

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).

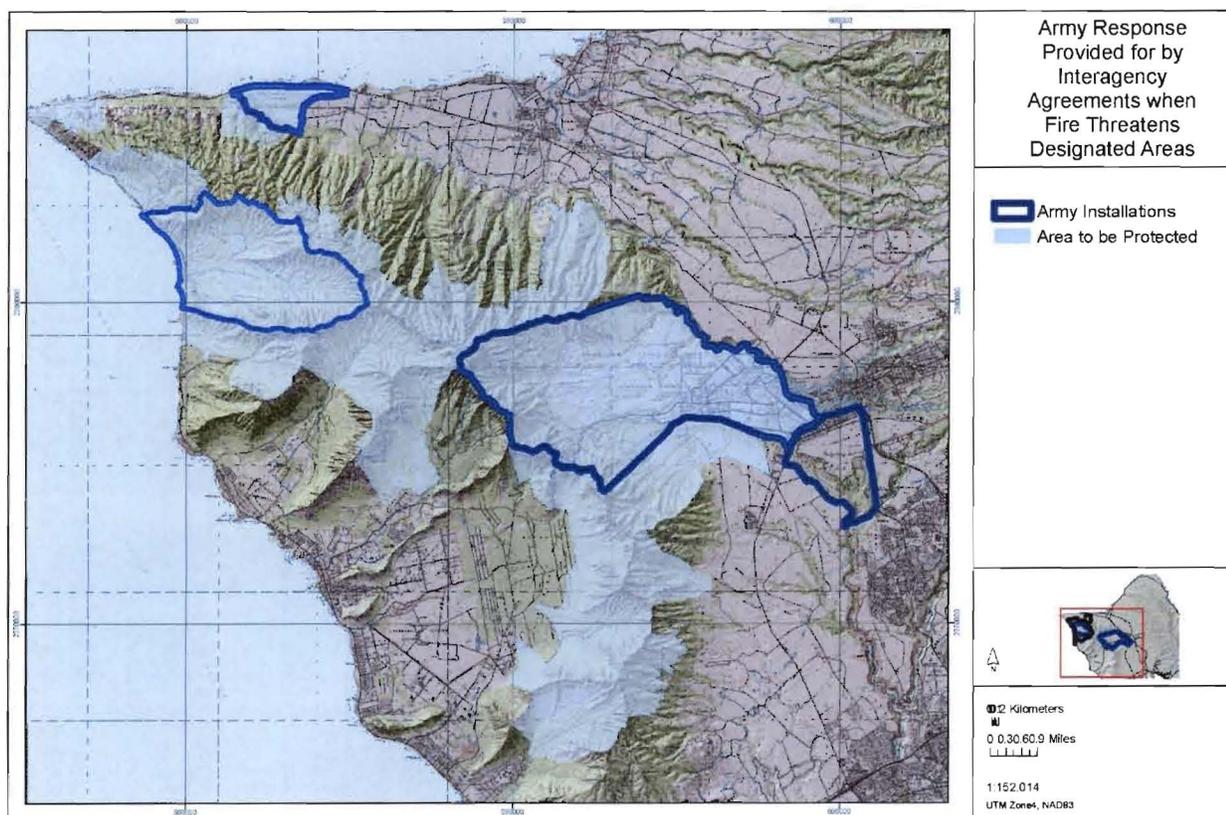


Figure 9. The Army will maintain agreements with the State of Hawaii and City and County of Honolulu, which will enable the rapid deployment of Army-funded helicopter fire suppression forces and ground firefighting forces to better ensure fires do not impact the blue shaded areas.

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.

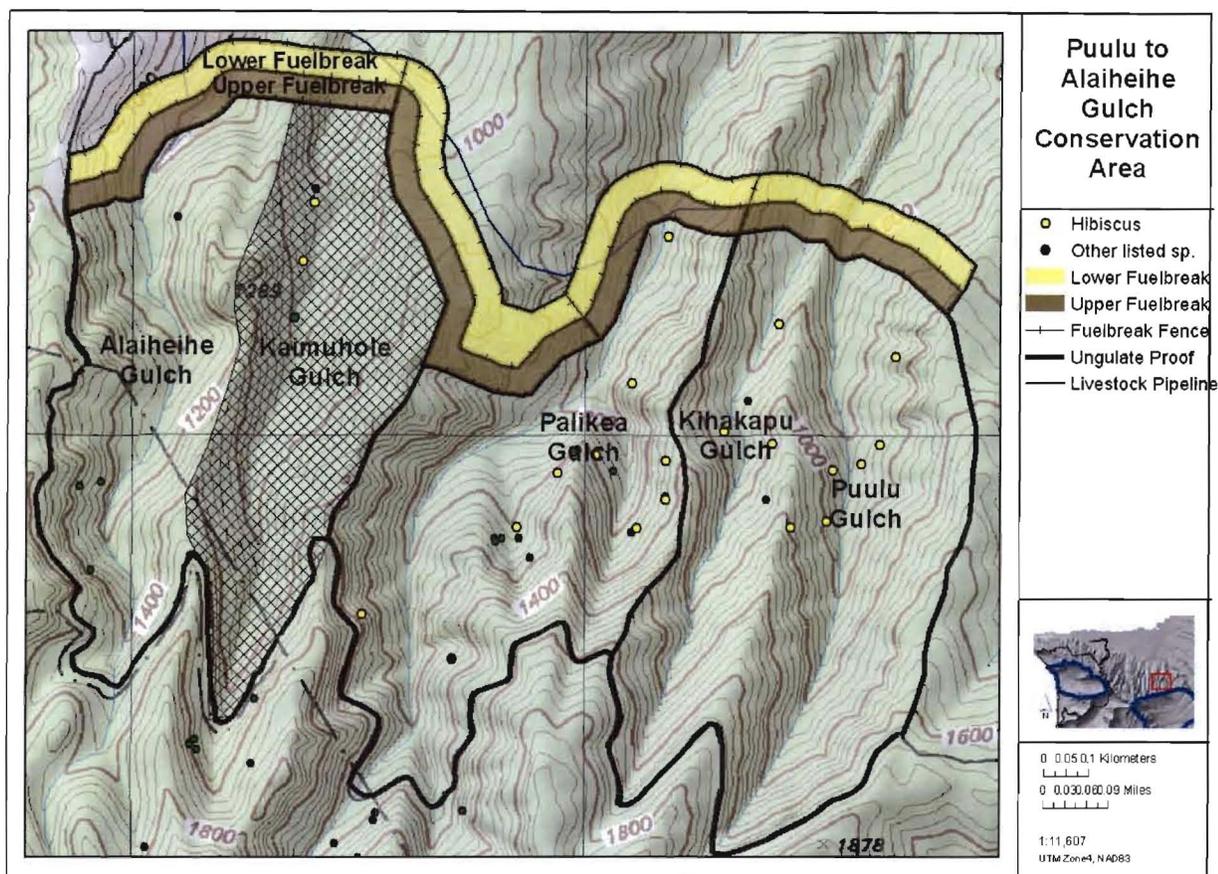


Figure 10. The Army will ensure that ungulate-exclusion fencing is completed and areas are free of ungulates within three years of the completion of this Amendment.

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 Alaihehe 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

browse and grass competition impacts. Where browsing impact is found, the Army will install temporary fencing to protect seedlings until permanent fencing can be completed.

STATUS AND ENVIRONMENTAL BASELINE OF SPECIES AND CRITICAL HABITAT

The population status of *Hibiscus brackenridgei* was significantly reduced as a result of the 2007 Waialua Fire and the biological and ecological information relevant in analyzing the effects of the action to this species has been updated in this Amendment. Because a fuelbreak proposed to protect a *H. brackenridgei* population is located partially within areas designated as critical habitat for six plant taxa, impacts to critical habitat are addressed in this Amendment as well. Four of the six affected taxa's critical habitat units were addressed in the Makua Biological Opinion and are updated here. Critical habitat for two taxa (*Abutilon sandwicense* and *Eugenia koolauensis*) which were not addressed in the Makua Biological Opinion (because no units occur within the training portion of the action area) are addressed for the first time in this Amendment.

General environmental baseline factors, which are uniform for all species and critical habitat in the training portion of the action area, are described in the Makua Biological Opinion and remain valid. Baseline factors that apply to all critical habitat units within the Puulu to Alaiheihe fuelbreak area are addressed in the General Environmental Baseline Factors section below. These factors include past and present impacts of all Federal, State, or private actions, and other human activities in the action area; anticipated impacts of all proposed Federal projects in the action area that have already undergone formal consultation; and impact of State or private actions that are contemporaneous with the consultation. Details on unique or important factors for particular species or critical habitat units are discussed more fully in the species-specific status and baseline descriptions that follow.

General Environmental Baseline Factors within the Proposed Puulu to Alaiheihe Fuelbreak

The proposed Puulu to Alaiheihe fuelbreak is located on the north slope of the Waianae Mountains, on the north shore of Oahu, in steep valleys ranging in elevation from 158 to 402 m (520 to 1,320 ft). In the fuelbreak area, rainfall averages range from 1105 to 1240 millimeters (43 to 49 inches) per year (Giambelluca *et al* 1986). Slopes within the fuelbreak area average 51 percent but intermittent vertical rock cliff areas are distributed throughout its length (U.S. Geological Survey 2003). The fuelbreak is located on land held in title by Castle & Cooke Hawaii, Inc. The property is leased by Robert Cherry, who operates Flying R Ranch, a cattle and goat production operation. Portions of the fuelbreak are within areas designated as critical habitat for the six taxa shown in Table 1. The fuelbreak area is occupied by alien vegetation as a result of past and present ranching and wildfires, including portions of the 2,269-ha (5,606-ac) Waialua Fire of 2007 (see Table 1 and Figure 1).

Table 1. Critical Habitat Found Within the Puulu to Alaiheihe Fuelbreak Portion of the Action Area.

Critical Habitat Taxa	Size of Critical Habitat Unit	Percentage of Critical Habitat Unit		
		Within Puulu to Alaiheihe Fuelbreak	Burned in Waialua Fire (2007)	Protected From Fire by Fuelbreak
<i>Abutilon sandwicense</i>	604 ha (1,492 ac)	1%	18%	30%
<i>Bonamia menziesii</i>	94 ha (232 ac)	6%	55%	94%
<i>Eugenia koolauensis</i>	113 ha (279 ac)	14%	80%	34%
<i>Euphorbia haelealeana</i>	357 (881 ac)	6%	53%	35%
<i>Hibiscus brackenridgei</i>	560 (1385 ac)	6%	64%	28%
<i>Notrichium humile</i>	237 (586 ac)	3%	44%	74%

According to the Hawaii Gap Analysis Program vegetation map, as of 2005, the proposed grazed fuelbreak area contained the following vegetation: Koa Haole Shrubland: 11 ha (27 ac), Christmas Berry Shrubland: 7 ha (18 ac), Alien Grassland: 7 ha (16 ac), Kiawe-Koa Haole Forest and Shrubland: 7 ha (17 ac), Alien Forest: 1 ha (4 ac), Alien Shrubs and Grasses 2 ha (4 ac) and Mixed Native-Alien Forest 0.2 ha (0.4 ac) (Hawaii Gap Analysis Program 2005). Before human settlement on Oahu, vegetation in lowland areas such as this probably consisted of dry grasslands and shrublands, and shrublands and forests in some areas may have extended all the way to the coast (Cuddihy and Stone 1990). Major threats to critical habitat in the action area related to human activities are non-native plants and animals introduced by Polynesian and Euro-American settlers. These invasive species include ungulates (pigs, goats, cattle, and sheep), rodents (rats and mice), insects (black-twig borer, Chinese rose beetle, two-spotted leaf hopper, long-legged ant, white fly, and scales), other invertebrates (snails and slugs), and hundreds of invasive weed species that compete with native plants for growing space, light, water, and soil nutrients (See the Makua Biological Opinion for more detailed information).

No Federal projects within the fuelbreak portion of the action area have been addressed in any previous formal or informal consultations. Adjacent lands include the Puulu to Alaiheihe Management Unit, the Kaimuhole Gulch portion of which was designated for Army management pursuant to the Makua Implementation Plan Addendum (U.S. Army Garrison 2005a). The Puulu to Alaiheihe Management Unit is predominantly on private land, but extends into the lower edges of the Mokuleia Forest Reserve and Kaala Natural Area Reserve areas managed by the Hawaii Department of Land and Natural Resources.

Status of the Critical Habitat – *Abutilon sandwicense*

Critical Habitat Description

A total of 783 ha (1,935 ac) has been designated as critical habitat for *Abutilon sandwicense* and within six distinct units on Oahu (Figure 11). Critical habitat unit A, on state and private land, the largest of the units, at 604 ha (1,492 ac), was designated to provide habitat for five populations of 300 mature, reproducing *A. sandwicense* (68 FR 36020). Units B through F total 197 ha (443 ac), range in size from 30 ha (74 ac) to 49 ha (121 ac), and are each designated to provide habitat for one population of 300 mature, reproducing *A. sandwicense*

(68 FR 36016, 68 FR36021). Within these units, the primary constituent elements include, but are not limited to, the habitat components provided by steep slopes or gulches in dry to mesic lowland forest and containing one or more of the following associated native plant species: *Antidesma pulvinatum*, *Diospyros sandwicensis*, *Elaeocarpus bifidus*, *Eugenia reinwardtiana*, *Hibiscus arnottianus*, *Metrosideros polymorpha*, *Myrsine lanaiensis*, *Nestegis sandwicensis*, *Pipturus albidus*, *Pisonia* sp., *Pittosporum* sp., *Pleomele* sp., *Psydrax odorata*, *Rauvolfia sandwicensis*, *Reynoldsia sandwicensis*, or *Sapindus oahuensis*; at elevations between 215 and 725 m (705 and 2,378 ft). The plant community, associated species, and elevations are indicative of important features such as soil moisture, nutrient cycling and availability, temperature ranges, and light levels that are included as primary constituent elements of the habitat required for the conservation of this species (68 FR 36400).

The major threats to *Abutilon sandwicense* critical habitat are competition from the non-native plant species *Ageratina riparia*, *Aleurites moluccana*, *Clidemia hirta*, *Ficus microcarpa*, *Grevillea robusta*, *Hyptis pectinata*, *Ipomoea* sp., *Kalanchoe pinnata*, *Leucaena leucocephala*, *Melia azedarach*, *Melinis minutiflora*, *Montanoa hibiscifolia*, *Oplismenus hirtellus*, *Panicum maximum*, *Passiflora suberosa*, *Pimenta dioica*, *Psidium cattleianum*, *Psidium guajava*, *Rivina humilis*, *Schinus terebinthifolius*, *Syzygium cumini*, and/or *Toona ciliate*; fire; damage from the black twig borer and Chinese rose beetle; habitat degradation and/or destruction by feral pigs and goats and trampling by cattle (Service 1998b; 56 FR 55770; 68 FR 35951). Approximately 18 percent (105 ha (269 ac) of the 604-ha (1,492-ac) *A. sandwicense* critical habitat unit A (14 percent of all critical habitat designated for this taxa) was burned in the 2007 Waialua Fire (see Figure 11).

Environmental Baseline of the Critical Habitat

Status of the Critical Habitat in the Action Area Less than one percent (4 ha (10 ac)) of *Abutilon sandwicense* critical habitat unit A occurs within the Puulu to Alaiheihe Fuelbreak portion of the Makua action area (see Figure 11). No *A. sandwicense* critical habitat occurs within the training portion of the Makua action area.

Threats to the Critical Habitat in the Action Area Threats to *Abutilon sandwicense* critical habitat in the Puulu to Alaiheihe fuelbreak portion of the action area include fire, grazing, trampling, disturbance by feral pigs, and competition from invasive exotic plants including guinea grass. Ninety-six percent of *A. sandwicense* critical habitat in the fuelbreak portion of the action area was classified as alien vegetation (Hawaii Gap Analysis Program 2005), the site is currently managed as a pasture for cattle and goats (Cherry 2008) and all of the *A. sandwicense* critical habitat within the fuelbreak area was burned in the 2007 Waialua Fire (see Figure 20).

Ongoing Conservation Actions for the Critical Habitat Within the Action Area Other than interagency fire protection efforts, no ongoing conservation actions benefit *Abutilon sandwicense* critical habitat in the Puulu to Alaiheihe fuelbreak portion of the action area.

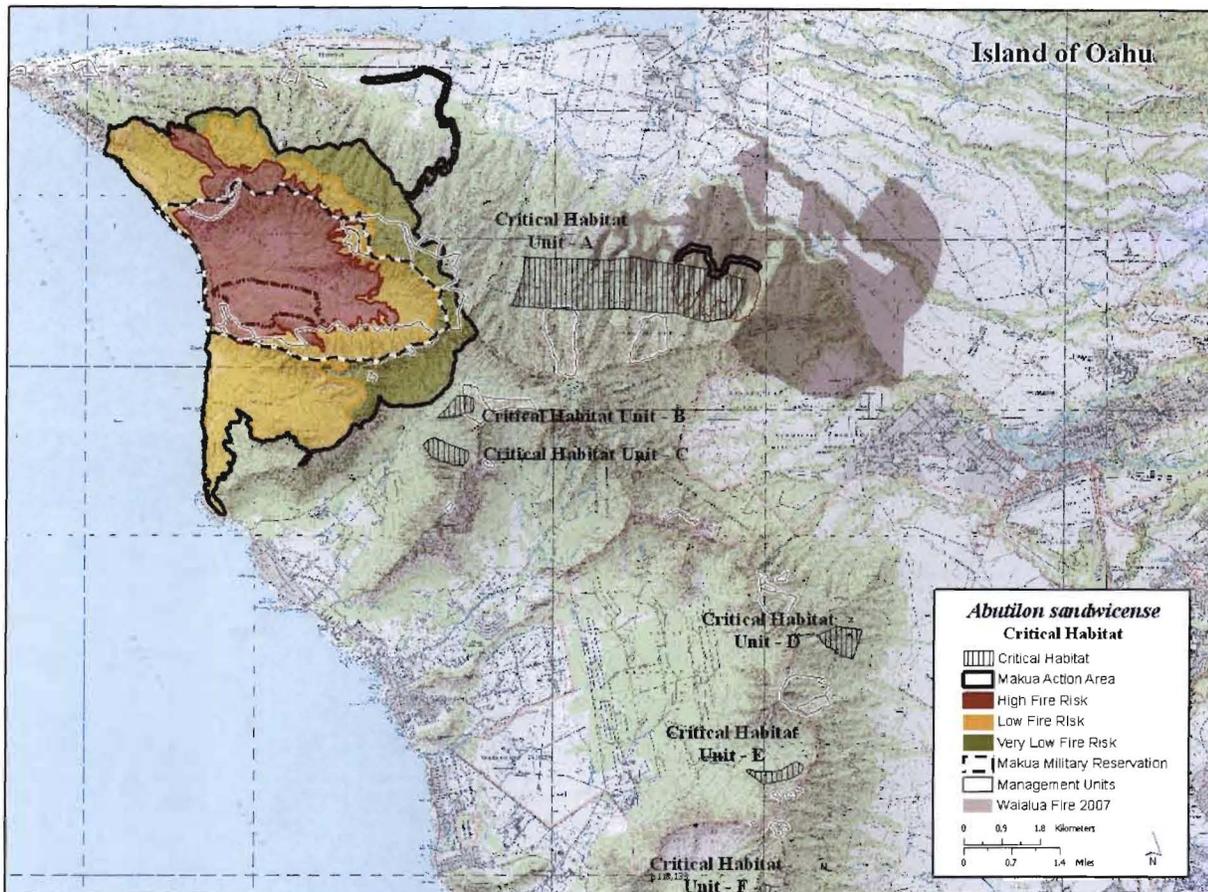


Figure 11. *Abutilon sandwicense* critical habitat in the Waianae Mountains.

Status of the Critical Habitat – *Bonamia menziesii*

The Makua Biological Opinion's description of *Bonamia menziesii* critical habitat remains valid. In summary, a total of 1,795 ha (4,415 ac) has been designated as critical habitat for *B. menziesii* within nine distinct units on four Hawaiian Islands. Two critical habitat units on Kauai total approximately 513 ha (1,267 ac), one unit on Maui is 536 ha (1,325 ac), five units totaling 608 ha (1,503 ac) are designated on Oahu, and one 163-ha (402-ac) unit is designated on Hawaii. Each of the critical habitat units was designated to provide habitat for one population of at least 300 mature, reproducing individuals of *B. menziesii* (68 FR 9116, 68 FR 25934, 68 FR 35950, 68 FR 39624). The primary constituent elements of the units on Oahu include steep slopes or level ground in dry or mesic forest in open or closed canopy at elevations between 81 and 658 m (266 and 2,158 ft), containing one or more of the following associated native plant species: *Acacia koa*, *Alyxia oliviformis*, *Dianella sandwicensis*, *Diospyros sandwicensis*, *Dodonaea viscosa*, *Erythrina sandwicensis*, *Hedyotis terminalis*, *Leptecophylla tameiameia*, *Melicope* sp., *Metrosideros polymorpha*, *Myoporum sandwicensis*, *Nestegis sandwicensis*, *Pisonia* sp., *Pittosporum* sp., *Pleomele* sp., *Pouteria sandwicensis*, *Psydrax odorata*, *Rauwolfia sandwicensis*, *Sapindus oahuensis*, *Sicyos* sp., *Sida fallax*, or *Waltheria indica*. The plant community, associated species, and elevations are indicative of important features such as soil moisture, nutrient cycling and availability, temperature ranges, and light levels that are included as primary constituent elements of the habitat required for the conservation of this species (68 FR 35950). The major threats to the primary constituent

elements of the critical habitat include the black twig borer, fire, habitat degradation by feral pigs, and stochastic events. Non-native plants, especially *Andropogon virginicus*, *Clidemia hirta*, *Psidium cattleianum*, *Pterolepis glomerata*, and *Toona ciliata*, compete with associated native plants for light, space, and nutrients. In addition, predation of associated native plants by rats, slugs and the Chinese rose beetle threaten critical habitat

Environmental Baseline of the Critical Habitat

Status of the Critical Habitat in the Action Area A total of 34 ha (83 ac) of *Bonamia menziesii* critical habitat, accounting for approximately two percent of range-wide critical habitat for this species, and five percent of all of critical habitat designated for this species on Oahu, occurs within the two portions of the Makua action area (Figure 12). Four percent (28 ha (69 ac)) of all *B. menziesii* critical habitat designated on the island of Oahu is located in two units located entirely within the training portion of the Makua action area and approximately one percent (6 ha (14 ac)), of the 94-ha (232-ac) critical habitat Unit C is located in the proposed Puulu to Alaiheihe fuelbreak portion of the action area. Originally land was proposed as critical habitat for *E. haeleleana* on the Makua Military Reservation; however, pursuant to 3(5)(A) and 4(b)(2) of the Act, proposed critical habitat was not designated on Army lands (68 FR 36001). Unit B is a residual portion of that larger piece of proposed critical habitat.

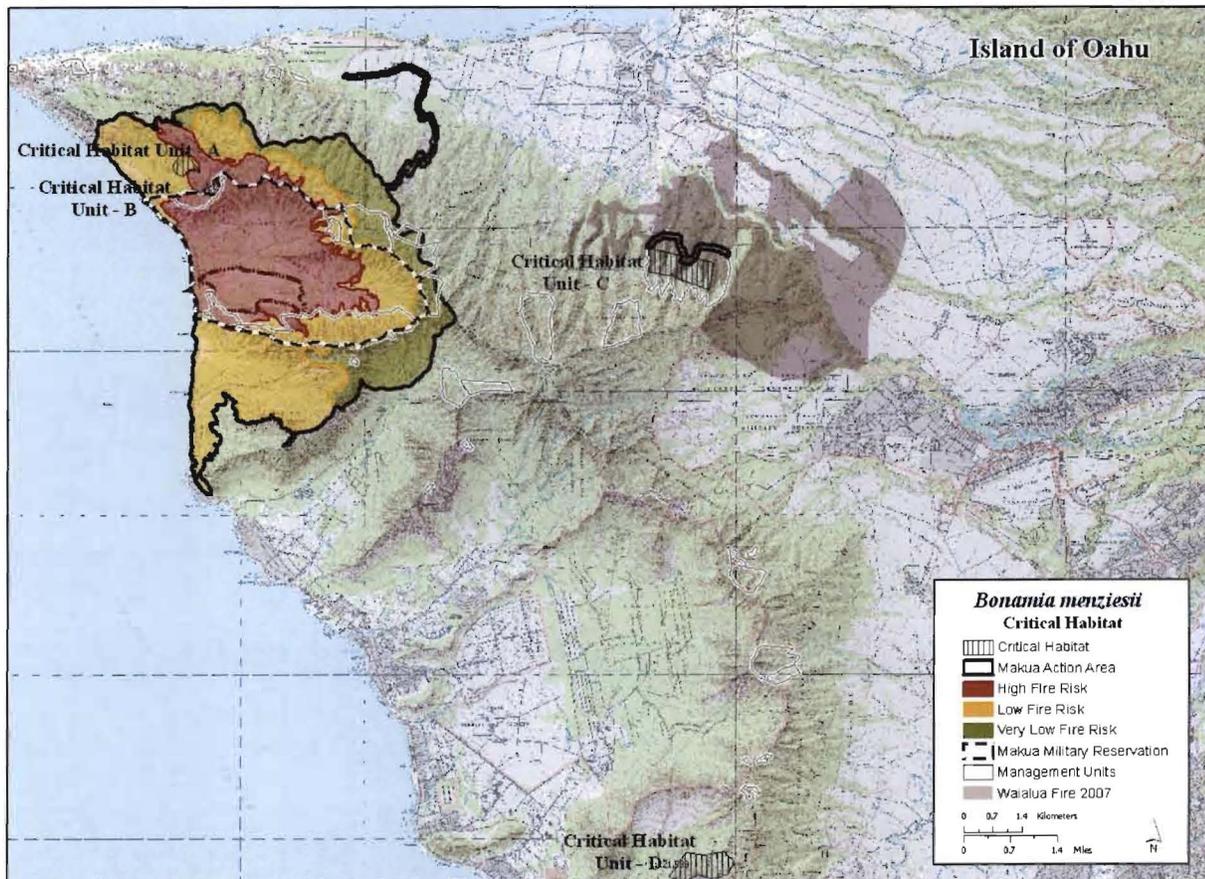


Figure 12. *Bonamia menziesii* critical habitat in the Waianae Mountains.

Within the training portion of the action area, the eight-ha (20-ac) critical habitat unit B, accounting for one percent of *Bonamia menziesii* critical habitat on Oahu, occurs entirely within the high fire risk zone and a 20-ha (49-ac) unit is located in the high and low fire risk zone. These critical habitat units together provide habitat for the conservation of one population of at least 300 mature, reproducing individuals of *B. menziesii*. It is estimated that only one-quarter of the critical habitat within the Makua action area for this species has a native plant component of more than 75 percent (U.S. Army Garrison 1999a and Kawelo, 2004).

Ninety seven percent of the 6 ha (14 ac) of *Bonamia menziesii* critical habitat located in the fuelbreak portion of the action area was classified as alien vegetation (Hawaii Gap Analysis Program, 2005), all of it is currently managed as a pasture for goats (Cherry 2008) and all of it was burned in the 2007 Waialua Fire (see Figure 12).

Threats to the Critical Habitat in the Action Area Threats to *Bonamia menziesii* critical habitat in the training portion of the action area include fires ignited by the public and military training and invasion of alien vegetation are described in the Makua Biological Opinion. In summary and to update the Makua Biological Opinion's description of threats, in 2006, the Yokohama Fire, ignited on State land adjacent to Makua, burned 96 percent of *B. menziesii* critical habitat unit A (U.S. Army Garrison 2006f). The edges of unit A appear to have been previously burned in fires attributed to the military in 1970 and 1984 (Costales 2006). Approximately 33 percent of the 7-ha (18-ac) critical habitat unit B was impacted by the 2003 escaped prescribed burn (Enriques 2003). Threats to *B. menziesii* critical habitat Unit C, in the Puulu to Alaiheihe fuelbreak portion of the action area are the same as those in the training portion of the action area except the fuelbreak area is not threatened by fires associated with military training at Makua. Approximately 55 percent of the 94-ha (232-ac) *B. menziesii* critical habitat unit C was burned in the Waialua Fire (see Figure 12). Unit C was designated to provide habitat for one population of *B. menziesii*.

Ongoing Conservation Actions for the Critical Habitat Within the Action Area Conservation actions that include Army fencing and control of non-native plants and rats, described in the Makua Biological Opinion, remain valid. Other than interagency efforts to protect this area from fire, no ongoing conservation actions benefit *B. menziesii* critical habitat in the proposed Puulu to Alaiheihe fuelbreak portion of the action area.

Status of the Critical Habitat – *Eugenia koolauensis*

Critical Habitat Description

Critical habitat was designated for *Eugenia koolauensis* in three units totaling 385 ha (952 ac) on Oahu and one unit of 471 ha (1,164 ac) on Molokai. Critical habitat unit A on Oahu, at 114 ha (280 ac), is located on private land. Critical habitat units B and C on Oahu (149 ha (369 ac) and 122 ha (303 ac) respectively), are both located on State and private land. Critical habitat unit A on Molokai is located on private land (68 FR 35949-35998 and 68 FR 12982-13141). Within the critical habitat units on Oahu, the primary constituent elements include, but are not limited to, gentle to steep slopes or ridges in mesic or dry forests dominated by *Metrosideros polymorpha* or *Diospyros* sp. and containing one or more of the following associated native plant species: *Alyxia oliviformis*, *Bobea elatior*, *Carex meyenii*, *Dicranopteris linearis*,

Leptecophylla tameiameia, *Myrsine lessertiana*, *Nestegis sandwicensis*, *Pleomele halapepe*, *Pouteria sandwicensis*, *Psydrax odorata*, or *Rauvolfia sandwicensis*; at elevations between 57 to 437 m (187 to 1,433 ft) (Service 2003a). On Molokai, *Eugenia koolauensis* was found in rocky gulches or on gentle slopes with deep soil between 475 and 992 m (1,558 and 3,254 ft) in elevation. Associated native plant species include *Diospyros sandwicensis*, *Erythrina sandwicensis* (wiliwili), *Nesoluma polynesianum*, *Nestegis sandwicensis*, *Nototrichium sandwicensis*, *Reynoldsia sandwicensis*, or *Xylosma hawaiiense* (68 FR 35949-35998).

The major threats to *Eugenia koolauensis* critical habitat on Oahu are habitat degradation by feral pigs; competition with non-native plant species such as *Acacia confusa*, *Aleurites moluccana*, *Araucaria columnaris*, *Ardisia elliptica*, *Casuarina equisetifolia*, *Clidemia hirta*, *Cordyline fruticosa*, *Eucalyptus* sp., *Grevillea robusta*, *Hyptis pectinata*, *Lantana camara*, *Melia azedarach*, *Oplismenus hirtellus*, *Panicum maximum*, *Passiflora laurifolia*, *Passiflora suberosa*, *Psidium cattleianum*, *Schinus terebinthifolius*, *Syzygium cumini*, and *Toona ciliata*. Approximately 80 percent (90 ha (223 ac)) of the 113-ha (280-ac) *E. koolauensis* critical habitat unit A (27 percent of all critical habitat designated for this taxa) was burned in the 2007 Waialua Fire (see Figure 13).

Environmental Baseline of the Critical Habitat

Status of the Critical Habitat in the Action Area Approximately 14 percent (16 ha (40 ac)) of the 113 ha (280 ac) of *Eugenia koolauensis* critical habitat unit A occurs within the Puulu to Alaiheihē Fuelbreak portion of the action area (Figure 13). No *E. koolauensis* critical habitat occurs within the training portion of the Makua action area.

Threats to the Critical Habitat in the Action Area Threats to *Eugenia koolauensis* critical habitat in the Puulu to Alaiheihē fuelbreak portion of the action area include fire, grazing, trampling, disturbance by feral pigs, and competition from invasive exotic plants including guinea grass. Approximately 80 percent (90 ha (223 ac)) of *E. koolauensis* critical habitat unit A was burned in the Waialua Fire (see Figure 13).

Ongoing Conservation Actions for the Critical Habitat Within the Action Area Other than interagency fire protection efforts, no ongoing conservation actions benefit *Eugenia koolauensis* critical habitat in the Puulu to Alaiheihē fuelbreak portion of the action area.

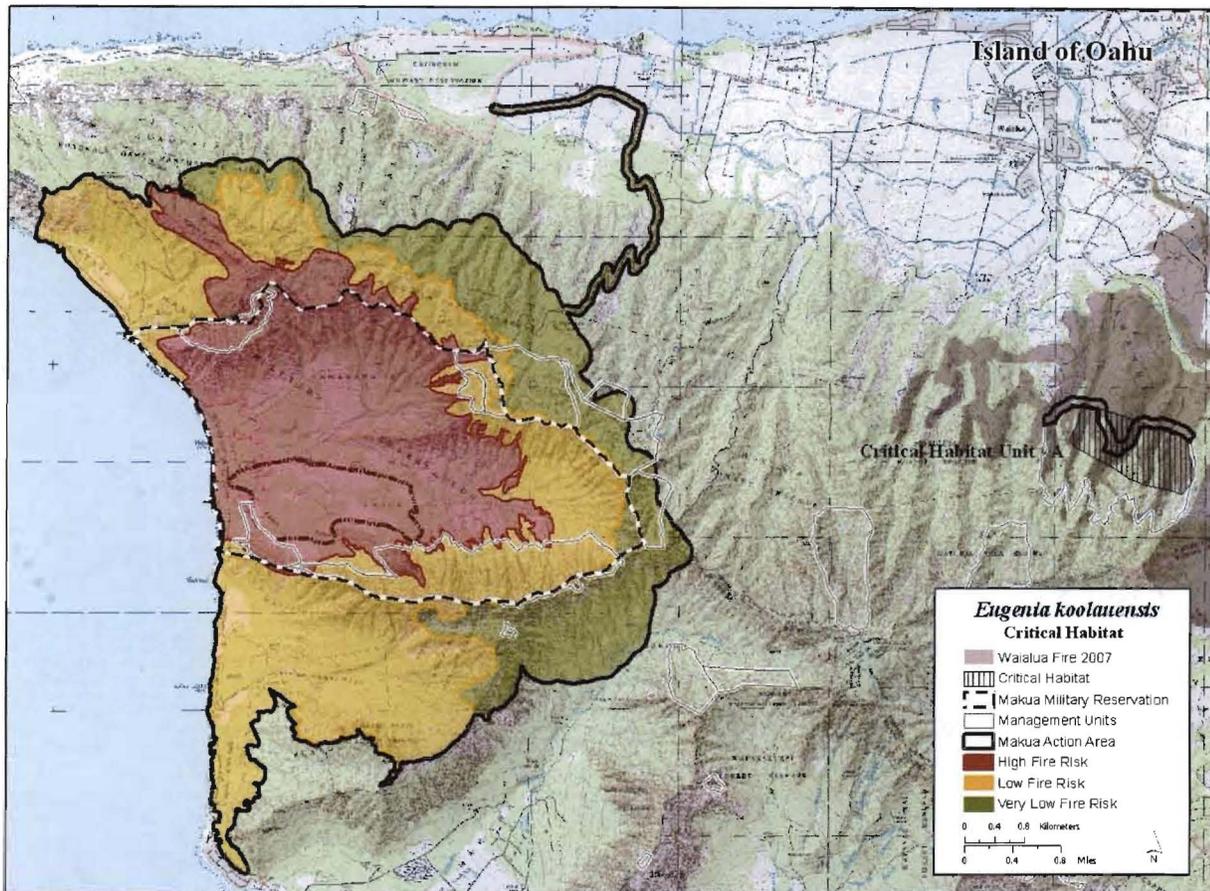


Figure 13. *Eugenia koolauensis* occurring in the vicinity of the Makua action area.

Status of the Critical Habitat – *Euphorbia haeleeleana*

A total of 1,020 ha (2,522 ac) in five separate units has been designated for *Euphorbia haeleeleana*. Three units on Kauai total 659 ha (1,630 ac) and two on Oahu total 361 ha (892 ac). Each unit on Kauai was designated to provide habitat for two populations. On Oahu unit B is 357 ha (881 ac) and was designated to provide habitat for three populations with a minimum of 300 mature, successfully reproducing *E. haeleeleana* individuals (68 FR 9116; 68 FR 35950). Originally land was proposed as critical habitat for *E. haeleeleana* on the Makua Military Reservation; however, pursuant to 3(5)(A) and 4(b)(2) of the Act, proposed critical habitat was not designated on Army lands (68 FR 36001). Unit A is a residual portion of that larger piece of proposed critical habitat and represents approximately 4 ha (10 ac). The primary constituent elements of the critical habitat include dry forest dominated by *Diospyros* sp. and containing one or more of the following associated native plant species: *Dodonaea viscosa*, *Erythrina sandwicensis*, *Pleomele* sp., *Psydrax odorata*, *Reynoldsia sandwicensis*, or *Sapindus oahuensis*; and elevations between 156 and 526 m (512 and 1,725 ft). The plant community, associated species, and elevations are indicative of important features such as soil moisture, nutrient cycling and availability, temperature ranges, and light levels, which are primary constituent elements of the habitat required for the conservation of the species (68 FR 35950). The Makua Biological Opinion's characterization of threats to *E. haeleeleana* critical habitat remains valid.

Environmental Baseline of the Critical Habitat

Status of the Critical Habitat in the Action Area *Euphorbia haeleleana* critical habitat unit A 4 ha (10 ac) is located entirely within the high fire risk zone of the training action area (Figure 14) and approximately 75 percent of the unit is vegetated by native plants (Kawelo 2004; Service 2004a). Approximately six percent of the 357-ha (881-ac) critical habitat unit B is within the Puulu to Alaiheihe fuelbreak portion of the action area. **Less than one percent of the *E. haeleleana* critical habitat located in the fuelbreak portion of the action area was classified as Mixed Native-Alien Forest and the rest is mapped as alien vegetation in 2005 (Hawaii Gap Analysis Program) and approximately 90 percent of it was burned in the Waialua Fire (see Figure 14). The whole fuelbreak area is currently managed as pasture for goats (Cherry 2008).**

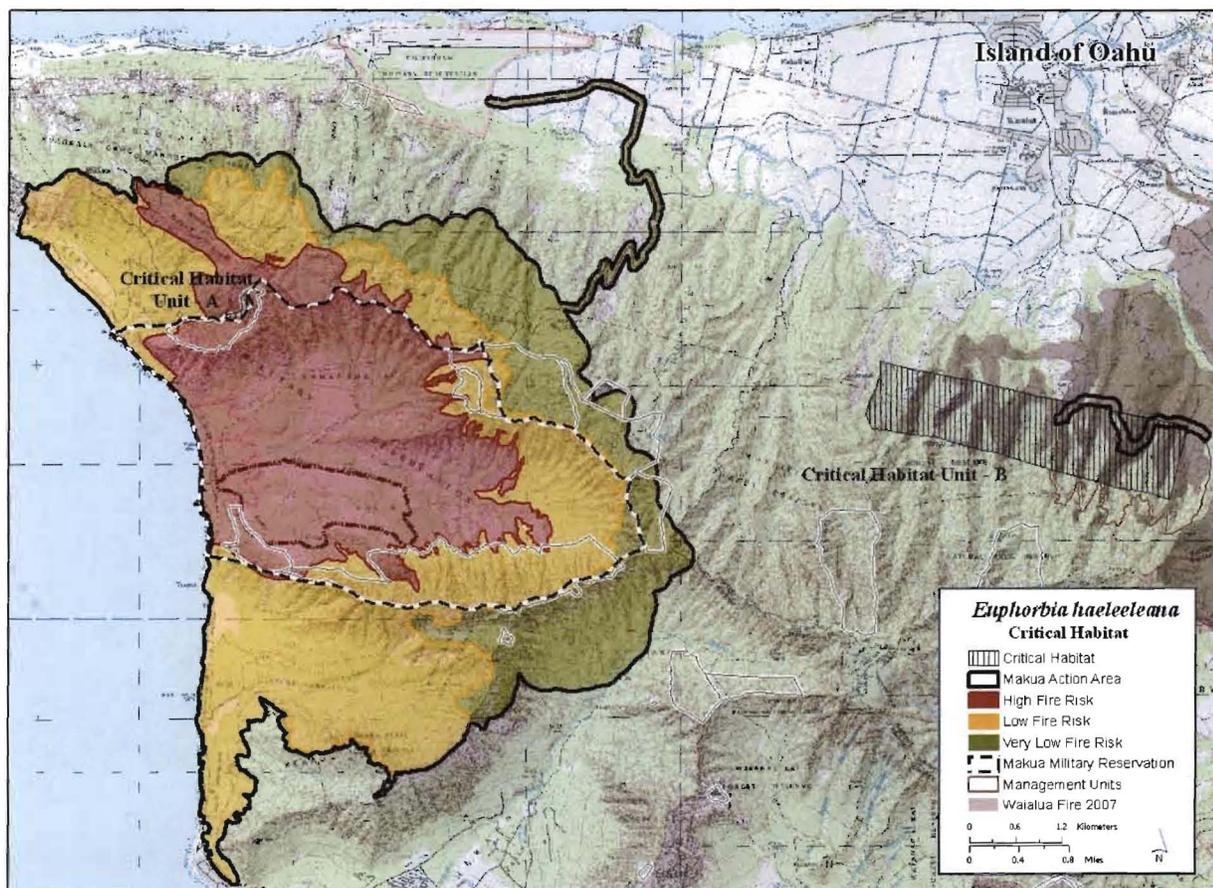


Figure 14. *Euphorbia haeleleana* critical habitat in the Makua Action Area vicinity.

Threats to the Critical Habitat in the Action Area Threats to *Euphorbia haeleleana* critical habitat in the training portion of the action area include fires ignited by the public and military training and invasion of alien vegetation are described in the Makua Biological Opinion. Approximately half of unit A was burned in the 1995 and 2003 escaped prescribed burns at Makua (Enriques 2003) and the entire critical habitat unit is within the areas mapped as burned by the 1970 and 1984 military fires (Costales 2006). **Within the fuelbreak portion of the action area, approximately 53 percent of critical habitat unit B is within the mapped perimeter of the 2007 Waialua Fire (Keir and Cannarella 2007) and more than half the unit is on private land currently used to raise cattle and goats (Cherry 2008).**