APPENDIX H-2
2008 BIOLOGICAL OPINION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

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In Reply Refer To:
1-2-2008-F-0108
1-2-2005-F-356

JUN 18 2008

Colonel Matthew T. Margotta
U.S. Army Commander
Department of the Army Headquarters
United States Army Garrison, Hawaii
Schofield Barracks, Hawaii 96857-5000

Subject: Amendment of the Biological Opinion of the U.S. Fish and Wildlife Service for Military Training at Makua Military Reservation (1-2-2005-F-356)

Dear Colonel Margotta:

This responds to your January 11, 2008, letter requesting an amendment to the June 22, 2007 "Reinitiation of the 1999 Biological Opinion of the U.S. Fish and Wildlife Service for Routine U.S. Army Military Training at Makua Military Reservation, Island of Oahu" (1-2-2005-F-356) (Makua Biological Opinion) pursuant to section 7 of the Endangered Species Act of 1973 (Act), as amended. The Makua Biological Opinion addressed impacts from ongoing training activities conducted by the military, to 39 listed plants, Oahu tree snail (*Achatinella mustelina*), Oahu elepaio (*Chasiempis sandwichensis ibidis*) and critical habitat for 36 plant species and Oahu elepaio. This Amendment will be appended to the Makua Biological Opinion. This Amendment was necessary, pursuant to 50 CFR §402.16, because the August 2007, Waialua Fire burned a significant number of federally endangered *Hibiscus brackenridgei* (ma`o hau hele, native yellow hibiscus), substantially reducing the status of the species and increasing the magnitude of the effects that military training at Makua Military Reservation (Makua) could have on this species. This Amendment addresses the potential effects of military training at Makua to *H. brackenridgei*. It also addresses effects of the development of a fuelbreak, designed to protect an extant population of *H. brackenridgei* and critical habitat for a number of taxa including *Abutilon sandwicense, Bonamia menziesii, Eugenia koolauensis, Euphorbia haeleeleana, Hibiscus brackenridgeii* and *Nototrichium humile*. This Amendment will augment the sections of the Makua Biological Opinion that addressed *Hibiscus brackenridgei* ssp. *mokuleianus,* and critical habitat for *Bonamia menziesii, Euphorbia haeleeleana, Hibiscus brackenridgeii* and *Nototrichium humile* that were addressed in that Opinion. All other information within the Makua Biological Opinion is still valid and remains in effect. This Amendment addresses *Hibiscus brackenridgei* which was federally listed as endangered on November 10, 1994 (59 FR 56333), with emphasis on the subspecies *Hibiscus brackenridgei* ssp. *mokuleianus* addressed in the Makua Biological Opinion. Critical habitat for *Abutilon sandwicense* and *Eugenia koolauensis*, which occurs within the proposed fuelbreak area, but not within the area threatened by training-related fire, is addressed for the first time in this Amendment.

CONSULTATION HISTORY

October 3, 2007: The U.S. Fish and Wildlife Service (Service) received a letter from the Army, reporting that the Waialua Fire, ignited on private land on Sunday August 12, 2007, had impacted nine endangered plant species occurring on State and private land. This report indicated that approximately 90 percent of the *Hibiscus brackenridgei* occurring on Oahu were impacted by this fire. Post-fire surveys were completed by Army Natural Resources Staff, with assistance from the Service and Hawaii Department of Land and Natural Resources Staff and Flying R Ranch.

October 3, 2007 through February 26, 2008: The Service, Army Natural Resources Staff, Army Installation Fire and Safety Office, State of Hawaii Department of Land and Natural Resources, the Makua Implementation Team, the Natural Resources Conservation Service, Center for the Environmental Management of Military Lands, Castle & Cooke, Hawaii Inc., Dole Food Company Hawaii, and Flying R Ranch collaborated in the conceptual design of the Puulu to Alaiheihe Management Unit and Fuelbreak.

January 11, 2008: The Service received a reinitiation request letter which included a report updating the status of *Hibiscus brackenridgei* on Oahu.

February 1, 2008: Army Natural Resource Manager, Michelle Mansker, provided the Service with the project description addressing the reduced population status of *Hibiscus brackenridgei* and associated Army conservation measures.

May 27, 2008: The Service transmitted a project description, incorporating editorial revisions, to Army Natural Resource Manager Michelle Mansker, who approved the changes on the same date.

May 29, 2008: Army Natural Resource Manager, Michelle Mansker, granted the Service an extension of the due date for this Amendment to June 18, 2008.

ACTION AREA SUMMARY

The action area pursuant to section 7 regulations consists of all areas to be affected directly or indirectly by the Federal action including land proposed as management units, land occupied by stabilization plant population units, and adjacent lands where fuelbreaks and firebreaks are established to reduce fire threat to these management and population units pursuant to the Makua Implementation Plan (U.S. Army Garrison, 2003e) and the Makua Implementation Plan Addendum (U.S. Army Garrison 2005a), as updated in annual Makua Implementation Team meetings (U.S. Army Garrison 2006c and 2007). As described in the Action Area Summary of the Makua Biological Opinion, it was determined the Army's actions within the portion of the action area that encompasses the management units outside of the training action area would have beneficial effects to listed species and critical habitat. However, impacts from vegetation management within the newly-proposed 34-hectare (ha) (86-acre (ac)) Puulu to Alaiheihe fuelbreak area may effect *Hibiscus brackenridgei* and critical habitat for six species, and are addressed in this formal consultation. The term "action area" has been refined in this

Amendment to refer to the proposed Puulu to Alaiheihe fuelbreak area in addition to the area at risk of training-related wildland fire described in the Makua Biological Opinion (Figure 1). If Army Natural Resource Staff determine that any additional action may adversely affect a listed species or designated critical habitat, the Army will coordinate with the Service prior to implementing that action.

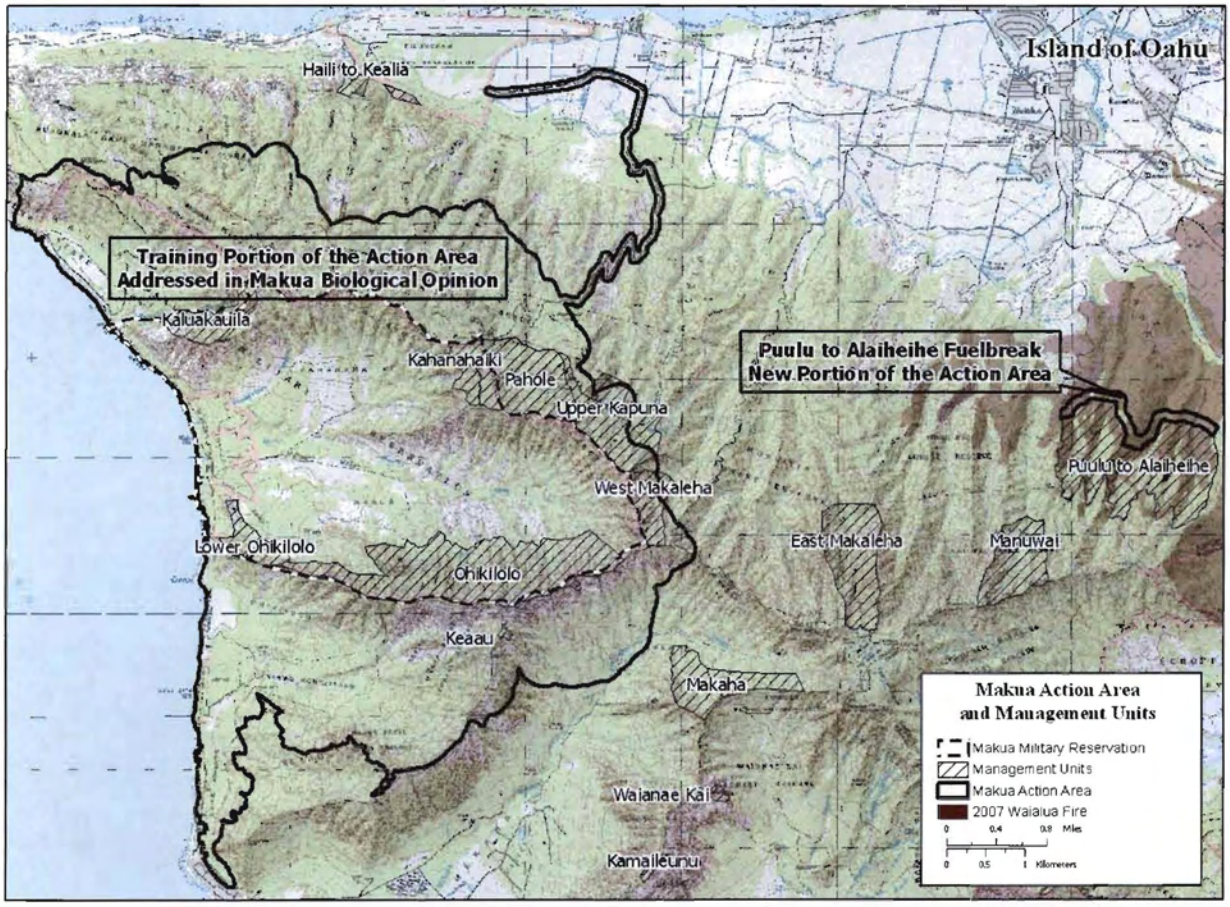

Figure 1. Training and fuelbreak portions of the Makua action area and adjacent management units.

PROJECT DESCRIPTION

The Army training action analyzed in the Makua Biological Opinion (completed in June 2007) will be implemented with the addition of the supplementary conservation measures detailed in this project description. The conservation measures described in this project description were developed to minimize the risk of fire to *Hibiscus brackenridgei* in order to address the severe impacts of the 2007, Waialua Fire, on this species. Four *H. brackenridgei* ssp. *mokuleianus* populations (two within the Makua action area and two outside the action area) will be managed to achieve stabilization goals pursuant to the Makua Implementation Plan Addendum and this project description, as adapted by the Makua Implementation Team.

Summary of Army Actions to Minimize and Offset Wildland Fire Impacts to *Hibiscus brackenridgei*

Expedited stabilization of *Hibiscus brackenridgei* requires control of the threat of fire to the four populations of *H. brackenridgei* ssp. *mokuleianus* designated "manage for stability" population units as outlined in the Makua Implementation Plan Addendum (U.S. Army Garrison 2005a). Development and implementation of fuelbreaks and firebreaks to protect these population units was identified as an urgent action by the Makua Implementation Team (January 28, 2008). Site selection for the four *H. brackenridgei* ssp. *mokuleianus* population units was addressed by the Makua Implementation Team, in coordination with the Service. Site priorities may change through time based on changes in land ownership, site access, plant population status, and other factors. Fuelbreaks and firebreaks have been designed to reduce the risk of fire spreading outside the south lobe of the firebreak road at Makua and to protect management units and plant population units from wildland fire. Prior to use of any weapon at Makua, fuel treatments within and adjacent to the *H. brackenridgei* growing in Lower Ohikilolo Management Unit will be increased and fuel treatments will be maintained to further minimize fire risk to these endangered plants on the installation. Within three years of the completion of this Amendment, and prior to implementation of Column B weapons restrictions (see Makua Biological Opinion), additional fuelbreaks and firebreaks will be developed and maintained to afford additional protection to the three stabilization population units of *H. brackenridgei* which are located outside Makua Valley. Specifications for fuel modifications for the protection of the Puulu to Alaiheihe population unit, developed by Oahu's interagency wildland fire management community (Greenlee *et al* 2007), are outlined in this project description. Fuel treatments to provide the other sites with similar protection are being developed in coordination with the Service (Beavers 2008). Fuel modifications are designed to stand alone in effectively halting the spread of a guinea grass headfire burning under 97th percentile fire weather conditions. In addition, fuels will be modified to minimize fire intensity and firebrand production to minimize short-range spotting into areas occupied by *H. brackenridgei*. A firebrand is a flaming or glowing fuel particle that can be carried naturally by wind, convection currents, or by gravity into unburned fuels. A head fire is a fire spreading or set to spread with wind and slope vectors and a spot fire is a fire ignited outside the perimeter of the main fire by a firebrand. The Army will continue to provide assistance as necessary to the interagency wildland fire suppression agencies to protect the areas identified in this project description from fire, as described in further detail below. As fuelbreaks are completed and the City and County of Honolulu and the State of Hawaii become better equipped to protect these endangered species populations from fires ignited by the public, the magnitude of the Army's response to these fires may be reduced. As new techniques are developed through research, modifications to fuelbreaks and firebreaks outlined in this project description may be made through the adaptive management process of the Makua Implementation Team, in coordination with the Service.

Specific Fuel Treatments Within the Makua Action Area

The north and south lobes of the training area at Makua are surrounded by a firebreak road, which is maintained as a passable road, cleared to bare mineral soil to a width of 6 meters (m) (20 feet (ft)). Fuelbreaks are swaths of less flammable vegetation, where fuel load or continuity is manipulated mechanically, or with prescribed fire, grazing, herbicide, or by other

means, in order to stop or slow fire spread. The maintenance schedule of each of the fuel treatment areas will vary due to accessibility, unexploded ordinance, topography, and vegetation response. Fuelbreak and firebreak descriptions are detailed in the Makua Biological Opinion, as modified, below, in this Amendment. The assigned Army Wildland Fire Incident Commander and the senior Range Control officer staffing Makua during live-fire training are both responsible for daily documentation confirming completion of all fuel treatments in this Amendment.

A. Grass removal within 3 m (10 ft) of *Hibiscus brackenridgei* and within Weed Control Area: Within the Lower Ohikilolo Management Unit, all live and dead grass will be removed from within 3 m (10 ft) of all *Hibiscus brackenridgei* such that total grass cover is maintained at less than one percent. Fuel will be reduced within the remainder of the 3-ha (7-ac) weed control area (labeled A in Figure 2) such that the area will not support the spread of fire given upslope wind speeds of 15 mph and one-hour fuel moisture of eight percent and under more severe burning conditions. Given these conditions, fire spread could occur, but the fire would not be hot enough or have a long enough residence time to kill *H. brackenridgei* (i.e., lethal temperatures of 60 degree Celcius temperatures for more than one minute (Kayll 1968, pp. 96-98 and Methven 1971, p.8).

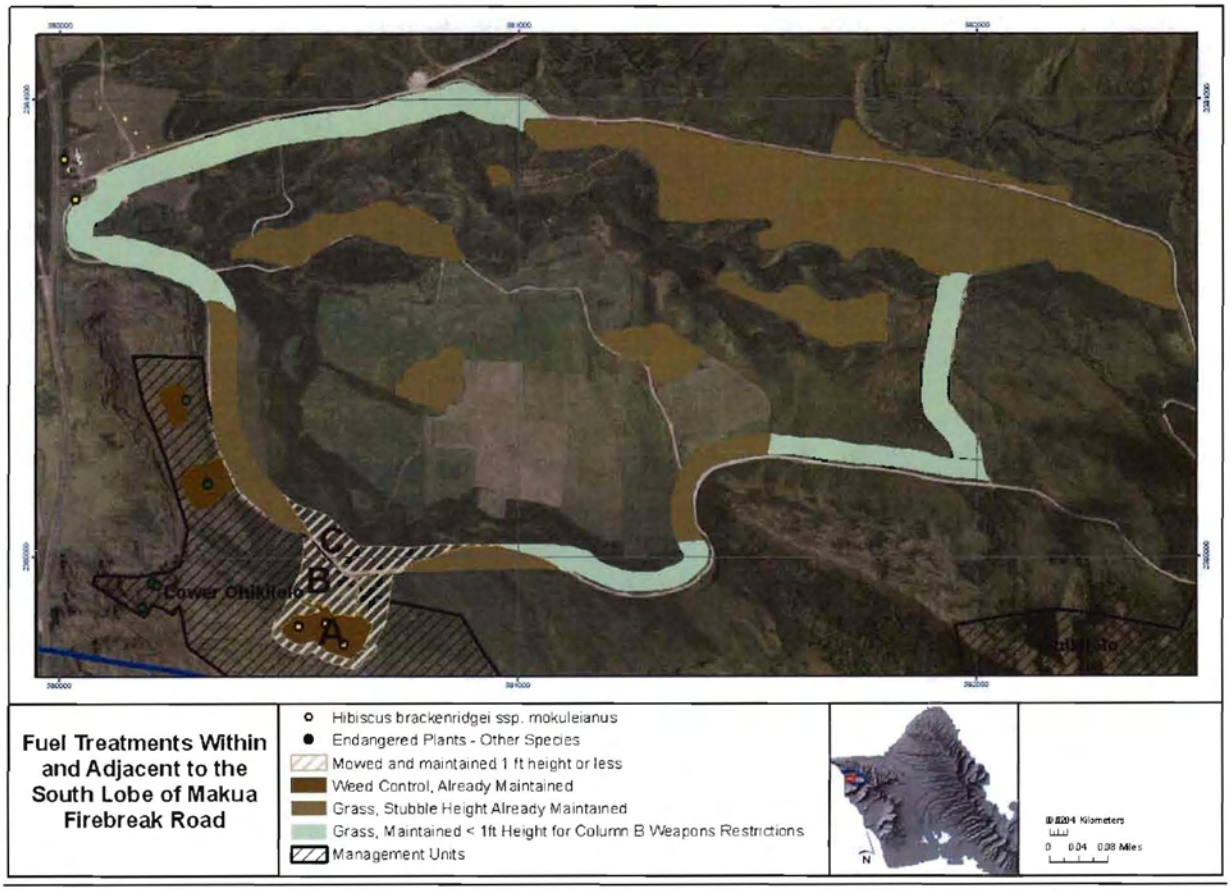

Figure 2. Summary of fuel treatments in the vicinity of the South Lobe of the firebreak road at Makua.

This grass control is currently achieved with frequent herbicide application (Figure 3), and cliff areas that are too steep to access will be excluded from treatments. This level of grass control will remain in place whenever live herbaceous fuel moisture, as measured in the Weather Information Management System (WIMS) at the Makua Range weather station, is less than 150 percent. The rainfall associated with wet periods, when live herbaceous fuel moisture exceeds 150 percent, will enable a high density of grass seedlings to become established. This young vegetation would not contribute to fire spread because of its high moisture content.

Figure 3. Existing weed control area protecting *Hibiscus brackenridgei* at Makua from fire.

B. New Mowed Area: To further minimize fire risk to *Hibiscus brackenridgei* growing in Lower Ohikilolo Management Unit, grass below and adjacent to the existing weed control area will be mowed. Fuel within the 3.1-ha (7.6-ac) area (labeled B in Figure 2) between the firebreak road and the *H. brackenridgei* population and within 20 m (66 ft) of the outer perimeter of the *H. brackenridgei* weed control area, will be mowed within one year of completion of this Amendment and prior to the use of any weapon or prescribed burning. This fuel treatment will be maintained continuously, regardless of training intensity, for the 30-year timeline of the Makua Biological Opinion. Vegetation height will be maintained at 0.3-m (1-ft) height or less or vegetation cover will be reduced to less than 20 percent cover within each square meter (10.8 square feet) in this fuel treatment area. Fuel wetting may be substituted for more permanent fuel modification during the six month period following completion of this Amendment, to provide training opportunities before grass mowing can be completed. Fuel would be periodically sprayed with water with either an irrigation system or hand-held water hoses such that a minimum of 0.01 inches of water falls throughout Area B within two hours of the initiation of the training or burning activity. Area B would be re-treated with 0.01 inches of water every four hours during the training or burning activity. This wetting treatment is designed to ensure fire could not spread in this area of the firebreak. The Service will be contacted prior to the use of this wetting treatment to view its implementation.

C. Fuel Treatment Inside Firebreak Road Grass inside the southern lobe of the firebreak road is, and will continue to be, maintained to stubble height in Objectives Badger, Buffalo, Coyote, Deeds, Deer, Elk, and Wolf, where most weapons are targeted (see Figure 2, Grass, Stubble Height Already Maintained). All flammable material is and will continue to be cleared from firing points and detonation areas pursuant to DA PAM 385-63 (2003, as updated) and the Makua Biological Opinion.

Vegetation within a 60-m (197-ft) strip along the inside edge of the south lobe of the firebreak road will be maintained at 0.3-m (1-ft) height or less by mowing (see Figure 2). Approximately half this area is mowed and already meets this specification. In the Project Description of the Makua Biological Opinion, 17 ha (42 ac) of this fuel treatment area, which was not being mowed, was scheduled to be treated prior to implementation of Column B weapons restrictions. To provide more immediate protection to the *Hibiscus brackenridgei* growing in Lower Ohikilolo Management Unit, the 60-m (197-ft) strip of vegetation along the inside the southwest corner of the south lobe of the firebreak road (a 2-ha (5-ac) area (Figure 2, area labeled C) will be no taller than 0.3-m (1-ft) height when any weapons are used or prescribed burning is conducted at Makua. The remaining 15 ha (37 ac) of fuel treatment along the inside of the firebreak road will be completed prior to implementation of Column B weapons restrictions and will meet these specifications any time a weapon (including all weapons listed in Table PD 2 of the Makua Biological Opinion) is in use at Makua. Fuel wetting, as described for Area B (above) may be substituted for more permanent fuel modification during the six month period following completion of this Amendment, to provide training opportunities and time for grass mowing to be completed.

Fuel Treatments in the Puulu to Alaiheihe Gulch Area The impact of the 2007 Waialua Fire to *Hibiscus brackenridgei* underscores the need to expedite development of fuelbreaks and firebreaks to protect at-risk population units from fire. Within three years of the completion of this Amendment, (provided landowner and lessee permission is secured and maintained), the *H. brackenridgei* in the vicinity of Puulu to Alaiheihe Gulches will be protected from wildland fire by a fuelbreak adequate to halt fire spread and minimize spot fire occurrence in the *H. brackenridgei* conservation area. An interagency team of wildland fire management specialists has drafted a plan for a fuelbreak to traverse the bottom edge of the proposed conservation area (Figures 4 and 5). The Army will provide assistance to the interagency conservation community to ensure this fuelbreak is completed and operational within three years of the completion of this Amendment and that it remains effective for the life of the Biological Opinion.

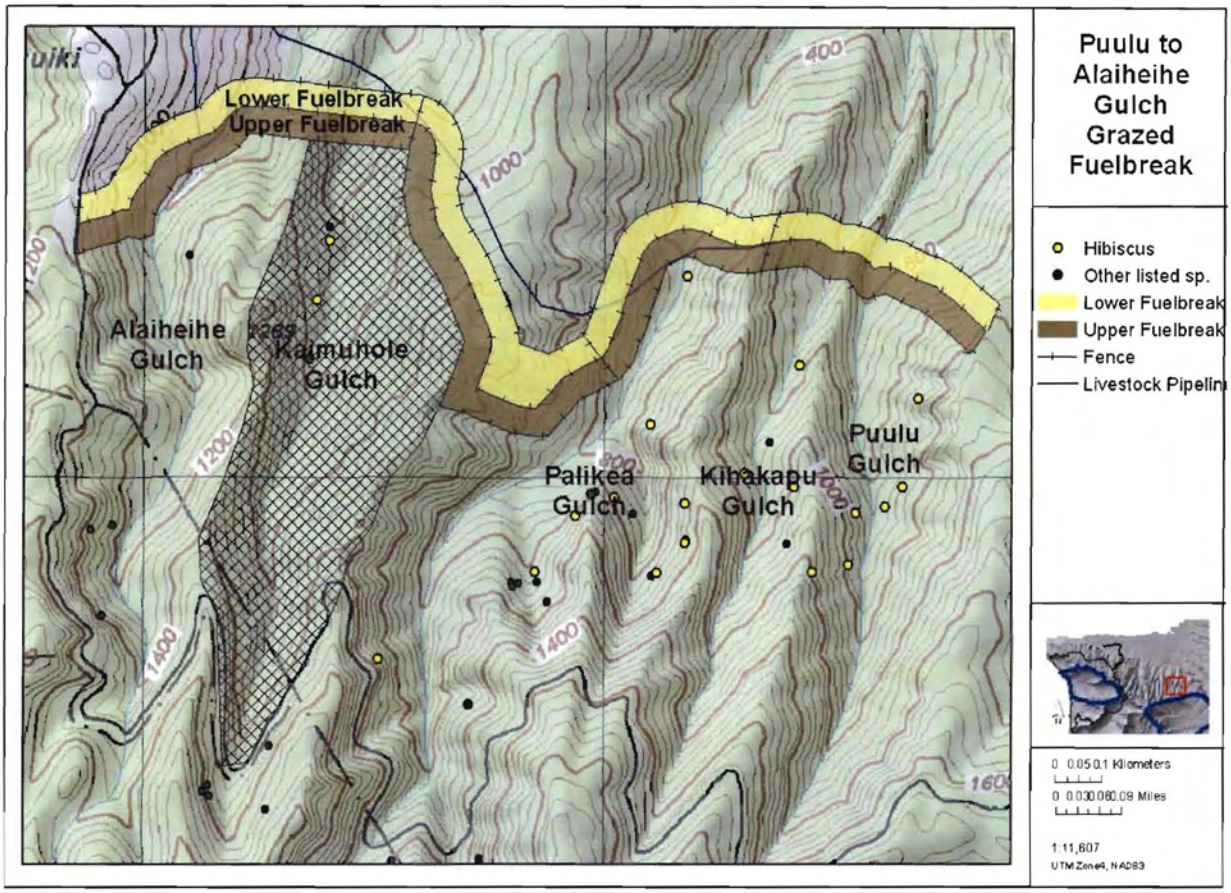

Figure 4. Puulu to Alaiheihe Gulch fuelbreak to protect *Hibiscus brackenridgei* population on upper slope with prescribed grazing below.

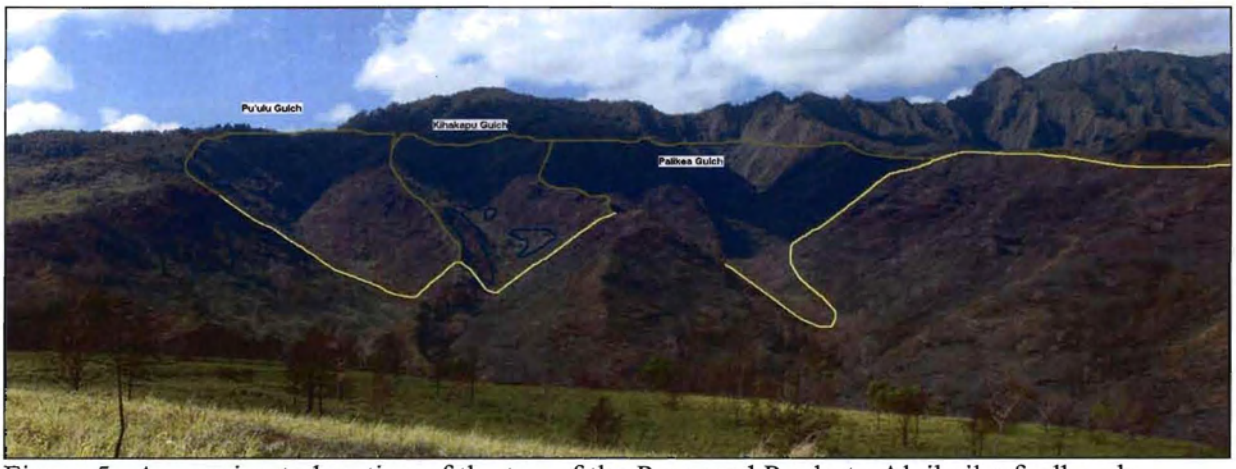

Figure 5. Approximate location of the top of the Proposed Puulu to Alaiheihe fuelbreak showing, from left to right, Puulu Gulch, Kihakapu Gulch, and Palikea Gulch.

A 34-ha (86-ac) fuelbreak will be constructed along the bottom edge of the Puulu to Alaiheihe Gulch *Hibiscus brackenridgei* population unit and it will be intensively managed with prescribed grazing to protect the remaining *H. brackenridgei* in this area. The fuelbreak

location, adjacent to the areas that were vegetated by forest fuels prior to the 2007 Waialua Fire, is designed to minimize fire risk to the listed species and critical habitat within the Puulu to Alaiheihe Management Unit. The fuelbreak will be subdivided with cross-fencing to enable intensive grazing and rotation of working animals. Cross-fencing will divide the fuelbreak into upper and lower halves. Half the fuelbreak would be grazed to such an extent, vegetation would not carry fire, similar to heavily grazed areas which contributed to fire containment efforts in the northwest perimeter of the Waialua Fire (Keir and Cannarella 2007) (Figure 6). Within this intensively managed half of the fuelbreak, there may be some discontinuous pockets of heavier fuel that would support fire spread, but there will always be a continuous width, a minimum of 20 m (66 ft) wide, within the 60-m (197-ft) wide intensively managed area, that would not carry fire. These narrower areas may include sparsely vegetated cliffs. Year-round, throughout a minimum of 90 percent of the length of the fuelbreak, the fuel on either the upper or lower portion will be managed to the level necessary to prevent breach by a headfire. Any area, such as the steepest areas, not managed to this prescribed level with grazing (up to 10 percent of the fuelbreak length) must be actively managed in an alternative way (for instance with out-planting of trees and shrubs, in conjunction with grass control and a narrow handline) to achieve effectiveness as a fuelbreak in the long-term. Research, including installation of areas of shaded fuelbreak may be conducted along portions of the fuelbreak and the fuelbreak location or dimensions may be changed with the approval of the Service.

To provide working animals with adequate energy to perform intensive grazing in the fuelbreak, supplemental feeding may be necessary. Water sources, feed, and mineral supplements would be strategically placed within the fuelbreak to ensure adequate fuel reduction throughout the treatment area. The Army may hire the local lessee, who operates cattle and goat ranch on the property, or another contractor to manage grazing within the fuelbreak area. Cattle, goats, sheep, or other suitable livestock may be rotated through the fuelbreak area to achieve fuelbreak goals. During the winter rainy season, when grass is green (for instance, whenever live herbaceous fuel moisture, as measured in the Weather Information Management System (WIMS) at the Dillingham remote automated weather station, is greater than 150 percent, the fuelbreak will not need to be grazed to maintain effectiveness. This green grass would not contribute to fire spread because of its high moisture content. Heavier stands of ungrazed vegetation will minimize soil erosion during the rainy season.

Figure 6. Intensively grazed areas which contributed to fire containment efforts in the northwest perimeter of the Waialua Fire (Photos taken August 30, 2007).

While it is recovering from periods of more intensive grazing, the other half of the fuelbreak will be managed to minimize significant spot fire production. The onset of significant fire

spotting activity is generally acknowledged to occur at fire intensities of approximately 435-700 Btu/ft/sec (1,500-2,413 kW/m) (Hough and Albini 1978, p. 5; Hirsch *et al* 1979, p.3 and 12, Alexander *et al* 2004, pp. 1-2, Omi 2005, pp. 151-153). This corresponds to flame lengths of between seven and nine feet. Andrews (1986, p.10) predicts spotting to begin when flame lengths reach eight to 11 feet. BehavePlus fire behavior model (Andrews *et al* 2005) indicates that guinea grass head fire intensity is generally below this threshold under 97th percentile burning conditions, on a 60 percent slope with upslope winds, when live herbaceous fuel moisture is greater than 120 percent or when the grass is grazed to a fuel loading of less than 2.0 tons/acre (as shown in Figure 7).

Figure 7. Fuel on half of the fuelbreak would not be as heavily grazed, but would be managed to reduce fire intensity to minimize spot fire production (Photo taken at Dillingham Ranch, August 12, 2007).

Because the fuelbreak will not need to be grazed when grass is green, grass cover will be higher and erosion will be minimized during the wet season. Figure 8 illustrates the seasonal variation in grass cover associated with various levels of grazing and rainfall at Flying R Ranch.

Figure 8. Pasture (with a road crossing back and forth through it) grazed by goats, unburned in the Waialua Fire (top) compared with the same site during the wet season (bottom).

The fuelbreak was selected because the fire suppression helicopter response necessary to protect the site from fire, in the absence of a fuelbreak, is cost-prohibitive and, based on contractor availability during the 2007 Waialua Fire, unreliable. A fuelbreak is needed because impacts of the fire to listed species and native forest, as well as the severe erosion of topsoil that occurred in the burned forest areas (Beachy 2007) are inconsistent with recovery of the species and conservation of the critical habitat units. Alternatives to the grazed fuelbreak were considered, but their impacts, costs, or effectiveness made them less suitable for this site than the proposed grazed fuelbreak. Placement of the grazed fuelbreak lower down on the slope would leave a larger area of guinea grass in which spot fires could proliferate and exceed suppression resource capabilities. Slopes are too steep to install a mid-slope road along the forest edge, and erosion associated with the cut banks would have been severe (Kacir 2007 and Koob 2007). A mid-slope shaded fuelbreak, in which native shrubs are planted, would not be effective unless guinea grass is controlled within the fuelbreak area. The landscape-scale use of herbicide within the shaded fuelbreak, as well as within another alternative in which herbicide would have been broadcast to create a mineral soil firebreak, were not selected

because they were more labor intensive would result in greater soil erosion than the selected grazed fuelbreak (Beavers, 2006). As the guinea grass fuel model is refined as grazed fuels are studied, the Army will coordinate with the Service to alter fuelbreak specifications. The Army has contracted the U.S. Forest Service to study fire behavior in recently grazed and burned guinea grass stands to increase our knowledge regarding efficient, effective management and maintenance of fuelbreaks.

Specific Army Fire Suppression Assistance to State and City and County

Training at Makua is contingent upon the successful augmentation and reintroduction of endangered species populations and the control of threats to these populations outside the Makua installation boundary. As fuelbreaks are completed and the City and County of Honolulu and the State of Hawaii become better equipped to protect these endangered species populations from fires ignited by the public, the magnitude of the Army's response to these fires would be reduced. Historically the Army has provided firefighter and fire suppression helicopter support to fires threatening these off-installation areas. As funding and fire suppression resources are available, the Army will continue to assist other Federal agencies, State, and City and County fire suppression organizations with the suppression of fires that threaten the management units and manage for stability population units (Figure 9).

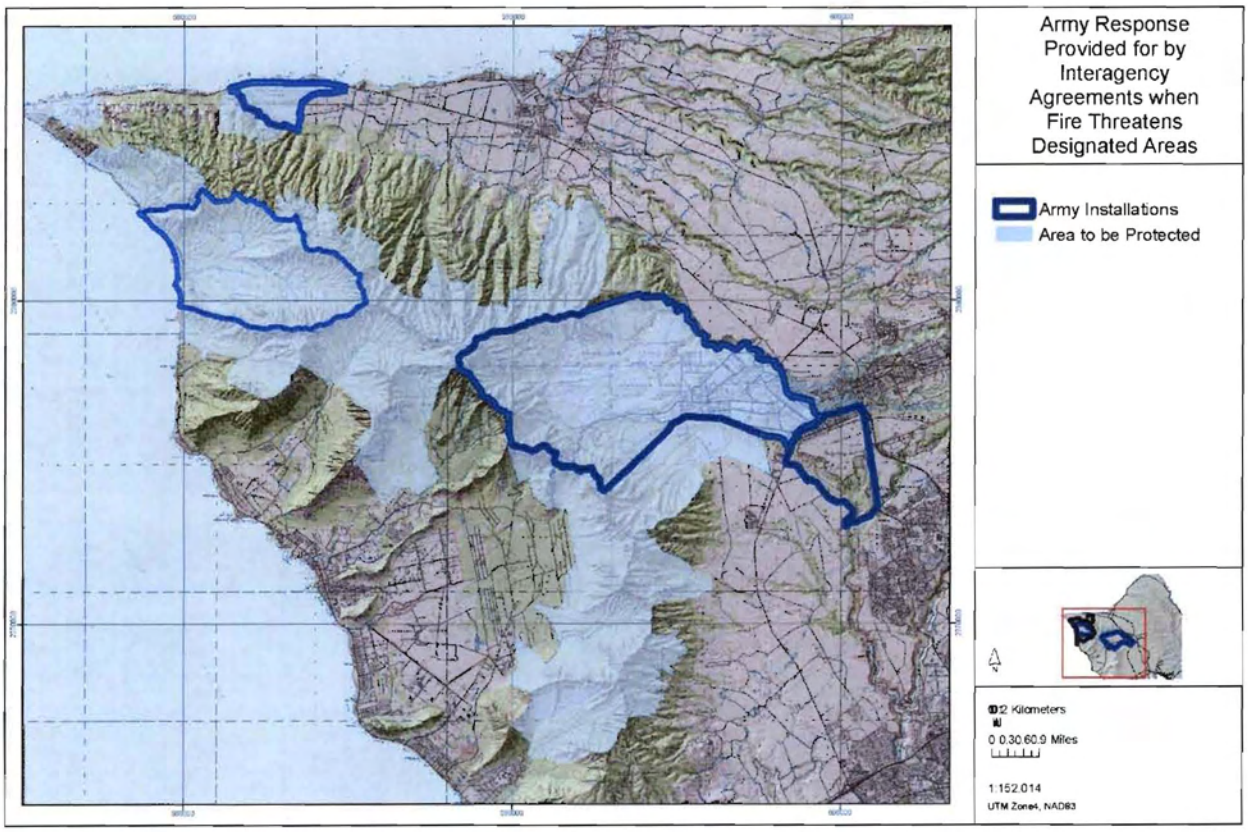

Figure 9. The Army will maintain agreements with the State of Hawaii and City and County of Honolulu, which will enable the rapid deployment of Army-funded helicopter fire suppression forces and ground firefighting forces to better ensure fires do not impact the blue shaded areas.

The use of Army-funded aerial and ground firefighting resources may be authorized as necessary on a case-by-case basis when the designated Fire Response Area is threatened by fire. The Army Wildland Fire Management Officer, Army Wildland Fire Assistant Fire Management Officer, Department of Public Works Natural Resources Manager, their supervisors in the chain of command, or the Federal Fire Department Unified Command Incident Commander have the authority to dispatch fire suppression helicopters, under contract with the Army, to these and other fires. The Army also maintains agreements with the interagency wildland fire community, which provide for use of military aircraft on interagency fires in Hawaii.

Makua Implementation Plan – Stabilization Overview

Four *Hibiscus brackenridgei* ssp. *mokuleianus* populations (two within the Makua action area (Makua and Keaau) and two outside the action area (Puulu to Alaiheihe and Haili to Kawaiu) will be managed to achieve stabilization goals pursuant to the Makua Implementation Plan Addendum, as adapted by the Makua Implementation Team (U.S. Army Garrison 2005a).

Makua Population Unit The Makua Population Unit will continue to be managed to achieve stabilization goals pursuant to the Makua Implementation Plan Addendum (U.S. Army Garrison 2005a). In February, 2008, 23 Army-propagated seedlings were out-planted in the Lower Ohikilolo Management Unit. All mature and immature *Hibiscus brackenridgei* growing in Lower Ohikilolo Management Unit are currently represented in genetic storage. Full genetic storage will be maintained for all Makua immature and mature plants throughout the life of the Makua Biological Opinion. Full genetic storage is considered to be maintained for a *Hibiscus brackenridgei* ssp. *mokuleianus* plant when at least one cutting from the original plant is growing vigorously in the nursery or a secure ex situ site, or when ten or more viable seeds are secured in storage.

Puulu to Alaiheihe Population Unit Although 96 percent of the adult plants and 99 percent of the immature plants in the Waialua area were killed by the 2007 Waialua Fire (U.S. Army Garrison 2008; pp 7-29), seedlings are abundant in the vicinity of burned *H. brackenridgei* plants. The Army is working closely with the interagency conservation community to ensure the future protection of the Puulu to Alaiheihe manage for stability *H. brackenridgei* population unit. Although the Army will fund the majority of the actions described in this project description, portions of the project may be funded by the Service, Hawaii Department of Land and Natural Resources, U.S.D.A. Natural Resource Conservation Service, the landowner and lessee, and other public and private conservation organizations. The Army will (provided landowner permission is granted and maintained) ensure the Puulu to Alaiheihe Management Unit and fuelbreak shown in Figure 10 are completed and operational within three years.

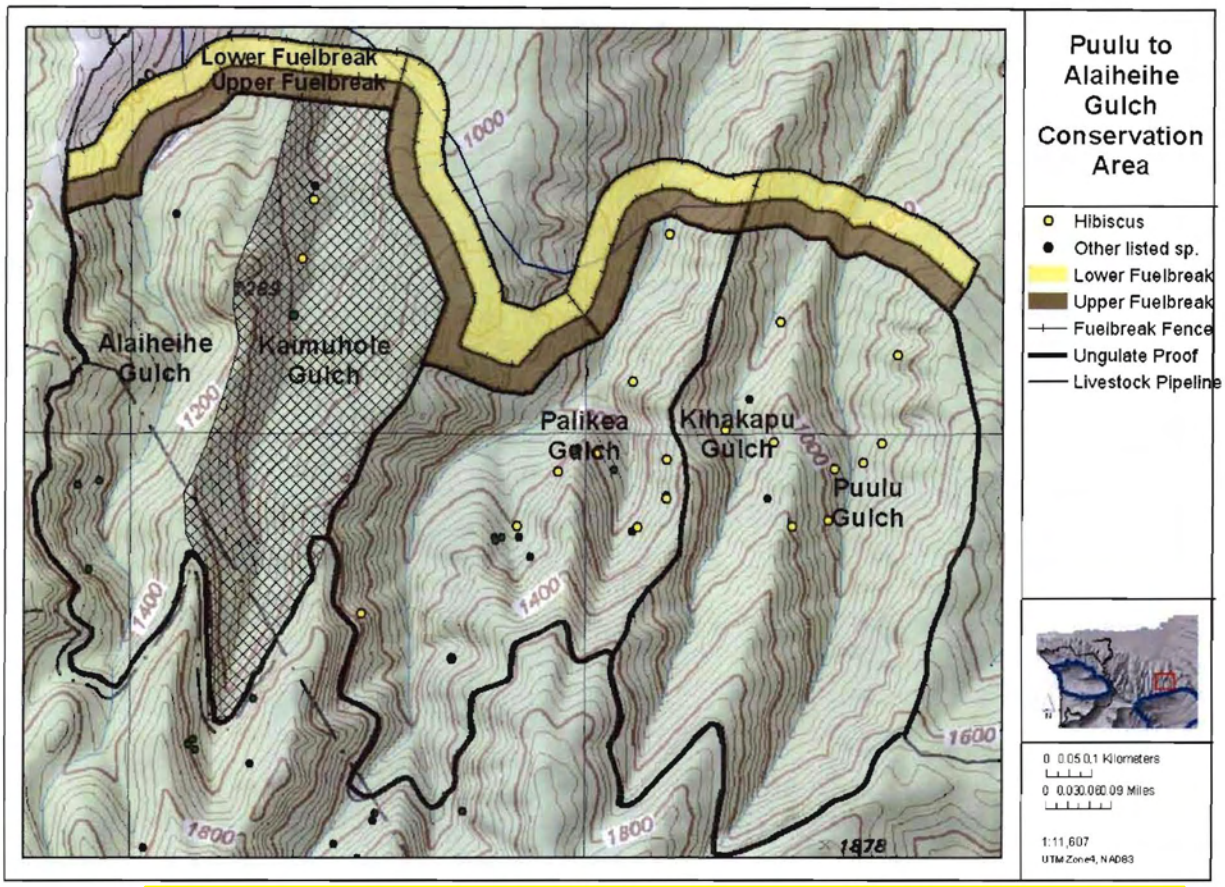

Figure 10. The Army will ensure that ungulate-exclusion fencing is completed and areas are free of ungulates within three years of the completion of this Amendment.

The Makua Implementation Team identified this fuelbreak and ungulate exclusion as the highest priority management action for these gulches. The team believes protection from fire and ungulates will provide opportunity for at least 75 percent of pre-fire adult plus immature *H. brackenridgei* population to re-establish. If in five years, the population has not recovered to a minimum size of 469 individuals (seventy five percent of 625 plants is 469 plants), the Makua Implementation Team will develop additional measures to ensure rapid restoration and maintenance of population size. Weed control targets that apply to the other Makua Implementation Plan management units will not apply to this new area, and other than any adaptive management which may be developed by the Makua Implementation Team, the Army would not conduct weed control within this new area. Numeric stabilization goals have not been refined for this species, and a population structure with 50 mature, reproducing individuals remains the Army's management objective for this population unit. The site is predominantly on Castle & Cooke Hawaii property and is partially on State Forest Reserve and State Natural Area Reserve land. Castle & Cooke Hawaii and the Army are nearing completion of a right-of-entry agreement which would serve as a template for the right-of-entry agreement for Puulu to Alaiheihe population unit management. The Army is working diligently with the State to finalize access agreements to provide for the Army fence construction on the State portion of the project area. The Army will survey the seedlings in the fire area (two to three times a year) to determine seedling numbers and document any ungulate