ecc: Elaine Jackson-Retondo, NPS, PWR-Oakland
Mark Rudo, NPS, PWR-Oakland



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REPLY TO
ATTENTION OF:

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

OCT 20 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
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

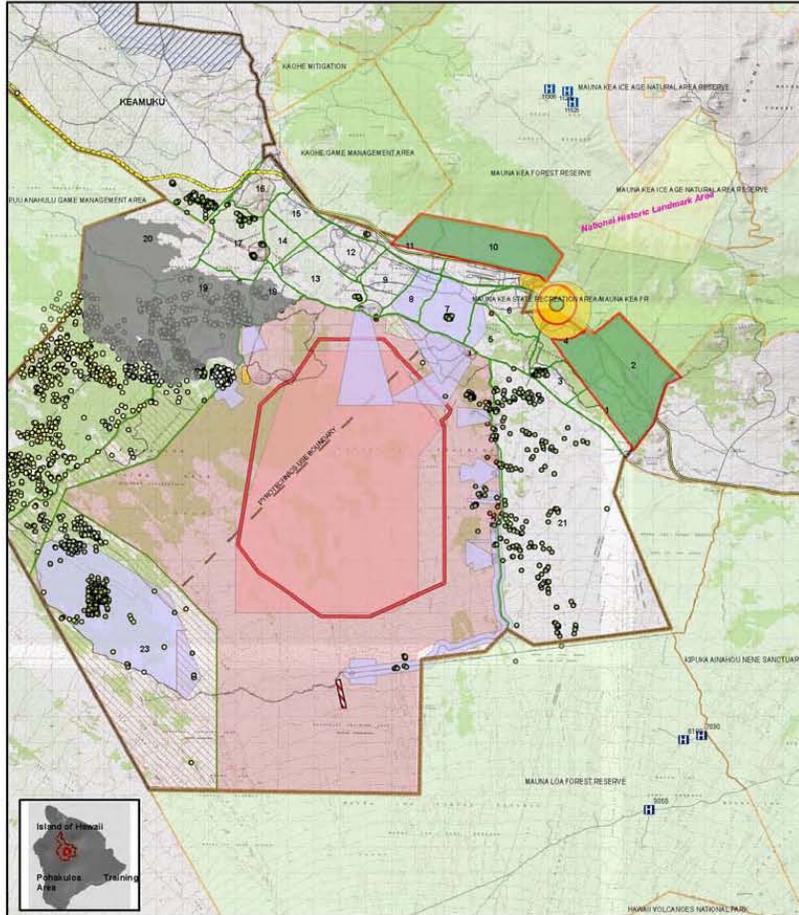
Ms. Ruby McDonald
Hawaii Island Council of Hawaiian Civic Clubs
P.O. Box 85
Kailua-Kona, HI 96745

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-Monthly Meetings held at PTA Headquarters

Enclosure 1

25TH COMBAT AVIATION BRIGADE: HIGH-ALTITUDE ARMY AVIATION TRAINING



<p>LEGEND</p> <p>Mauna Kea HAAT LZs Mauna Loa HAAT LZs National Historic Landmark DLNR Reserves</p> <p>Critical_Habitat</p> <p>AREA</p> <p>ALLIANCE CRITICAL HABITAT ENVIRONMENTAL PROTECTED HABITAT</p> <p>Current Plant Locations</p> <p>NAME</p> <p>Asplenium pervanatum Haplostachys haplostachya Hedyotis contorta</p> <p>LABEL</p> <p>MAUNA KEA STATE PARK STATE PARK BUFFER BUFFER Roads NEW SADDLE ROAD SADDLE RIDGE POWANAKAO DRAFT W/ ALIEN ALTERNATIVES</p>	<p>Isodonium hawaiiense Mastomys tereticaudus Nerardus ovata Portulaca sclerotheca Scladacia hawaiiensis Silene hawaiiensis Silene lanceolata Solanum inaepletum Spermatophytes hawaiiensis Stenogyne angustifolia Tetramolopium arenatum Tetramolopium sp. 1 Vigna o-wahuensis Zanthoxylum hawaiiense</p> <p>RESERVATION BOUNDARY Bradshaw Army Airfield PTA Buildings Cabotment TRAINING AREA BOUNDARY Ending Ranges Training Areas TARGET AIRFIELD PYROTECHNIC LINE IMPACT AREA CMBoundary Aerial Bombing Box</p> <p>Hydrology</p> <p>AGUEDUCT STREAM Fire Buffer</p>	<p>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.</p> <p>DATE: 16 SEPTEMBER 2010 CREATED BY: RDH SCALE: 1:120,000 SCALE BAR:</p> <p>9,700 1,950 0 0 9,700 Meters 13,000 6,500 0 13,000 Feet</p>
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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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NEIL ABERCROMBIE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

January 31, 2011

Log No. 2011.0099

Doc No. 1101TD09

MEMORANDUM

TO: Charlene Unoki, Assistant Administrator
Land Division
P.O. Box 621
Honolulu, Hawai'i 96809

FROM: Theresa K. Donham, Acting Archaeology Branch Chief

SUBJECT: Chapter 6E-8 and National Historic Preservation Act (NHPA) Section 106 Review -
Final Environmental Assessment and Draft Finding of No Significant Impact
Proposed High-Altitude Mountainous Environmental Training (HAMET)
Humu'ula Ahupua'a, North Hilo District (TMK: (3) 3-8-001:001) and
Ka'ohē Ahupua'a, Hāmākua District (TMK: (3) 4-4-015: 001, Island of Hawai'i

This is in response to your memo dated December 23, 2010 and received in our Kapolei office January 10, 2011 regarding the U.S. Army environmental Assessment and draft FONSI. We apologize for missing your response deadline of January 20, 2010. The NEPA Program Manager and Director of Public Works at Wheeler Army Airfield have also requested our comments regarding the EA and draft FONSI. They have also requested comments pursuant to NHPA Section 106. We assume that your office will be transmitting our comments to the appropriate Army officials. This letter addresses potential impacts to historic properties and to the extent possible, potential impacts to cultural practices. It appears that little consultation was conducted by the applicant regarding the second area of concern.

Project Description

The HAMET program will provide high-altitude helicopter training for military personnel prior to deployment to mountainous war zones. Six existing helicopter landing zones have been identified at elevations above 8,000 ft. on Mauna Kea (three in Ka'ohē) and Mauna Loa (three in Humu'ula). Three types of helicopters will be staged at the Bradshaw Airfield in the Pōhakuloa Training Area (PTA), for use during training (OH-58D Kiowa Warrior, UH-60 Black Hawk and CH-47D Chinook). Maneuvers will occur between February and August 2011, and could continue through February 2012 (EA, page 2-8). Training will include :Visual-meteorological-conditions take-off, approach, hover and landing; abort and go-around procedures; 100-300 ft. reconnaissance over LZs; landing on a sloped or uneven surface; landing on pinnacles or ridges; navigating without modern technology; fuel management; and night operations. Training sessions will involve up to two aircraft per flight.

Area of Potential Effect

As identified in the Section 106 consultation correspondence, the area of potential effect (APE) for this undertaking "...consists of three discrete, discontinuous locations on each mountain (six total) that have been bulldozed previously, creating relatively open, level areas" (R. Eastwood letter to L. Thielen, October 20, 2010).

The EA for this project, prepared pursuant to NEPA, NHPA and ARPA identifies a continuous project area (ROI) that encompasses all six proposed LZs, Bradshaw Airfield, the eastern section of PTA, and a flight corridor between the Bradshaw Airfield and the LZs on Mauna Kea (EA Figure D-7). In addition, the project area extends *mauka* well beyond the identified LZs at both Ka'ohē and Humu'ula. We question why the APE identified in the Section 106 correspondence and the Project Area/ROI for the EA are so divergent. It appears that most of the project area as identified in the 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 EA states that no landings will occur outside the LZs; however, 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. Based on a description of the project, we therefore believe that 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 area boundary as identified in the EA.

Identification of Historic Properties

Cultural resources staff at PTA conducted site inspections of the proposed LZ areas in Ka'ohē on October 22 and December 4, 2003; and in Humu'ula on May 20, 2009. Summaries of these inspections are reported in the EA. At the request of our office, copies of the memoranda describing these site inspections were forwarded for our records and for information purposes. Information provided in the PTA staff memoranda state that no historic properties were found within the LZ areas, which are described in the memos and in the EA as being previously bulldozed, leveled and cleared. The actual size of the LZs or area inspected is not provided in any of the documents reviewed. It is not certain how far the inspections extended beyond the previously graded areas, or whether a consistent perimeter zone was examined at all six locations. Nearby cultural features were located and briefly described in the Ka'ohē LZ area. One of these, a historic enclosure located approximately 450 meters south of LZ-5 (as determined by our GIS), was assigned SIHP Site 50-10-22-24004, and was described to a greater degree than a faced mound that was observed approximately 50 meters south of LZ-6. This latter feature may be within the area of rotor wash associated with training activities; its age, function and significance have not been determined, and no mitigation measures are proposed in the EA or in the Section 106 consultation correspondence. This feature is not mentioned in the EA, due to an error in correlating the field inspection memo with the final LZ numbers.

No additional field inspections or surveys were conducted within the project area; and it appears that no thorough records search was conducted to identify and locate known historic properties in relation to the project area. For example, Figure D-8 depicts the boundary of the Mauna Kea Summit Region Historic District and known historic properties within the project area; however there are no statements in the text acknowledging that a portion of the project area is within this Historic District and that LZ-6 is quite close to the district boundary. The EA discussions of archaeological/historic resources for the areas of Mauna Kea, Mauna Loa and the saddle area are less than one page for each area. In addition, as noted above, the information in the EA regarding historic properties for LZ-6 in Ka'ohē 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 (Godby & Head, December 4, 2003). Detailed comments regarding this topic and others are listed in the attachment.

Project Impacts and Proposed Mitigation Measures

A draft FONSI has been issued for this proposed training program. At this time, we are not confident that all of the historic properties have been identified within the areas of direct affect (in the near vicinity of LZs). 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. The only area

designated for a minimum elevation of 2,000 ft is the flight corridor north of Bradshaw Airfield in Ka'ohe; a second zone with a 1,000 ft minimum elevation is noted for other forested areas; however this is not designated on maps. Other portions of the ROI and the areas surrounding all of the LZs have no stipulations on flight elevation.

Proposed mitigation measures for both direct and indirect impacts is to avoid the cultural resources. Avoidance is only effective when the locations of the historic properties and culturally sensitive areas are known and documented in work/flight plans. At this time, 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. For example, the boundaries of the project area could have been modified to avoid the Summit Region Historic District and the known sites in the vicinity. 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. There is a high likelihood that one or more of these unidentified sites will be impacted by the training activities, because they cannot at this time be marked for avoidance in the flight planning stage. We believe this is a major/critical flaw in the FONSI.

In connection with this issue, we could find no discussion of potential impacts from rotor wash. There is a brief discussion of fugitive dust resulting from take-off and landing, but there is no information on the areal extent or intensity of rotor-generated winds in connection with the other training exercises. We also believe that repeated use of areas for landing will result in cumulative impacts from rotor wash. The EA assumes that conditions at all six LZ are similar (page4-3); 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.

Finally, we believe that the consideration of noise impacts to cultural practices needs to take greater consideration of specific types of practices, and the expected timing and location of such. The noise model used assumes that minimum flight ceiling would be 2,000 ft in the designated flight corridor and 1,000 feet above other forested areas (page 4-24). This leaves the bulk of the project area 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.

ATTACHMENT

Comments and Questions, *Environmental Assessment for High-Altitude Mountainous Environmental Training (HAMET) Pōhakuoa Training Area, Island of Hawaii*, USAG-HI/DPTMS, December 2010

Introduction and Description of Proposed Action

1. The title of the EA, and statements found elsewhere (i.e. Section 2.6.2) create the impression that this training program will occur within/at the PTA. We understand that helicopters and trainees will originate from within the PTA, but the bulk of the actual training will occur outside the PTA.
2. We were not able to locate information regarding the acreage of the overall project area, or acreage of the project area beyond the PTA. This information is important and should be provided somewhere.
3. There is no discussion of the methods used to determine the boundaries of the project area. What is the reason for the two-pronged project area boundary to the south of LZ-1 and the crescent shape around LZs 4-6 in the Ka'ōhe area?
4. There is no discussion regarding the practical application of the project area boundary in relation to the training activities. There are general statements indicating that the training flights will be confined to this area. How will this be achieved and monitored? This is important information given the close proximity of sensitive cultural and natural resource areas.

Affected Resources

5. The discussion of cultural beliefs and practices for Mauna Kea relies on only two sources. We believe that additional sources should be cited and discussed, particularly when they contain information relevant to the project area. For example, Maly's (1997) proposed Traditional Cultural Property designation encompasses all of the project area and the three LZs located in Ka'ōhe.
6. The discussion of cultural beliefs and practices for Mauna Kea and Mauna Loa include no information derived from consultation with persons knowledgeable of the project area, or with Native Hawaiian Organizations. We note that the LZs here are located on the crests of cinder cones. There is no discussion/consideration of the cultural significance of these pu'u as indicated in prior cultural/ethnographic studies or in the context of the proposed TCP (cf. Maly 1997) for the mountain from its summit to the 6,000 ft elevation.
7. The discussion of cultural beliefs and practices for the Saddle region (Section 3.7.3.1) states that the "Oral history subjects did report the continuation of bird hunting using old trails and modified lava blisters to encourage nesting in the region" (p. 3-32). The EA does not indicate whether these practices occur within the project area, or if, based on the patterning of historic properties, they might be expected to occur.
8. Section 3.7.4.1 states that "Perhaps because it is an active volcano that erupted as recently as 1984, literature searches reveal much less information about Mauna Loa than either Mauna Kea or the Saddle region". Donham 2010 is cited as a reference for this statement. We wish to clarify that the email sent from Donham to Braun-Williams on October 27 2010 did not make a connection between Mauna Loa's volcanic activity and the presence of literature regarding cultural beliefs and practices. Common sense would indicate that there is less information for Mauna Loa because there have been fewer actions triggering the need for impact assessments on Mauna Loa, as compared to the PTA and Mauna Kea summit areas.
9. As noted above, Section 3.7.2.2 regarding archaeological/historic resources in the Ka'ōhe portion of the project area contains an omission regarding the faced platform identified near LZ-5, and describes in error three mounds that are near LZ-6. LZ-6 as reported in the PTA staff memo was not selected for further consideration; LZ-6 as identified in the EA correlates

- with LZ-5a described in the PTA staff memo. Information regarding LZ-5a is omitted from the EA in this section and in Section 4.8.5.1.
10. Section 3.7.3.2 states that nearly 350 archaeological sites have been identified within the Saddle region, presumably within the PTA. There is no discussion clarifying how many of these sites are within the project area. A map showing the distribution of known sites within the PTA section of the project area should be included. In addition, further discussion of types of sites expected to occur within areas beyond the PTA should occur. Normally, some level of fieldwork would be conducted in areas not previously surveyed to determine the frequency, distribution and types of sites expected to occur within the project area.
 11. Section 3.7.4.2 includes a discussion of the Mauna Loa Solar Observatory in the context of archaeological/historic resources. Is this facility over 50 years in age? It is not clear why this facility and the NOAA observatory are included in a discussion of historic properties.
 12. Section 3.7.4.2 references one historic sites review that was conducted on Mauna Loa, prepared for the Nature Conservancy (Dye 2005). There is no reference/discussion of resources known/inventoried by the National Park Service within the Hawaii Volcanoes National Park, which encompasses upper slopes and the summit of Mauna Loa.

Impacts to Cultural Resources

13. Section 4.8.1 states that SHPD "...was contacted to provide cultural resources surveys and survey results within the ROI. The latter contact resulted in the identification of no new resources" (page 4-18)." The referenced "contact" consisted of an email requesting essentially all the information we have on file for the subject area. We responded by stating that we do not do research for entities responsible for federal historic preservation compliance, and recommended that the preparers of the EA send someone to the SHPD libraries in Hilo and/or Kapolei to conduct their research; and that they contact CRM staff at Volcanoes National Park and the PTA as part of their research. To our knowledge, no one from the EA preparation staff visited our offices to research our files and report library.
14. Section 4.8.5 concludes that "No direct impacts would occur from project activities." This conclusion is based on a consideration of direct impacts from helicopter landings, and states that no landings would be allowed outside of LZ's. We believe that further consideration should be given to the potential for direct impacts as a result of rotor wash during hover and low elevation flight, and abort/go-around activities. If an abort/go-around drill exercise occurs over/near an LZ, there will be a certain amount of physical disturbance as a result. We are not certain of the expected extent, because this factor is not considered in the EA.
15. Section 4.8.5.1 discusses direct impacts to historic properties. Each LZ is considered, and a determination that no historic properties would be affected is offered. The discussion of the flight paths includes only the Ka'ohē section of the project area, and states that "Additionally, flight paths would be planned to avoid the majority of cultural resources" (page 4-21). How can this be achieved when there is no information as to where the cultural resources are located within the flight path areas? As stated above, no fieldwork was conducted within the project area/ROI to identify and inventory historic properties. We believe there is a potential for direct impacts to historic properties within the flight paths that are not designated for the 1,000 ft. or 2,000 ft. minimum elevation.
16. The description of LZ-6 in Section 4.8.5.1 states that five mounds were identified in the vicinity of the LZ; these mounds are not within the project area. LZ-6 as used in the EA correlates with LZ-5a as used in the field inspection memo.
17. Section 4.8.6 summarizes indirect and cumulative impacts; this section includes a bullet stating that "flights would avoid known cultural resources." Again, the Army does not know where the cultural resources are located, so it will not be possible to plan flights to avoid them.

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Appendix C

Aircraft for Use in High-Altitude Mountainous Environment Training

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Appendix C

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. REFERENCES

Boeing, *Defense, Space, and Security*, <http://www.boeing.com/rotorcraft/military/ch47d/index.htm>, Web page visited November 2, 2010.

Global Security, 2010a, *UH-60L/S-70A Black Hawk*, <http://www.globalsecurity.org/military/systems/aircraft/uh-60l.htm>, Web page visited November 2, 2010.

Global Security, 2010b, *UH-60A Black Hawk*, www.globalsecurity.org/military/systems/aircraft/uh-60a.htm, Web page visited November 2, 2010.

Appendix D
Spatial Data References

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Appendix D

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	<i>Elevation Contours, 100 foot interval</i> , Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
N/A: 500-ft elevation contour	<i>Elevation Contours, 500 foot interval</i> , 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)	<i>Reserves</i> , Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published March 4, 2011.
1-5 km proposed trail buffer	<i>Historic Sites Review of a Proposed Mauna Loa Trail System</i> , T. S. Dye & Colleagues, Archaeologists, Inc., Figure 2 (p. 10), March 25, 2005.
Access road	<i>TIGER Roads (2002)</i> , 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)	<i>Mauna Kea Science Reserve Master Plan</i> , 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	<i>Geographic Place Names</i> , Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
‘Akiapola‘au habitat (bird)	<i>Bird Habitat (Version 2)</i> , Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Astronomy Precinct	<i>Mauna Kea Comprehensive Management Plan: UH Management Areas</i> , Figure 5-1 (p. 5-21), University of Hawai‘i, January 2009.
Bradshaw Army Airfield	<i>Bradshaw Airfield</i> , Pōhakuoloa Training Area Integrated Training Area Management Geodatabase 2010, U. S. Army 25 th CAB, as provided to Portage, Inc., on October 7, 2010.
Burned area (Summer 2010)	Mauna_Kea_33_Perimeter_082510.shp, U.S. Army 25 th CAB, as provided to Portage, Inc., on October 21, 2010.
City or town	<i>Cities</i> , ESRI Data and Maps 10 [CD-ROM], Environmental Systems Research Institute, Redlands, CA, June 2010.
County of Hawai‘i General Plan District	<i>Judicial Districts</i> , Hawai‘i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published March 31, 2011.
Cultural feature	<i>Historic Sites Review of a Proposed Mauna Loa Trail System</i> , 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)	<i>Historic Sites Review of a Proposed Mauna Loa Trail System</i> , 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	<i>Historic Sites Review of a Proposed Mauna Loa Trail System</i> , T. S. Dye & Colleagues, Archaeologists, Inc., Figure 3 (p. 11), March 25, 2005.
Federal land	<i>Large Landowners</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Forest reserve	<i>Reserves</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published March 4, 2011.
Glider activity area	<i>Hawaiian Islands 83.tif</i> , Sectional Raster Aeronautical Chart of the Hawaiian Islands, Federal Aviation Administration (http://avn.faa.gov/index.asp?xml=aeronav/applications/VFR/chartlist_sect), 83 rd Edition, effective 10/21/2010 to 05/05/2011.
Haleakalā National Park	<i>Reserves</i> , 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_flihpah_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_flihpah_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)	<i>MV-22 Site Evaluation Report for US Army Garrison Hawai'i</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 25 th 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	<i>Roads – Major (USGS)</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published March 14, 2011.
Historic District boundary	<i>Preliminary Draft Report: A Cultural Resources Management Plan for the University of Hawai'i Management Areas on Mauna Kea, Ka'ohē Ahupua'a, Hāmākua District, Hawai'i Island, State of Hawai'i - A Sub-Plan for the Mauna Kea Comprehensive Management Plan</i> , 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	<i>Mauna Kea Comprehensive Management Plan: UH Management Areas</i> , Figure 5-1 (p. 5-21), University of Hawai'i, January 2009.
'Io habitat (bird)	<i>Bird Habitat (Version 2)</i> , 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	<i>Large Landowners</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Local road	<i>TIGER Roads (2002)</i> , 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	<i>Na Ala Hele Trails and Access System</i> , 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)	<i>Bird Habitat (Version 2)</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/); as published October 1, 2010.
Nēnē sanctuary	<i>Reserves</i> , 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	<i>TIGER Roads (2002)</i> , 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	<i>Mauna Kea Comprehensive Management Plan: UH Management Areas</i> , Figure 5-1 (p. 5-21), University of Hawai'i, January 2009.
Other trail	<i>TIGER Roads (2002)</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
Palila critical habitat	<i>Critical Habitat</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Park or reserve	<i>Reserves</i> , 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	<i>All listed plants</i> , Pōhakuoloa Training Area Integrated Training Area Management Geodatabase 2010, United States Army 25 th CAB, as provided to Portage, Inc., on October 7, 2010. <i>Biological Assessment for Section 7 Consultation on High Altitude Aviation Training (HAATs) on Mauna Kea</i> , Hawai'i Department of Public Works, Environmental Division, Aviation Brigade 25 th Infantry Division Aviation, Figure 3 (p. 16), December 2007.
Pōhakuoloa Training Area	<i>mil_restricted_access_area</i> , Pōhakuoloa Training Area Integrated Training Area Management Geodatabase 2010, U.S. Army 25 th CAB, as provided to Portage, Inc., on October 7, 2010.
Primary road	<i>TIGER Roads (2002)</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
Private land	<i>Large Landowners</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Proposed trail	<i>Historic Sites Review of a Proposed Mauna Loa Trail System</i> , T. S. Dye & Colleagues, Archaeologists, Inc., Figure 2 (p. 10), March 25, 2005.
Restricted air space	<i>RestrictedAirSpace</i> , Pōhakuoloa Training Area Integrated Training Area Management Geodatabase 2010, U.S. Army 25 th CAB, as provided to Portage, Inc., on October 7, 2010.
Saddle Road, new section	<i>Placemarks_line</i> , Portage, Inc., HAMET Project Geodatabase, interpreted from Google Earth (TM), March 14, 2011.
Secondary road	<i>TIGER Roads (2002)</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
Soil type	<i>Soils</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
State land	<i>Large Landowners</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
State land (Dept. of Hawaiian Homelands)	<i>Large Landowners</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Threatened and endangered plants	<i>Threatened and Endangered Plants</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
Traditional cultural property	<i>Mauna Kea Comprehensive Management Plan: UH Management Areas</i> ; Figure 5-1 (p. 5-21), University of Hawai'i, January 2009.
Trail (TIGER roads)	<i>TIGER Roads (2002)</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 5, 2010.
Vehicular trail	<i>TIGER Roads (2002)</i> , 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	<i>Geographic Place Names</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.
Waiki'i (settlement)	<i>Geographic Place Names</i> , Hawai'i Statewide GIS Program Online Server (http://hawaii.gov/dbedt/gis/), as published October 1, 2010.

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